County of Los Alamos

1000 Central Avenue
Los Alamos, NM 87544

Agenda - Final

Board of Public Utilities

Jeff Johnson, Chair; Stephen McLin, Vice-chair; Andrew Fraser,
Paul Frederickson and Kathleen Taylor, Members
Tim Glasco, Ex Officio Member
Harry Burgess, Ex Officio Member
Susan O'Leary, Council Liaison

Wednesday, February 15, 2017 **5:30 PM** **1000 Central Avenue**
Council Chambers

REGULAR SESSION

Complete Board of Public Utilities agenda packets, past agendas, videos, legislation and minutes can be found online at http://losalamos.legistar.com/Calenar.aspx. Learn more about the Board of Public Utilities at http://www.losalamosnm.us/gov/bcc/utilitiesboard.

PUBLIC COMMENTS:

Please submit written comments to the Board at bpu@lacnm.us. Oral public comment is accepted during the two periods identified on the agenda and after initial board discussion on a business item, prior to accepting a main motion on an item. Oral comments should be limited to four minutes per person. Requests to make comments exceeding four minutes should be submitted to the Board in writing prior to the meeting. Individuals representing or making a combined statement for a large group may be allowed additional time at the discretion of the Board. Those making comments are encouraged to submit them in writing either during or after the meeting to be included in the minutes as attachments. Otherwise, oral public comments will be summarized in the minutes to give a brief succinct account of the overall substance of the person's comments.

1. CALL TO ORDER

2. PUBLIC COMMENT

This section of the agenda is reserved for comments from the public on Consent Agenda items or items that are not otherwise included in this agenda.

3. APPROVAL OF AGENDA

4. BOARD BUSINESS

4.A. Chair's Report

4.B. Board Member Reports

4.C. Utilities Manager's Report

4.D. County Manager's Report

4.E. Council Liaison's Report

4.F. Environmental Sustainability Board Liaison's Report

4.G. General Board Business

4.G.1 8985-17 Quarterly Conservation Program Update

Presenters: James Alarid, Deputy Utilities Manager - Engineering

PG. 1 - 41

4.G.2 9083-17 Review of Department of Public Utilities Quarterly Report

Presenters: Tim Glasco, Utilities Manager

PG. 42

4.H. Approval of Board Expenses

4.I. Preview of Upcoming Agenda Items

4.I.1 9082-17 Tickler File for the Next 3 Months

Presenters: Board of Public Utilities

PG. 43 - 45

5. PUBLIC HEARING(S)

6. CONSENT AGENDA

The following items are presented for Board approval under a single motion unless any item is withdrawn by a member for further Board consideration in the "Business" section of the agenda.

CONSENT MOTION -

I move that the Board of Public Utilities approve the items on the Consent Agenda as presented and that the motions in the staff reports be included in the minutes for the record.
OR
I move that the Board of Public Utilities approve the items on the Consent Agenda as amended and that the motions contained in the staff reports, be included in the minutes for the record.

6.A 9081-17 Approval of Board of Public Utilities Meeting Minutes

Presenters: Department of Public Utilities

PG. 46 - 60

7. BUSINESS

7.A 8978-17 Approval and Ratification of Quote No. 40429 for $106,131.06 from Milsoft Utility Solutions for Software Licensing, GIS Database Conversion and Server Setup, and Training, Configuration; and for Ongoing Annual Software Maintenance and Support Services

Presenters: Rafael De LaTorre, Deputy Utilities Manager - Electric Distribution

PG. 61 - 69

7.B 9092-17 Approval of the Long-Range Water Supply Plan

Presenters: James Alarid, Deputy Utilities Manager - Engineering

PG. 70 - 183

7.C 9091-17 Discussion of Wastewater Fund Status, Rate and Future Capital Needs

Presenters: Tim Glasco, Utilities Manager

PG. 184 - 192

7.D 9093-17 Department of Public Utilities FY2018 Budget Presentation

Presenters: Bob Westervelt, Deputy Utilities Manager - Finance/Admin

PG. 193 - 245

8. STATUS REPORTS

8.A 9084-17 Status Reports

Presenters: Board of Public Utilities

PG. 246 - 259

9. PUBLIC COMMENT

This section of the agenda is reserved for comments from the public on any items.

10. ADJOURNMENT

If you are an individual with a disability who is in need of a reader, amplifier, qualified sign language interpreter, or any other form of auxiliary aid or service to attend or participate in the hearing or meeting, please contact the County Human Resources Division at 662-8040 at least one week prior to the meeting or as soon as possible. Public documents, including the agenda and minutes can be provided in various accessible formats. Please contact the personnel in the Department of Public Utilities (505) 662-8132 if a summary or other type of accessible format is needed.

Los Alamos, NM 87544
www.losalamosnm.us

County of Los Alamos

Staff Report

February 15, 2017

Agenda No.:	4.G.1
Index (Council Goals):	BCC - N/A
Presenters:	James Alarid, Deputy Utilities Manager - Engineering
Legislative File:	**8985-17**

Title
Quarterly Conservation Program Update

Recommended Action
None

Staff Recommendation
None

Body
Presentation of the Pajarito Environmental Education Center 2016 Calendar Year Report on conservation achievements for the Department of Public Utilities.

Alternatives
N/A

Fiscal and Staff Impact
None

Attachments
A - 2016 Calendar Year Report

Los Alamos County Department of Public Utilities
PEEC Service Agreement AGR16-033

2016 Calendar Year Report
January 23, 2016

Prepared by Siobhan Niklasson, Education Programs Director
Pajarito Environmental Education Center
2600 Canyon Road
(505) 662-0460
educator@peecnature.org

LOS ALAMOS
Department of Public Utilities
Electric, Gas, Water, and Wastewater Services

PEEC
Pajarito Environmental
Education Center

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Program Summary

In February 2016, Pajarito Environmental Education Center ("PEEC") entered into a contractual agreement with the Los Alamos County Department of Public Utilities ("DPU") to provide educational services to DPU customers about water and energy conservation in Los Alamos County.

This contract continues the work started under a previous contract between DPU and PEEC, carried out between 2012 and 2015.

The period covered by this report is calendar year 2016, starting in February, when the contract went into effect. During this time, PEEC engaged in outreach efforts through Los Alamos Public Schools ("LAPS") and at public venues.

This report contains a summary of outreach efforts and results, budget summaries for 2016, and overviews of each of the task orders, including a brief summary of work completed and plans for continuation of each project. A summary of curricula is provided. Finally, the report includes a list of teacher contacts, publicity materials and teacher evaluations.

Complete curricula, outfitted trunks, activities, giveaways and other materials are stored at the Los Alamos Nature Center and may be viewed there. If you would like to observe a lesson, please contact Siobhan Niklasson at educator@pajaritoeec.org.

Cover photo: Los Alamos 4th graders learn about groundwater at the 2016 Los Alamos Water Festival. Photo: Vinton Miller

Year-at-a-Glance

2016 Outreach Summary

• ***1995 student contacts*** *made with energy and water conservation lessons during school hours*

• ***268 4th graders*** *took part in interactive demos about water and the annual Los Alamos Water Festival*

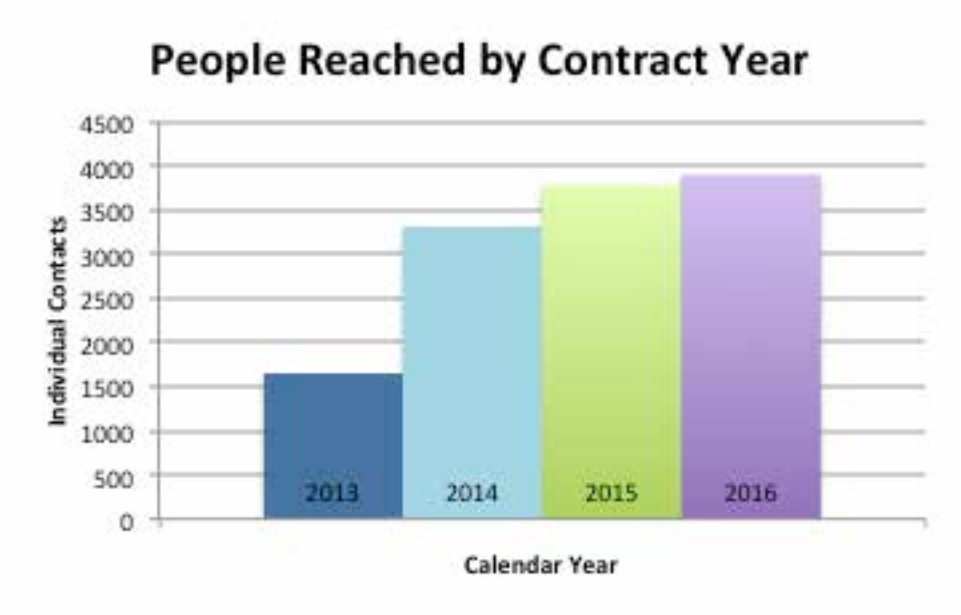
• ***over 1200 people*** *participated in hands-on demonstrations of Los Alamos County electricity sources at Discover E, PEEC's Earth Day event, and the Los Alamos Science Fest*

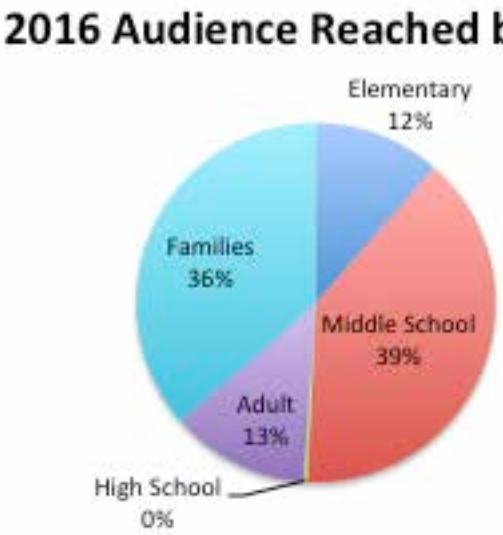
• ***390 people*** *learned about waterwise gardening at ChamberFest and the Master Gardener Fair*

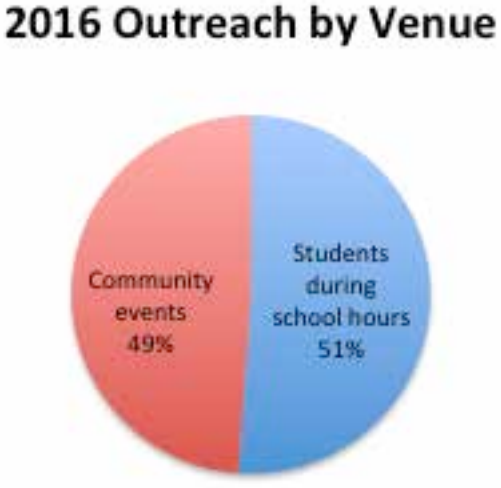
• ***220 people*** *checked out practical home efficiency solutions at the Home Efficiency Expo*

• ***81 people*** *toured energy efficient homes in the county*

Above: Students at Piñon School spend a day in the life of a water droplet during a water cycle game.


People Reached by Contract Year
Individual Contacts
4500
4000
3500
3000
2500
2000
1500
1000
500
0
2013
2014
2015
2016
Calendar Year


2016 Audience Reached by Age
Elementary
12%
Families
36%
Middle School
39%
Adult
13%
High School
0%


2016 Outreach by Venue
Community
events
49%
Students
during
school hours
51%

Left: The Department of Public Utilities' Clay Moseley and a 4th grade student demonstrate water pumping at the 2016 Los Alamos Water Festival. Photo by Vinton Miller.

Right: Students experiment with water power at the DPU booth at PEEC's Earth Day Festival.

Left: Kids get ready to race with solar power. Photo by Vinton Miller

Participant Feedback:

"Thanks for organizing this tour. It was worthwhile and gave me many ideas. The hosts were all welcoming and informative."

- Energy Efficient Home Tour visitor

"Hands-on, completely engaging! The kids were totally into the learning. Perfect length of time to stay engaged! Well done! The ladies are incredibly engaging. Kudos to Denise and others."

- 4th-grade teacher

"The solar house really got the kids thinking about their own homes."

- 6th-grade teacher

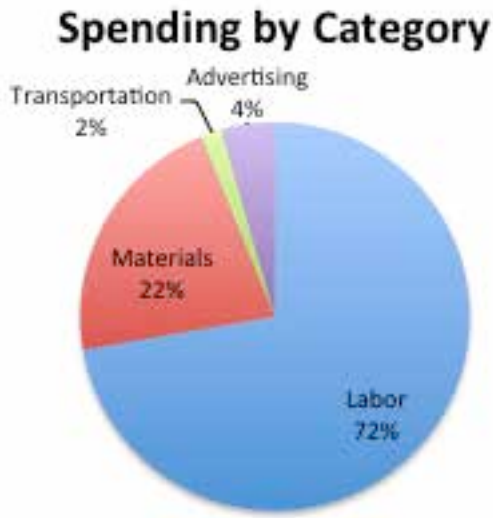
"Great lesson! All students were excited and engaged in their learning. We can hardly wait to participate in Siobhan's lesson on water."

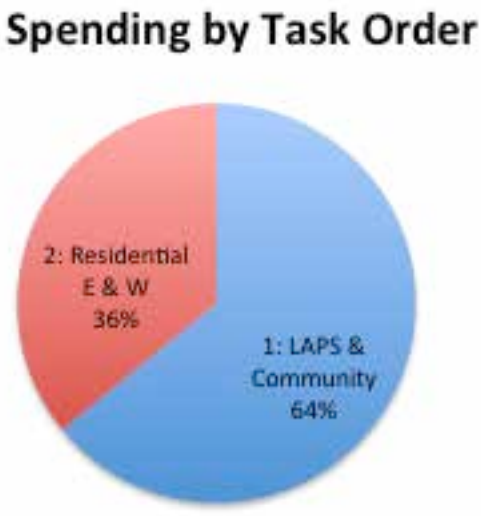
- 4th-grade teacher

Budget Summary

Budget Overview
February – December 2016

Task Order	Student Contacts	Hours	Category	Budgeted	Spent	Remaining
1: LAPS & Community	3415	386.25	Advertising Labor Materials Transportation Total	$500 $24,000 $11,500 $2,000 $38,000	$154 $15,450 $6,815 $602 $23,021	
2: Residential E & W	485	258	Advertising Labor Materials Transportation Total	$1,200 $7,200 $3,600 $0 $12,000	$1,422 $10,320 $957 $0 $12,699	
All Task Orders	3900	644.25	Total	$50,000	$35,720	$14,280





Invoice Summary
February – December 2016

Month	Student Contacts	Hours	Amount
February	965	121.00	$5,899.07
March	25	54.50	$3,720.47
April	803	89.25	$7,219.81
May	88	38.25	$2,090.02
June	390	13.25	$646.55
July	600	11.00	$888.28
August	0	37.00	$1,784.79
September	220	53.00	$2,508.92
October	220	74.50	$4,408.12
November	589	98.00	$4,027.77
December	0	54.50	$2,526.18
TOTAL	3900	644.25	$35,719.98

2016 Task Order Overviews

Los Alamos County Public Schools and Community Outreach

Task Order 1

Goal:
Educate Los Alamos students about energy and water and the importance of conservation through hands-on instruction in K-12 classrooms and at community events

Scope:
Modify and implement classroom curricula that include hands-on in-class activities and field trips that meet New Mexico State curriculum and Common Core standards. The instruction should focus on energy and water especially as they relate to Los Alamos County; understanding energy conservation; and/or other topics deemed appropriate by agreement between PEEC and DPU staff. A PEEC representative will present the curricula, on invitation from the classroom teachers, in Los Alamos schools. Organize a water festival for 4th-grade students including water-themed activities and giveaways. Bring energy and water themed exhibits to community events.

YEAR-END COMMENTS:

1) Accomplishments:
We improved upon some lessons and created other new lessons addressing energy and water conservation. Our 8th-grade energy unit continues to be one of our most-demanded programs, and middle school outreach constituted about three-quarters of our in-class student contacts. We hosted the second annual 4th grade water festival. The festival featured presenters from around the community, including Los Alamos County, Los Alamos National Laboratory, PEEC and Bandelier National Monument. We also created new materials for a traveling booth about Los Alamos County electrical sources, and brought this exhibit to several community events, including PEEC's Earth Day, Los Alamos ChamberFest, and Los Alamos ScienceFest. We hired a high school student intern to assist in the booth design.

2) Plans for future work:
In the coming year, we plan to completely revise our offerings for grades 3-6 and advertise these new programs to teachers. We also hope to increase our outreach to the high school through offerings to relevant courses and the eco club. We are also working on plans for an interactive exhibit for students about solar power.

Los Alamos/White Rock Residential Energy and Water Efficiency Outreach

Task Order 2

Goal:
Educate Los Alamos County residents and homeowners about energy and water conservation at home.

Scope:
Organize a home efficiency expo and home efficiency house tours to demonstrate energy and water efficient solutions to Los Alamos residents and homeowners. Create signage to be displayed at the Los Alamos Nature Center highlighting energy and water conserving features such as photovoltaics, water harvesting and waterwise gardening. Offer quarterly public program about energy and water conservation.

YEAR-END COMMENTS:

1) Accomplishments:
We organized our second annual home energy efficiency expo, and hosted our first ever energy efficiency home tour. In addition, we provided outreach through the Master Gardener Fair about water conservation in the garden and designed a sign to be displayed at the nature center about water conservation strategies for the garden. We are currently working on an exhibit for the nature center educating residents about our rooftop solar panels.

2) Plans for future work:
In the coming year, we are considering instituting an alternate-year schedule for the home efficiency expo and home efficiency tour (expo one year, tour the next), as we want the public's interest in these events to remain high. We also hope to complete design work and install the solar panel exhibit. Public programs, including a tour to the County solar array, and an event celebrating the unveiling of our waterwise gardening exhibit, are in the works.

Curriculum Overview

Lesson Summaries 2015 – 2016

Complete lesson plans are stored at PEEC.
Contact educator@peecnature.org to see them.

3rd – 5th grade water: What is an aquifer?

Many students have never thought about where their water comes from. In this lesson, students build an aquifer with gravel and water, come up with a plan to extract water from it, and practice harvesting water using a pump. They compare their model to the real aquifer underlying Los Alamos and the equipment the County uses to pump water. They learn about the energy it requires to pump our water and how saving water saves energy as well.

3rd – 6th grade energy: Passive solar investigation

Students learn about passive solar home design by participating in a simple experiment (younger grades) or by designing a "home" using insulated boxes, glass and different colors of paper to maximize solar gain (older grades). They use scientific practices, and experience how effective the sun can be as a heater. They discuss ways to control solar gain in a home to reduce the amount of heating and cooling required.

3rd – 6th grade energy: Energy transformations

Students observe a simple machine that transforms thermal energy to motion. They work together to come up with an explanation for how energy transforms from one kind to another. They discuss ways to conserve energy in the machine, and try their hand and designing their own energy-transforming machines.

7th grade: Water and carbon cycles

During a 4-day unit, students do experiments and play games to build on what they know about the water cycle and how it manifests in Los Alamos County. They also learn about the carbon cycle through hands-on activities and games. They discuss the importance of water and energy conservation under drought and long-term climate change conditions.

8th grade energy: Sources and transformations

During a 4-day unit, students explore energy sources and energy transformations through hands-on laboratory investigation. They distinguish between renewable and non-renewable energy sources, learn where their electricity comes from in Los Alamos County, and explore energy losses during transformations and discuss the efficiency of electricity production.

2015 – 2016 Teacher Contact List

(some teachers organize programming for others at their school)

Teacher	School	Email
Amy Gilbert	Aspen	a.gilbert@laschools.net
Andrea Determan	Barranca	a.determan@laschools.net
Kayti Herring	Barranca	k.herring@laschools.net
Svetlana Martin	Barranca	s.martin@laschools.net
Cynthia Richard	Chamisa	c.richard@laschools.net
Megan Lee	Chamisa	m.lee@laschools.net
Mitzi Mann	Chamisa	m.mann@laschools.net
Tammy Hinckley	Chamisa	ta.hinckley@laschools.net
David Parsons	Chamisa	d.parsons@laschools.net
Pamela Miller	District Office	p.miller@laschools.net
Barbara Musgrave	LAHS	b.musgrave@laschools.net
Whitney Pomeroy	LAHS	w.pomeroy@laschools.net
Jon Frost	LAHS	j.frost@laschools.net
Curtis Terrill	LAMS	c.terrill@laschools.net
Eva Abeyta	LAMS	e.abeyta@laschools.net
Sarah Szymanski-Blom	LAMS	s.blom@laschools.net
Carissa Pittman	Mountain	c.pittman@laschools.net
Kimberly Clayton	Mountain	k.clayton@laschools.net
Michele Altherr	Mountain	mi.altherr@laschools.net
Shanda Moore	Mountain	s.moore@laschools.net
Kati Steinberg	Piñon	k.steinberg@laschools.net
Kristen Martines	Piñon	k.martines@laschools.net
Sarah Hayes	Piñon	s.hayes@laschools.net
Whitney Muziani-Holland	Piñon	w.holland@laschools.net

Water Festival Information

2016 Los Alamos Water Festival

Sponsored by

Department of Public Utilities

COUNTY OF LOS ALAMOS NEW MEXICO

Additional thanks to:

Pajarito Environmental Education Center
University of New Mexico-Los Alamos
Bandelier National Monument
City of Santa Fe
Los Alamos National Laboratory
New Mexico State University
And our wonderful volunteers!

Water Festival Schedule

Date: April 8 & 15, 2016
Location: UNM-LA

8:30	Presenter Setup
9:15 – 9:30	Buses arrive at Sullivan Field
9:30 – 9:40	Introduction (Student Center)
9:45 – 10:10	Lesson 1 (all spaces)
10:15 – 10:40	Lesson 2 (all spaces)
10:40 – 10:55	Snack/recess break (outside)
11:00 – 11:25	Lesson 3 (all spaces)
11:30 – 11:55	Lesson 4 (all spaces)
12:00 – 12:40	Lunch (Mesa Field)
12:45 – 1:30	Closing project (all spaces)
1:30 – 1:45	Buses depart Sullivan Field
1:45 – 2:15	Clean up spaces

April 8 Lesson Schedule

Time →	**Lesson1 9:45**	**Lesson 2 10:15**	**Lesson 3 11:00**	**Lesson 4 11:30**	**Project 12:45**
Determan	606	Courtyard	517	Parking Lot	610
Lambson	Courtyard	517	Parking Lot	230	230
Lee	517	Parking Lot	230	608	608
Mann	Parking Lot	230	608	Kiva	202
Hayes	230	608	Kiva	203	203
Kress	608	Kiva	203	606	606
Siegel	Kiva	203	606	Courtyard	517
Homeschool	203	606	Courtyard	517	627

April 8 Presenter Classroom Schedule

Room Number	**Title**	**Presenter**
606 (Classroom)	Groundwater	LANL
Courtyard	Water Pumping	Department of Public Utilities
517 (Art room)	Water Testing	NMSU
Parking Lot	Wildland Fire	Bandelier
230 (Lecture hall)	Surface Tension	PEEC
608 (Classroom)	Wastewater Treatment	Department of Public Utilities
Kiva	Drop in a Bucket	City of Santa Fe
203 (Media room)	Aquatic Wildlife	PEEC

Community Presenters

Organization	Name	Contact Information	Presentation Title
City of Santa Fe	Caryn Grosse, Lisa Noriega	cychavez@santafenm.gov	Drop in a Bucket
Los Alamos National Lab	Emily Snyder, Michelle Bourret	esnyder@lanl.gov	Groundwater Model
PEEC	Jennifer Macke	jpmacke@comcast.net	Aquatic Wildlife
Bandelier National Monument Fire Management Program	Ryan Brenteson, Hanna Davis	ryan_brenteson@nps.gov	Wildland Fire
NMSU	Rossana Sallenave	rsallena@ad.nmsu.edu	Water Testing
Department of Public Utilities	Jennifer Baca	jennifer.baca@lacnm.us	Wastewater Treatment
PEEC	Sarah Gustafson	sarahgus@cybermesa.com	Surface Tension
Department of Public Utilities	Clay Moseley	clay.moseley@lacnm.us	Water Pumping

2016 Water Festival Logo Contest
"Water is Life"

The Los Alamos Department of Public Utilities is calling 4th grade artists!! Put your imagination to work by submitting an original drawing for the 2016 Water Festival!

The theme for the 2016 Water Festival is "Water is Life." Draw a picture representing this theme and what it means to you. Be sure to include the words "Water is Life."

The 2016 Water Festival Logo Contest is open to 4th grade artists in Los Alamos County. The winning design will be used as the official 2016 Water Festival logo and will be placed on event t-shirts, drawstring bags and other official event materials.

Participants will receive a thank-you gift from the Department of Public Utilities
Winner will receive a gift certificate to Village Arts

Logo Contest Guidelines:

1. All entries should be drawn in **thick, black ink on plain, unlined white paper.** The lines should be thick enough to reproduce properly on a t-shirt.
2. All entries should be no larger than **8.5 x11 inches** in size.
3. The words "**Water is Life"** should prominently appear somewhere on the design.
4. Drawings can be made on the back of this form. If another sheet of paper is used, the artist's name, school, address, phone number, parent/guardian name must be written *lightly (preferably in pencil) on the back of the entry.*
5. All artists must be enrolled in LAPS or homeschooled in 4th grade to be eligible.
6. The artwork must be the child's original artwork.

Entry Deadline: 4 PM, Sunday, March 20, 2016

Mail or Deliver Entries to:
Los Alamos Nature Center
ATTN: Siobhan Niklasson
2600 Canyon Road
Los Alamos, NM 87544

****IMPORTANT: Do not fold when mailing or delivering the design****
With questions or for more information, contact:
Siobhan Niklasson, educator@pajaritoeec.org or 505-662-0460

Artist Name: _____ School: _____

Address: _____ Phone #: _____

Parent/Guardian Name: (Print)_____ Sign:_____ Date: _____
By signing this form, I give permission for my child's artwork to be used by the Los Alamos County Department of Public Utilities and Pajarito Environmental Education Center in publicity materials

The Los Alamos Public Schools neither endorses nor sponsors the organization or activity promoted in this document. The distribution of this material is provided on an equal basis as a community service.

Energy Expo Information

Home Efficiency Expo

Date: September 24, 2016
Time: 10 AM – 1 PM
Location: UNM-LA Student Center

Exhibitors:

- Accent Southwest Windows & Doors
  - Chad Boetger, chadb@southwestwindows.com & Greg Noel, gregn@southwestwindows.com
- ECC Solar Energy Concepts Corporation
  - Kevin Murphy, kevin@eccsolar.com
- Los Alamos Dept. Public Utilities
  - James Alarid, james.alarid@lacnm.us
  - Julie Wiliams-Hill, julie.williams@lacnm.us
- Los Alamos County Environmental Services
  - Angelica Gurule, angelica.gurule@lacnm.us
- Los Alamos County / NM State University – Cooperative Extension (Service Family & Consumer Science/4-H Agent)
  - Contact: Helen Idzorek, hidzorek@ad.nmsu.edu
- The Finishing Touch
  - Cheryl (Owner)
    - Had to mention event in person to her. No email contact available.
- Pajarito Environmental Education Center
  - Siobhan Niklasson, educator@peecnature.org
- Positive Energy
  - Karen Paramanandam, Karen@positiveenergysolar.com

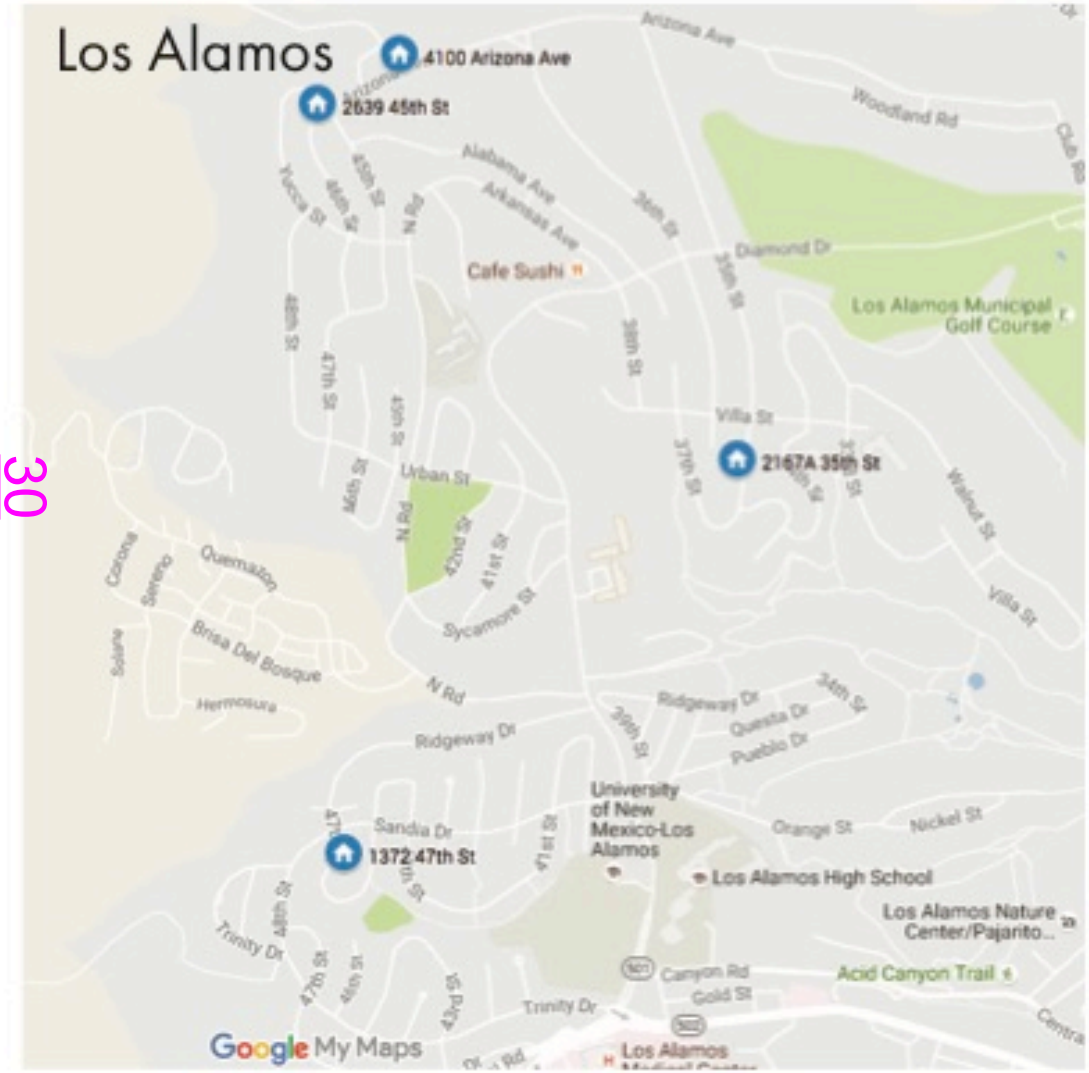
Cancellations

- Dreamstyle Remodeling
  - Taylor Williams, twilliams@dreamstyleremodeling.com
- Homewise, Inc.
  - Agiola Bejko, abejko@homewise.org
- Mechanical Controls Solutions (MCS)
  - Sharon Ray, 505-888-1616, sharonray7@hotmail.com
- Metzger's Do It Best
  - 505-662-3715

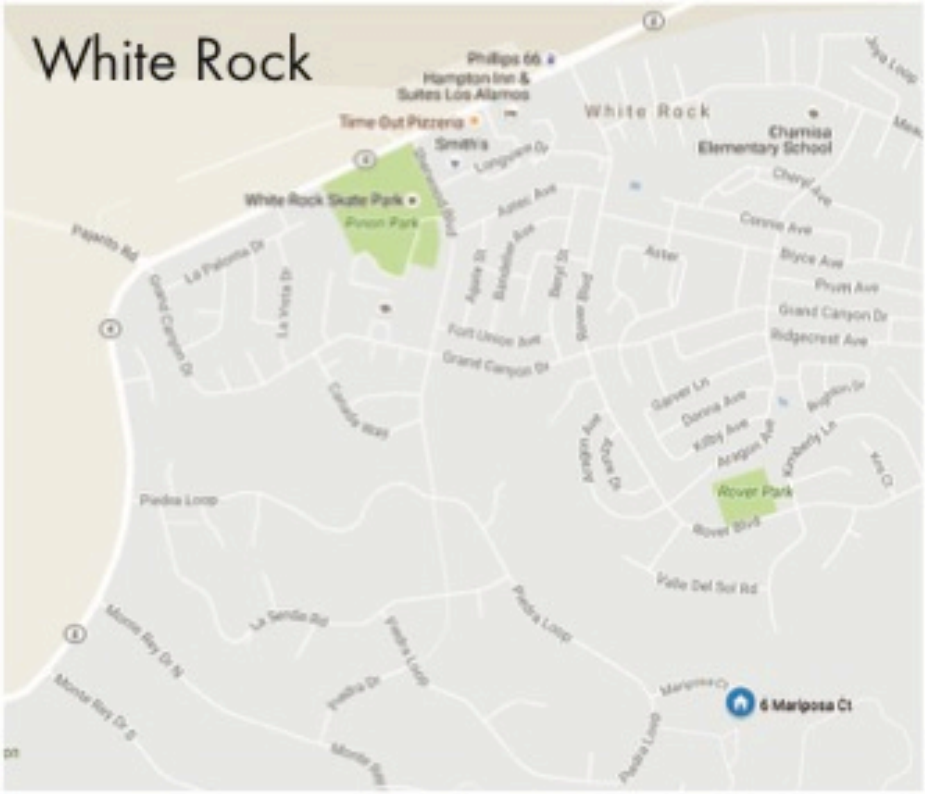
Home Tour Information

Energy Efficiency Home Tour Map

Saturday, October 15, 10 AM to 2 PM



Five houses. Four hours.
One great day of learning and inspiration.



30

PEEC
Pajarito Environmental Education Center

Details of the houses can be found on the back of this flyer.
Questions? Call PEEC at (505) 662-0460.

LOS ALAMOS
Department of Public Utilities
Electric, Gas, Water and Wastewater Services

Energy Efficiency Home Tour - The Houses

Gursky & Bolton Home
2639 45th St. Los Alamos, NM

This 5,000-square foot home, built in 2004 after the Cerro Grande Fire, uses less energy than their previous 2,200-square foot home. Look for their xeric but lush garden that provides both shading and privacy, and quality construction features that save on heating and cooling.

Fitzgibbon Home
4100 Arizona Ave. Los Alamos, NM

This striking home, built after the Cerro Grande fire, matches daring design with an array of features to save energy and maintain comfortable temperatures year-round. Look for passive solar features that provide optimal solar gain and shading, as well as innovative building materials that provide thermal mass and insulation.

Shankland Home
6 Mariposa Ct. White Rock, NM

This home, built during the energy crisis of the 1970s, uses passive and active solar features to allow the homeowners to avoid active heating during the winter. Look for many solar features including orientation, thermal mass, a trombe wall, Skylids, photovoltaics, and solar hot water. Check out the electric vehicle in the garage!

Frederickson Home
1372 47th St. Los Alamos, NM

The homeowners have spent many years updating a classic government home with modern energy-efficient features.
Look for a heat-collecting sunroom, efficient appliances, and a rooftop solar array that offsets the family's annual electrical load.

Meyer Home
2167A 35th St. Los Alamos, NM

This original 1949 government duplex has been updated with solar panels and a xeric garden.
Look for native plants, terracing and drought-tolerant cool-season grass that drop outdoor irrigation to almost nothing.

This tour was made possible thanks to support from these homeowners, Los Alamos County Department of Pubic Utilities, and Pajarito Enviornmental Education Center.

LOS ALAMOS

Department of Public Utilities
Electric, Gas, Water and Wastewater Services

PEEC
Pajarito Environmental Education Center

Energy Efficiency Home Tour

October 15, 2016

LOS ALAMOS

Department of Public Utilities
Electric, Gas, Water and Wastewater Services

PEEC
Pajarito Environmental Education Center

The Fitzgibbon Home

4100 Arizona Ave. Los Alamos, NM

Owners: Sally and Joe Fitzgibbon
Built after the Cerro Grande Fire

Energy-efficient Features:

- Oriented 10 degrees east of south for optimal solar heating in the morning, shade in the afternoon
- In summer, windows are almost never in direct sun because of overhangs and a vertical wall extending from the south side of the house
- Concrete floors both upstairs and downstairs for increased thermal mass
- House constructed of RASTRA blocks, made of recycled polystyrene and filled with reinforced concrete for even more thermal mass
- Insulation on both sides of RASTRA blocks
- Third-floor belvedere acts as a chimney, venting the entire house
- Double-paned windows with low E coating and insulated with argon gas
- On-demand hot water
- Efficient appliances
- LED lighting
- In-floor radiant heating
- Xeric garden design
- Rainwater harvesting: water runs off the roof and is collected in two cisterns (3400 gal.)
- Drip irrigation taps cisterns

Notes:

Energy Efficiency Home Tour

October 15, 2016

LOS ALAMOS

Department of Public Utilities
Electric, Gas, Water and Wastewater Services

PEEC
Pajarito Environmental Education Center

The Frederickson Home

1372 47th St. Los Alamos, NM

Owners: Paul and Rosmarie Frederickson
Built by the government in the late1940s

Energy-efficient Features:

- 1.5 inches of insulation added to original house on outside under stucco
- All additions insulated with fiberglass
- New energy efficient windows
- Skylight opens to circulate air within the home
- Honeycomb blinds, sealed in frame
- Sunroom facing east and south allows for solar gain
- Removable shade on upward-facing windows
- Stone floor in sunroom provides thermal mass
- Sunroom can be opened and closed to the rest of the house
- 5 separate heating zones
- Induction stove
- LED lighting throughout the house
- 70% efficient wood-burning fireplace insert with re-burner
- Electric on-demand hot water
- Fixed solar panels offset annual household use for both electric and hot water
- Huge garden allows the family to produce much of their food, including winter canning
- Automatic drip irrigation
- Grape arbor provides shade and grapes

Notes:

Energy Efficiency Home Tour

October 15, 2016

LOS ALAMOS

Department of Public Utilities
Electric, Gas, Water and Wastewater Services

PEEC
Pajarito Environmental Education Center

The Gursky & Bolton Home

2639 45th St. Los Alamos, NM

Owners: Kathy Gursky and Rick Bolton
Built in 2004 after the Cerro Grande Fire

Energy-efficient Features:

- Large east-facing windows allow for passive solar gain
- Double-paned windows
- 2x8 framing allows for thick layer of insulation
- Blown-in insulation
- Bedrooms in corners provide natural ventilation
- Ceiling fans circulate heat
- Honeycomb blinds
- Fluorescent and LED lighting throughout home
- Energy Star appliances
- Radiant heat on both floors
- Drip irrigation with timers
- Runoff from the roof drains through the gardens
- Deciduous trees to the east block sunlight in summer but not in winter
- Wisteria vines and retractable awning over patio
- Xeric garden design: oasis garden in back, other parts of the garden are less thirsty

Notes:

Energy Efficiency Home Tour

October 15, 2016

LOS ALAMOS

Department of Public Utilities
Electric, Gas, Water and Wastewater Services

PEEC
Pajarito Environmental Education Center

The Meyer Home

2167A 35th St. Los Alamos, NM

Owner: Coleen Meyer
Built in 1949

Energy-efficient Features:

- Efficient windows and doors
- Energy Star appliances
- Energy-efficient LED lighting
- Solar panels more than offset annual electricity use: could potentially add an electric vehicle
- Xeric garden requires very little additional watering
- Native plants are adapted to survive with natural rainfall
- Garden is terraced to retain water
- Most drought-tolerant plants are planted at the tops of hills, plants that need more water are planted downhill
- Lawn planted with drought-tolerant, cool-season dwarf fescue
- No automatic irrigation system because the garden is watered so little: 1-hour soak once a week 3 or 4 times a year, in the heat of June and July

Notes:

Energy Efficiency Home Tour

October 15, 2016

LOS ALAMOS

Department of Public Utilities
Electric, Gas, Water and Wastewater Services

PEEC
Pajarito Environmental Education Center

The Shankland Home

6 Mariposa Ct. Los Alamos, NM

Owners: Becky and Tom Shankland
Built during the energy crisis of the 1970s

Energy-efficient Features:

- House oriented 7 degrees east of south for optimal heating in the morning and shade in the evening
- Overhangs block direct sunlight in summer
- Adobe walls and brick floors provide thermal mass
- Wide roof joists allow for thick insulation
- Double-paned windows
- Thermal window treatments, especially on skylights
- Trombe wall
- Skylids: fluid-driven louvers in living room ceiling close automatically when temperature differential between outside and inside is high
- Hot air from near the ceiling is pumped into a rock bed under the floor
- Open fireplace has a vent to pull in cool air from outside
- Top-sealing chimney damper provides immediate updraft
- Grateless fireplace allows maximum radiation into the house
- Energy Star appliances
- Energy-efficient lighting

Continued on back...

Notes:

Energy Efficiency Home Tour

October 15, 2016

LOS ALAMOS
Department of Public Utilities
Electric, Gas, Water and Wastewater Services

PEEC
Pajarito Environmental Education Center

The Shankland Home

Energy-efficient Features, continued:

- Solar hot water system
- Solar panels more than offset annual electricity use, including an electric vehicle
- Electric vehicle can be charged from the home's solar panels

Notes:

Energy Sources Exhibit

Evaluations

PEEC Program Evaluations

Program:	DPU Energy Efficiency Home Tour
Date:	10/15/16
Number of people evaluated:	21

Questions	1	2	3	4	5
1. Overall satisfied	2	0	2	9	8
2: Knowledgeable	1	0	0	9	11
3: Participate again	2	0	0	11	8
4: Can use info learned	2	0	2	8	8

Program Average
4.00
4.38
4.10
4.00

Price	#
Too Low	1
Just Right	19
Too High	0

Age Range:	Visitor #
Under 12	0
13-18	0
19-35	1
35-50	7
50-65	5
65+	8

Non-Members: become member if…	
I knew how it helped PEEC	1
Knew more about membership	3
Benefits were valuable to me	3
More programs I'd attend	0
Other (Comments below)	

Zip Codes	#
87544	11
87547	9
87506	1

Home tour comments:

Only went to one house. Assume the lack of signage was to avoid attracting unregistered people but as a result the program seemed unwelcoming. Good idea, might need tuning.

Need better directions especially to houses in Western area. Maps are too small and not very legible. We live in WR, and don't know the ordered number system up there.

We only went to the house in White Rock, since we live here. We wish we had trekked up to Los Alamos to see the other houses. Thus, if this is offered again, we will definitely sign up and make the effort to get uptown. Thanks

Some houses only had "green" gardening techniques or JUST solar panels.. Not seeing that as overly valuable. But I do appreciate the effort some folks put out! Impressive.

Hosts were Very welcoming and enthusiastic about their efficiency upgraded homes! The tour was excellent! Thank you to all the hosts and planners!

Would have liked to see more homes in WR.

More information about contractors/suppliers of the energy saving features. It is one thing to look at the model number and manufacturer of efficient refrigerators, and another to know who would be able to supply automatic draperies, and louvers.

Very informative, will put information gained to use

Program was great...would like to see more homes on your.

Nice community activity!

I only got to 2 houses, but would have seen more if the hours were longer, if it hadn't been the same day as the artists studio tour, or if I hadn't gone down to Becky's, but I really wanted to see it because I have been curious having seen it from a distance many times.

Agenda No.:	4.G.2
Index (Council Goals):	BCC - N/A
Presenters:	Tim Glasco, Utilities Manager
Legislative File:	**9083-17**

Title

Review of Department of Public Utilities Quarterly Report

Recommended Action

None

Staff Recommendation

None

Body

The Board requested that the quarterly report be presented each quarter, with salient features explained.

Alternatives

Information only, no alternatives presented.

Fiscal and Staff Impact

No Staff or Fiscal impact.

Attachments

At the time of agenda publication, the report was not yet ready to be included in the packet. Hard-copies will be provided to the Board at the meeting.

Agenda No.:	4.I.1
Index (Council Goals):	BCC - N/A
Presenters:	Board of Public Utilities
Legislative File:	**9082-17**

Title

Tickler File for the Next 3 Months

Attachments

A - Tickler File for the Next 3 Months

County of Los Alamos

Tickler

Los Alamos, NM 87544
www.losalamosnm.us

Criteria: Agenda Begin Date: 3/1/2017, Agenda End Date: 5/31/2017, Matter Bodies: Board of Public Utiliti

File Number	Title	
Agenda Date: 03/15/2017		
9089-17	**Budget Item**	**06Consent**
	Approval of Budget Adjustment to the Fiscal Year 2017/2018 Department of Energy (DOE) - Los Alamos County (LAC) Resource Pool Budget	
	Department Name: DPU	**Length of Presentation:** N/A
	Drop Dead Date:	**Sponsors:** Bob Westervelt, Deputy Utilities Manager - Finance/Admin
8986-17	**Budget Item**	**07Business**
	Approval of Department of Public Utilities Budget for Fiscal Year 2018	
	Department Name: DPU	**Length of Presentation:** Apx 30 Min
	Drop Dead Date:	**Sponsors:** Bob Westervelt, Deputy Utilities Manager - Finance/Admin
9060-17	**Briefing/Report (Dept,BCC) - Action Requested**	**TBD**
	Approval of Western Area Power Administration (WAPA) Rocky Mountian Region (RMR) Services Agreement	
	Department Name: DPU	**Length of Presentation:**
	Drop Dead Date:	**Sponsors:** Steve Cummins, Deputy Utilities Manager - Power Supply
Agenda Date: 04/19/2017		
9094-17	**Briefing/Report (Dept, BCC) - No action requested**	**07Business**
	FER Implementation - Presentation and Discussion of the Draft Integrated Resource Plan	
	Department Name: DPU	**Length of Presentation:** Apx. 30 Min.
	Drop Dead Date:	**Sponsors:** Steve Cummins, Deputy Utilities Manager - Power Supply
8984-17	**Briefing/Report (Dept, BCC) - No action requested**	**07Business**
	Presentation of 2017 Department of Public Utilities Customer Service Survey Results	
	Department Name: DPU	**Length of Presentation:** Apx. 15 Min.
	Drop Dead Date:	**Sponsors:** Julie Williams-Hill, Public Relations Manager
8988-17	**Briefing/Report (Dept, BCC) - No action requested**	**Closed Session**
	TENTATIVE CLOSED SESSIONS - Board of Public Utilities Begins FY2017 Utilities Manager's Performance Evaluation and Amends Goals and Performance Plan for FY2018 (May require several special closed sessions and may begin prior to April 19th.)	

File Number	Title

Department Name: DPU
Length of Presentation: Unknown
Drop Dead Date:
Sponsors: Department of Public Utilities

Agenda Date: 05/17/2017

8703-16 **Briefing/Report (Dept,BCC) - Action Requested** **07Business**

FER Implementation - Approval of Power Sales Agreement for the Carbon Free Power Project (CFPP) & Phase II Budget

Department Name: DPU
Length of Presentation: Apx. 30 Min.
Drop Dead Date:
Sponsors: Steve Cummins, Deputy Utilities Manager - Power Supply

County of Los Alamos

Staff Report

February 15, 2017

Agenda No.:	6.A
Index (Council Goals):	
Presenters:	Department of Public Utilities
Legislative File:	**9081-17**

Title

Approval of Board of Public Utilities Meeting Minutes

Recommended Action

I move that the Board of Public Utilities approve the meeting minutes of January 10th, 2017 and January 18th, 2017 as presented.

Body

REQUESTED REVISIONS TO THE DRAFT MINUTES

Draft minutes are sent to members after each meeting for their review. Members may then send changes to be incorporated prior to final approval of the minutes at the next regular meeting. There were no changes.

Attachments

A - Draft BPU Special Session Minutes - January 10th, 2017
B - Draft BPU Regular Session Minutes - January 18th, 2017

DRAFT - These minutes have not yet been approved by the Board of Public Utilities.

County of Los Alamos

Minutes

Board of Public Utilities

1000 Central Avenue
Los Alamos, NM 87544

Jeff Johnson, Chair; Andrew Fraser, Vice-chair; Paul Frederickson Stephen McLin and Kathleen Taylor, Members
Tim Glasco, Ex Officio Member
Harry Burgess, Ex Officio Member
Susan O'Leary, Council Liaison

Tuesday, January 10, 2017 **9:30 AM** **1000 Central Avenue Council Chambers**

SPECIAL SESSION
NOTICE - MEETING TIME CHANGED
The starting time of this special meeting was changed from 11:00 a.m. to 9:30 a.m.

1. CALL TO ORDER

A special meeting of the Incorporated County of Los Alamos Board of Public Utilities was held on Tuesday, January 10, 2016 at 9:30 a.m. at 1000 Central Ave.,Council Chambers. Board Chair, Jeff Johnson, called the meeting to order at 9:34 a.m.

Present 6 - Chair Johnson, Vice-chair Fraser, Board Member Frederickson, Board Member McLin, Board Member Taylor and Board Member Glasco

Absent 1 - Board Member Burgess

2. PUBLIC COMMENT

Mr. Johnson opened the floor for public comment on items not otherwise included on the agenda. There were no comments.

3. APPROVAL OF AGENDA

****

Mr. Fraser moved that the agenda be approved as presented. The motion passed by the following vote:

****

Yes: 5 - Chair Johnson, Vice-chair Fraser, Board Member Frederickson, Board Member McLin and Board Member Taylor

4. BUSINESS

4.A. 8048-17 Complete 2016 Board of Public Utilities Annual Self-evaluation

Presenters: Andrew Fraser and Kathleen Taylor

The following is the substance of the item being considered.

The Board conducted its annual self-evaluation using the questionnaire provided by a subcommittee made up of two Board members (Mr. Fraser and Ms. Taylor). Rather than scoring, prioritizing and assigning action for every question, the Board opted to focus only on those questions where action or improvements might be necessary. The members were given an opportunity to identify those questions they wished to discuss in each section. If a question was not discussed, it was assumed that the members felt the Board was already doing well in those areas. The Board also considered suggested questions sent to them by Councilor Susan O'Leary.

Point of Order: Mr. McLin raised a point of order and expressed concern about the Board's consideration of Ms. O'Leary's suggested questions. He felt that while they were important, they had not been included in the original agenda packet and were perhaps not related specifically to the evaluation. Assistant County Attorney, Mr. Kevin Powers, gave the opinion that if the members did find the questions to be related to the evaluation, then they could be considered by the Board during the meeting, even though they were not in the published agenda packet. The majority of the Board judged through general consensus that Ms. O'Leary's question number one was not directly related to the evaluation and was not considered. Question number two was found to be related and was discussed. Question numbers three and four were found to be very similar to others in the questionnaire and the Board agreed they had already been addressed earlier in the discussion.

The following actions were identified for follow-up:

1) At the end of the evaluation, the Board identified only one area requiring possible action for improvement under question I.G. "Does the Board receive sufficient information to make good decisions?" After discussion and some suggestions for possible improvements, it was decided that this topic needed further consideration and would be brought up again by Mr. Johnson during his Chair's Report at the January 18th regular meeting.

5. PUBLIC COMMENT

Mr. Johnson opened the floor for public comment on any items. There were no comments.

6. ADJOURNMENT

The meeting adjourned at 11:33 a.m.

****

APPROVAL

_____

Board of Public Utilities Chair Name

_____

Board of Public Utilities Chair Signature

_____

Date Approved by the Board

County of Los Alamos
Minutes
Board of Public Utilities

1000 Central Avenue
Los Alamos, NM 87544

Jeff Johnson, Chair; Andrew Fraser, Vice-chair; Paul Frederickson Stephen McLin and Kathleen Taylor, Members
Tim Glasco, Ex Officio Member
Harry Burgess, Ex Officio Member
Susan O'Leary, Council Liaison

Wednesday, January 18, 2017 | **5:30 PM** | **1000 Central Avenue Council Chambers**

REGULAR SESSION

1. CALL TO ORDER

The regular meeting of the Incorporated County of Los Alamos Board of Public Utilities was held on Wednesday, January 18, 2017, at 5:30 p.m. at 1000 Central Ave., Council Chambers. Board Chair, Jeff Johnson, called the meeting to order at 5:30 p.m.

Present 7 - Chair Johnson, Vice-chair Fraser, Board Member Frederickson, Board Member McLin, Board Member Taylor, Board Member Glasco and Board Member Burgess

2. PUBLIC COMMENT

Mr. Johnson opened the floor for public comment on items on the Consent Agenda and for those not otherwise included on the agenda. There were no comments.

3. APPROVAL OF AGENDA

****

Mr. Fraser moved to amend the agenda to move the Environmental Sustainability Board presentation before public hearings. The motion passed by the following vote:

****

Yes: 5 - Chair Johnson, Vice-chair Fraser, Board Member Frederickson, Board Member McLin and Board Member Taylor

****

Mr. Fraser moved that the agenda be approved as amended. The motion passed by the following vote:

****

Yes: 5 - Chair Johnson, Vice-chair Fraser, Board Member Frederickson, Board Member McLin and Board Member Taylor

8.F. Environmental Sustainability Board Liaison's Report

Item 8.F. was moved out of the Board Business section and taken up prior to item 4. Public Hearings.

Ms. Sue Barnes provided a written report, which is included in the minutes as an attachment.

4. PUBLIC HEARING(S)

4.A. 8979-17 Public Hearing for Modification of Department of Public Utilities Rules & Regulations - Fee Schedule

Presenters: James Alarid

Deputy Utility Manager of Engineering, Mr. James Alarid, presented this item. The following is the substance of the item being considered.

Staff annually reviews the Department of Public Utilities Fee schedule and proposes changes if necessary.

The Board discussed this item and requested clarification where necessary.

Mr. Johnson opened the floor for public comments. Members of the public gave the following summarized comments:

1) Ms. Karen Paramanandam, resident and owner of Positive Energy Solar, 150 Central Park Square - Ms. Paramanandam asked that before the proposed net metering fees are implemented, a study be conducted to compare fees charged across the state. She stated she has verifiable proof showing that Los Alamos has the highest solar installation costs in the state.

****

Mr. Fraser moved the Board of Public Utilities approve the modifications to the Department of Public Utilities Rules and Regulations - Fee Schedule. The motion passed by the following vote:

****

Yes: 5 - Chair Johnson, Vice-chair Fraser, Board Member Frederickson, Board Member McLin and Board Member Taylor

5. CONSENT AGENDA

****

Mr. Fraser moved that the Board of Public Utilities approve the items on the Consent Agenda as presented and that the motions contained in the staff reports be included in the minutes for the record. The motion passed by the following vote:

****

Yes: 5 - Chair Johnson, Vice-chair Fraser, Board Member Frederickson, Board Member McLin and Board Member Taylor

5.A. 8983-17 Approval of Board of Public Utilities Meeting Minutes

Presenters: Board of Public Utilities

I move that the Board of Public Utilities approve the meeting minutes of December 22nd, 2016.

5.B. AGR0487-17 Approval of Services Agreement No. AGR17-01 with Diversified Data

Processing & Consulting Inc., dba DivDat, for a Total Contract value of $500,000.00, Plus Applicable New Mexico Gross Receipts Taxes

Presenters: Bob Westervelt

I move that the Board of Public Utilities approve agreement AGR17-01 with Diversified Data Processing and Consulting Inc, dba DivDat, for a total contract value of $500,000.00, plus applicable New Mexico Gross Receipts Taxes, as discussed in the staff report, and forward to Council for consideration with a recommendation for approval.

5.C. AGR0488-17 Approval of Services Agreement No. AGR17-12 with Crown Technical System, a California Company, in the amount of $1,403,455.43, plus Applicable Gross Receipts Tax, for the Purpose of the Los Alamos New Substation Switchgear Facility ("LASS").

Presenters: Rafael De LaTorre

I move that the Board of Public Utilities approve, in a form acceptable to the County Attorney, Services Agreement AGR17-12 with Crown Technical Systems, a California Company, in the amount of $1,403,455.43 and a contingency in the amount of $75,000.00, for a total of $1,478,455.43, plus applicable gross receipts tax, for the purpose of Los Alamos New Substation Switchgear Facility, "LASS", and forward to Council for approval.

6. BUSINESS

6.A. 8944-17 Presentation of Los Alamos Integrated Resource Plan Preliminary Portfolio Construction

Presenters: Steve Cummins

Deputy Utility Manager for Power Supply, Mr. Steve Cummins, presented this item. The following is the substance of the item being considered.

The Board of Public Utilities approved a contract to Pace Global in October 2016 for the development of an Integrated Resource Plan (IRP). The IRP is being developed to assist the County in the decision-making process on new or replacement generation resources. The IRP will compare the different generation resources available to meet load demands on a levelized cost of energy basis. The IRP will also address the adopted BPU policies with the primary goal of being a carbon neutral electricity provider by 2040. At the October meeting, the Board asked staff to share the preliminary generation portfolio construction prior to proceeding with the in-depth analysis. Mr. Cummins introduced Ms. Fengrong Li from Pace Global, who gave the presentation.

The Board discussed this item and requested clarification where necessary.

Mr. Johnson opened the floor for public comments. Members of the public gave the following summarized comments:

1) Ms. Sue Barnes, 3406 Ridgeway Drive - Ms. Barnes asked if the thermal energy resources in the portfolios were considered to be renewable and if not, how those fit in with the carbon neutral goal?

The following actions were identified for follow-up:

1) The Board directed staff through general consensus to consider two additional portfolios in the IRP:
- a. a portfolio with no carbon neutral goal constraints (least cost option)
- b. a portfolio using power purchase agreements vs. owning generation resources

Mr. Johnson called for a recess at 7:04 p.m. The meeting reconvened at 7:15 p.m.

Mr. Burgess left the meeting at 7:04 p.m.

6.B. **8971-17** Presentation on the Survey Results Regarding the Public Interest in a Community Solar Garden

Presenters: Steve Cummins

Deputy Utility Manager for Power Supply, Mr. Steve Cummins, presented this item. The following is the substance of the item being considered.

DPU released a short survey to the public for one month to gauge the public's interest in a community solar garden in Los Alamos. The concept of a solar garden is to provide customers the opportunity to invest in solar energy regardless of where they live in the community. The survey results showed there were at least 170 citizens interested in investing in solar energy totaling approximately 300 kW of capacity. Staff will share these results with potential bidders on the development of a community solar garden in Los Alamos County.

The Board discussed this item and requested clarification where necessary.

Mr. Johnson opened the floor for public comments. Members of the public gave the following summarized comments:

1) Ms. Karen Paramanandam, resident and owner of Positive Energy Solar, 150 Central Park Square - Ms. Paramanandam asked several questions.
a. - Would storage requirements of a solar array be added to the requirements of the request for proposals (RFP)?
b. - Who would benefit from the 20% tax credit given to those who install solar on their homes?
c. - Would businesses be able to buy into the solar garden?
d. - Is USDA funding being sought for building the solar garden?
e. - Could a person sell their share in the solar garden?
f. - When will the RFP be coming out?

6.C. **8980-17** Approval of Amended and Restated Southwest Reserve Sharing Group (SRSG) Participation Agreement

Presenters: Steve Cummins

Deputy Utility Manager for Power Supply, Mr. Steve Cummins, presented this item. The following is the substance of the item being considered.

The Southwest Reserve Sharing Group (SRSG) is a group of energy providers and Utilities who work together to meet certain requirements of the North American Electric Reliability Corporation (NERC). Specifically SRSG works together to meet contingency reserve, which is the required generation capacity held in reserve to cover an unexpected loss of generation or a transmission constraint. Los Alamos County joined the group in 1998 to

reduce contingency reserve requirements by sharing reserves with the other participants, resulting in a more efficient use of generation resources. SRSG administers the requirements of NERC compliance through the participation agreement. NERC modified the standard "Contingency Reserve for Recovery from a Balancing Contingency Event" known as Standard BAL-002-2 in September of 2015. The new standard changed the calculation for determining the amount of contingency reserves required. These changes required an amendment to the participation agreement. The participants of SRSG took this opportunity to not only change the calculation as required by NERC but to also update miscellaneous provisions of the agreement as recommended and agreed to by the participants.

The Board discussed this item and requested clarification where necessary.

****

Mr. McLin moved that the Board of Public Utilities approve the Amended and Restated Southwest Reserve Sharing Group (SRSG) Participation Agreement as presented and forward to Council with a recommendation for approval. The motion passed by the following vote:

****

Yes: 5 - Chair Johnson, Vice-chair Fraser, Board Member Frederickson, Board Member McLin and Board Member Taylor

7. STATUS REPORTS

7.A. 8992-17 Status Reports

Presenters: Department of Public Utilities

The following informational status reports were provided to the Board in the agenda packet:

1) Electric Reliability Update
2) Accounts Receivables Report

Mr. Glasco gave a brief verbal Safety Report update.

8. BOARD BUSINESS

8.A. Chair's Report

Mr. Johnson reported on the following items:

1) Mr. Johnson agreed at the recent Board self-evaluation special meeting to revisit the issue of long meetings and discuss what could possibly be done to streamline meetings. He made one recommendation. Staff reports for agenda packets are due by close of business the Monday the week prior to the meeting. Mr. McLin had stated previously that if packets were available to members earlier, that might help give them more time to read and digest the information. Mr. Johnson recommended it might help if the packets were published the Thursday prior to the meeting rather than Friday. After discussion, the Board decided that receiving the packet one day early might not actually be that beneficial and did not opt to change the agenda packet publication date. The ideas of having an additional monthly meeting or a brown bag luncheon type of meeting were also not acted upon.

8.B. Board Member Reports

Board members reported on the following items:

1) Mr. Frederickson - In the Mojave Desert near Las Vegas, there is a large area covered with mirrors with a solar tower. During the day it pumps phase change liquid into storage, and at night it uses that to produce electricity for Las Vegas. He would be interested in seeing an analysis of what it would take to recreate that sort of facility closer to Los Alamos and Albuquerque. The engineering feasibility analysis might include factors such as the climate and topography of the land here compared to that of the Mojave Desert. It might predict a fairly low-cost source of carbon neutral energy. If there was an engineer in DPU who would be interested in taking on that analysis, he felt it might produce a useful byproduct. After discussion, it was decided that if Mr. Frederickson wished to pursue this further as a possible future agenda item, he could meet with staff to get more information about how something like this might fit into the integrated resource plan currently in development.

8.C. Utilities Manager's Report

Mr. Glasco provided a written report, which is included in the minutes as an attachment.

8.D. County Manager's Report

Mr. Burgess was not present. No report was given.

8.E. Council Liaison's Report

Ms. O'Leary reported on the following items:

1) Council will hold its strategic planning session on Tuesday, January 24th at 6:00 p.m. at the Pajarito Cliffs Site large conference room in building one. Ms. O'Leary invited the Board to attend. She looks forward to reporting at the next Board meeting the Council's strategic priorities for the upcoming year.

8.G. General Board Business

8.G.1. 8974-17 Approval of Board of Public Utilities Meeting Calendar for 2017

Presenters: Jeff Johnson

In accordance with Incorporated County of Los Alamos Resolution No. 17-01 regarding Open Meetings, notice of regular meetings of all county boards, commissions and policymaking bodies shall be given ten days in advance of the meeting date. Each County board, commission and policymaking body may adopt a schedule of its regular meetings for the present calendar year or the balance thereof.

****

Mr. Fraser moved the Board of Public Utilities approve the proposed Board meeting calendar for 2017. The motion passed by the following vote:

****

Yes: 5 - Chair Johnson, Vice-chair Fraser, Board Member Frederickson, Board Member McLin and Board Member Taylor

8.G.2. 8977-17 Approval of Meeting Agenda Outline for 2017

Presenters: Jeff Johnson

Section 3.3 of the Board of Public Utilities Policies and Procedures Manual outlines an annual calendar of BPU activities. Annually at the January meeting, the Board is to review and approve the standard meeting agenda outline in section 3.4 of the PPM.

****

Mr. Fraser moved that the Board of Public Utilities approve the meeting agenda outline for 2017 as presented. The motion passed by the following vote:

****

Yes: 5 - Chair Johnson, Vice-chair Fraser, Board Member Frederickson, Board Member McLin and Board Member Taylor

8.G.3. 8973-17 Schedule and Selection of Members to Attend Boards & Commissions Luncheons for 2017

Presenters: Jeff Johnson

Regular County Boards & Commissions luncheons are scheduled to give these groups an opportunity to work with one another and with Council representatives. Only one representative from each board or commission is asked to attend.

Board members volunteered for the following dates:

Thursday, January 19 - Mr. Frederickson
Thursday, March 16 - Mr. Fraser
Thursday, May 18 - Mr. Johnson
Thursday, September 21 - Ms. Taylor
Thursday, November 16 - Mr. McLin

8.G.4. 8975-17 Appointment of Board Member to Audit Committee for 2017

Presenters: Jeff Johnson

Mr. McLin was appointed to serve on the Audit committee for 2017.

8.G.5 8976-17 Affirmation of the Incorporated County of Los Alamos Open Meetings Resolution No. 17-01

Presenters: Jeff Johnson

At the first County Council meeting of a new calendar year, Council passes an Open Meetings resolution that establishes minimum standards of reasonable notice to the public for all meetings of County boards, commissions and policy making bodies. After the resolution is passed, the Board of Public Utilities reviews the resolution at the next regularly scheduled meeting and affirms the standards, as per Section 2.12.C of the Board's Policies and Procedures Manual.

****

Ms. Taylor moved that the Board of Public Utilities affirm Incorporated County Of Los Alamos Resolution No. 17-01; A Resolution Establishing Minimum Standards Of Reasonable Notice To The Public For All Meetings Of The Council, The County Indigent Hospital And County Health Care Board And Of All County Boards, Commissions And Policymaking Bodies. The motion passed by the following vote:

****

Yes: 5 - Chair Johnson, Vice-chair Fraser, Board Member Frederickson, Board Member McLin and Board Member Taylor

8.G.6. 8970-17 Election of Board of Public Utilities Chair and Vice-chair for 2017

Presenters: Jeff Johnson

The Board of Public Utilities shall annually elect its chair and such officers as it desires from among its members. The election shall occur at a regular meeting in January of each year. (LAC Ordinance Sec. 40-41. Board of public utilities - Organization.)

ELECTION OF BOARD CHAIR:

****

Member Frederickson nominated Member Johnson.

Member McLin nominated Member Taylor.

After a roll call vote, Member Johnson was appointed Board Chair.
****

Member Johnson: 4 - Member Fraser, Member Frederickson, Member Taylor and Member Johnson

Member Taylor: 1 - Member McLin

ELECTION OF BOARD VICE-CHAIR:

****

Member Taylor nominated Member McLin.

Member McLin nominated Member Frederickson.

After a roll call vote, Member McLin was appointed Board Vice-chair.
****

Member McLin: 4 - Member Fraser, Member Frederickson, Member Taylor and Member Johnson

Member Frederickson: 1 - Member McLin

8.H. Approval of Board Expenses

There were no expenses.

8.I. Preview of Upcoming Agenda Items

8.I.1. 8991-17 Tickler File for the Next 3 Months

Presenters: Board of Public Utilities

No additional items were identified for the tickler.

9. PUBLIC COMMENT

There were no comments.

10. ADJOURNMENT

The meeting adjourned at 8:23 p.m.

****

APPROVAL

_____

Board of Public Utilities Chair Name

_____

Board of Public Utilities Chair Signature

_____

Date Approved by the Board

ATTACHMENT
OFFICER REPORTS
SUBMITTED AT THE MEETING

MANAGER'S REPORT

JANUARY 18, 2017

1. Public Meeting for Carbon Free Power Project on January 12, 2017. Approximately 60 people attended. A representative from UAMPS was there to explain the project details and the power sales agreement, while a NuScale representative answered technical questions about the small modular reactor.

2. Continuing to negotiate a settlement with JR Merritt. Goal is to have an agreement by the end of January.

3. The DPU employee focus group completed their meeting, HR is drafting the results.

4. Asset Management Team annual meeting held on 1/13.

5. New Employee Orientation held today. 5 new employees, 2 newly-elected councilors and 4 other county employees attended.

6. County is now deploying the new PRISM system. DPU employees are working with the team on integration of our needs into the work order system. One coordination session has been held, with four more still to happen.

7. CAFR was approved by Council so we are working on our Annual Financial Report, which is due 45 days after CAFR approval, or February 24.

Environmental Sustainability Board liaison report

Susan Barns, ESB Liaison 1/18/2017

Note: Due to meeting schedules in December, my liaison report of 12/22/2016 covered the Nov. and Dec. 2016 ESB meetings.

Agenda items for January ESB meeting (1/19/2017):

- Review of FY2017 Work Plan and Development of FY18 ESB Work Plan draft
- Discussion of food waste diversion
    - Food waste makes up 17% of LAC solid waste, and is the largest category of potentially preventable/divertible/recoverable waste not yet addressed by LAC services.
    - Americans waste ca. 40% of US-grown food! Reduction of waste has potential to conserve resources, reduce GHGs (esp. methane), and save residents money.
    - Reduction approaches include consumer education and recovery/composting of food scraps

Also upcoming:

- Update of LAC Environmental Sustainability Plan
- Rate increases for FY18
- Presentations by Friedman Recycling and Solutions (composting)

Agenda No.:	7.A
Index (Council Goals):	BCC - N/A
Presenters:	Rafael De LaTorre, Deputy Utilities Manager - Electric Distribution
Legislative File:	**8978-17**

Title
Approval and Ratification of Quote No. 40429 for $106,131.06 from Milsoft Utility Solutions for Software Licensing, GIS Database Conversion and Server Setup, and Training, Configuration; and for Ongoing Annual Software Maintenance and Support Services

Recommended Action
Motion 1: I move that the Board of Public Utilities approve and ratify the invoiced costs of Milsoft Utility Solutions, quote No. 40429, for $106,131.06 for work performed to date.

Motion 2: I further move that the Board of Public Utilities approve the procurement of ongoing but optional software maintenance and support services of the Milsoft software in the amount of $25,400.00.

Staff Recommendation
Staff recommends that the Board approve the two motions as presented as the software and services are beneficial and in the best interest of the County and Department of Public Utilities.

Body
During 2008, Staff considered and evaluated three (3) geographical information system (GIS) engineering modeling software systems that incorporates electrical distribution system mapping and modeling capabilities. Such programs are generally unique to the municipal electrical distribution (ED) field and few systems are capable of performing complex analysis of ED system calculations. The programs considered and evaluated by the Department of Public Utilities (DPU or Department) included Milsoft, Synergee, and Aspen. The Department found that the Milsoft platform met both the price and performance requirements of the County. Subsequently, under the small purchase provisions of the County's Procurement Code, licenses for the Milsoft Windmil engineering modeling, Contingency Analysis, and Light Table were purchased. The cost for the 3 licenses was approximately $35,000 with each having an annual, but optional, 20% maintenance, update, and support fee. The Board of Public Utilities (Board) approved the purchase at that time through the normal Departmental budgeting process.

Over the course of 4 months, visual data from the GIS electrical system was utilized to manually enter electrical modeling data into Windmil and create an electrical model of the County's entire electrical distribution (ED) system for electrical engineering analysis purposes. The over-current device (OCD) protection analysis of the software proved that all OCD settings needed to be reprogrammed and all overhead fuses needed to be replaced.

This project took one year to implement but improved the SAIDI by at least one hour.

Recognizing the value of this program and need to evaluate and plan for future system configurations to the County's ED system, the Department in 2010, budgeted an additional $120,000 for the purpose of advancing the software's abilities and functions. The expenditure was subsequently approved for the FY 2012 budget. The scope of the project was to include that Milsoft would convert the County's GIS ED grid system into the new software as well as train DPU staff on its uses, functions, and capabilities. Milsoft provided to the County a quote for the GIS data conversion of the system, manual system programing of the application, and finally onsite training and use of the in Milsoft Quote No. 40429 (attached).

Prior to this project, the electrical distribution system consisted of an generalized GIS system profile with little to no value from an electrical engineering modeling perspective and a separate 2009 electrical distribution model. Therefore, having to maintain two separate software systems, two databases (one good, one bad) into the future, the Department believed this was unworkable.

During April, 2011 the Milsoft purchase order was approved for payment in the in the amount of $114,000 during the FY 2012 fiscal period with $57,000.00 or 50% of the quote amount to be paid in September, 2011. The Milsoft quote also contemplated that the County would then pay Milsoft another 40% after Milsoft's entry of the data into the Windmill system and then installation of the complete database and Milsoft software on the County's server, with the remainder, 10% to be paid within 30 days after installation.

Over the next 3 years, there were numerous interactions between DPU GIS staff and Milsoft with respect to the ED system data conversion and entry into Windmil. There were numerous and contentious issues to work through including conversion of the existing DPU electrical ESRI GIS data into the Windmil Map application (i.e., development of the electrical distribution modeling component).

During the 4th year, DPU worked with the County's IT department to install a server, hardware, etc. to host a newly converted DPU electrical GIS database utilizing network licenses for Milsoft's Windmil Map. In essence this provided the County and DPU with a seamless electrical GIS database and electrical distribution modeling capability.

In September, 2016, Milsoft finished the configuration of the DPU hardware, installed two new Windmil Map network licenses, provided onsite training to DPU staff, and installed the desk top software. Subsequently, in October, 2016, Milsoft submitted for payment invoices totaling $33,681.06 which included the remaining $31,800 payment and actual travel costs of $1,881.06 for the onsite training. It was then that current County and DPU accounting processes flagged the invoices because current procedures now require that all project costs such as these (possibly exceeding $50,000 in total) be combined as one procurement item. Thus it was recommended that the DPU seek Board ratification and approval in lieu of continuing under individual signed Quote #40429.

Important to understand is that, the project is critical to the electrical department's success now and into the future. Having a singularly and seamless software transition from a useful and accurate GIS electrical database into an electrical distribution modeling component is

imperative for any electric utility. For example, having the ability in-house to electrically model the Los Alamos Sub-Station (LASS) Project, in advance of construction, to determine the best feeder configuration, Open and Closed electrical points, develop OCD settings, etc. can only be performed with electrical distribution engineering modeling software which this program is capable. Having to contract out the LASS engineering analysis to outside sources could easily exceed $30,000 to $40,000 for individual project review and analysis.

Alternatives

Two motions have been provided for Board consideration. As to the first, the Board could choose to not ratify Milsoft's prior invoices which in effect would be a directive to not pay the remaining invoiced amounts for work already performed. This however could subject the County to potential claims from Milsoft, and its subcontractors where applicable, for recovery of their actual costs and expenditures. Milsoft has rendered products and services to the County to which the County has benefited. As provided, the Purchasing Agent and Utilities Manager has each has found that continuation of the services is in the best interest of the County and DPU and that there was no bad faith involved in this award process.

As to the second motion, the Board could approve the payment of prior invoices but discontinue any further services as related to optional software support and services, with Milsoft. The impact here would be that Milsoft would not provide further software, database, and programmatic application support. Milsoft would also not be required to provide any further program updates, fixes, or patches. Although the software would continue to be usable to the Department, the program and software would be fixed to its current capabilities and limitations as of the date of the Board's decision and no further application support from the developer would be provided.

Fiscal and Staff Impact

The fiscal impact for this year is $49,131.00. Funds from another project would be utilized for continuation of this project. Optional annual support fees in the amount of $12,700 (20% of software costs for 5 different licenses: Windmil, Light Table, Contingency Analysis, 2-Windmil Map) would be budgeted each year for at least two (2) years. We want to allow DPU GIS and Engineering Staff hands on time with the Milsoft software systems, update the electrical model with other missing information, etc. for at least 2 years; thereafter, the department can consider doing away with the optional 20% annual maintenance support fees.

Attachments

A - Final Tabulation Cost for Milsoft GIS Data Conversion Project with 2 new Windmil Map license seats
B - Original Milsoft Quote
C - Written Determination of the Purchasing Agent

Milsoft Windmil Map license purchase (2 additional seats), Database Conversion, Setup & Configuration, & Onsite Traning Project

			First Payment Oct 2011 at 50%			Second Payment 40% Upon Installation, completed			Third & last Payment 10% Upon final acceptance of system (30 days after completion)		
License Fees	1st Seat	$ 20,000	0.5	$ 20,000	$ 10,000	0.4	$ 20,000	$ 8,000	0.1	$ 20,000	$ 2,000
	Additonal Seat	$ 5,000	0.5	$ 5,000	$ 2,500	0.4	$ 5,000	$ 2,000	0.1	$ 5,000	$ 500
	Subtotal	$ 25,000		$ 25,000	$ 12,500		$ 25,000	$ 10,000		$ 25,000	$ 2,500
Database Conversion		$ 50,000	0.5	$ 50,000	$ 25,000	0.4	$ 50,000	$ 20,000	0.1	$ 50,000	$ 5,000
Setup & Configuration for 9000 meters		$ 20,000	0.5	$ 20,000	$ 10,000						$ 7,500
Platform & Staker		$ 10,000	0.5	$ 10,000	$ 5,000						
	Subtotal	$ 30,000		$ 30,000	$ 15,000						
ONSITE Training for Windmil Map		$ 4,500	0.5	$ 4,500	$ 2,250	0.4	$ 4,500	$ 1,800	0.1	$ 4,500	$ 450
ONSITE Training for Field Engineering		$ 4,500	0.5	$ 4,500	$ 2,250						
	Subtotal	$ 9,000		$ 9,000	$ 4,500		$ 4,500	$ 1,800		$ 4,500	$ 450
	Total	$ 114,000			**$ 57,000**			**$ 31,800**			**$ 15,450**
						Travel Expenses		**$1,881.06**			

NOTES: - **DUE NOW**: $31,800 based on Initial $114,000 Proposal
- $7950 for Remaining 10% is due upon Project Acceptance

Revised Conversion Total: **$104,250** ($57K + $31.8K + $15.45K) from original $114K Proposal
(The Platform and Staker Software was cancelled)

Also Due $ 1,881.06 For Actual Travel Expenses

Final Database Conversion Total: **$106,131.06**

For Board Ratification:

Past Payment in the amount of $57,000.00
Invoices due NOW in the amount of $31,800.00 + $1881.06
Invoices due upon project acceptance/completion: $15,450.00

MILSOFT
Utility Solutions

Quote

Quote Number:	40429
Date:	10/29/2010
Account Manager:	Bart Brockway
Email:	bart.brockway@milsoft.com
Phone:	800.344.5647
Valid Until:	12/29/2010

Bill To	Ship To
Clay Moseley	Clay Moseley
Los Alamos County Utilities	Los Alamos County Utilities
PO Box 1030	901 Trinity Drive
Los Alamos, NM 87544-1057	Los Alamos, NM 87544-3200
USA	USA

GIS

Quantity	Product	List Price	Ext. Price
1	WindMilMap - 1st Seat	$20,000.00	$20,000.00
1	WindMilMap - Additional Seat	$5,000.00	$5,000.00
		GIS Total:	$25,000.00

Database Conversions

Quantity	Product	List Price	Ext. Price
1	Database Conversion From ESRI Database conversion from ESRI. Data conversion overall difficulty: High	$50,000.00	$50,000.00
		Database Conversions Total:	$50,000.00

Field Engineering - 9000 Meters

Quantity	Product	List Price	Ext. Price
1	Standard Setup and Configuration Fee	$20,000.00	$20,000.00
1	Platform & Staker	$10,000.00	$10,000.00
		Field Engineering Total:	$30,000.00

Training

Quantity	Product	List Price	Ext. Price
3	On-site Training for WMM $1,500 Per day for WMM training	$1,500.00	$4,500.00
3	On-site Training for FE $1,500Per day for FE training	$1,500.00	$4,500.00
		Training Total:	$9,000.00

Grand Total

Total:	$114,000.00

Terms and Conditions

All payment must be made in U.S. Dollars.
Milsoft products are MultiSpeak compliant, and interfaces with other MultiSpeak compliant products are provided at no charge. Unless otherwise indicated in this quotation, development by Milsoft of any custom interfaces to non-MultiSpeak compliant products may be provided only under Milsoft's specific and prior evaluation, and will be quoted at additional cost. No other interface policy is expressed or implied.

WindMilMap

Price Inclusions/Exclusions

Total price includes WindMilMap. ESRI components and customer database are not included.

Terms:

(New Systems - All Seats)
50% upon quote acceptance
40% upon installation
10% upon final acceptance of the system (30 days after completion)
(Future Additional Seats)
100% upon quote acceptance

Support & Maintenance

Support/Maintenance will be billed at the rate of 20% of the retail system cost annually. Invoicing will begin 60 days after installation is complete.

Installation & Training

Installation is typically accomplished remotely from the Milsoft corporate office. Onsite installation and/or training are available upon the Customers request at the rate of One Thousand Five Hundred U.S. Dollars ($1,500.00) per day, plus all travel and out-of-pocket expenses. Additionally, Customer will be invoiced in the amount of Five Hundred U.S. Dollars ($500.00) per day for required travel days.
Should an onsite pre-installation meeting, or meetings, be required, Customer will be responsible for reimbursement of travel and out-of-pocket expenses only for each Milsoft employee required to attend the meeting. Reimbursement is due upon receipt of invoice.

Database Conversions, Digitizing and Conversion Tools

Price inclusions/Exclusions

Conversion pricing is standardized and assumes the geodatabase and customer information system are 1. Linked with static unique identifier and 2. Provide detailed connectivity from the source to the consumer level. A detailed review process and statement of work for the conversion will be accomplished upon quote signature. Data deficiencies found to adversely affect product functionality or timeline to deployment will be addressed during the review process and may, in rare cases, drive additional costs.

Terms:

50% upon quote acceptance
40% upon installation
10% upon final acceptance of the system (30 days after completion)

Support & Maintenance

Support/Maintenance will be billed at the rate of 20% of the Database conversion tool licensing fee. The first year of support is included.

Training

Available upon request. Please contact MUS for current training rates and schedule.

Milsoft Field Engineering

Price Inclusions/Exclusions

Total price includes Milsoft Field Engineering Applications. ESRI components and customer database are not included.

Terms:

50% upon quote acceptance
40% upon installation
10% upon final acceptance of the system (30 days after completion)

Support & Maintenance

Milsoft Field Engineering Support/Maintenance (to include, if applicable, Material List and/or Field Estimate) will be billed at the rate of 20% of the retail system cost and configuration annually. Invoicing will begin 60 days after installation is complete.

Installation & Training

Installation is typically accomplished remotely from the Milsoft corporate office. Onsite installation and/or training are available upon the Customers request at the rate of One Thousand Five Hundred U.S. Dollars ($1,500.00) per day, plus all travel and out-of-pocket expenses. Additionally, Customer will be invoiced in the amount of Five Hundred U.S. Dollars ($500.00) per day for required travel days.
Should an onsite pre-installation meeting, or meetings, be required, Customer will be responsible for reimbursement of travel and out-of-pocket expenses only for each Milsoft employee required to attend the meeting. Reimbursement is due upon receipt of invoice.

Training

For training delivered by MUS personnel at the Customers facility, any travel and related expenses are not included and will billed additionally as incurred. For training delivered at Milsoft facilities, the Customer is responsible for all travel and related expenses for the Customers personnel attending the training. Additionally, Customer will be invoiced in the amount of Five Hundred U.S. Dollars ($500.00) per day for required travel days.

Quote Acceptance

This Quote constitutes the entire understanding and agreement between the parties and supersedes any and all prior and contemporaneous, oral or written representations, communications, understandings and agreements between the parties with respect to the subject matter hereof. The parties acknowledge and agree that neither of the parties is entering into this Quote on the basis of any representation or promise not expressly contained herein.

Account: Los Alamos County Utilities
Accepted By: _____
Print Name: _____
Date: _____
PO# (if required): _____

To submit this form, please fax it to 325.690.0338 or mail it to:

Milsoft Utility Solutions, Inc.
4400 Buffalo Gap Rd
Suite 5150
Abilene, TX 79606

If you have any questions regarding this quote, please call 800.344.5647 and ask for Bart Brockway or email Bart at bart.brockway@milsoft.com.

INTERNAL MEMO

FROM: Annalisa Miranda, Chief Purchasing Officer
TO: Office of the County Attorney
DATE: February 7, 2017
SUBJECT: Written Determination of the Purchasing Agent – Purchase from Milsoft Utility Solutions

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This is the written determination of the Purchasing Agent pursuant to §31-233, regarding the purchase from Milsoft Utility Solutions of Software Licensing, GIS Database Conversion, Server Setup, Training, Configuration, and Ongoing Annual Software Maintenance and Support.

Part of my preparation of this written determination included consultation with the office of the County Attorney, and discussions with Rafael De LaTorre, Deputy Utility Manager for Electric Distribution. I have also reviewed the Purchase Order and Invoice documentation available in the County's financial system, and in the office of Records and Information Management.
It is my determination that neither the purchaser nor the person awarded the contract have acted fraudulently or in bad faith.

Information which I considered as part of making my determination follows:
Prior to requesting the 2011 purchase, Utilities Department staff recalls performing their own assessment of available sources of the software (and related services) which met their operational needs. This assessment included a review of costs and specifications available from Milsoft and two other potential suppliers. While the expenditure of $57,000 exceeded the small purchase threshold of $35,000, and a formal Invitation for Bid (IFB) or Request for Proposals (RFP) should have been issued at that time, it is my opinion this was due to an administrative error or oversight. Documentation attached to the Purchase Order number DA 4423 includes an email from DPU which states, in part, "We budgeted work to be performed by Milsoft for software....which is licensed by one vendor." While it is not clear, this email may have been sent as an explanation of/request for a sole source determination. However, no such determination appears to have been officially made as part of the procurement. A copy of the Purchase Order number DA 4423 and related documentation, including the email, are attached to this memo.

Subsequent expenditures of $5775 for software support in December of 2011, and again in November of 2012 fall under the small purchase threshold, so Procurement staff did not request evidence of further competition before issuing Purchase Orders for those two purchases.

Regarding the pending expenditure of $33,861.06 which includes payment for configuration for configuration of DPU hardware, installation of two new WindMil Map network licenses, onsite training to DPU staff, and installed desktop software, the County has a financial obligation to Milsoft.
Before Milsoft was authorized to provide the goods and/or services, DPU should have requisitioned the desired purchase and Procurement should have issued a Purchase Order. Additionally, since the purchase exceeded the $10,000 small purchase threshold, DPU should have submitted a justification for use of a sole source procurement for my review and determination. It is my opinion that this also was due to an administrative error or oversight, not a deliberate intent to violate the Procurement Code or the supporting standard operating procedures contained in the Procurement Manual.

County of Los Alamos
Staff Report
February 15, 2017

Agenda No.:	7.B
Index (Council Goals):	BCC - N/A
Presenters:	James Alarid, Deputy Utilities Manager - Engineering
Legislative File:	**9092-17**

Title
Approval of the Long-Range Water Supply Plan
Recommended Action
I move that the Board of Public Utilities approve the revised Long-Range Water Supply Plan and forward to the County Council for their consideration.
Staff Recommendation
Staff recommends approval of the updated Long-Range Water Supply Plan.
Body
DPU contracted with Daniel B. Stephens & Associates, Inc. (DBS&A) to revise the Long-Range Water Supply Plan. Using the original format and data from the Council-adopted 2006 Long-Range Water Supply Plan as a starting point, DBS&A updated the Plan to:

- Reflect current population and water demand projections,

- Evaluate potential climate change impacts, and

- Assess various water supply options, including the timing for development of the County's San Juan-Chama water rights.

The revised Long-Range Water Supply Plan was presented at a public meeting on November 15, 2016, which had 24 attendees, to the Board of Public Utilities on November 16, 2016 and to the County Council on November 29, 2016. The final step, as required by the Office of the State Engineer, is to get County Council approval for adoption of the final revised Plan on February 28, 2017. DPU has received written comments from Robert Wells, the Pajarito Conservation Alliance, Ed Jacobson, and C.M. Gillespie. In addition, staff met with three County Councilors on January 17, 2017 to review the plan in detail. Based on input from these sources the following appropriate adjustments have been incorporated:

There were many comments and questions about the need for and cost of a potential San Juan-Chama project. The updated long-range water supply plan does not endorse any specific San Juan-Chama project. While the comparison of water supply and demand does not clearly demonstrate that the project water is needed in the short term, the County has more uncertainty in their demand projections than many other communities with the need to support changes in LANL water demands.

1. There were changes made to the plan recommendation related to the San Juan Chama project to “continue to examine project options”. Revisions were made to better explain how bringing San Juan-Chama project online would diversify the water supply, and to discuss the potential effects of climate change on this source of supply.Based on the growth projections (LACWU and LANL combined) and the uncertainty of the U.S. DOE water rights lease, the consultants recommend that the County proceed with the project planning by conducting an environmental assessment for utilization of San Juan Chama water. The DPU will revisit whether or not to take the next steps towards project implementation at a later time when demands warrant.

2. There were comments about the importance of incorporating conservation into this revised plan. DPU has prepared the Energy and Water Conservation Plan to meet the requirements of the Office of the State (OSE). This plan was approved by the Utiltiy Board in March 2015 and submitted to the OSE as required. A separate branch of the OSE mandates an independent conservation plan be prepared and submitted for approval. As such, the Long-Range Water Supply Plan did not duplicate content and initiatives developed in the conservation plan.

Based on a question received on the earlier draft of the plan, the plan now includes information about the quantity of water that would be conserved if the per capita water use were reduced to be in line with the City of Santa Fe’s 2015 value. The City of Santa Fe’s per capita water demand was 90 gallons per day in 2015. Comparing this to the Los Alamos County value in the plan (135 gallons per day in 2014), the difference (45 gpd) would be equivalent to an annual conservation savings of 800-1,114 acre-feet, based on the population projections for 2060.

3. Figure 6-1 was removed from the revised plan (this figure doesn’t add a lot of value and was the subject of many questions and comments). An explanation of what this was meant to illustrate is included in the text.

4. In response to the discussion about the lease of U.S. DOE water rights, any mention of the partial volume (983.39 acre-feet/year) was replaced with the total (1,662.39 acre-feet/year), since the County is pursuing a lease for the total water rights volume owned by U.S. DOE.

5. Figures 4-1, 4-2, and 4-3 were inadvertently left out of the draft plan that went out for public review, and they are added back in to the final document.

6. No changes were made to Figure 2-1 (we used the city & county boundaries for Los Alamos and White Rock that were available) or Figures 3-1 and 3-2 (that information comes from LANL publications and correctly represent the regional hydrogeology).

7. Colors of the figures were modified to aid in clarity.

Note that the revised plan is presented as three attachments, the plan is provided in edit mode, with revised figures and revised tables.

Responses to each of the four comment letters received have been prepared and provided as attachments.

Alternatives

If the revised plan is not approved the 2006 plan on file with the OSE will remain in effect.

Fiscal and Staff Impact

None

Attachments

A - Revised Long-Range Water Plan - edit mode
B - Revised Figures
C - Revised Tables
D - Letters in Response to Comment Received

Table of Contents

Section **Page**

1. Introduction

The Los Alamos County Water Utility (LACWU) supplies water for Los Alamos, White Rock, Los Alamos National Laboratory (LANL), and Bandelier National Monument. To prepare for the future water supply needs of these communities, the LACWU developed a long-range water supply plan that was published in 2006 (DBS&A, 2006). This document updates that plan to incorporate more recent data and developments relevant to water resources management. The objective of this plan is to evaluate projected demands in relation to available supply, while considering water quality and water rights risks to the supply, to ultimately ensure that both a viable physical supply and associated water rights are in place as needed to meet future demands.

In addition to providing a plan for a sustainable future water supply, a long-range water plan that covers at least 40 years addresses several regulatory requirements regarding water rights and water conservation. In particular, a water plan allows certain organizations, including Counties, to set aside water for use in the future. Section 72-1-9(B) of the New Mexico Water Code allows covered entities such as Los Alamos County to legally appropriate and preserve water that they cannot currently use but will need in the future to meet projected water requirements for the service area based on projected growth and other factors. Counties are specifically exempt from forfeiture of unused water rights if those rights have been appropriated for the implementation of a water development plan or for preservation of water supplies (NMSA 72-12-8 (F)). These provisions are the same for both surface water and groundwater (NMSA 72-5-28(C)).

The New Mexico Office of the State Engineer (OSE) requirements set out in statute NMSA 1978 Section 72-14-3.2 call for conservation planning by any public supply system with diversions of at least 500 acre-feet annually for domestic, commercial, industrial, or government customers for other than agricultural purposes. Covered entities must develop, adopt, and submit to the OSE a comprehensive water conservation plan, including a drought management plan, as a prerequisite for applying for funding from key state funding agencies. The Water Trust Board requires funding applicants to provide verification from the OSE that all of its statutory and regulatory requirements have been met, and the OSE is requiring that Water Trust Board

funding applicants have a conservation plan that was prepared in accordance with New Mexico's *Water Conservation Planning Guide for Public Water Suppliers* (NMOSE, 2013). The U.S. Bureau of Reclamation (USBR) also requires a conservation plan for diversion of San Juan-Chama Project water.

The LACWU published an *Energy and Water Conservation Plan* in 2013 (LACWU, 2013a) and updated it in 2015 (LACWU, 2015), and prepares reports annually discussing the County's progress toward the goals established in that plan. This long-range water supply plan summarizes the water conservation goals established by the *Energy and Water Conservation Plan* and provides an update on its implementation and recommendations.

For this long-range water supply plan, the LACWU retained Daniel B. Stephens & Associates, Inc. (DBS&A) to update the 2006 plan with current data and analyses. The remainder of this water plan presents the results of the summarized and updated information including an overview of the water system (Section 2), water supply and water rights (Sections 3 and 4), current and projected demand and supply-demand gaps (Sections 5 and 6), risks due to climate change (Section 7), water conservation (Section 8), and actions the LACWU may undertake to plan for a sustainable future water supply (Section 9).

2. Overview of Los Alamos County Water System

The Los Alamos Boys Ranch, a school for teenage boys started in 1918, was the original settlement in the area that is now Los Alamos County. The sole source of water for the school was surface water from Los Alamos Reservoir in Los Alamos Canyon (Figure 2-1). The water was piped from the reservoir and stored in a redwood water tank near the school. During World War II, Los Alamos was selected as the site for the secret Project Y, because the steep canyons and mesa tops provided a secure location for the project. The Los Alamos Laboratory (as it was then called) came into existence in early 1943 for the single purpose of Project Y: to design and build an atomic bomb (LANL, 2006). Los Alamos Boys Ranch closed in early 1943 and the Laboratory became the only establishment. In 1949, Los Alamos County was created from parts of Sandoval and Santa Fe Counties.

When the Laboratory took over in 1943, they continued to use Los Alamos Reservoir, but also piped in water from a spring gallery in Guaje Canyon. In 1947, a dam was built in Guaje Canyon and water from the resulting Guaje Reservoir was used for water supply (Figure 2-1). In addition, American Spring and several springs in Water Canyon were tapped and piped into the water system. The Los Alamos well field was drilled in 1946 on San Ildefonso Pueblo property, thereby increasing the supply to meet the growing demands of the Laboratory and its residents. By 1989, groundwater from the Los Alamos, Guaje, Pajarito, and Otowi well fields supplied all of the potable demands for Los Alamos.

The Los Alamos well field was plugged and abandoned in 1992 because the wells had reached the end of their useful life. Also in the 1990s, six of the seven wells in the Guaje well field were retired, and four replacement wells were drilled and tapped into the existing piping and booster stations. Los Alamos Reservoir continued to be used to water parks, but the Cerro Grande fire in 2000, Las Conchas fire in 2011, and subsequent flooding in 2012, 2013, and 2014 damaged the reservoir and the diversion system. The LACWU has been working on a water line replacement project in order to bring the reservoir back online. The reservoir has been dredged and the LACWU will be installing a new pipeline from the reservoir into town in order to connect to the existing non-potable infrastructure (Meyers, 2016). The LACWU is also in the process of completing a few other non-potable projects, including installing booster pumps and pipelines to

push non-potable water to the Group 12 tank, which has been renovated. This will allow gravity feed of the non-potable water to all current users, including the golf course and ball fields (Meyers, 2016).

The LACWU began operating the water system in September 1998; however, ownership of the water system and water rights was not transferred from the U.S. Department of Energy (DOE) to the LACWU until September 2001 (ownership of 70 percent of the water rights was transferred to Los Alamos County and DOE retained the other 30 percent). The LACWU ~~currently~~ provides water service to the residents of Los Alamos and White Rock, LANL, and Bandelier National Monument. The LACWU has a contract to supply DOE with the water required by LANL with no limitations. This contract will expire in 2019 (LANL demands have been projected beyond 2019 under the assumption that a new contract will be negotiated).

The LACWU has a contract with the U.S. Bureau of Reclamation for water from the San Juan-Chama Project, which brings water from the San Juan Basin to Heron Reservoir on the Rio Chama (the Rio Grande Basin). Releases from Heron Reservoir flow down the Rio Chama to the Rio Grande. In the *San Juan-Chama Water Supply Project Final Preliminary Engineering Report,* the recommended alternative for the LACWU to obtain and treat San Juan-Chama Project water for distribution was to construct up to three groundwater wells in the White Rock area and install pumps and a pipeline to connect the new wells to the Pajarito Booster Station (CDM Smith, 2012); however, the alternatives and project timeline will be revisited after the long-range water supply plan update is complete. The diversion rights of San Juan-Chama **Project** water could alternatively be used to offset impacts of pumping (as the City of Santa Fe has done since 1972), as further discussed in Sections 4.3.2 and 6.

With the abandonment of the Los Alamos well field and six wells in the Guaje well field, the LACWU water system is currently supplied by the 12 wells shown in Figure 2-1 and listed in Table 2-1. These wells, with depths up to 3,000 feet below ground surface (ft bgs) and water levels ranging from approximately 250 to 1,200 ft bgs, all draw on the regional aquifer beneath the Pajarito Plateau.

Table 2-1. Active Wells in the Los Alamos Water Supply System.

Well Field	Well Name	Date Completed	Completion Depth (feet)	Coordinates (feet)		Initial Depth to Water
				x	Y	
Guaje	G-1A	Oct-54	1,519	1,655,241	1,784,353	250
	G-2A	Mar-98	1,980	1,651,974	1,786,166	318
	G-3A	May-98	1,980	1,649,662	1,786,585	408
	G-4A	Apr-98	1,980	1,647,318	1,787,113	452
	G-5A	Jun-98	1,980	1,644,877	1,789,636	551
Otowi	O-1 [a]	Aug-90	2,497	1,649,396	1,772,232	673
	O-4	Mar-90	2,595	1,637,337	1,772,995	780
Pajarito	PM-1	Feb-65	2,499	1,647,734	1,768,112	722
	PM-2	Jul-65	2,300	1,636,698	1,760,406	823
	PM-3	Nov-66	2,552	1,642,590	1,769,530	740
	PM-4	Aug-81	2,874	1,635,623	1,764,740	1,060
	PM-5	Sep-82	3,092	1,632,110	1,767,790	1,208

Source: Koch and Rogers, 2003

[a] Well is currently not being used to supply drinking water.

Two new applications have been filed recently:

- The LACWU filed an application for an additional point of diversion on April 28, 2016. The new well will be called Otowi Well 2 and will be drilled to supplement the system's existing production wells in anticipation of declining production rates from existing wells that are nearing the end of their service life (Alarid, 2016).

- In May 2016, an application for permit to change an existing water right was filed jointly by DOE and the LACWU in support of the chromium plume control interim measure and chromium plume center characterization project (U.S. DOE and LACWU, 2016), and emergency authorization was received on September 10, 2016 (NMOSE, 2016).

The addition of new points of diversion under these applications will not increase the appropriation of water above the existing permitted water rights.

Wastewater is treated at two facilities: the White Rock wastewater treatment plant (WWTP) and the Los Alamos WWTP. Both of these WWTPs have treated effluent reuse lines that are used for irrigation of turf. Two former WWTPs—the East Road, abandoned and demolished in the mid-1960s, and the Pueblo, abandoned in 1993—also had effluent reuse systems, both of which supplied the golf course.

The LACWU operates a non-potable water system, using treated wastewater effluent to irrigate several areas in Los Alamos and White Rock and using stormwater runoff for fire protection and snow making at the Pajarito Mountain Ski Area (Forsgren & Associates, 2013). The system has three separate components:

- *Los Alamos Townsite:* Reuse is used to irrigate four sites in Los Alamos (Los Alamos County Golf Course, Los Alamos Middle School, North Mesa Ball Fields, and North Mesa Soccer Fields) and to feed the wetlands located downgradient of the Los Alamos wastewater treatment facility. A volume of 180,000 gallons per day is needed to keep the wetlands healthy. LANL is currently receiving reuse water for the wetlands from the LACWU at no charge because surplus reuse water is available.

- *White Rock:* Reuse is used to irrigate Overlook Park.

- *Pajarito Mountain Ski Area:* Captured stormwater is used for fire protection and snow making.

A Los Alamos County non-potable water system master plan was completed in 2013, to evaluate the efficiency of the existing non-potable water system, make recommendations for how to improve the system's efficiency, determine if additional development of non-potable water use is economically feasible, and identify and evaluate sites that could potentially be served (Forsgren & Associates, 2013), most of which currently use potable water for irrigation. The plan identified a total of 25 sites (5 existing and 20 new) suitable for service by the Los Alamos Townsite non-potable water system and 6 sites (1 existing and 5 new) for the White Rock non-potable water system. Bringing the additional sites online would increase the annual average system demands from 152.8 to 206.5 million gallons per year for the Los Alamos

Townsite system and from 18.9 to 41.2 million gallons per year for the White Rock system (Forsgren & Associates, 2013).

3. Hydrologic Overview and Risks to Water Supply

The LACWU public drinking water supply is supplied by groundwater, with surface water supplying a small amount of non-potable use. This section describes the hydrogeologic conditions pertinent to the Los Alamos groundwater supply (Section 3.1) and includes an assessment of potential risks to the groundwater supply due to depletion or contamination of the aquifer (Section 3.2). The LACWU water rights (groundwater and surface water) are discussed in Section 4.

3.1 Hydrogeology

Los Alamos County is situated on the Pajarito Plateau within the western side of the Española Basin. The Pajarito Plateau extends eastward from the Sierra de los Valles, the eastern range of the Jemez Mountains. On the western part of the Pajarito Plateau, the Bandelier Tuff overlaps the Tschicoma Formation, which consists of older volcanics that form the Jemez Mountains. In the central Pajarito Plateau and near the Rio Grande, the Bandelier Tuff is underlain by the Puye Formation. The Cerros del Rio basalts interfinger with the Puye Formation conglomerate along the river and extend beneath the Bandelier Tuff to the west. These formations overlie the sediments of the Santa Fe Group, which extend across the basin between LANL and the Sangre de Cristo Mountains and are more than 3,300 ft thick (LANL, 2014a). A cross section of the area is shown on Figure 3-1.

The hydrogeologic framework within Los Alamos County consists of three distinct aquifer systems **(LANL, 2014a)**:

- Shallow perched groundwater in alluvial deposits along canyon bottoms
- Intermediate-depth perched groundwater
- Deeper regional aquifer, which extends through the neighboring Española Basin ~~(LANL, 2014a)~~

A block diagram depicting a conceptual model of the hydrogeology of the Los Alamos area that illustrates the general configuration of these aquifer systems is shown in Figure 3-2.

Alluvial aquifers occur within axial fluvial deposits located along canyon bottoms and have a limited saturated thickness and variable lateral extent, depending on the presence of intermittent surface flow or anthropogenic discharges from wastewater treatment outfalls. Hydrologic investigations of alluvial aquifers have been conducted in Los Alamos Canyon, Pueblo Canyon, Mortandad Canyon, Pajarito Canyon, Sandia Canyon, Cañon de Valle, and Water Canyon. Though their limited extent precludes any utility for beneficial use, these aquifers provide an important pathway for contaminant migration.

Intermediate-depth perched aquifers are widely distributed across the northern, western, and central parts of the Pajarito Plateau beneath Los Alamos Canyon, Pueblo Canyon, Sandia Canyon, Mortandad Canyon, and Cañon de Valle. These perched zones usually occur in the Puye Formation fanglomerates, the Cerros del Rio Basalt, and units of the Bandelier Tuff, and are typically associated with low-permeability layers such as unfractured basalt flows and fine-grained zones. Saturated thicknesses range from about 3 to 420 feet, but lateral extents are sometimes poorly defined (LANL, 2005). Depths to the intermediate perched groundwater vary. For example, the depth to intermediate-perched groundwater is approximately 120 feet in Pueblo Canyon, 450 feet in Sandia Canyon, and 500 to 750 feet in Mortandad Canyon (LANL, 2014a). Though the exact extent of these aquifers is not well defined, it is clear that they are generally small enough that their potential for beneficial use is limited. However, they provide an important pathway for contaminant migration through the vadose zone.

The regional aquifer occurs primarily within the poorly to semi-consolidated basin-fill sediments of the Santa Fe Group. The total thickness of the Santa Fe Group beneath the Pajarito Plateau is poorly defined. The deepest well on the plateau (PM-5), with a depth of 3,110 feet, does not fully penetrate the base of the basin-fill sediments. Estimates of the total thickness of these sediments range from 6,650 feet in the central basin to as much as 9,000 to 10,000 feet in the central and western parts of the basin (Broxton and Vaniman, 2005).

The regional aquifer extends into the overlying Puye Formation fanglomerate beneath parts of the Pajarito Plateau. Other geologic units encompassed by the regional aquifer beneath parts of the county include fractured volcanic rocks of the Tschicoma Formation (western part) and the Cerros del Rio Basalt (eastern part), as well as localized occurrences of older basalts.

The regional aquifer water table occurs at a depth of 1,200 feet along the western edge of the plateau and 600 feet along the eastern edge. In the central part of the plateau, the regional aquifer lies about 1,000 feet beneath the mesa tops. The regional aquifer is the only aquifer in the area capable of serving as a municipal water supply (LANL, 2014a).

Well locations and types are shown in Figure 3-3, and the potentiometric surface contours and extrapolated flow directions in the regional aquifer are shown in Figure 3-4. Water in the regional aquifer generally flows east or southeast (LANL, 2015c). As discussed in Section 2, the LACWU's production wells have water levels that range between approximately 250 and 1,200 feet below ground surface (ft bgs). Water in the regional aquifer is under artesian conditions beneath the eastern part of the Pajarito Plateau near the Rio Grande and under phreatic conditions beneath most of the Pajarito Plateau (Purtymun and Johansen, 1974). The upper portion of the regional aquifer beneath the Laboratory discharges into the Rio Grande through springs in White Rock Canyon (LANL, 2014a).

Groundwater modeling studies indicate that underflow of groundwater from the Sierra de los Valles west of Los Alamos is the main source of regional aquifer recharge (LANL, 2014a). Alluvial groundwater is also a source of recharge to the regional aquifer, as well as to the intermediate perched saturated zones (thereby providing potential downward pathways for contaminants released at the surface to eventually reach the regional aquifer).

A number of studies have estimated recharge to the regional aquifer for the Española Basin and for the Pajarito Plateau (Table 3-1). Recharge varies in relation to precipitation, which in Los Alamos County is elevation-dependent and ranges between about 13 and 20 inches annually (Newman and Robinson, 2005). Keating et al. (2005) determined that significant recharge occurs primarily above the 2,195-meter (7,200-foot) elevation. At lower elevations, recharge occurs primarily in canyons and arroyos; recharge on mesas is minimal to non-existent

(Anderholm, 1994; Birdsell et al., 2005). Kwicklis et al. (2005) estimated that 23 percent of total recharge to the regional aquifer beneath the plateau is from streamflow loss.

In addition to the recharge estimates, Table 3-1 includes an estimate of discharge to the Rio Grande (determined from inverse modeling using streamflow data and transient head data), which approximates aquifer recharge before significant pumping began.

Table 3-1. Regional Aquifer Recharge Estimates

Category	Rate (ac-ft/yr)	Source
Pajarito Plateau recharge	8,596	Kwicklis et al., 2005
	4,912	McLin et al., 1996
	4,298 to 5,526	Griggs and Hem, 1964
	8,084	Hearne, 1985
Lateral inflow from Jemez Mountains	7,445	McAda and Wasiolek, 1988
Discharge to Rio Grande from Pajarito Plateau and Sierra de los Valles	6,473	Keating et al., 2003

~~A number of investigations have been conducted to help understand regional aquifer properties as they relate to the potential for contaminant transport:~~

- ~~The results of pump tests performed in several regional aquifer monitor wells (often referred to as *R*- wells) installed as part of LANL's *Hydrogeologic Work Plan* (1998) implementation showed hydraulic conductivities ranging from 0.04-4.9 feet per day (ft/d) in all wells except R-13, which had a much higher conductivity (DBS&A, 2006).~~

- ~~A multiple well pump test conducted by LANL on supply well PM-2 during February 2003, using supply wells PM-4 and PM-5 (which were not pumped during the 25-day test) and monitor wells R-15, R-20, R-21, R-22, and R-32 as observation wells (McLin, 2005), estimated hydraulic conductivities ranging from 5 to 15 ft/d (DBS&A, 2006).~~

- ~~Anisotropy, the ratio of vertical to horizontal hydraulic conductivity, is important for predicting contaminant movement in the vadose and saturated zones. Pumping test~~

analyses have indicated that a strong degree of anisotropy is present in the regional aquifer beneath the Pajarito Plateau. Hydrologic modeling suggests that vertical permeability is 100 to 1,000 times lower than horizontal permeability in the Santa Fe Group silts and sands (Hearne, 1985; McAda and Wasiolek, 1988; Keating et al., 2003, as cited by LANL, 2005), indicating that contamination is much more likely to move horizontally than vertically.

- A 2008 aquifer test evaluated responses in monitor wells R-11, R-15, and R-28 due to long-term water supply pumping at the Pajarito (PM-1 through PM-5) and Otowi (O-1 and O-4) well fields, and concluded that there is considerable heterogeneity in aquifer properties. The heterogeneity can lead to preferential flow paths (Vesselinov et al., 2008).

- The deep section of the regional aquifer pumped by Santa Fe's Buckman well field is in relatively poor hydraulic connection with the Rio Grande and the aquifer below LANL. This can be explained by the pronounced westward-dipping stratification of the Santa Fe group sediments near the Buckman well field, which cause the aquifer to be anisotropic and under confined conditions (Vesselinov et al., 2011).

3.2 Aquifer Depletion Risk

To evaluate risks of water supply depletion, available water level data from numerous wells screened in the regional aquifer were used to plot hydrographs illustrating historical water level behavior in the regional aquifer. Locations of these wells are shown in Figure 3-3. Long-term supply well data, consisting of annual average non-pumping water levels for the Guaje well field (since 1950) and the Pajarito well field (since 1965), are shown in Figures 3-5 and 3-6 respectively. More recent (since 1990) but sporadic data are available for the Otowi well field (Figure 3-7).

Table 3-2 summarizes the net changes and average water level declines indicated by these data. Long-term data from the Pajarito and Guaje well fields indicate an average water level decline of about 1.1 and 3.5 feet per year (ft/yr), respectively; the average decline in the Otowi

well field is about 0.8 ft/yr. Substantial declines have occurred in the abandoned Guaje wells, ranging from about 0.2 to 2.5 feet, and averaging about 1.3 ft/yr.

LANL also monitors water levels in regional wells. Previous analysis of those data indicated that responses were mixed but that water levels in most regional wells were also steadily declining (DBS&A, 2006). Though the average rate of decline appears modest on an annual basis, one supply well has experienced a total water level decline of approximately 85 feet since 1998, and water levels in four of the active production wells have declined by more than 50 feet (Table 3-2).

Using water level data, Rogers et al. (1996) estimated the volume of groundwater depletion from supply well production between 1949 and 1993 to be between 4.0×10^{10} and 6.0×10^{10} gallons (123,000 and 184,000 acre-feet), compared to total pumping withdrawals of 5.7×10^{10} gallons (175,000 acre-feet) during the same period. This analysis implies that recharge to the regional aquifer during this period was negligible and that production well pumping was essentially mining the aquifer. However, the recovery of water levels in wells that were not pumped for extended periods was cited by McLin et al. (1996) as evidence that recharge has occurred. Water levels can recover without recharge as the cone of depression that develops during pumping re-equilibrates, however, and it should be noted that the recharge estimates presented in Table 3-1 are on the same order as pumping withdrawals.

Even if net recharge is negligible, considering a demonstrated saturated thickness of at least 1,900 feet penetrated in supply well PM-5 and potentially as much as 10,000 feet of Santa Fe Group sediments underlying the plateau (Section 3.1), a continuation of the observed rates of decline does not represent a substantial imminent or foreseeable risk to the water supply. Barring potential water quality issues, continued pumping of the regional aquifer at current rates is likely to be sustainable for hundreds of years. LANL's Española Basin and Pajarito Plateau Regional Flow Model predicts that water levels will continue to decline at the same rate (with the same production rates) and that this rate can be sustained for hundreds of years (Keating, 2006). However, the water is expected to be of poorer quality as wells begin to draw from greater depths, and pumping costs will increase.

3.3 Contamination Risk

To evaluate the potential for the LACWU water system to produce water quality that meets all drinking water standards, this section (1) identifies sources of contaminants in the Los Alamos area, (2) summarizes existing knowledge of contaminant transport pathways and velocities, **and** (3) summarizes the concentrations and extent of chromium, perchlorate, and other contaminants in groundwater~~, and (4) discusses potential treatment options~~.

3.3.1 Sources of Contamination

Since the early 1940s, a wide array of chemicals have been released into the canyons of the Pajarito Plateau from various LANL operations. These releases have occurred through effluent discharges from wastewater treatment facilities and other miscellaneous sources, such as sanitary septic systems, cooling towers, and runoff from firing sites and other LANL facilities. Figure 3-8 shows the locations of industrial outfall sites at LANL.

The presence of contaminants in groundwater in Los Alamos County is primarily associated with areas where effluent discharges have led to enhanced infiltration. Since the 1940s, liquid effluent discharge by LANL has affected the shallow perched alluvial groundwater that lies beneath the floor of a few canyons, and has also affected intermediate-perched zones and the regional aquifer (LANL, 2014a). The major effluent discharges include:

- Mortandad Canyon, Pueblo Canyon from its tributary Acid Canyon, and Los Alamos Canyon from its tributary DP Canyon received liquid radioactive effluents during past decades (LANL, 2015c).

- Sandia Canyon has received discharges of power plant cooling water and water from LANL's Sanitary Wastewater Systems Consolidation (SWSC) Plant.

- Water Canyon and its tributary Cañon de Valle have received effluents produced by high explosives processing and experimentation (LANL, 1993a, 1993b).

- Over the years, Los Alamos County has operated several sanitary wastewater treatment plants (WWTPs) in Pueblo Canyon (LANL, 1981). The Los Alamos and White Rock WWTPs are currently operating. LANL has also operated numerous sanitary treatment plants.

- From 1956 through 1976, up to 160,000 pounds of hexavalent chromium were released from cooling towers at a LANL power plant. The chromium was commonly used in industry at the time as a corrosion inhibitor (LANL, 2014b).

Since the early 1990s, LANL has significantly reduced both the number of industrial outfalls and the volume of water discharged. The quality of the remaining discharges has been improved through treatment process improvements so that they meet applicable standards (LANL, 2014a).

Los Alamos groundwater monitoring has defined two areas of notable contamination: RDX contamination beneath Technical Area 16 and chromium contamination beneath Sandia and Mortandad Canyons (LANL, 2015c).

3.3.2 Contaminant Transport Pathways and Velocities

Numerous pathways for potential contaminant transport are present throughout the Pajarito Plateau. Transport modes for contaminants from the surface to the regional aquifer vary according to the hydrogeologic setting and include:

- Matrix flow through nonwelded and poorly welded tuffs (mesa tops and dry canyons)
- Fracture flow through welded tuffs (mountain front and Pajarito Fault zone)
- Fracture and matrix flow through dense and brecciated basalts (Cerros del Rio basalt outcrop at low-head weir and perched intermediate aquifers)
- Infiltration from wet canyons (portions of Los Alamos Canyon, Pueblo Canyon, Mortandad Canyon, Sandia Canyon, and Cañon de Valle)

Transport velocities are highly variable throughout the plateau. Infiltration beneath dry canyons and mesa tops is estimated to be very low, resulting in travel times to the regional aquifer of several hundred to thousands of years (Birdsell et al., 2005). On the other hand, fracture flow through fractured tuffs or basalts is likely to be comparatively rapid in many locations. Although they vary spatially, groundwater velocities are typically on the order of 30 feet per year (LANL, 2016).

Another possible contaminant transport pathway is potential cross contamination between perched aquifers and the regional aquifer during well drilling, primarily when open borehole conditions are maintained over an extended period of time. Well drilling by LANL has incorporated procedures to minimize this risk, such as sealing off zones of saturation above the regional aquifer prior to advancing the borehole to the regional aquifer. Data do not indicate any cases of cross contamination in the monitoring network; however, future drilling should include the procedures that are in place to minimize the risk of cross contamination.

The chemical properties of each contaminant control the degree to which they move into the subsurface. Reactive chemicals have a tendency for adsorption (adhesion of dissolved molecules to the surfaces of solids), limiting their movement in groundwater, while conservative or non-reactive chemicals tend to move readily in groundwater. Examples of these two types of contaminants that have been released from LANL facilities are:

- Non-reactive contaminants include chromium, tritium, nitrate, perchlorate, and RDX (a component of explosives, also known as cyclotrimethylenetrinitramine, cyclonite, hexogen, and T4). These chemicals are highly mobile and are observed in groundwater within perched intermediate zones and the regional aquifer beneath several canyons, including Cañon de Valle, Los Alamos Canyon, Mortandad Canyon, Pueblo Canyon, and Sandia Canyon (LANL, 2005).

- Reactive contaminants include strontium-90, americium-241, cesium-137, plutonium-238, -239, and -240 (LANL, 2005). These contaminants have been detected in the alluvial system but are not observed in the intermediate and regional aquifers.

3.4 Extent of Contamination and Risk to Water Supply

To evaluate the risk of contamination to the LACWU water supply, this section summarizes existing contaminant levels in the regional aquifer (Section 3.4.1) and provides additional detail on percholorate, hexavalent chromium, and other contaminants (Sections 3.4.2 through 3.4.4).

3.4.1 Summary of Contamination in Groundwater

Monitoring of production wells is conducted by the LACWU as part of routine monitoring and compliance with the U.S. Safe Drinking Water Act, and monitoring is also conducted by LANL. Recent monitoring and reporting indicates~~d~~ that all drinking water produced by the LACWU water system meets federal and state drinking water standards. Drinking water wells in the Los Alamos area have not been impacted by LANL discharges with one exception: well Otowi-1 (O-1) in Pueblo Canyon, where perchlorate has been detected below the 2012 LANL Compliance Order on Consent screening level of 4-micrograms per liter (µg/L) (the 2016 LANL Compliance Order on Consent does not include a screening level for perchlorate and the perchlorate standard that will apply going forward is an NMED tap water screening level of 13.8 µg/L). Concentrations of perchlorate in this well are continuing to decline (LANL, 2016). Tritium has also been detected at low levels in well O-1. This well is not being used to supply drinking water due to water leaks in the transmission line, but the LACWU plans to put it back online in the future after this pipeline has been replaced.

Table 3-3 summarizes groundwater contaminants that were detected in the regional aquifer in 2015. These data were downloaded from the LANL and NMED Intellus New Mexico web site (LANL and NMED, 2016). Data for well O-1 has been included on Table 3-3, although there were no standard exceedances for samples collected from this well.

The alluvial and intermediate-perched groundwater bodies are separated from the regional aquifer by hundreds of feet of unsaturated rock and sediments, so recharge from the shallow groundwater occurs slowly. As a result, less contamination reaches the regional aquifer than is found in the shallow perched groundwater (LANL, 2014a). Where contaminants are found at depth, the setting is either a canyon where alluvial groundwater is usually present or a location

beneath canyons where large amounts of liquid effluent have been discharged. This section focuses mainly on contamination that has been detected in the regional aquifer, since it is the source of the LACWU water supply.

Discussion of the extent and concentrations of specific contaminants follows.

3.4.2 Perchlorate Contamination

Perchlorate is used as an energetics booster or oxidant in solid propellant for rockets and missiles. An official standard for this chemical has not been established. A screening level for perchlorate of 4 µg/L was set in the LANL Compliance Order on Consent issued by NMED on March 1, 2005 and revised on April 20, 2012 (NMED, 2012); however, a new LANL Compliance Order on Consent was issued in 2016 and it does not include a screening level for perchlorate (NMED, 2016). The perchlorate standard that will apply going forward is an NMED tap water screening level of 13.8 µg/L (NMED, 2014).

Perchlorate contamination is present in groundwater beneath Mortandad Canyon (LANL, 2016). In 2015, perchlorate concentrations exceeded 4 µg/L in samples collected from 8 monitoring wells, one of which (R-15) is completed in the regional aquifer (LANL, 2016). As discussed above, the 2016 LANL Compliance Order on Consent does not include a screening level for perchlorate (NMED, 2016), and the perchlorate standard that will apply going forward is an NMED tap water screening level of 13.8 µg/L (NMED, 2014). The concentrations detected in 2015 in the regional aquifer well R-15 ranged between 7.22 and 9.05 µg/L (LANL and NMED, 2016). The 4-µg/L screening level was the standard in effect in 2015, but with the higher standard being applied in the future, the number of standard exceedances is expected to decrease (any similar concentrations detected in the future will not exceed the 13.8-µg/L screening level). The two monitoring wells with the highest detected concentrations of perchlorate in 2015 were MCOI-5 and MCOI-6 (LANL and NMED, 2016), and these wells are completed in the perched-intermediate aquifer (LANL, 2016). The concentrations detected in these wells in 2015 ranged between 61.1 and 99.4 µg/L (LANL and NMED, 2016).

3.4.3 Hexavalent Chromium

Most contaminants that have been detected in groundwater beneath LANL have concentrations that are largely below regulatory standards; however, a hexavalent chromium plume is present in the regional aquifer. Chromium can be present in either the Cr^{+3} (trivalent chromium) or Cr^{+6} (hexavalent chromium) species. Cr^{+3} is an essential nutrient for humans and occurs naturally in many foods; Cr^{+6} causes various health effects. The U.S. Environmental Protection Agency (U.S. EPA) is currently reviewing data from a 2008 long-term animal study by the Department of Health and Human Service's National Toxicology Program, which concluded that hexavalent chromium may be a human carcinogen if ingested (U.S. EPA, 2015a).

The primary source of chromium is blowdown of potassium dichromate from the TA-03 power plant cooling tower that occurred from 1956 to 1972. LANL's conceptual model hypothesizes that chromium originated from releases into Sandia Canyon and may have migrated along lateral pathways to locations beneath Mortandad Canyon. For this reason, perched-intermediate and regional wells beneath Mortandad Canyon are monitored. Other contamination beneath Sandia and Mortandad Canyons may be associated with Mortandad Canyon sources. These sources and the migration pathways are described in the *Investigation Report for Sandia Canyon* (LANL, 2009) and *Phase II Investigation Report for Sandia Canyon* (LANL, 2012).

As discussed in the original long-range water supply plan (DBS&A, 2006), several exceedances of the New Mexico Water Quality Control Commission (NMWQCC) groundwater standard for human health of 50 µg/L for chromium were observed in samples collected in 2005 from monitoring well R-28. Since the 2006 water plan was completed, the areal extent and concentrations within the plume have been better defined. The chromium plume is located in an area of approximately 1 mile by 0.5 mile and within the top 50 feet of the regional aquifer (LANL, 2016). Data for monitoring wells where there were chromium concentration exceedances of the NMWQCC groundwater quality standard for human health in 2015 are shown on Figure 3-9.

In 2015, **hexavalent** chromium concentrations exceeded the NMWQCC groundwater quality standard in five regional aquifer monitoring wells—R-28, R-42, R-62, R-50 Screen 1, and R-43

Screen 1 (Figure 3-9)—and the highest concentrations of **hexavalent** chromium detected in the plume are near monitoring wells R-42 and R-28. Two intermediate wells (SCI-2 and MCOI-6) also had **hexavalent** chromium concentrations above the standard (LANL, 2016). The monitoring wells located in the center of the plume (R-42 and R-28) show a relatively flat trend in the **hexavalent** chromium concentrations, while monitoring wells along the edge of the plume (R-45 screen 1, R-43 Screen 1, and R-50 Screen 1) show gradually increasing **hexavalent** chromium concentrations (LANL, 2016). The LACWU production well that is located closest to the **hexavalent** chromium plume is PM-3, which is located about ½ mile from R-28 (Figure 3-9). **Hexavalent c**~~C~~hromium detections in monitoring wells R-35a and R-35b (located adjacent to PM-3 and screened deep in the upper louvered section of PM-3 and at the water table, respectively) are at background levels (Katzman, 2016). Well PM-3 could become contaminated in the future, depending on the direction of groundwater flow and on the interim measures being implemented by LANL (discussed below) to control plume migration (LANL, 2015b).

The screened interval in monitoring well R-28 is from 934 to 958 feet deep, extending only 69 feet into the top of the regional aquifer, while PM-3 is screened at much greater depths (from 956 to 2,532 feet), therefore producing water from a much larger section of the aquifer. If the chromium plume were to reach PM-3 yet be confined to a shallow segment near the top of the aquifer, the concentration is likely to be highly diluted as a result of pumping from an interval of more than 1,500 feet. Nevertheless, the presence of **hexavalent** chromium near the well represents a risk that should be carefully monitored. During 2015, the NMED DOE Oversight Bureau coordinated with the NMED Drinking Water Bureau on a scope of work for a potential project to assess the vulnerability of the LACWU water supply wells to contamination; however, due to grant timing and State contracting limitations, the project has been put on hold (Yanicak, 2016). **In the event that any of the production wells are impacted by hexavalent chromium, the LACWU maintains an insurance policy to fund and implement corrective actions, as needed.**

The May 2015 Interim Measures Work Plan (LANL, 2015a) presents LANL's approach for controlling movement of chromium-contaminated groundwater along the downgradient portions of the plume. LANL plans to extract contaminated groundwater, treat it at the surface using ion

exchange, and reinject it into the aquifer, with project implementation beginning in 2016 (LANL, 2016). In an October 2015 letter, NMED approved the LANL work plan and set due dates for the interim measure task work plans (NMED, 2015b). Figure 3-10a shows the chromium interim measure project area in relation to the rest of the County, and Figure 3-10b shows the existing and planned extraction, injection, and monitoring wells, and provides an approximate areal extent of the hexavalent chromium-contaminated groundwater that exceeds the 50-µg/L NMWQCC groundwater standard for human health (DOE and LACWU, 2016). The work plan also provides a general description of the planned treatment system, including two ion exchange vessels for treatment and redundancy (LANL, 2015b).

In addition, LANL is conducting work under the July 2015 *Work Plan for Chromium Plume Center Characterization* to further investigate the aquifer in the center of the chromium plume and to further characterize the nature and extent of the contamination in order to identify remedial alternatives for the chromium plume (LANL, 2015b). Objectives include investigating the feasibility of chromium source removal, further characterizing the aquifer—including heterogeneity and dual porosity—in order to evaluate the potential for in situ remedial strategies, studying the hydrologic and geochemical conditions that occur near the proposed injection wells, and characterizing the infiltration beneath the shallow alluvial groundwater in Sandia Canyon (LANL, 2015b). The LANL chromium plume center characterization work plan details planned LANL activities, including extraction well installation, pumping, and sampling, aquifer tracer tests and a field cross-hole trace study, an injection well study, and characterization of infiltration in Sandia Canyon (LANL, 2015b).

LANL plans to work with the LACWU to ensure that the interim measure pumping does not interfere with the water supply pumping and to continue to monitor water quality in the monitoring and water supply wells (LANL, 2014c). In addition, LANL will prepare a corrective measures evaluation report that proposes the final remedy for the chromium plume (LANL, 2015b).

3.4.4 Other Contaminants in Groundwater

A number of additional contaminants have been detected in groundwater, including nitrate, RDX, tritium, trichloroethene, and radioactive contaminants. These contaminants are discussed briefly in the sections that follow.

3.4.4.1 Nitrate

Nitrate (NO_3 as nitrogen) has been detected in the regional aquifer at concentrations of up to 6.1 mg/L in monitoring wells R-43 S1 and R-11 in Sandia Canyon and R-42 in Mortandad Canyon (the U.S. EPA national primary drinking water standard and NMWQCC groundwater standard for human health are both 10 mg/L). Nitrate (as N) concentrations are also elevated (> 2 mg/L) in samples from regional aquifer monitoring wells R-36 in Sandia Canyon and R-15, R-28, and R-45 in Mortandad Canyon (LANL, 2014a).

3.4.4.2 RDX

RDX, a component of explosives, has been detected in groundwater. An official standard for this chemical has not been established; however, the EPA's tap water screening level for RDX is 0.70 µg/L (U.S. EPA, 2016). LANL indicated that EPA is using a target risk of E–6 for RDX (0.70×10^{-6} µg/L), and that NMED requires LANL to use a target risk of E–5 (Katzman, 2015). The RDX standard used by LANL is 7.0 µg/L (NMED, 2015a).

RDX is monitored by LANL, and RDX concentrations exceed LANL's 7.0-µg/L standard at two springs (Burning Ground Spring and Martin Spring), one alluvial well (CdV-16-02659), and three intermediate-perched zone wells (CdV-16-4ip S1, CdV-16-2(i)r, and CdV-16-1(i)) near TA-16 in the Water Canyon watershed (LANL, 2015c). RDX is also persistently detected in regional aquifer monitoring wells R-18 and R-63 at concentrations that are below the standard. In 2015, the maximum concentrations detected were 1.66 µg/L in R-63 and 2.86 µg/L in R-18. The concentrations in R-63 have been relatively steady since this well was installed in 2011, with the exception of the first few samples following well construction. Detected concentrations in R-18 show an increasing trend since the well was completed in 2006 (LANL, 2016).

3.4.4.3 Trichloroethene and Tetracloroethene

Chlorinated solvents are present in the groundwater near TA-16 (LANL, 2015c). Trichloroethene (TCE) was detected in Pajarito Canyon regional aquifer monitoring well R-20 S2 beginning in late 2008 and continued to be detected in every sampling event through 2011. In 2015, TCE was not detected in R-20 S2 (LANL and NMED, 2016). In 2014, tetrachloroethene (PCE) and TCE were detected in alluvial well FLC-16-25280 at concentrations above the U.S. EPA national primary drinking water standards of 5 µg/L (LANL and NMED, 2016).

3.4.4.4 Radioactive Contaminants

Radioactive effluent was discharged into Los Alamos Canyon during the earliest Manhattan Project operations at TA-01 (1942 through 1945) and from nuclear reactors at TA-02 (until 1993). Liquid and solid radioactive wastes were also discharged in Los Alamos Canyon from TA-21, and radionuclides and metals were discharged from the sanitary sewage lagoons and cooling towers at the Los Alamos Neutron Science Center at TA-53. Compared with past decades, little radioactivity is now found in groundwater samples. In 2013, strontium-90 was detected in shallow alluvial wells in DP and Los Alamos Canyons, at concentrations of up to 17 picocuries per liter (pCi/L) (LANL, 2014a). The U.S. EPA has established a national primary drinking water standard of 4 millirem per year (mrem/yr) for beta particle and photon radioactivity from man-made radionuclides in drinking water (including strontium-90, which emits beta particles during radioactive decay). Based on conversions provided by the U.S. Department of Commerce Bureau of Standards, the derived concentration of 8 pCi/L is equivalent to a dose of 4 mrem/yr for strontium-90 (U.S. Department of Commerce, 1959; U.S. EPA, 2015b). Samples collected from alluvial well LAO-3a continue to exceed the standard. In 2015, the strontium-90 concentration in this well was 12.4 pCi/L (LANL and NMED, 2016).

Tritium activities in groundwater peaked in the early 1980s and have since declined. Tritium was detected in water supply well O-1 at an activity of 2.373 pCi/L in 2015 (LANL and NMED, 2016). In the intermediate zone monitor wells MCOI-5 and MCOI-6, tritium was detected in 2015 at activities of 3,140 and 2,940 pCi/L, respectively. The U.S. EPA's dose-based drinking

water standard for tritium is 4 mrem/yr, based on a maximum contaminant level of 20,000 pCi/L (U.S. EPA, 2002).

3.5 Surface Water Supply

Though most of the LACWU water supply is from groundwater, there are two sources of surface water supply:

- The Los Alamos Canyon reservoir has provided non-potable water supplies to schools, parks, and a golf course. The reservoir filled with debris following the 2000 Cerro Grande Fire, and the area was further impacted by the 2011 Los Conchas fire and subsequent flooding. The debris was cleared and reservoir repair and reconstruction was completed in the spring of 2013, but a flood in September 2013 filled the reservoir with silt again. The reservoir has been dredged and the LACWU plans to install a new pipeline from the reservoir into town in order to connect to the existing non-potable infrastructure (Meyers, 2016).

- LACWU has the potential to use Rio Grande surface water from the San Juan-Chama Project in the future, though a diversion structure has not yet been constructed. Bringing the San Juan-Chama Project water online would diversify the water supply **geographically and also in terms of water rights**, helping the LACWU to mitigate any future effects due to contamination of existing wells and/or climate change. Details of the proposed San Juan-Chama Project and LACWU water rights are discussed in Section 4.

Since surface water supplies only non-potable supplies to LACWU, surface water contamination is not a primary issue for drinking water quality. However, careful management of stormwater runoff, particularly in areas impacted by fire, is an important water resource management issue for Los Alamos County, as discussed in Section 7. Surface water quality will become more of an issue **if and when a project to use** ~~once the~~ San Juan-Chama Project **water** comes online.

4. Water Rights

In addition to having sufficient physical supply, the LACWU needs to have the legal rights to use the water. New Mexico water law is founded on the principle that all water in New Mexico belongs to the State of New Mexico, which thus has the sole authority to grant or recognize rights to use that water. Two further tenets, both based on New Mexico Constitution Article XVI, Section 2, are that (1) water rights "are subject to appropriation for beneficial use, in accordance with the laws of the state" and (2) "priority of appropriation shall give the better right."

- The concept underlying the principle of prior appropriation is that the first person to use water for a beneficial purpose has a prior right to use that water against subsequent appropriators. Water rights acquired through this system of prior appropriation are a type of property right and may be sold or leased.

- The essential basis of water right ownership is beneficial use. The principle of beneficial use is that a water right arises out of a use that is productive or beneficial, such as agricultural, municipal, industrial, and domestic uses, among others.

The State Engineer, through the OSE, administers water rights for the State of New Mexico:

- To actively manage groundwater resources in New Mexico, the State Engineer has the authority, as set forth in the Water Code, to delineate groundwater basins that require a permit for groundwater withdrawals. Such a permit specifies (1) how much water a user can withdraw in any given year, (2) the location and type of well that will be used to withdraw the water, and (3) the use to which the water will be put. Many water right permits have special conditions that further define the use and quantity of water allowed under the permit.

- Like groundwater, the diversion of water from New Mexico's surface waters requires either a declaration, permit, license, or court decree to divert the water. Surface water appropriations follow the same standards as groundwater rights in that a transfer or

lease cannot impair existing water rights and must not be contrary to public welfare or conservation (NMSA 72-5-23, 72-12-3(D)).

Many of New Mexico's surface waters are governed by interstate compacts that require set amounts of water to be delivered to specified delivery points. The Interstate Stream Commission, an adjunct commission to the OSE, has responsibility for ensuring that specific rivers in New Mexico meet their obligations under their respective interstate compacts.

4.1 Water Rights

The LACWU has existing water rights from a variety of sources, including water rights from the Rio Grande surface water and underground water basins and rights to use 1,200 acre-feet of water from the San Juan-Chama Project. The U.S. DOE also owns Rio Grande underground water basin rights. These rights are discussed in Sections 4.1.1 and 4.1.2, respectively.

4.1.1 Rio Grande Surface Water and Groundwater Rights

As discussed in Section 2, the LACWU's Rio Grande water rights were originally owned by the U.S. DOE. In 2001, 70 percent ownership was transferred to the LACWU, and DOE retained 30 percent ownership. Table 4-1 summarizes these permitted, licensed, and declared water rights.

The rights outlined in Table 4-1 are based on a permit application filed by U.S. Energy Research on May 29, 1975 to combine a series of previously licensed and declared water rights. That application requested a total right of 5,547.1 ac-ft/yr for municipal, industrial, and related purposes that could be diverted from any combination of permitted points of diversion. The OSE approved the application on October 30, 1975 with the exception of subtracting 5.8 ac-ft/yr for evaporation losses at Los Alamos Reservoir. Figure 4-1 shows the LACWU water diversions for 2010 to 2015 (these volumes were calculated by subtracting LANL demands from total diversions), and Figure 4-2 shows the LANL water use volumes for the same period, in comparison to their respective groundwater rights. Figure 4-3 shows the LACWU water diversions and LANL water use volume, along with the water rights for both entities. The

LACWU has an extension of time for putting their rights to beneficial use that will expire on September 30, 2017.

Table 4-1. Summary of Water Rights

Permit Number	Water Source	Priority Date	Quantity of Water Originally Appropriated (ac-ft/yr)
RG-485 through RG-496-Comb-S-4 [a]	Groundwater	1948-1951	5,329
RG-485 through RG-496-Comb-S-5 [b]	Groundwater	1948-1951	50
1503,1802, and 1802-amended [c]	Surface water	March 14, 1922	168.1
Evaporation loss	Surface water	NA	(5.8)
		Total water rights	5,541.3 [d]

Source: Southwest Water Consultants, Inc., 1999

[a] Permitted August 31, 1965 from numerous underground water right declarations filed on March 5, 1957 and amended in 1965. These declarations identified actual use of 3,966 acre-feet in 1964, a capacity of 6,579 ac-ft/yr, and an OSE feasible diversion of 5,329 ac-ft/yr. Dates that water was put to beneficial use vary.

[b] Subsequent declarations added an additional 50 acre-feet and new points of diversion.

[c] The amendment to Permit 1802 raised the storage capacity from 6.66 acre-feet to 28.33 acre-feet.

[d] Of the total 5,541.3 ac-ft/yr under the 1975 combined permit, the LACWU owns 70 percent (3,878.91 ac-ft/yr) and DOE owns 30 percent (1,662.39 ac-ft/yr).

The LACWU (which is the sole water provider for LANL) leased the DOE-owned water rights from 2001 to 2011, when the lease expired. In May 2016, an application for permit to change an existing water right was filed jointly by DOE and the LACWU in support of the chromium plume control interim measure and chromium plume center characterization project (U.S. DOE and LACWU, 2016). In addition, a Request for Emergency Authorization associated with the joint application was submitted, and emergency authorization was received on September 10, 2016 (NMOSE, 2016). The application and emergency authorization request were filed jointly because of the nature of the existing permitted rights between the DOE and the LACWU (U.S. DOE and LACWU, 2016).

The application requests a change in purpose of use for groundwater to add groundwater remediation and additional groundwater points of diversion (PODs) to be used for control and future characterization of hexavalent chromium-contaminated groundwater at LANL (U.S. DOE and LACWU, 2016). The application calls for 24 additional PODs (3 extraction wells, 6 injection wells, and 15 monitoring wells). The volume of water for this application is 679 ac-ft/yr (U.S. DOE and LACWU, 2016), and LANL also plans to file for return credits from the OSE.

Operation of the additional PODs will not impair or increase the appropriation of water above the existing permitted water rights between DOE and the LACWU (5,541.3 ac-ft/yr total) (U.S. DOE and LACWU, 2016). On September 10, 2016, the OSE approved the request for Emergency Authorization and issued Emergency Authorization, RG-00485 et al. (NMOSE, 2016).

~~Using 679 ac-ft/yr of the DOE-owned water rights for the LANL chromium project leaves 983.39 ac-ft/yr of DOE-owned water rights.~~ The LACWU **continues to negotiate** ~~plans to enter into~~ a new lease with DOE for the ~~remaining 983.39~~ **full 1,662.39** ac-ft/yr, for use by all customers, including LANL **and the chromium interim measure** (Meyers, 2016).

In 2006, the OSE approved a 30-ac-ft/yr surface water diversion from Los Alamos Canyon for snowmaking**, which is included in the existing total water rights volume of 5,541.3 ac-ft/yr**. The purpose of use was changed from municipal and industrial to municipal, industrial, recreational, and snowmaking. ~~The proof of completion of works was accepted by the OSE in August 2010. The diversion could be increased up to 120 ac-ft/yr with the filing of a return flow plan, provided that the consumptive use did not exceed 30 ac-ft/yr. These water rights are referred to as the Camp May water rights (SP-1802-C). In 2009, the OSE approved an additional POD to fill a storage tank or reservoir for snowmaking at the Pajarito Ski Area. The coordinates for the new POD will be x = 1,646,410.77 and y = 1,771,027.64 (New Mexico State Plane NAD83 coordinates), within Township 19 North, Range 5 East, Section 10. In November 2014, the OSE approved an extension of time for submitting proof of completion of works, and proof of application of water to beneficial use is due to the OSE by September 30, 2017.~~

4.1.2 San Juan-Chama Surface Water Rights

Implementation of a project to use San Juan-Chama Project water will help to diversify the Los Alamos County water supply, both geographically and from a water rights perspective. The San Juan-Chama Project surface water originates in the Colorado River Basin and provides a source of supply that is geographically separate from the regional aquifer near Los Alamos. This geographic separation will be a benefit~~,~~ should there be expanded water quality contamination issues in the local groundwater in the future. Additionally, as a federal project, San Juan-Chama Project water contracts are not subject to OSE priority issues, although they may be subject to water rights

administration (discussed in Section 4.3.1 and 4.3.2). The San Juan-Chama Project water rights may also be subject to shortage sharing on a pro rata basis among all contractors in drought years, as discussed in Section 4.3.3. Even with some drought vulnerability, having a separate source of supply could help to provide back-up supply, if contamination or water rights issues affect the use of the regional aquifer.

Los Alamos County has contracted water rights with the U.S. Department of the Interior Bureau of Reclamation for 1,200 acre-feet of San Juan-Chama Project surface water, which flows into the Rio Grande through a series of tunnels, conveyance channels, and reservoirs. ~~Los Alamos County has a service contract for 1,200 acre-feet of San Juan-Chama Project surface water, which flows into the Rio Grande through a series of tunnels, conveyance channels, and reservoirs. The current contract has an expiration date of 2017. Los Alamos County's San Juan-Chama service contract was converted to a repayment contract, which eliminates expiration dates and the need to renegotiate and renew the contract. Under the amended repayment form of contract, the annual payments are viewed as repayment of Los Alamos's allocated construction cost obligation instead of annual water service charges, as was the case under the former water service form of contract (USBR, 2007).~~**Los Alamos County's San Juan-Chama contract was converted from a service contract to a repayment contract in October 2006, and the LACWU completed repayment of the contract (Los Alamos County's share of the San Juan-Chama Water Project construction costs) in December 2015. Under the current contract, remaining payments are for operation, maintenance, and replacement costs only (SJ-C Project Contract No. 05-WC-40-560).**

A final preliminary engineering report (PER) was completed for the LACWU San Juan-Chama **Project** water supply project in September 2012. The PER evaluated five alternatives for diverting, treating, and conveying the San Juan-Chama Project water and **recommended**~~selected~~ the alternative that called for the installation of three wells in White Rock (CDM Smith, 2012). Under this alternative, groundwater that would have naturally discharged to the river would be pumped, and the San Juan-Chama **Project** water would replace the pumped groundwater in the river (CDM Smith, 2012). This alternative would not require treatment above disinfection, and the proposed well locations would allow for connection to the water system at an existing booster station (CDM Smith, 2012). ~~Public concerns have~~

~~been raised over the proposed well locations, and t~~The Los Alamos County Council advised that **further study of alternatives and** an environmental assessment be completed before the project moves forward (LACWU, 2014).

The environmental assessment will provide an opportunity to re-evaluate specifics of the project design in light of environmental and public concerns. In July 2014, the Utilities Manager recommended delaying further action on the San Juan-Chama Project diversions until the 40-year water plan update has been completed (LACWU, 2014). **Through the environmental assessment and further planning processes, LACWU will need to consider the benefits of the separate San Juan-Chama Project water supply in relation to costs and other concerns, and to determine when and if to construct a project that would bring this water online.** ~~Bringing the San Juan-Chama Project water online would diversify the water supply, helping the LACWU to mitigate any future effects due to contamination of existing wells and/or climate change.~~

4.2 Water Rights Administration

As part of the planning process, it is important to view the LACWU's water rights in the larger context of the administrative and other legal considerations that could affect the LACWU's ability to use and divert its water rights in any given year. This section discusses the administrative policies currently or potentially affecting the LACWU's water rights; Section 4.3 assesses the potential risks to those water rights.

4.2.1 Rio Grande Compact

Water in the Rio Grande is governed by the Rio Grande Compact, an agreement entered into by New Mexico, Texas, and Colorado in 1939 and approved by the United States Congress and the State of New Mexico (NMSA 72-15-23). The Compact applies to the use of surface water of the Rio Grande, from its headwaters in Colorado to Fort Quitman, Texas, by each of the three states. Each upstream state is required to make a surface water delivery to its downstream neighbor. The volumes of water required to be delivered to New Mexico and Texas are calculated based on upstream flows, and an annual accounting is conducted to determine each

state's actual deliveries in relation to that delivery obligation and the resulting credits or debits (over- or under-deliveries), which are carried over from year to year.

New Mexico's Compact delivery requirements are based on an inflow-outflow schedule where inflow is measured at the Rio Grande at Otowi Bridge near San Ildefonso, NM gage (Otowi gage) east of Los Alamos. Because of the Otowi gage's role in determining delivery amounts, the State Engineer has a long-standing administrative practice of not permitting a change in point of diversion from one side of the gage to the other, whether by sale or by lease (Cartron et al., 2002). This requirement places a significant restriction on the water rights market, and coupled with the fact that few pre-1907 water rights are available for purchase, means that purchasing water rights, whether for municipal use or offsets (Section 4.2.4), will be a significant challenge. Additionally, even if a willing seller can be identified, water rights transfers on the Rio Grande are routinely protested and can require expenditure of significant technical and legal fees.

4.2.2 Protection of Senior Water Rights

As discussed above, the State of New Mexico adheres to the prior appropriation system for water rights administration. This approach is based on a "first in time, first in right" concept, whereby the water right holder with a priority date senior to other rights can exercise that right to the detriment of a right with a junior priority date. When senior water right holders are unable to fully exercise their right due to diversions by junior water right holders, they can make a priority call on a river (including stream-connected groundwater rights). This call, which would be administered by the OSE, would require junior users to cease pumping or diverting so that the senior rights could be fulfilled.

To date, priority call-based administration has rarely happened; however, most rivers and connected groundwater basins are over-appropriated. Even though the Rio Grande Basin has not been adjudicated (a legal process that establishes the amounts and priority dates of all surface water and groundwater rights in a stream system), LACWU water rights are junior to a significant number of downstream senior water rights, such as the Middle Rio Grande Conservancy District, that could be impacted by additional depletions upstream. With additional

growth and other pressures, such as endangered species requirements, active administrative protection of senior water rights in groundwater basins and rivers is likely to become more frequent over the 40-year planning horizon.

4.2.3 Active Water Resource Management

In an effort to develop more flexible tools for administering water rights in New Mexico, the OSE adopted Active Water Resource Management (AWRM) regulations (NMAC 19.25.13.1 to 13.49) in December 2004. The AWRM legislation creates an administrative framework within which the OSE will establish water master districts, appoint water masters for those districts, and develop district-specific water rights administration regulations.

The OSE has established seven priority basins for AWRM (NMOSE, 2004a), including the Lower Rio Grande. Over time, the OSE may extend the AWRM program to the Upper Rio Grande and develop regulations that will address administration of water rights, although the regulations will not become final until the Rio Grande Basin has been adjudicated (NMOSE, 2004b). In the Pecos River and connected groundwater basins, the OSE has developed AWRM regulations that clearly lay out several approaches to priority administration, all of which allow for curtailment of junior water rights to protect senior water rights.

4.2.4 Rio Grande Offset Requirements

In accordance with statutory authority and case law, the OSE manages the Rio Grande surface water and groundwater basins conjunctively and considers Rio Grande surface water to have been fully appropriated as of the year 1939 (the year the Rio Grande Compact was signed) (NMOSE, 2000). This means that the OSE recognizes the groundwater-surface water connection and conditions permits so that new groundwater appropriations will not increase surface water depletions and thereby affect senior water right holders. Specifically, the OSE requires applicants for groundwater rights to purchase and retire valid water rights in an amount equivalent to the effect the groundwater withdrawals will have on the river.

Previously, the OSE didn't require applicants to immediately begin purchasing and retiring water rights. However, current policy, which was upheld in a case involving the City of Rio Rancho, specifies that offsets must be in place to counteract the effect of pumping on the river. A phased acquisition of the offsets is possible, especially if the applicant is not planning to immediately pump up to the full permitted amount; however, offsets for impacts must be in place by the time those impacts affect the river (i.e., increase depletion).

The OSE has further clarified this policy, stating that offset rights may be valid only for pre-1907 rights, a pre-1907 surface water right previously transferred into a well, or an existing groundwater right with a priority date older than May 31, 1939, the date of the Rio Grande Compact (NMOSE, 2006). This policy limits the number of water rights that could be considered for offset requirements.

4.2.5 Rio Grande Declared Underground Water Basin

The Rio Grande Underground Water Basin covers 26,209 square miles along the Rio Grande in the center of the state. Although specific administrative criteria exist for the area near the river in the Middle Rio Grande (the reach from Cochiti to Socorro) (NMOSE, 2000), the OSE has no unique administrative criteria for the portion of the Rio Grande Basin near Los Alamos County. The OSE evaluates applications for water rights in this reach, including a change in point of diversion or place and purpose of use of water rights, to determine whether the granting of the application will impair existing water rights or be detrimental to the public welfare or contrary to the conservation of water.

4.3 Risks to Los Alamos County Water Rights

Although the LACWU owns a specific volume of water rights, the legal right to divert and use those rights in any given year can be affected by the rights of other water rights holders and even as a result of interstate compacts or other agreements governing interstate waters. These risks are discussed in the following subsections.

4.3.1 Protection of Senior Water Rights

As discussed in Section 4.2.2, the LACWU could potentially be subject to limitation of its water rights in order to protect senior water rights. A significant yet unquantified number of the water rights on the Rio Grande are senior to those of the LACWU. In the event that the OSE begins administering priorities based on a call or based on AWRM regulations, the LACWU could be required to limit its use or to use some of its San Juan-Chama Project water to mitigate the effects of its diversions on senior water right holders. Until the OSE conducts a hydrographic survey and adjudicates the Rio Grande Basin, however, it is impossible to quantitatively evaluate the LACWU's susceptibility to curtailment of its water rights under priority administration.

4.3.2 Rio Grande Offset Requirements

Even without a priority call, the OSE could potentially require the LACWU to offset its current pumping to avoid impairment of pre-1939 senior water rights holders. For example, should the LACWU submit an application to change the POD or purpose and place of use of a water right, the OSE would evaluate that application with respect to impairment, public welfare, and conservation. Because the LACWU's use of its water rights increases depletions on the Rio Grande, thereby impacting senior water rights holders, the OSE could require offsets due to impairment even though the existing permits have no offset requirement. As discussed in Sections 4.2.4 and 6, the LACWU could satisfy those offset requirements by using San Juan-Chama Project water as offset rights or by purchasing water rights. However, willing sellers of pre-1907 water rights are difficult to find, and many municipalities have encountered difficulties in identifying water rights to purchase.

The LACWU might also be able to reduce the number of offset water rights the OSE would require by applying to the OSE for return flow credit for the treated wastewater effluent it returns to the Rio Grande. Credit for return flow to the aquifer is also possible. Both types must be demonstrated in a return flow plan subject to OSE approval (NMOSE, 2000, Section 3).

4.3.3 Navajo Water Rights Settlement Provisions

The original legislation authorizing the San Juan-Chama Project includes provisions for sharing shortages among beneficiaries of the project (76 Stat. 96, PL 87-483). The Northwestern New Mexico Rural Water Projects Act (123 Stat. 1372, PL 111-11) was enacted on March 30, 2009, and Section 10402 amends Public Law 87-483, providing additional detail about shortage sharing. The Navajo Water Rights Settlement, which was approved in August 2013, defines flows and other requirements in a manner that could result in shortages to the San Juan-Chama Project. These shortages would likely be shared on a pro rata basis among all contractors. Although conditions giving rise to shortage sharing may be rare, implementation of the act could nonetheless reduce the quantity of San Juan-Chama **Project** water available to contractors in some years. **Predicted changes in San Juan-Chama Project water allocations resulting from climate change are discussed in Section 7.**

4.4 Acquisition of New Water Rights to Meet Future Demand

As discussed in Section 6, the LACWU could be required to obtain additional water rights to meet future water demand, or to move points of diversion for existing rights if contamination affects supply wells (Section 3). As the Rio Grande basin is considered to be fully appropriated, the LACWU would have to purchase water rights to meet future needs, which may not be feasible given water market limitations. The LACWU should consider maximizing use of its existing water rights through conservation or reuse and through maximizing return flow credits.

4.5 Los Alamos National Laboratory

In September 2009, LACWU signed an agreement with DOE to provide water service to LANL for the period October 1, 2009 through September 30, 2019, and the County will be the sole water provider for LANL at least through the term of this agreement. The contract indicates that DOE will provide support to LACWU for implementing use of San Juan-Chama Project water. The contract also identifies other terms of service such as meter testing, access to wells for hydrologic monitoring, water storage for firefighting, and water rates. Estimated quantities of water to be provided to LANL range from 412,000,000 gallons (1,264 acre-feet) in 2010 to

572,000,000 gallons (1,743 acre-feet) in 2019. The contract recognized that predicting future water needs for LANL is difficult and included provisions for notification if the future water needs were expected to increase by more than 50,000,000 gallons (153 acre-feet) per year. The agreement also includes a curtailment plan with provisions to reduce water use during times of shortage. LANL provided a 10-year water demand forecast (fiscal year 2017 through fiscal year 2027) in support of this plan update, with values ranging between 254,610,000 gallons (781 acre-feet) and 490,510,000 gallons (1,505 acre-feet) (Ballesteros Rodriguez, 2016) (Section 5).

5. Water Demand

In order to assess the LACWU's projected future demand for water, this section discusses current and historical water uses (Sections 5.1 and 5.2) and demographic and economic trends (Section 5.3). Based on this information, projected future water demands for the region are presented in Section 5.4.

5.1 Historical Use

Groundwater and surface water have supplied the community of Los Alamos for 60 years. Figure 5-1 and Table 5-1 show the metered diversion amounts from wells and surface water from 1947 through 2015. Table 5-2 shows water diversions and population by decade from 1950 through 2010.

Between 1950 and 2000, population increased in Los Alamos County, and since 2000, the population has decreased by approximately 2 percent (Table 5-2). Diversions also increased between 1950 and 1990, due to increased population, and decreased between 1990 and 2010, partially due to water conservation efforts.

Diversions fluctuate significantly from year to year due in part to fluctuating levels of precipitation (Figure 5-2). For instance, in 2012 precipitation was 8.76 inches, and total system demand was 156 gallons per capita per day (gpcd). In 2014, precipitation was 16.82 inches, and total system demand was 135 gpcd.

Demand from the LANL's operations also impacts the magnitude of diversions. Figure 5-3 shows the monthly variation in water use in 2014, with an annual diversion for LANL of 29 percent and 71 percent for the LACWU. While demand in summer months triples for the LACWU due to outdoor watering, the monthly range in water use by LANL varies less. In 2014, LANL used the greatest volume of water in November.

The LACWU has been using the GPCD (gallons per capita per day) calculator developed by the OSE to calculate per capita use since 2007. This allows the County to evaluate water use apart

from the bulk water sales to LANL. The per capita values calculated for the total water system demand and by sector for 2007 through 2014 are presented on Table 5-3. Since 2007, total system water demand has ranged between 133 and 157 gallons per day. For the single-family residential sector, per capita demand has ranged between 91 and 120 gallons per day.

Table 5-3. Los Alamos County Per Capita Demand

Year	Sector			Annual System Total
	Single-Family Residential	Multi-Family Residential	Industrial, Commercial, and Institutional	
2007	100	55	32	153
2008	105	55	29	157
2009	91	51	26	137
2010	105	53	29	133
2011	117	59	31	149
2012	120	60	31	156
2013	102	56	22	137
2014	104	54	23	135

Sources: Los Alamos County (2007-2013 data)
LACWU, 2015 (2014 data)

5.2 Current Water Use

The total population served by the LACWU includes the 17,950 residents estimated to live within Los Alamos County in 2010, primarily in the communities of White Rock and Los Alamos.

Table 5-4 shows the monthly and annual billing data by sector for 2010 through 2015. The total system water demand by LACWU (excluding LANL sales) was 135 gallons per day in 2014. In 2014, the per capita demand for the single-family residential sector was 104 gallons per day (Table 5-3). As shown in Figure 5-3, water use increases in the summer months for landscape watering.

In 2014, single-family residential water use accounted for 44.7 percent of LACWU water use (excluding LANL), and multi-family residential water use accounted for 11.6 percent of LACWU

water use. Industrial, commercial, and institutional water use accounted for 14.8 percent of the LACWU's water use, with LANL sales accounting for 28.8 percent of the billed totals (Figure 5-4a). In 2015, single-family residential water use accounted for 43.4 percent of LACWU water use (excluding LANL), and multi-family residential water use accounted for 11.5 percent of LACWU water use. Industrial, commercial, and institutional water use accounted for 16.2 percent of the LACWU's water use, with LANL sales accounting for 28.9 percent of the billed totals (Figure 5-4b).

Comparing the billed totals (Table 5-4) to total diversions (Table 5-1), there was a total of 156 million gallons of non-revenue water in 2014 and 185 million gallons of non-revenue water in 2015. Non-revenue water can include unmetered deliveries ~~(when a meter is broken)~~, leaking pipes in the delivery system, and periodic flushing of the system. The LACWU has performed a water audit following the International Water Association/American Water Works Association (IWA/AWWA) water audit methodology using data for fiscal year 2014 (Table 5-5). This analysis found a total of 86.4 million gallons in non-revenue water (LACWU, 2015). (The large discrepancy between the two results may be due to the different time periods, that is, calendar versus fiscal years).

Indoor watering is estimated as the average water demand for December, January, and February. Comparing the average summer (June, July, and August) and winter demands for the single-family residential sector in 2014, approximately 66 percent of the average summer demand was used outdoors, with the remaining 34 percent used indoors. Comparing the average summer and winter demands for the multi-family residential sector in 2014, approximately 42 percent of the average summer demand was used outdoors and 58 percent was used indoors. Comparing the average summer and winter demands for the single-family residential sector in 2015, approximately 59 percent of the average summer demand was used outdoors, with the remaining 41 percent used indoors. For the multi-family residential sector in 2015, approximately 28 percent of the average summer demand was used outdoors and 72 percent was used indoors.

For more than 70 years, Los Alamos County has used treated wastewater to irrigate turf for a golf course and parks during summer months. The golf course built in Los Alamos in the 1940s

has never been irrigated with anything but effluent. As discussed in Section 2, the LACWU has a non-potable water system that uses treated wastewater effluent for irrigation of several areas in Los Alamos and White Rock, for fire protection, and for snow making at the Pajarito Mountain Ski Area. Table 5-6 shows the monthly volume of treated effluent that was reused in 2010 through 2015; almost 72 million gallons was reused in 2015.

Table 5-6. Water Reuse, 2010-2015

Month	Reuse (gallons)					
	2010	2011	2012	2013	2014	2015
January	81,600	104,800	0	0	0	0
February	107,100	96,900	0	0	1,012,477	0
March	145,200	7,369,900	5,638,165	3,867,063	4,544,270	2,311,815
April	11,178,612	14,612,700	9,032,844	11,552,192	7,256,932	10,895,334
May	11,427,200	19,023,600	17,904,886	20,165,106	14,125,782	5,531,325
June	23,262,400	22,388,800	24,743,657	21,739,135	18,148,354	14,975,357
July	12,140,000	21,091,000	16,050,773	9,850,279	8,197,735	2,916,420
August	5,531,600	7,950,983	18,097,000	10,504,260	12,815,537	12,186,453
September	18,847,100	4,660,344	13,174,880	7,470,298	16,036,338	16,723,354
October	8,367,300	6,392,581	11,028,777	6,106,035	7,517,914	6,133,506
November	249,300	1,293,627	4,256,322	876,738	1,651,125	321,250
December	126,800	0	0	0	0	77
Total	91,464,212	104,985,235	119,927,304	92,131,106	91,306,464	71,994,891
Total (acre-feet)	281	322	368	283	280	221

5.3 Population Projections

The Bureau of Business and Economic Research (BBER) at the University of New Mexico has prepared multiple population projections for Los Alamos County, by examining the growth rate in the previous decades, the age of the population, current rates of in-migration, and death and birth rates (BBER, 1996, 2000). Because Los Alamos County's growth rate slowed significantly in the 1980s and 1990s, the 1996 and 2000 projections for growth were very small, showing an increase of only about 3,000 people (Table 5-7). The previous long-range water supply plan (DBS&A, 2006) presented the BBER projections, but did not use them to project demand,

because they did not take recent land transfers and plans for growth into account. Instead, the 2006 projections were based on the growth scenario identified in the August 2004 New Mexico First Town Hall (Fruth, 2004), which showed that a full build-out could occur rapidly, increasing the population to 25,000 people in 2020 (Table 5-7). Contrary to these projections, the population in Los Alamos County actually declined between 2000 and 2010 (Table 5-2), largely due to a reduction in the work force at LANL.

Table 5-7. Population Projections for Los Alamos County 2000 through 2060

Year	Population Census	BBER (1996)	BBER (2000) [a]	Fruth (2004)	BBER (2012)	2014 Population Projections [b]	
						Low	High
2000	18,343	19,317	19,234	18,359	—	—	—
2004	18,796	19,647	19,505	18,796	—	—	—
2005	18,407	19,729	19,573	19,189	—	—	—
2010	17,950	20,123	19,913	21,155	—	—	—
2015	NA	20,601	20,318	23,120	—	—	—
2020	NA	21,079	20,722	25,086	18,063	17,988	20,000
2030	NA	21,758	21,289	—	17,880	17,789	20,812
2040	NA	22,141	21,627	—	17,210	17,123	21,447
2050	NA	22,291	21,761	—	—	16,480	21,874
2060	NA	22,404	21,854	—	—	15,863	22,092

[a] Based on BBER's (2000) "most likely" scenario
[b] Poster Enterprises, 2014
— = Population not estimated for this decade
NA = Not yet available

The State of New Mexico prepared updates of the 16 regional water plans that were published in 2016, and population projections were prepared by a market research consultant as a part of this effort (Poster Enterprises, 2014). BBER released new population projections in November 2012 that project population by decade through 2040, and these projections were extended by the ISC market research consultant in 10-year increments through 2060 using the BBER growth rate trends as a basis for the extensions. Interviews were conducted to obtain input on growth trends and potential water conservation measures, with the feedback being used to refine the projections. Two population projections were developed for Los Alamos County, with the high forecast assuming that the County's goal of a population of 20,000 is achieved in 2020, with a

very low rate of growth thereafter, and the low forecast closely tracking the BBER projections (Table 5-7).

The high and low population projections that have been developed for Los Alamos County as part of the regional water planning effort have been used as the basis for projecting demand as part of the updated long-range water supply plan. In addition, a separate water demand forecast was obtained from LANL (Table 5-8). There is considerable uncertainty in developing forecasts for LANL over a 40-year horizon, because its mission and size is dependent on political and national security decisions that could result in a wide range of possible activity.

Table 5-8. Los Alamos National Laboratory 10-Year Water Forecast

Fiscal Year	Estimated Annual Consumption (gallons)	Water Demand [a] (acre-feet)
2017	254,610,000	781
2018	262,160,000	805
2019	268,950,000	825
2020	299,110,000	918
2021	363,180,000	1,115
2022	380,760,000	1,169
2023	387,690,000	1,190
2024	389,650,000	1,196
2025	411,700,000	1,263
2026	482,980,000	1,482
2027	490,510,000	1,505

Source: Ballesteros Rodriguez, 2016

[a] The LACWU provides the LANL water supply, so these demands have been included on Table 5-9.

A conceptual master plan has been developed for a new development that is planned in White Rock (Baer, 2016). The A-19 tract development will have a maximum residential density of 8.7 dwelling units per acre, and a total of 160 dwelling units are proposed (Baer, 2016). This will be a private development, although the potential buyer is still in due diligence and the property still belongs to the County (Baer, 2016). The proposed A-19 tract development was not called out specifically in the ISC population projections; however, the high population projection will

account for this growth. The 2010 Census reported a County population of 17,950 people and an average household size of 2.33 people (U.S. Census Bureau, 2010). Adding 160 dwelling units would add approximately 370 people, which is within the 20,000-person high projection for 2020.

5.4 Future Water Demand

DBS&A developed two projections of future water demand for the LACWU for 2020 through 2060. The projections are based on (1) the population projections developed as a part of the State of New Mexico's regional water plan update project (Poster Enterprises, 2014), (2) the total water system per capita demand for 2014 (LACWU, 2015), and (3) a separate water demand forecast that was provided by LANL (Ballesteros Rodriguez, 2016). The demand projections are shown on Table 5-9 and Figures 5-5 and 5-6. Total projected demand ranges between 3,634 and 4,841 ac-ft/yr, with the low projection showing an increase in demand between 2020 and 2030 and decreasing demand between 2030 and 2060, and the high projection showing increasing demands throughout the 40-year time frame.

The previous long-range water supply plan recommended an initial minimum goal of a 12 percent reduction in water demand (DBS&A, 2006). This was one of the long-term goals developed for the LACWU's fiscal year 2013 planning, and it was approved by the Utility Board on September 18, 2013 (Alarid, 2015). Comparing the 2006 water diversions to the more current data, this goal was met by 2014 (Table 5-1), when total diversions were 13 percent less than in 2006. Los Alamos County has a robust water conservation program (Section 8) and recently published an update to the *Energy and Water Conservation Plan* (LACWU, 2015). Further reductions in per capita demand are expected; however, to help compensate for the uncertainty of the LANL projections and ensure that the County plans for adequate future supply, further reductions in demand that may result from conservation have not been incorporated into the water demand projections **that are shown on Table 5-9 and Figures 5-5 and 5-6**.

LANL provided a 10-year water demand forecast, spanning the period of fiscal year 2017 to 2027 (Table 5-8). For the projections beyond 2027, to 2060, LANL demand was assumed to

remain at the fiscal year 2027 volume. LANL also provided projections for the volume of water to be pumped as part of the chromium interim measure project. As discussed in Section 4.1.1, an application for permit to change an existing water right was filed jointly by DOE and the LACWU in May 2016, in support of the chromium interim measure project that will run through December 2023 (Rodriguez, 2016), and emergency authorization was received on September 10, 2016 (NMOSE, 2016). The volume of water for this application is 679 ac-ft/yr (U.S. DOE and LACWU, 2016). In the absence of any estimates for the volume of water that will be needed to support the future chromium remediation project, the chromium interim measure volume is assumed to be needed through 2060. This volume has not been included in the water demand projections (Table 5-9), as the water will be pumped separately and will not be supplied by the LACWU. Figures 5-5 and 5-6 present the low and high water demand projections and illustrate the LACWU and DOE water rights volumes including and excluding the volume needed for the chromium interim measure project. The projections assume that the water supply remains available in terms of water rights and contamination**, and do not take into account the possibility of treating and using contaminated groundwater, which would be possible (with public support)**.

Table 5-10 presents a range in conservation savings that could be achieved with further reductions in the LACWU's 2014 per capita demand of 135 gpcd, ranging from a 5-gpcd savings to a 45-gpcd savings (the reduction necessary to match the City of Santa Fe's 2015 per capita value of 90 gpcd). Achieving the City of Santa Fe's 2015 per capita value would be equivalent to a water conservation savings of between 800 and 1,114 acre-feet per year, based on the population projections for 2060.

Table 5-10. Potential Water Conservation Savings

Per Capita Water Use (gpcd)	Reduction from 2014 Per Capita Use (%)	Annual Conservation Savings	
		Low Population Projection (acre-feet) [a]	High Population Projection (acre-feet) [a]
130	4	89	124
120	11	267	371
110	19	444	619

Per Capita Water Use (gpcd)	Reduction from 2014 Per Capita Use (%)	Annual Conservation Savings	
		Low Population Projection (acre-feet) [a]	High Population Projection (acre-feet) [a]
100	26	622	866
90 [b]	33	800	1,114

[a] Annual water conservation savings that would be achieved based on reductions from the 2014 per capita value of 135 gallons per day in 2060.
[b] This value is equivalent to the City of Santa Fe's per capita demand in 2015.

Figures 5-7 and 5-8 show low and high water demand projections, assuming that the LACWU water demands are reduced in the future due to conservation (the LANL water demands remain unchanged). Table 5-11 shows the data that are plotted on Figures 5-7 and 5-8. The same low and high population projections that are used for Figures 5-5 and 5-6 have been used for both scenarios, but the per capita demand is assumed to be reduced from 135 gpcd (the 2014 value) to 130 gpcd by 2030, 120 gpcd by 2040, 110 gpcd by 2050, and 100 gpcd by 2060.

6. Reconciliation of Supply with Demand

To ensure that adequate water resources are available to meet future demands, the LACWU must take into consideration the quantity of supply available, limitations to the supply due to water quality concerns, and the legal ability to use the available supply (water rights).

The physical water supply is discussed in detail in Section 3. Given the amount of water in storage and the large saturated thickness in relation to observed rates of water level decline, and assuming that the LACWU remains the primary diverter in the area, the LACWU is expected to have an adequate quantity of supply to meet the projected demands over a 40-year time frame. Wells may need to be replaced or moved to new locations, but it is expected that the available supply somewhere in the vicinity of Los Alamos will be adequate to fulfill the LACWU's existing water rights. Ongoing monitoring of water levels and aquifer testing is recommended to confirm that threats to water supply do not develop.

As discussed in Section 3.2.2, there is some risk to the supply due to contamination, and if the LACWU's supply wells were to be impacted, they could become unusable over the 40-year plan horizon **(without treatment)**. The hexavalent chromium plume near several supply wells will continue to be monitored as the interim measure is implemented, and the presence of this contamination highlights why contingency planning for potential impacts to water supply wells is important.

If contaminant levels exceed applicable standards in any supply well, the LACWU could potentially redrill the well in an alternate location and continue to pump the same volume, provided that the transfer of the diversion point is approved by the OSE. Potential locations for replacement wells have not been identified, but the best locations would be upgradient from contaminant sources, accessible to existing water supply infrastructure, in productive zones, and separate from the influence of other pumping wells. The LACWU filed an application for an additional point of diversion (O**towi Well No. -**2) on April 28, 2016. This well will be drilled to supplement the system's existing production wells in anticipation of declining production rates from existing wells that are nearing the end of their service life (Alarid, 2016), rather than as a replacement well for any future contamination of well(s) that could occur.

As discussed in Section 4.1.1, DOE owns 30 percent (1,662.39 ac-ft/yr) of the total groundwater rights (5,541.3 ac-ft/yr), and the long-term lease that was in place for LACWU to use these water rights expired in 2011. A portion of the volume of the DOE-owned water rights (679 ac-ft/yr) will be used for the chromium interim measure project**; however,** ~~, and~~**the** LACWU **is pursuing**~~plans to~~ **a** lease **for** the ~~remaining~~ **full** DOE**-owned water rights volume** ~~water rights~~ (**1,662.39**~~983.39~~ ac-ft/yr)~~.;~~ ~~however, t~~**T**he lease is not yet in place. If DOE declines to lease their water rights to the LACWU, the groundwater rights volume that the LACWU has access to will be reduced to 3,878.91 ac-ft/yr.

The LACWU-owned groundwater rights volume **(3,878.91 ac-ft/yr)** is not adequate to meet the LACWU plus LANL low-water-use projections for 2030, 2040, 2050, or 2060, but the 2020 low-water-use projections can be met with this volume (Figure 5-5). The LACWU-owned groundwater rights volume is not adequate to meet any of the LACWU plus LANL high-water-use projections (Figure 5-6). **With increased conservation in the amounts shown on Table 5-11, the LACWU-owned groundwater rights volume is not adequate to meet the LACWU plus LANL low-water-use projections for 2030, but the 2020, 2040, 2050, and 2060 low-water-use projections can be met with this volume (Figure 5-7). With increased conservation, the LACWU-owned groundwater rights volume is not adequate to meet any of the LACWU plus LANL high-water-use projections (Figure 5-8).** In the event that the remaining DOE water rights are not leased to the LACWU,~~ and~~ the LACWU continues to be the sole water provider for LANL, **and the high population projections are realized, even with significant additional conservation** the LACWU will need to implement a project to bring their San Juan-Chama **Project** water online. Additional discussion of contaminant and water rights risks is presented in Sections 3.2.3 and 4.3, and recommendations for responding to these risks are discussed in Section 9.

As discussed in Section 5.4, both low- and high-water-use projections were developed based on LACWU and LANL growth projections made for the current regional water plan updates. To evaluate the gap between the projected demands and the available supply, two scenarios were considered, as discussed in Sections 6.1 and 6.2.

6.1 Scenario 1: Low-Water-Use Projection and Supply Available to Fulfill Water Rights

The total (LACWU plus LANL) projected water use under the low-water-use scenario is estimated to increase from the actual 2010 water demand of 3,616 ac-ft/yr to 3,634 ac-ft/yr in 2020 and 4,191 ac-ft/yr in 2030 and then decrease to 3,900 ac-ft/yr by 2060 (Table 5-9, Figure 5-5). In this scenario, total projected demand can be met by the existing groundwater rights, assuming that the LACWU will lease the DOE groundwater rights ~~that will not be used for the chromium interim measure project~~. The total low-water-use projections are less than the volume of LACWU- and DOE-owned groundwater rights remaining after subtracting the volume that will be used for the chromium **interim measure** project (4,862.3 ac-ft/yr). It is also assumed that the LACWU can continue to produce water under these water rights, recognizing that either treatment or moving of wells to alternate uncontaminated locations may be required to fulfill those water rights.

6.2 Scenario 2: High-Water-Use Projection and Loss of Water Rights

The total (LACWU plus LANL) projected water use under the high-water-use scenario is estimated to increase to 3,938 ac-ft/yr by the year 2020 (Table 5-9, Figure 5-6) and to further increase to 4,841 ac-ft/yr by 2060. In this scenario, total projected demand can be met by the existing groundwater rights, assuming that the LACWU will lease the DOE groundwater rights ~~that will not be used for the chromium interim measure project~~. The total high-water-use projections are less than the volume of LACWU- and DOE-owned groundwater rights remaining after subtracting the volume that will be used for the chromium **interim measure** project (4,862.3 ac-ft/yr); however, the projected water demand in 2060 is within 21.3 ac-ft/yr of this water rights volume.

As discussed in Section 4.3.2, there is some risk that if wells need to be moved or other changes are needed that require OSE approval, additional water rights may be required to offset pumping impacts on the Rio Grande. If additional water rights could not be purchased and transferred to the Los Alamos area, a potential scenario given extended drought conditions and other growth pressures on the Rio Grande, the San Juan-Chama **Project** water rights might

need to be used to offset pumping effects, in which case physical diversion of the San Juan-Chama **Project** water would not be possible.

In the event that ~~This scenario envisions a situation where~~ a portion of the groundwater supply is contaminated, ~~necessitating the relocation of~~ 1,200 acre-feet of groundwater diversions **will need to be relocated and** ~~. The scenario further assumes that~~ the OSE **will** require the impacts to the Rio Grande to be offset in an amount equal to the production of the new wells**. To meet this requirement,** ~~necessitating the use of~~ San Juan-Chama **Project** water **would be needed** ~~in an equal amount~~ to offset the pumping. ~~In effect, the groundwater rights would be diminished.~~

The high water demand projection with a loss of water rights scenario assumes that the LACWU will lease the **full volume of** DOE groundwater rights**, and that the volume** ~~that will~~ not be**ing** used for the chromium interim measure project **will be available for use**. Under this scenario, there is a gap between the diminished groundwater supply and projected demand starting in 2030 that would need to be addressed, either by bringing the San Juan-Chama Project water online or through reductions in demand (water conservation). Taking into account the volume of DOE groundwater rights that will be used to support the LANL chromium interim measure project, this gap reaches **1,146**~~500~~ ac-ft/yr by 2060 ~~(Figure 6-1)~~.

7. Climate Change

One of the goals of the LACWU water resource planning effort is anticipating and preparing for potential climate change impacts. For water resources planning, it is important to understand both natural variations in climate and variations that may result from anthropogenic climate change. This section includes information on natural climate variability (Section 74.1), anticipated changes in temperature and precipitation due to climate change (Section 74.2), potential impacts of climate change in the Los Alamos area (Section 74.3), and recommendations for mitigating climate change impacts (Section 74.4).

7.1 Natural Climate Variability

The climate of Los Alamos County naturally exhibits variability in precipitation and temperature, including both seasonal and annual variations. Weather patterns in the southwestern United States, including the Los Alamos area, are affected by several natural cycles:

- *El Niño/La Niña:* El Niño and La Niña are characterized by unusually warm and unusually cool temperatures, respectively, in the equatorial Pacific. Years in which El Niño is present are more likely to be wetter than average in New Mexico, and years with La Niña conditions are more likely to be drier than average.

- *The Pacific Decadal Oscillation (PDO):* The PDO is a long-lived pattern of climate variability caused by shifting sea surface temperatures between the eastern and western Pacific Ocean that cycle approximately every 20 to 30 years. Warm phases of the PDO (shown as positive numbers on the PDO index) correspond to El Niño-like temperature and precipitation anomalies (i.e., wetter than average), while cool phases of the PDO (shown as negative numbers on the PDO index) correspond to La Niña-like climate patterns (drier than average). It is believed that since 1999, Los Alamos County has been in the cool phase of the PDO.

- *The Atlantic Multidecadal Oscillation (AMO):* The AMO refers to variations in surface temperatures of the Atlantic Ocean which, similarly to the PDO, cycle on a multi-decade

frequency. The pairing of a cool phase of the PDO with the warm phase of the AMO is typical of drought in the southwestern United States (McCabe et al., 2004; Stewart, 2009). The AMO has been in a warm phase since 1995 and it is possible that the AMO may be shifting to a cool phase, but the data are not yet conclusive. LANL has been doing statistical analyses to evaluate the correlation between the AMO and warming temperatures and has concluded that anthropogenic effects account for two-thirds of the post-1975 global warming, while the AMO accounts for one-third of the effect (Chylek et al., 2014).

These natural cycles and other short-term meteorological conditions lead to considerable annual and monthly variability in temperature and precipitation.

7.2 Changes in Temperature and Precipitation

In addition to the natural variability in temperature and precipitation, there is significant research indicating that long-term trends, particularly in temperature, are changing. The Intergovernmental Panel on Climate Change (IPCC) is an international body that was created to assess the science related to climate change world-wide. The IPCC's most recent research efforts are summarized in the Fifth Assessment Report, which was released in September 2013.

IPCC assessments are prepared and reviewed by hundreds of scientists and provide a scientific basis for governments at all levels to develop policies related to climate change. The Fifth Assessment report indicates that globally the atmosphere and oceans have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased (IPCC, 2013). Atmospheric concentrations of greenhouse gases are rising so quickly that all current climate models project significant warming trends over continental areas in the 21st century. The IPCC report also suggests that it is extremely likely that more than half of the increase in annual surface temperature from 1951 to 2010 is explained by anthropogenic increases in greenhouse gases and other anthropogenic forcings (IPCC, 2014). Likely impacts of climate change include increased numbers of dry days and extreme events (IPCC, 2012).

In the United States, regional assessments conducted by the U.S. Global Change Research Program (USGCRP, 2015) have found that temperatures in the southwestern United States have increased and are predicted to continue to increase. Reduced snowpack and streamflow and increased drought and wildfires are anticipated impacts of climate change in the southwest (USGCRP, 2015). Recent flows in the Upper Colorado and Rio Grande were 3 to 5 percent lower during 2001 through 2010 than 20th Century average flows, and snowmelt occurred earlier (Overpeck et al., 2013).

To assess climate trends in New Mexico, the NMOSE and NMISC (2006) conducted a study of observed climate conditions over the century and found that observed wintertime average temperatures had increased statewide by about 1.5 degrees Fahrenheit (°F) since the 1950s.

More recently, the U.S. Bureau of Reclamation, with technical assistance from Sandia National Laboratories and the U.S. Army Corps of Engineers, conducted a study of the Upper Rio Grande that evaluated climate impacts in northern New Mexico (USBR, 2013). The study, entitled the Upper Rio Grande Impact Assessment (URGIA) found that average temperatures from 1971 through 2011 rose at a rate of approximately 0.7°F per decade, approximately twice the global average, for a total warming of approximately 2.5°F since 1971. Temperatures are predicted to rise an additional 4° to 6°F by the end of the century. The study additionally projected a decrease in native Rio Grande water by about a third and a decrease in tributary flow by about a quarter, increasing frequency, intensity, and duration of droughts and floods, earlier snowmelt runoff, and increased variability in the magnitude, timing, and spatial distribution of streamflow and other hydrologic variables.

A number of other studies predict temperature increases in New Mexico from 5° to 10°F by the end of the century (Forest Guild, 2008; Hurd and Coonrod, 2008; USBR, 2011).

Although there is consensus among climate scientists that global temperatures are warming, there is considerable uncertainty regarding the specific local and temporal impacts that can be expected. Predictions of annual precipitation are also subject to uncertainty, particularly regarding precipitation during the summer monsoon season in the southwestern U.S.

While attribution of individual events remains a challenge, droughts and heavy short-term precipitation in the Southwest are predicted to be more severe as human-induced climate change progresses (USGCRP, 2014). An example of extreme precipitation events occurred in September 2013 in Boulder, Colorado, where a 3-day rainfall exceeded the monthly total for any month on record and was classified as a 1,000-year event (chance of 1 in 1,000 of occurring) (NOAA Climate.gov, 2013). During the same September 2013 time period, the Los Alamos area also experienced extreme precipitation. Initial research indicates that the extreme events that occurred in Colorado in 2013 were not due to anthropogenic climate change (NOAA Climate.gov, 2014). Since extreme events occur infrequently, however, it is difficult to observe trends and conclusively attribute causes.

7.3 Impacts of Climate Change on Los Alamos County

Climate change impacts that are likely to occur in Los Alamos County based on studies of the Southwest and New Mexico in particular (Christensen et al., 2004; Hurd and Coonrod, 2008; NMOSE/NMISC, 2006; Overpeck et al., 2013; USBR, 2011, 2013; USGCRP, 2015; Williams et al., 2010) include:

- Though model predictions vary, increasing temperatures are expected to occur. Warming will continue with longer and hotter heat waves during summer months.

- Higher temperatures will result in a longer and warmer growing season, resulting in increased water demand for outdoor watering during the spring and summer months and potentially lower rates of recharge.

- Reservoir and other open water evaporation is expected to increase. This could affect the non-potable water in storage in Los Alamos Reservoir and could potentially lead to shortages of San Juan-Chama **Project** water.

- Although predictions of annual precipitation are subject to greater uncertainty “given poor representation of the North American monsoon processes in most climate models” (NMOSE/NMISC, 2006), precipitation is expected to be more concentrated and intense,

so increases in the frequency and severity of flooding are projected. Due to the presence of various contaminated areas around Los Alamos due to historical LANL operations, stormwater management is a key issue for the LACWU and LANL.

- Streamflow in major rivers across the Southwest is projected to decrease ~~substantially~~ during this century, due to a combination of diminished cold season snowpack in the headwaters regions and higher evapotranspiration during the warm season. **The U.S. Bureau of Reclamation developed projections of the hydrologic impacts of modeled climate changes for the Upper Rio Grande Basin over the rest of this century and published their results in the Upper Rio Grande Impact Assessment (USBR, 2013). Their analysis included the reliability of the San Juan-Chama Project water under potential climate change scenarios. The projections suggest an increase in the month-to-month and inter-annual variability, and a somewhat more reliable supply from the San Juan-Chama Project than for the native Rio Grande supply (USBR, 2013). The results for the average total San Juan-Chama allocations were 94 percent of contracted water rights in the 2020s, 88 percent in the 2050s, and 81 percent in the 2090s (USBR, 2013), indicating that the average total San Juan-Chama Project allocation would be reduced by about 20 percent by the 2090s (USBR, 2013). To account for the**~~There is a~~ potential for reduced streamflow to result in shortages of San Juan-Chama **Project** water in some years, ~~indicating~~ **San Juan-Chama Project water**~~that it~~ should be conjunctively managed with more reliable groundwater resources.

- The seasonal distribution of streamflow is projected to change as well: flows could be somewhat higher than at present in late winter as warmer conditions lead to more winter precipitation falling as rain and less as snow, but peak runoff will be weaker due to reduced snowpack. Late spring/early summer flows are projected to be much lower than at present, given the combined effects of less snow, earlier melting, and higher evaporation rates after snowmelt. Since the LACWU relies primarily on groundwater, this is not anticipated to present a major concern for LACWU water resources, but these pressures may lead to overall added stress on the Rio Grande systems, which may

increase vulnerability to administrative changes in junior water rights management, as discussed in Section 4 and by Kenney et al. (2008).

During the period of observed record, the Southwest has experienced two significant dry periods, the 1950s and the early 2000s, with the second drought period being warmer and producing greater water loss. The 1980s and 1990s were wetter and promoted a lot of vegetation growth, creating conditions of higher vulnerability to forest fire (NOAA, 2013). The extreme drought conditions prevalent throughout New Mexico and Los Alamos in the past 10 years have resulted in the mortality of many trees. Between 2002 and 2005, more than 90 percent of the mature piñon trees in the Los Alamos area died from a combination of drought stress and bark beetle infestation (Breshears et al., 2005, as cited in LANL, 2014a). Lower-elevation ponderosa pine and mixed conifer stands were also affected. More recently, large numbers of mature ponderosa pine are dying, apparently due to prolonged drought stress. These conditions lead to vulnerability to wildfire and post-fire flooding.

Los Alamos County has already experienced extreme wildfires and post-fire flooding since 2000:

- The Cerro Grande fire burned 47,000 acres in May 2000. The fire started as a result of controlled burning in Bandelier National Monument and directly impacted structures and vegetation in the Los Alamos area.

- The Las Conchas wildfire started on June 26, 2011 in the Jemez Mountains, approximately 10 miles west of Los Alamos, and ultimately burned approximately 156,600 acres, making it the largest wildfire in New Mexico history at the time. Fire damage in the upper portions of watersheds above Los Alamos greatly increased the risk of flash floods and flood damage in the downstream canyons (LANL, 2014a).

- On September 13, 2013, anywhere from 2.49 to 3.52 inches of rain fell at different locations around Los Alamos within a 24-hour period. All of the local canyons flooded, and some experienced substantial channel and bank erosion and widespread sediment deposition. Infrastructure, including roads, gaging stations, and other sampling

equipment, was also significantly damaged (LANL, 2014a). With saturated antecedent soil conditions caused by a previous storm on September 10, the flooding that occurred during the September 12 to 13 storm damaged LANL's environmental monitoring and control infrastructure, including access roads, groundwater monitoring wells, gaging stations, and watershed controls. The damage to or impairment of flood- and sediment-control structures included a large amount of erosion in the Pueblo Canyon Wetlands, and overflow from sediment traps and retention basins in other canyons. LANL has since installed various sediment-control structures to minimize the erosive nature of stormwater runoff and to enhance deposition of sediment.

As discussed previously, while it may be difficult to determine if a specific event is caused by climate change, these are the types of impacts that the LACWU needs to continue to plan for.

7.4 Recommendations for Mitigating Impacts of Climate Change

Though it is difficult to determine whether individual events are a result of natural climate variability or climate change, it is important for the LACWU to be prepared to address variability, including drought and extreme precipitation events, and to be aware that these conditions may be both more frequent and more severe as a result of climate change. Higher temperatures and drought may contribute to increased demands for water, diminished supplies, impacts to vegetation, and wildfire risk. Extreme precipitation may damage infrastructure due to stormwater runoff and flooding, mobilize surface or shallow contaminants due to erosion, and create extreme sedimentation that can affect reservoir storage, as has occurred at Los Alamos Reservoir following the Cerro Grande and Las Conchas fires.

The following are recommendations that the LACWU could implement to prepare for long-term and severe drought, as well as for extreme precipitation events:

- Implement adaptive management as a part of the long-range water supply plan, where decisions are made sequentially over time, allowing adjustments to be made as more information is known. This approach may be useful in dealing with the additional uncertainty introduced by potential climate change.

- Use research and monitoring to fill knowledge gaps and enhance planning capabilities. Although neither will eliminate all uncertainty, they will provide significant improvements in understanding the effects of climate change on water resources and in evaluating associated uncertainties and risks required for more informed decision making (Brekke et al., 2009).

- Continue to implement and update the Los Alamos Energy and Water Conservation Plan to help reduce outdoor demands during periods of drought and to use water resources efficiently during all times.

- Conjunctively manage surface and groundwater resources. It will be important to bring surface water from Los Alamos Reservoir (and potentially ~~the~~ San Juan-Chama **P**~~p~~roject **water**) online, allowing for conservation of groundwater resources during times when surface water is available, while having provisions for meeting demand with groundwater during extreme drought periods when surface water is not available.

- Prepare for the increasing risk of large and severe wildfires. The LACWU should work with U.S. Forest Service and New Mexico State Forestry Division personnel to identify particular fire risks and vulnerabilities. Ponderosa pine and Douglas fir are particularly susceptible to drought and rising temperatures (Williams et al., 2010). An important component of wildfire planning is to work with emergency personnel on a plan to protect critical drinking water infrastructure during potential fires. The LACWU should also coordinate with LANL on its efforts to mitigate the effects of potential wildfires:

  - LANL operates a program to reduce wildfire fuels and manage forest health throughout forested areas on Laboratory and DOE property. Defensible space is created and maintained around facilities and other high-priority areas, and areas not designated as defensible space are managed for a combination of wildfire fuel reduction and forest health. The major roads within the facility continue to be thinned along the road easements to the fencelines, to provide firebreaks and improve vehicle visibility to wildlife crossing the roads (LANL, 2014a).

– Following the Los Conchas fire in 2011, high-priority areas in the canyons were armored to protect against potential flood damage (LANL, 2014a).

The U.S. EPA published the 2013 Draft National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Industrial Activities, also referred to as the Multi-Sector General Permit (MSGP), by Federal Register (FR) notice on September 27, 2013 (78 FR 59672). The MSGP requires the implementation of control measures, development of stormwater pollution prevention plans (SWPPPs), and monitoring of stormwater discharges from permitted sites. LANL conducts stormwater sampling and has implemented some flood mitigation measures. LACWU should continue to work with LANL to mitigate the risk of extreme precipitation events and flooding mobilizing contamination, which could affect the drinking water system.

Climate change modeling for the Southwest is based on varying carbon emissions scenarios, with higher rates of warming predicted with higher emissions. While Los Alamos County alone cannot significantly change regional emissions, the LACWU can contribute to reduced emissions through its energy policies, as discussed in the *Energy and Water Conservation Plan* (LACWU, 2015).

8. Water Conservation

The existing long-range water supply plan (DBS&A, 2006) included a water conservation plan, and additional documents that address water conservation have been published since that time. The LACWU published an *Energy and Water Conservation Plan* in 2013 (LACWU, 2013a), and this document was revised and reissued in 2015. The updated *Energy and Water Conservation Plan* focuses on conservation goals for the planning period of 2015 through 2019 (LACWU, 2015), and it meets the requirements of the New Mexico *Water Conservation Planning Guide for Public Water Suppliers* (NMOSE, 2013). The plan includes a water audit covering fiscal year 2014 (July 1, 2013 through June 30, 2014) (Section 5, Table 5-6), as well as the completed GPCD calculator worksheets covering 2007 through 2014 (LACWU, 2015).

~~The LACWU has a full-time conservation coordinator position, responsible for public outreach, program implementation and monitoring, and future document revisions.~~ The conservation program is implemented by customers primarily on a voluntary basis and the goals are not directed toward LANL, which falls outside of the County's jurisdiction (LACWU, 2015).

Existing water conservation program activities that are discussed in detail in the 2015-2019 Energy and Water Conservation Plan (LACWU, 2015) include:

- *Customer meter testing and replacement.* The LACWU routinely tests customer meters and replaces those that are not working properly; in FY 2015, the program goal called for replacing 350 residential water meters.

- *Large water customer usage and account review.* The LACWU completed a large water meter review project in 2011 that addressed discrepancies in the billing or metering of large customers.

- *System leak detection surveys.* The LACWU surveys 20 percent of the water system annually in an effort to identify and fix water leaks.

- *Regulatory measures.* The Los Alamos Board of Public Utilities adopted Water Rule W-8 in 2005 to prohibit water waste and implement the even/odd address watering schedule, daytime watering restrictions, and leak repair requirements.

- *Water rates.* The Los Alamos County Council approved a tiered water rate structure in July 2014 for the LACWU's single-family and multi-family residential customers.

- *County park irrigation water audits.* The LACWU **has** work**ed**~~s~~ with the County parks to conduct irrigation audits, ~~to~~ recommend irrigation scheduling and maintenance, and ~~to~~ identify any leaks or problems. ~~Baseline water use is being determined for each park, so that park managers are able to analyze trends in water use after the audit has been completed.~~ The Los Alamos County Sustainability Plan includes a goal of reducing water demand for County parks by 25 percent ~~compared to~~**of** 2012 demand by 2020 (LACWU, 2013b).

- *Residential water leak training and audits*. The LACWU participates in the nationally advertised "Fix a Leak" week, offering fix a leak demonstrations and providing water audits for high water using customers.

- *Commercial water audits.* The LACWU conservation coordinator implemented a commercial water audit program in 2012, initially conducting seven audits on facilities including a hotel, grocery store, and school campus. The program is ongoing, and each participating facility is provided with a detailed report of the audit findings and recommendations.

- *Residential water conservation outreach.* Educational materials are distributed to LACWU customers through bill inserts, feature articles, workshops, and booklets on subjects including graywater use, rainwater harvesting, xeriscape and permaculture, and energy efficiency.

- *Public school outreach.* Since 2008, the LACWU has had a contract with the Pajarito Environmental and Education Center (PEEC) to perform energy and water conservation outreach in the public schools.

- *Conservation partnerships.* The LACWU participates in numerous regional and national conservation partnerships in order to share ideas, resources, and lessons learned. Existing partnerships include EPA WaterSense (promotional partner), Alliance for Water Efficiency (charter member), New Mexico Water Conservation Alliance (member), U.S. EPA Energy Star (promotional partner), Alliance to Save Energy (member), and Los Alamos Sustainability Program (participant).

- *Residential bill revisions.* The LACWU implemented changes to the residential customer bills in 2012, and customer bills now show usage for the past 13 months, allowing for comparison of usage between the current month and the previous year. Additional revisions are being planned.

A Conservation Advisory Group was formed in 2011 ~~to assist the LACWU conservation coordinator with the development of conservation goals.~~ **and** ~~The group~~ has eight members, representing the Los Alamos Public Schools, County Parks Division, County Environmental Services Division, small commercial customers, and residential customers (LACWU, 2015). The long-term goal of the water conservation program is to achieve a 12 percent reduction in per capita water demand by 2050, as approved by the Utility Board on September 18, 2013 (Alarid, 2015). Specific actions that have been identified to assist in meeting this goal include:

- Increase water conservation education in the public schools.
- Increase adult education efforts, including outreach lectures and demonstration workshops.
- Implement residential irrigation water audits, focusing on customers with high summer water use.
- Improve Water Rule W-8 by researching its effectiveness, revising as necessary, and potentially adding enforcement capabilities.

- Implement incentives for replacement of lawns, including rebates for plant purchases and technical assistance.
- Implement the county's non-potable water master plan (Forsgren & Associates, 2013), which presents water use criteria for evaluating the efficiency of the existing non-potable water systems and for additional sites that could be potentially served by one of the non-potable water systems in the future.

The LACWU monitors the success and implementation of the Energy and Water Conservation Program annually, using activities such as evaluating data from the Cayenta billing system, completing the OSE GPCD calculator, and using the Alliance for Water Efficiency tracking tool~~. The LACWU conservation coordinator updates the Board of Public Utilities on the program's activities on a quarterly basis~~ (LACWU, 2015).

9. Recommendations

The LACWU is planning for potential future growth and increased water demands. While the groundwater supply will likely continue to produce at current rates for well beyond the 40-year planning period, issues regarding water rights and potential water quality concerns indicate that the LACWU needs to proactively plan for the future. A summary of recommendations for addressing the future water supply needs of the LACWU follows.

Water Supply (Quantity)

- Monitor water levels in the vicinity of the water supply wells and evaluate declines on a regular basis, with particular emphasis on monitoring the Guaje well field. Static water levels should also be measured in each of the active production wells on at least an annual basis.

- **Continue to examine project options and initiate an environmental assessment for San Juan-Chama Project water utilization**~~Initiate an environmental assessment for the San Juan-Chama Project~~, and evaluate whether to initiate steps toward implementation, based on the water demand projections and supply-demand gap estimates presented in this ~~report~~**plan**. Bringing the San Juan-Chama Project water online would help the LACWU address the potential for contamination of the existing wells by diversifying the water supply **both geographically and in terms of water rights**.

Water Quality/Contaminant Risk Recommendations

- Work closely with LANL and NMED regarding the ongoing monitoring of contaminants and assessment of anticipated transport velocities and flow paths, especially relating to the chromium interim measure and future remediation projects.

- Evaluate contaminant data on a quarterly basis to identify any trends or changes.

- Begin contingency planning for alternate well locations. In a worst case scenario, many wells could be affected by contaminants over the planning period. To prepare for this contingency, identify possible locations for new wells that are upgradient from or off-gradient of key source areas, and begin to resolve infrastructure, land access, and water rights transfer issues so that alternative wells could be developed in a timely manner.

- To mitigate potential climate change impacts, work with emergency personnel to develop a plan to protect drinking water infrastructure in the event of a wildfire, and work with LANL to prepare for extreme precipitation events, to ensure that stormwater runoff does not mobilize contaminants to the detriment of the drinking water system.

Water Rights

- Pursue a new lease with DOE for ~~the portion of~~ their water rights ~~that will not be used by the chromium interim measure project~~ (~~983.39~~**1,662.39** ac-ft/yr).

- Renegotiate the contract that LACWU has with DOE for supplying water to LANL before it expires in 2019.

- Secure services of a water rights attorney to advise and plan for water rights acquisition (availability of pre-1907 water rights, return flow credits, costs, time to secure, potential litigation).

- Pursue return flow credits as identified in the 1999 return flow study (SWC, 1999).

- Evaluate and quantify pumping effects on the Rio Grande from the current water production regime and explore potential changes in pumping amounts and locations in order to be prepared to address OSE concerns during a potential water rights transfer application process.

- Meet with the OSE to discuss priority administration and the number and amount of water rights that are senior to the LACWU's water rights.

Water Conservation

- Continue and expand the existing water conservation program, as discussed in Section 8, monitoring the effectiveness of the existing and new conservation measures and refining the conservation program as needed.

- Monitor the effectiveness of voluntary compliance with Rule W-8 in reducing water waste, and if necessary, pass an enforceable ordinance so that penalties can be assessed.

- Update the subdivision regulations to include requirements for graywater reuse, water harvesting, xeriscaping, and low-water-use indoor plumbing for all new commercial and residential development.

- Establish rebate programs for xeriscaping and appliance replacement.

- Distribute indoor plumbing leak detection and retrofit kits.

Implementation of these recommendations will help the LACWU be prepared to meet its future water supply needs.

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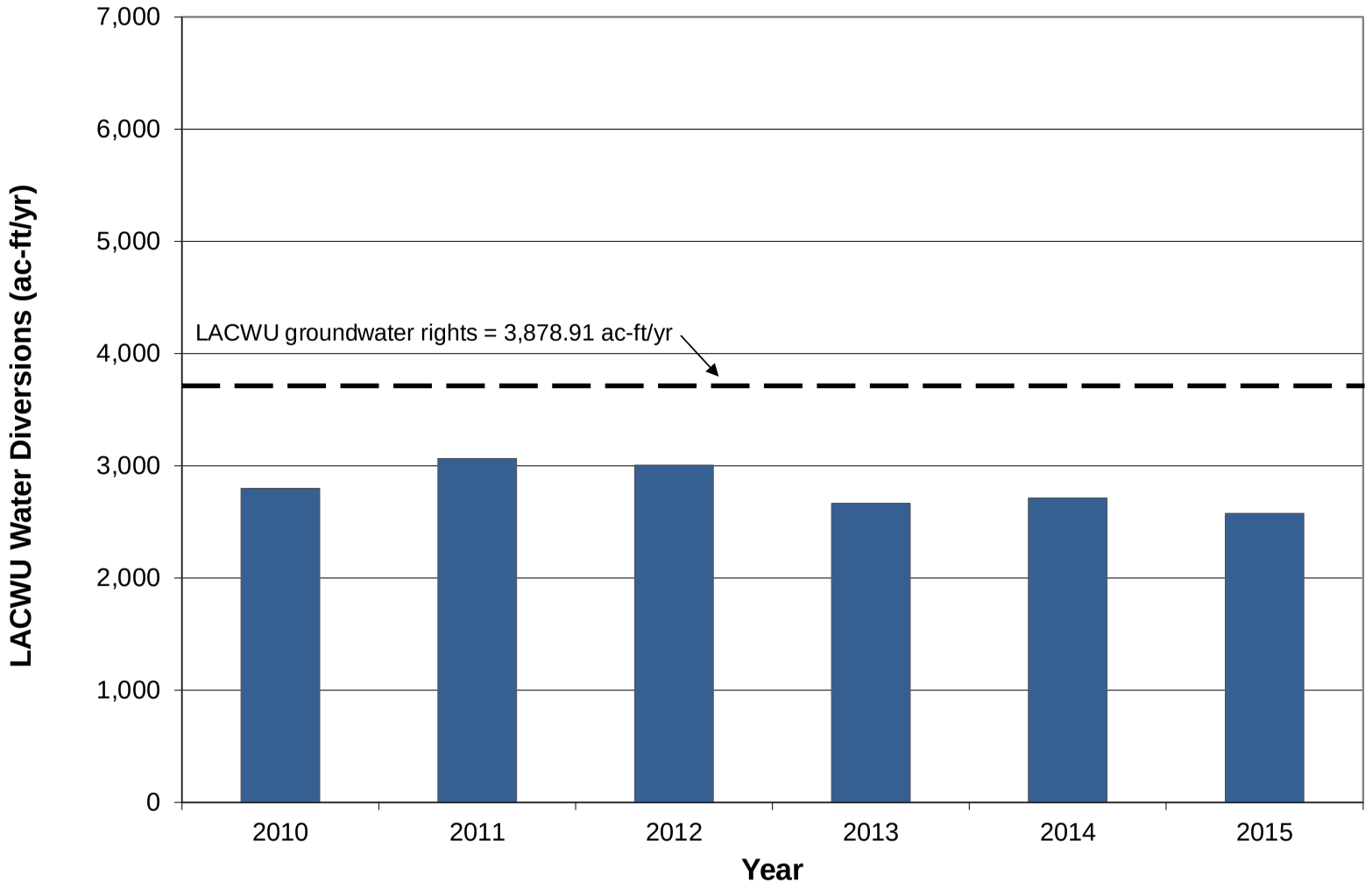


Note: These values were obtained by subtracting the LANL water demands from the total diversions.

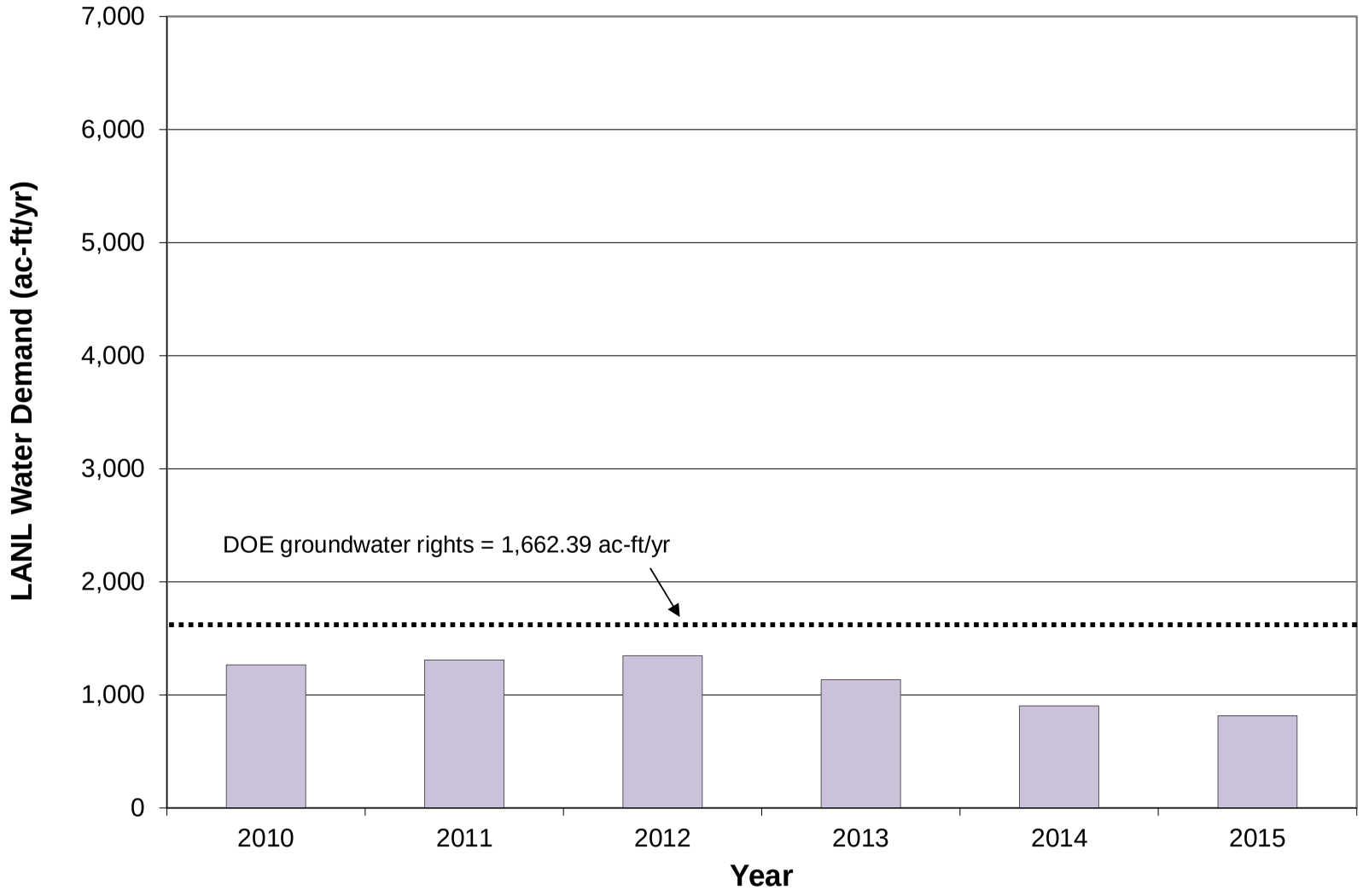
Figure 4-1

LOS ALAMOS COUNTY WATER PLAN

Annual Water Use by Los Alamos County 2010 Through 2015

Daniel B. Stephens & Associates, Inc.

1/31/17



Note: The groundwater supply being used for the LANL chromium interim measure project has not been subtracted from LANL's total water rights.

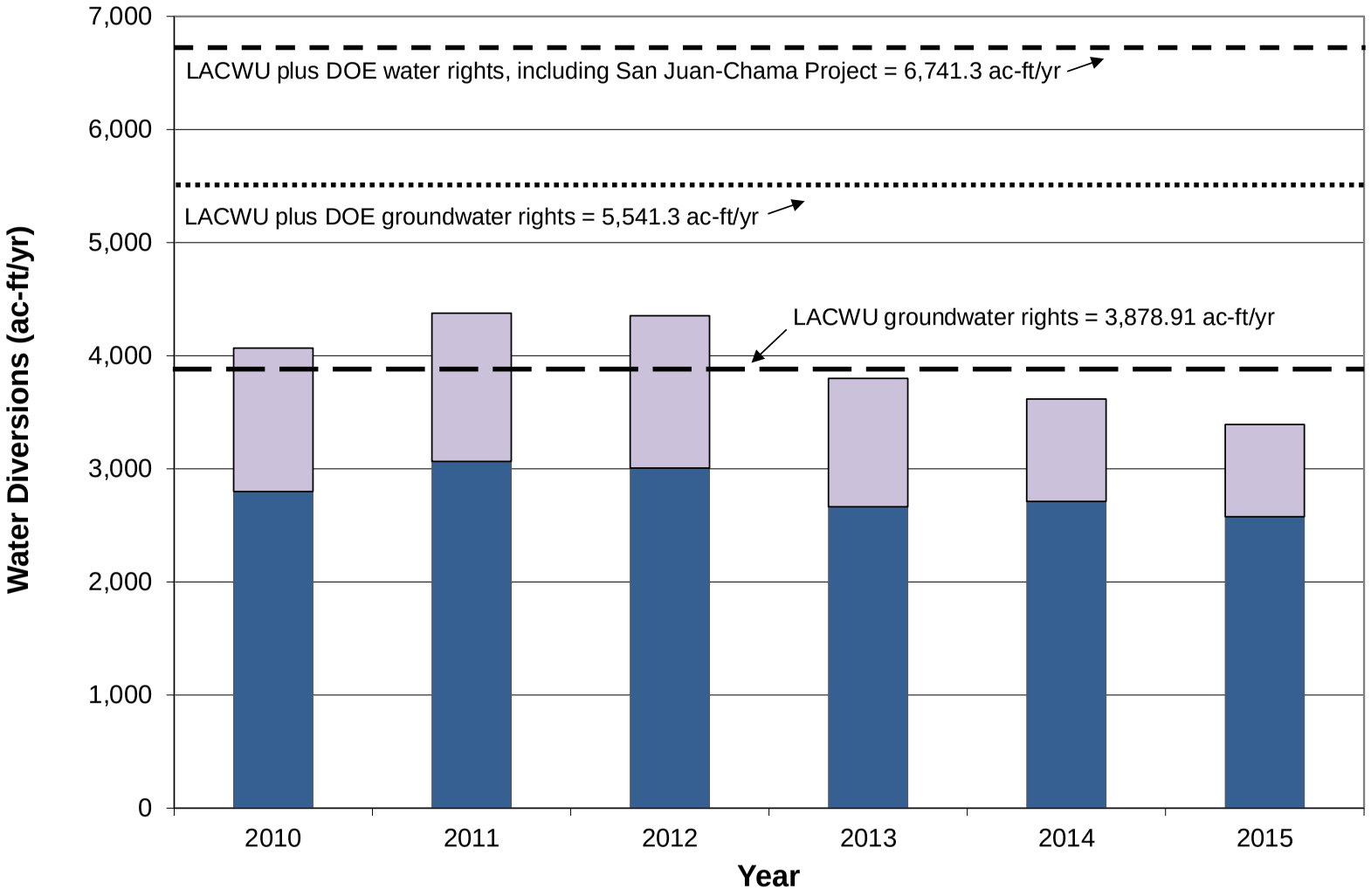
Figure 4-2

LOS ALAMOS COUNTY WATER PLAN

Annual Water Use by Los Alamos National Laboratory 2010 Through 2015

Daniel B. Stephens & Associates, Inc.

1/31/17



Note: The groundwater supply being used for the LANL chromium interim measure project has not been subtracted from DOE's total water rights.

Figure 4-3

LOS ALAMOS COUNTY WATER PLAN

Annual Water Use by Los Alamos County and Los Alamos National Laboratory, 2010 Through 2015

Daniel B. Stephens & Associates, Inc.

1/31/17

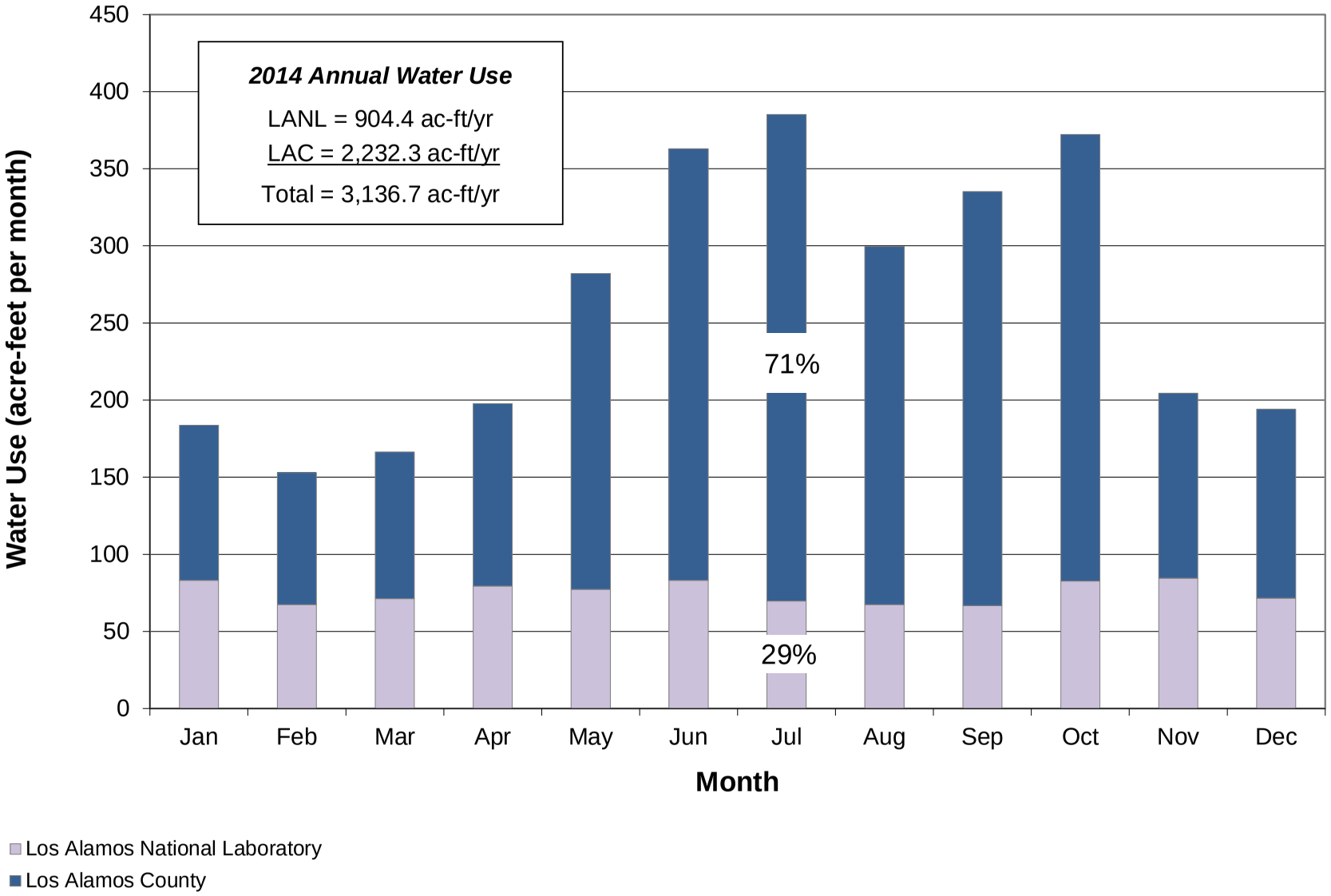


Figure 5-3

LOS ALAMOS COUNTY WATER PLAN

Monthly Water Use by Los Alamos County and Los Alamos National Laboratory in 2014

Daniel B. Stephens & Associates, Inc.

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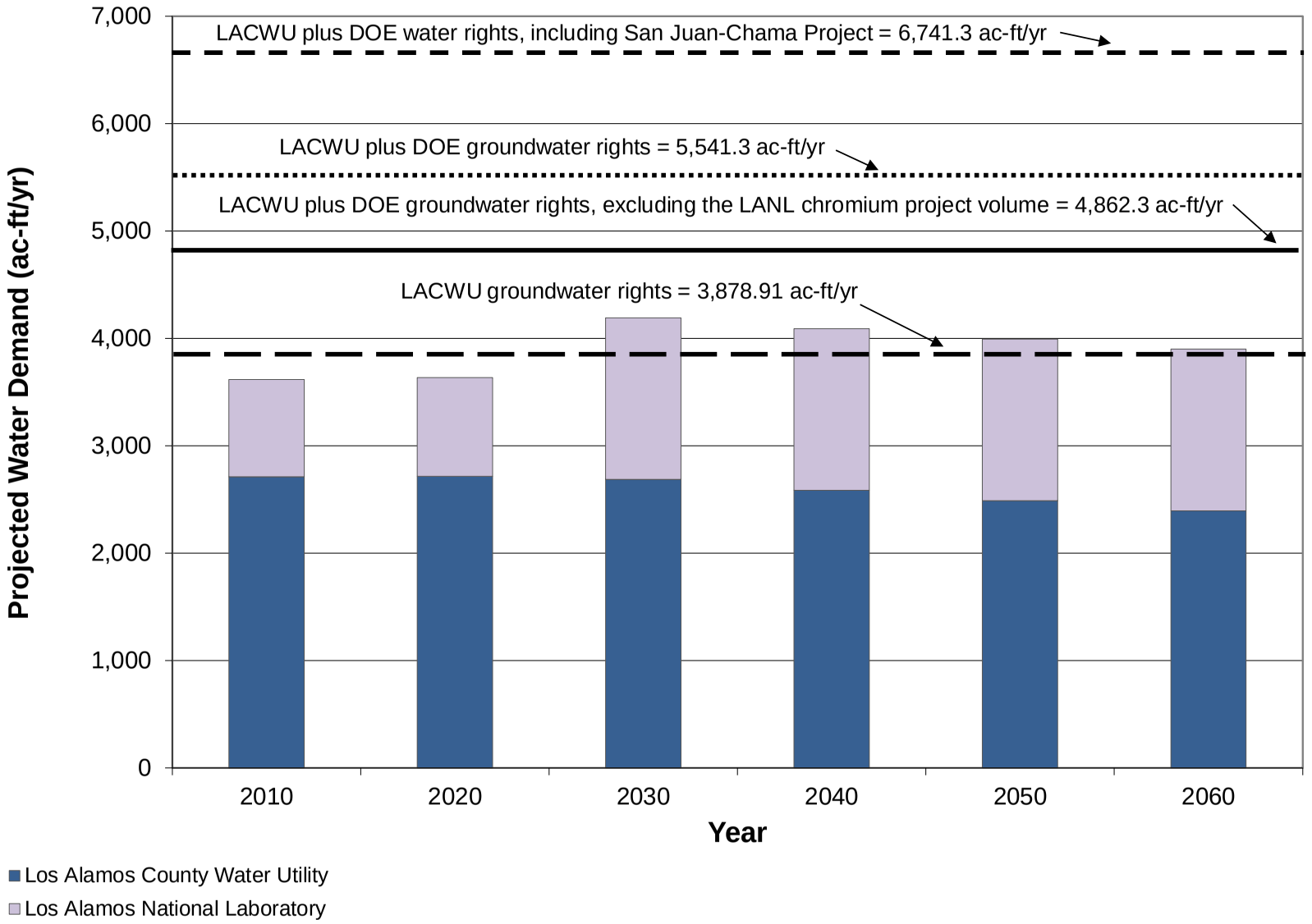

Figure 5-5

LOS ALAMOS COUNTY WATER PLAN

Projected Water Demand Under the Low Water Use Projection

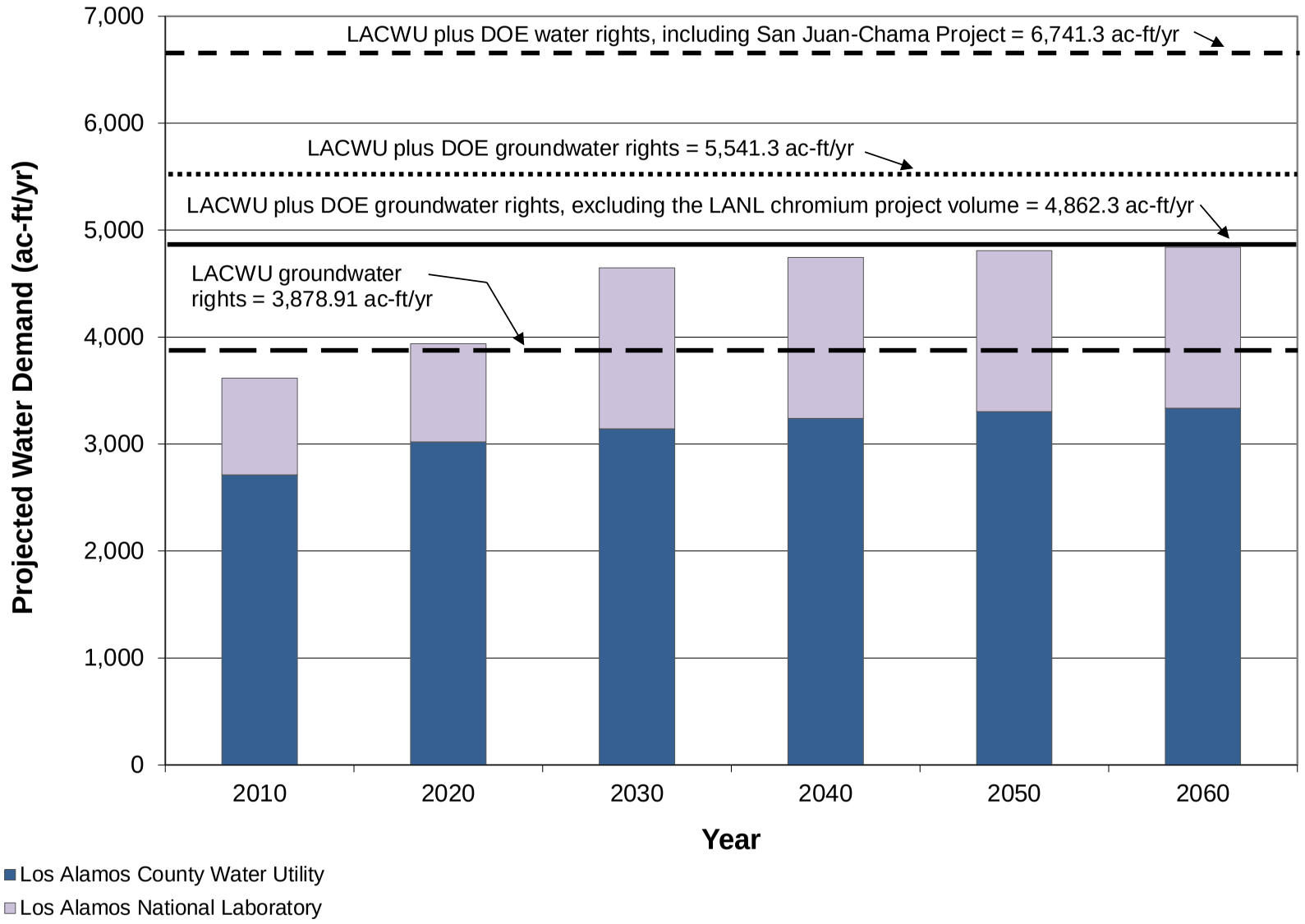

Figure 5-6

LOS ALAMOS COUNTY WATER PLAN

Projected Water Demand Under the High Water Use Projection

Daniel B. Stephens & Associates, Inc.

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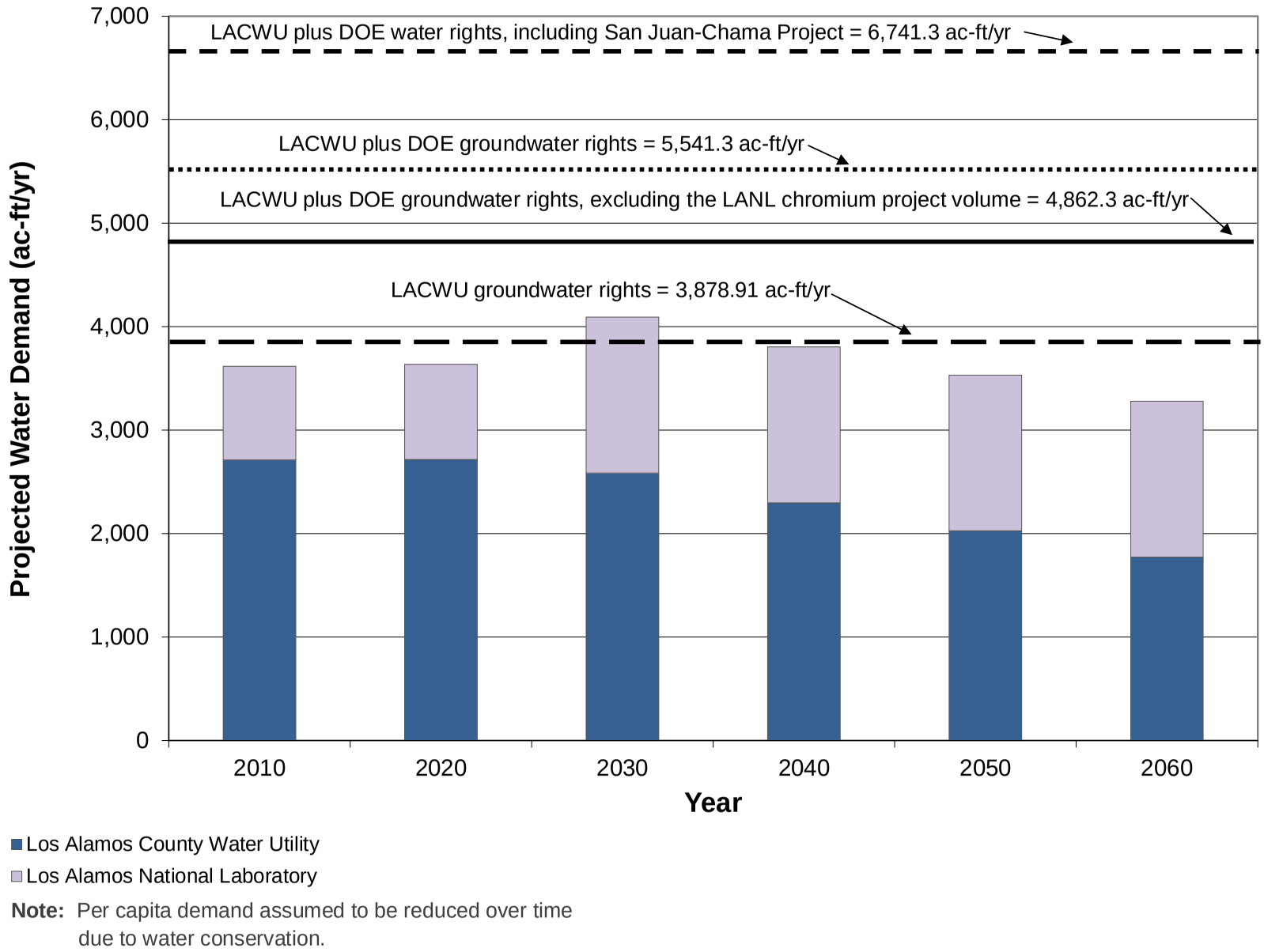


Note: Per capita demand assumed to be reduced over time due to water conservation.

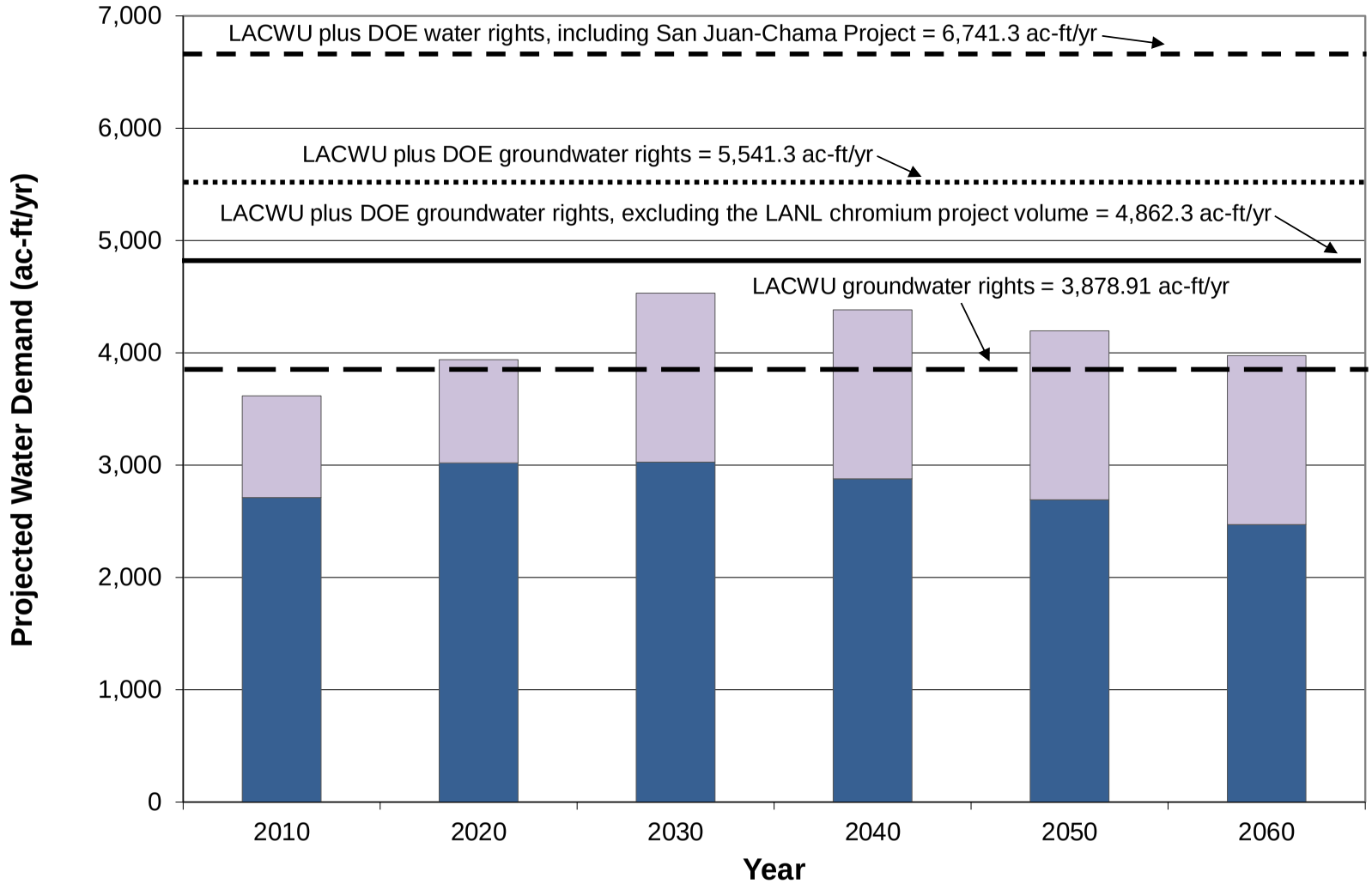
Figure 5-7

LOS ALAMOS COUNTY WATER PLAN

Projected Water Demand Under the Low Water Use Projection with Reduced Per Capita Demand

Daniel B. Stephens & Associates, Inc.

1/31/17



Note: Per capita demand assumed to be reduced over time due to water conservation.

Figure 5-8

LOS ALAMOS COUNTY WATER PLAN

Projected Water Demand Under the High Water Use Projection with Reduced Per Capita Demand

Daniel B. Stephens & Associates, Inc.

1/31/17

Table 3-3. Groundwater Contaminants in the Regional Aquifer in 2015

Chemical	Location	Concentration [a] (µg/L [b])		Trends
		Result	Screening Level	
Regional Aquifer (LANL and NMED, 2016)				
Perchlorate	Mortandad Canyon	**≤ 99.4**	4 [c] 13.8 [d]	
Hexavalent c~~C~~hromium	Sandia Canyon	**≤ 386** (2014)	50 [e]	Flat trend in the center of the plume (monitoring wells R-42 and R-28) and gradually increasing trend along the edge of the plume (monitoring wells R-45 screen 1, R-43 screen 1, and R-50 screen 1).
	Mortandad Canyon	**≤ 915**	50 [e]	
Los Alamos County Water Supply Wells (LANL and NMED, 2016)				
Tritium	Well O-1	2.373 pCi/L	20,000 pCi/L [f]	Results have declined since 2004, when there was a detection of 58 pCi/L.
Perchlorate	Well O-1	0.515	4 [c] 13.8 [d]	Results variable, but declining since 2008; concentrations ≤ 3 µg/L since 2001.

[a] **Bold** text indicates standard exceedances.

[b] Unless otherwise noted

[c] 2012 LANL Compliance Order on Consent screening level (NMED, 2012)

[d] NMED tap water screening level (NMED, 2014)

[e] NMWQCC Groundwater Standards for Human Health (20.6.2.3103)

[f] The EPA has established an MCL of 4 millirem per year for beta particle and photon radioactivity from man-made radionuclides in drinking water. The average concentration of tritium that is assumed to yield 4 millirem per year is 20,000 pCi/L. If other radionuclides that emit beta particles and photon radioactivity are present in addition to tritium, the sum of the annual dose from all the radionuclides shall not exceed 4 millirem per year (U.S. EPA, 2002).

µg/L = Micrograms per liter
≤ = Less than or equal to
pCi/L = PicoCuries per liter

Table 5-11. Projected LACWU Supplied Water Demand Assuming Decreased Demand Due to Water Conservation, 2020-2060

Year	Per Capita Water Demand Used to Calculate LACWU Demand (gpcd)	Low Demand Scenario (ac-ft/yr)			High Demand Scenario (ac-ft/yr)			LANL Projected Demand (ac-ft/yr)
		LACWU Projected Demand	Potential Conservation Savings	LACWU Projected Demand with Conservation	LACWU Projected Demand	Potential Conservation Savings	LACWU Projected Demand with Conservation	
2010 [a]	135	2,712	—	2,712	2,712	—	2,712	904
2020	135	2,716	0	2,716	3,020	0	3,020	918
2030	130	2,686	100	2,586	3,143	117	3,026	1,505
2040	120	2,586	288	2,298	3,239	360	2,879	1,505
2050	110	2,488	461	2,027	3,303	613	2,690	1,505
2060	100	2,395	622	1,773	3,336	866	2,470	1,505

[a] Actual values

gpcd = Gallons per capita per day
ac-ft/yr = Acre-feet per year
LACWU = Los Alamos County Water Utility
LANL = Los Alamos National Laboratory
— = Not applicable

LOS ALAMOS

Department of Public Utilities

Electric, Gas, Water, and Wastewater Services

February 6, 2017

Robert Wells
1001 Oppenheimer Drive, Unit #301
Los Alamos, NM 87544

Dear Mr. Wells,

This letter is in response to your email dated November 21, 2016 in regards to the Long-Range Water Supply Plan, November 2D16 draft.

Your comments, observations, and long-term perspectives are in some cases reflections of the internal discussions that took place as we prepared the plan. In particular, the uncertainty of projecting LANL demands. We relied on LANL to provide projections of their future water demand, which is limited to a 10-year horizon due to their uncertainty.

We agree with your comment that "while a 2060 planning horizon is understandable, it must be kept in mind that, hopefully, the Los Alamos community will exist much longer, possibly hundreds of years. The reality of Southwest water resources management is that increasing dependence is being placed on groundwater "mining" and that even aggressive restoration methods might take hundreds of years, even if good snow packs continue to feed ground water reserves." The State uses a 40-year water planning horizon, with communities continually updating their plans to continue planning into the future. Our consultants recommend that the LACWU continue to plan for development of a San Juan-Chama project, given the uncertainty of water demand and the U.S. Department of Energy (DOE) water rights lease, and the availability of the water; however, it will be up to the County and the public to select whether or not to construct a project, and to define its scope. Additional language has been added to the final plan to better explain how bringing San Juan-Chama project water online would diversify the water supply.

You suggest that the County pursue the exchange of the San Juan-Chama contract water for groundwater water rights that could be pumped in our existing and future water wells. There is a fundamental difference in the SJC contract water being a surface water right and the groundwater rights owned by the county and DOE. Consistently and historically, the OSE does not view favorably the intermingling of water rights from different supply

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sources (in our case SJC water being a surface diversion associated with an interstate water transfer and the groundwater rights whose origin is the aquifer below the Pajarito Plateau). Performing such an exchange is much more complicated than a "political problem" to be overcome. For this reason, a transfer of SJC water to existing water wells is not a proposed option in the plan.

Other comment responses:

- On Figure 2-1, community and county boundaries for Los Alamos and White Rock that were available were used.
- Figures 3-1 and 3-2 come from LANL publications and correctly represent the regional hydrogeology.
- Regarding the County's San Juan-Chama water supply, it will be up to the County and its residents to decide whether to pursue a project.
- In the event of a SJC water shortage, Los Alamos will have the same priority as other SJC contractors. We do not support the concept that SJC water can be traded for additional groundwater rights.
- The County population projections were put together by a demographer for the State, and LANL/DOE provided the LANL projections. We agree that it is especially difficult to project what will happen at LANL. Los Alamos certainly has many attractive attributes that could lead to increases in population.
- The long-range water supply plan update reports on the LACWU's existing conservation program, but is not a water conservation plan itself. We have added information to the final plan about the quantity of water that would be conserved if the per capita water use were reduced in the future.

We thank you for taking the time to review the plan and provide valuable input. If you have any questions or would like to discuss further please contact me at 663-3420 or by email at james.alarid@lacnm.us.

Sincerely,

James Alarid
Deputy Utility Manager Engineering

Cc: Gaylyn Meyers, LAC
Amy Ewing, DBS&A
Tim Glasco, LAC

From: Robert Wells, 1001 Oppenheimer Dr., Unit #301, Los Alamos, NM 87544

To: James Alarid, DPU/BPU, Los Alamos County

Subject: Comments on County Water Plan (draft)

November 21, 2016

As a **general comment**, I found the draft plan to be professionally credible. The consultants demonstrated a good understanding of the issues and complexities of making an essentially forty year projection under conditions of considerable uncertainty regarding County needs and weather changes impacting water. While a 2060 planning horizon is understandable, it must be kept in mind that, hopefully, the Los Alamos community will exist much longer, possibly hundreds of years. The reality of Southwest water resources management is that increasing dependence is being placed on ground water "mining" and that even aggressive restoration methods might take hundreds of years, even if good snow packs continue to feed ground water reserves.

Page 3 and associated Figure 2-1.

Los Alamos County does not contain "cities/towns" – it is simply and solely a "county" with three postal codes (87544/Los Alamos townsite or "hill", 87545/LANL, and 87547/White Rock). Thus, "city" boundaries shown in Figure 2-1 should be discussed with appropriate County authorities.

Figures 3-1 and 3-2, which show conceptural hydrological models for Los Alamos County, appear to misrepresent the reality that Los Alamos County is founded on the apron of a massive and complex volcanic system that formed the Jemez Mountains region. The idea that there is an essentially uniform saturated zone under the County (i.e., the Santa Fe Group shown in Figure 3-2) should be reconsidered as being a system of largely disconnected perched aquifers within the shoulders of the volcanic system formation. (This more realistic characterization is noted on page 11; i.e., "Intermediate-depth perched aquifers are widely distributed across the northern, western and central parts of the Pajarito Plateau ...")

Section 4. -- Water Rights, pages 38-48

One of the major issues raised at the public meeting on November 16th, involved how best to use the San Juan-Chama 1200 acre-feet annual allocation for Los Alamos County. I first raised the question whether the County's long –term water needs might best be realized by considering trading the 1200 acre-feet of San Juan-Chama surface water rights for an equivalent amount of additional ground water right within the County. The consultants were dismissive of this because of bureaucratic difficulties (e..g., BLM versus State Engineer responsibilities and authorities). This response was vehemently countered by a White Rock attendee. It is recommended that the following factors be considered by County authorities:

a. The San Juan-Chama diversion was planned in the 1950s, when factors such as water availability and downstream demands were much different than now – let alone for the long-term future.

b. Los Alamos has not needed the San Juan-Chama water allocation to date – and may not need it under more optimistic 2060 projections of this plan. The County's San Juan allocation has been beneficially used thus far for other State/Rio Grande needs -- without endangering the County's original allocation.

c. However, there are less optimistic 2060 projections that would need the 1200 acre-feet allocation.

d. The overall annual San Juan-Chama diversion to New Mexico is about 100,000 acre-feet; but this year that amount of water could not be delivered. Should such shortfalls become the norm – and given the projected needs of other beneficiaries (especially Santa Fe, Albuquerque and further down Rio Grande users) – Los Alamos might find its allocation a low priority vis-a-vis such other users.

e. Assuming that only Los Alamos County (including LANL) will have direct access to ground water within Los Alamos County, there should be considerable ground water in addition to the present County and LANL/DOE ground water right authorizations (using either 5,379 acre-feet per Figure 4-1 or 5,541 acre-feet per Figure 5-1, neither figure including the 1200 acre-feet of San Juan-Chama surface water rights).

f. The State Engineer would likely welcome the additional 1200 acre-feet of San Juan-Chama surface water rights to help adjudicate water long-standing and worsening water rght disputes along the Rio Grande.

g. While the Bureau of Land Management would have to concur in the suggested transfer, there is no obvious reason why they should object – other than bureaucratic inertia. As emphasized during the November 16th public meeting, this appears to be a political problem, not a technical problem or a judicial problem involving potential harm to other parties involved in the San Juan-Chama scheme.

h. Ultimately, the acquisition of an additional 1200 acre-feet of ground water rights would assure Los Alamos County of water it can reasonably count on having available – as opposed to San Juan-Chama surface water that already could be in jeopardy. Further, Los Alamos County access to an additional 1200 acre-feet of ground water from Pajarito Plateau would be relatively inexpensive, as compared to the cost of using water pumped one way or another from the Rio Grande.

Section 5 -- Future Water Demand, pps 49-72

Table 5-2, page 55, shows that Los Alamos County resident population has been very stable for at least the past thirty years; i.e., 17,599 in 1980 and 17,950 in 2010, with a peak of 18,343 in 2000. This plan uses a reasonable range of projections through 2060 (i.e., a 2060 low of 15,863 versus a 2060 high of 22,092). A major uncertainty will be the needs of LANL during this planning period. During the period 1987-1994, I served as LANL's Program Director for Construction Development. Periodically, DOE would survey their sites for potential major new developments. Their queries would typically include (a) buildable land, (b) water, and (c) power. Consequently, it should be easily recognizable that water availability – in terms of water rights and actual water that could be inexpensively acquired -- would likely be the most crucial decision factor. Another factor that should be included is whether Los Alamos Count might attract significant population growth from high end residents now in Santa Fe and the northern Rio Grande Valley generally – who are attracted by (c) excellent schools and community facilities and (d) availability of very good and relatively inexpensive community water. This last point should be considered in light of excessive water shortfall projections, such as -35% deficiency in Santa Fe County by 2030. It is particularly important to note (e) of the eight north central New Mexico water sheds, only Los Alamos is free of major shortfalls for 2030. Further, most if not all of these "valley" communities are depending heavily on San Juan-Chama surface water diversions that (f) might not be as available as expected and (f) very expensive diversion schemes, such as those constructed for Santa Fe and Albuquerque are supposed to be returning diversion water to local aquifers and/or the Rio Grande – a very questionable presumption. Thus, Los Alamos may draw significant new population that has nothing to do with LANL mission growth – but which could be a critical factor for long term community welfare should the LANL mission be seriously curtailed.

Section 8 – Recommendations: Water Consevation, page 87

Both Los Alamos County and LANL appear to have started to take water conservation seriously. Where not too long ago at least one member of the Board of Public Utilities expressed support for ensuring that traditional "green lawns" should be mandated, this plan appears to start thinking seriously about water conservation. However, the recommendations listed in pages 87-90 essentially address fairly easy-to-accomplish administrative and educational measures. For example, a Conservation Advisory Group was formed in 2011 to assist the LACWU conservation coordinator with development of conservation goals, such as "implement incentives for replacement of lawns, including rebates for plant purchases and technical assistance." It should be noted in the mid-1970s, Albuquerque threatened to fine home owners who wanted to practice xeroscaping rather than have traditional green lawns. When Albuquerque subsequently faced water crunches, a program of financial compensation for removing green lawns in favor of xeroscaping was implemented, which in large part helped Albuquerque roughly halve its water consumption. Thus, it would seem that Los Alamos County needs to put some "teeth" into its conservation program.

While, on one hand, Los Alamos County has what appears to be a uniquely favorable water future – at least for the next few decades, but on the other hand, if future weather does not provide historical snow packs – which are essential for ground water recharge – future water consumption will necessarily be "mining" explicitly limited ground water reserves. Again, 2060 is merely a practical planning horizon; the community's fundamental responsibility is to pursue a concerted effort ensuring very long-term water availability – potentially hundreds of years -- which can best be achieved by reasonably optimum conservation; i.e., never use more water than what seems to be reasonable when keeping long term water availability in mind.

One thing that might be helpful would be for this plan to include specific examples of various types of water conservation techniques and community programs that have shown significant progress. At present, the plan merely alludes to such possibilities – which does not promise much reader comprehension regarding what things he/she could/should be doing.

LOS ALAMOS

Department of Public Utilities

Electric, Gas, Water, and Wastewater Services

February 3, 2017

Reid Priedhorsky, Secretary
Pajarito Conservation Alliance

Sent Via Email

Dear Mr. Priedhorsky,

This letter is in response to your letter to Jeff Johnson, Chair of Board of Public Utilities dated December 21, 2016 in regards to the Long-Range Water Supply Plan, November 2016 draft.

We have reviewed your comments and prepared the following responses:

1. The purpose of this long-range (40-year) water plan is to provide the New Mexico Office of the State Engineer (OSE) with updated demand projections and a comparison of projected water demand to the water rights portfolio. Water conservation is important, and the Los Alamos County Water Utility has a stand-alone water conservation plan. Conservation will be a part of the solution when the time comes to make large investments in water supply and balance future demands. This will be a future decision for our community to make.

   The New Mexico Water Code allows covered entities to set aside water for use in the future (i.e., hold more water rights than they can currently use but will need in the future to meet projected water requirements). This 40-year plan is an instrument that allows Los Alamos County to protect unused water rights. The scope of this project does not include going into detail about the water conservation program, since the County has an existing water conservation program and a compliant plan is on file with the OSE. Information has been added to the final 40-year water plan update to quantify the volumes of water that would be conserved if the per capita water use were reduced by various amounts, to as low as the City of Santa Fe's 2015 value of 90 gallons per capita per day.

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2. Conservation planning is required by statute for any public water supply system with diversions of at least 500 acre-feet annually. The OSE developed a guidance document for water conservation plans that was published in 2013 (this document is available at http://www.ose.state.nm.us/WUC/PDF/Planning%20Guide_Final_.pdf), although there is no current requirement for water conservation plans to meet this guidance. Our consultants expect that this will be required in the future and recommend that the guidance document be followed when preparing a conservation plan (the LACWU water conservation plan follows the guidance). The 40-year water plan is a different type of plan, and the conservation plan guidelines do not apply to these plans. Section 72-1-9 of the New Mexico Water Code allows for 40-year water planning, but it does not specifically outline what should go into 40-year water plans. There have been a few efforts to adopt specific guidelines for 40-year water plans, but none of them has been passed by the legislature. Discussions of water quality are not usually included in 40-year water plans, but is beneficial for Los Alamos. The rest of the outline of the draft plan (water rights, water supply, projected demand, and the comparison of supply and demand) reflects the content of all 40-year water plans.

3. The County's consultants recommend that the LACWU continue to plan for development of a San Juan-Chama project, given the uncertainty of water demand and the U.S. Department of Energy (DOE) water rights lease, and the availability of the water. It will be up to the County and the public to select whether or not to construct a project, and to define its scope. Additional language has been added to the final plan to better explain how bringing San Juan-Chama project water online would diversify the water supply, and to discuss the potential effects of climate change on this source of supply.

4. Development of a cost-benefit analysis for drilling replacement wells is outside of the scope of this project and plan.

5. The scenario where the LACWU is unable to lease the DOE water rights but is required to supply LANL with their water supply is unlikely; however, it provides a worst case scenario for projecting demand. The current LACWU-DOE contract will expire in 2019. LANL does not have its own wells, and so we assume that the LACWU will continue to provide LANL with water supply in the future under a new agreement. LANL water projections have uncertainty. We would like to note that Los Alamos County does not have authority to impose conservation measures on LANL.

6. It is possible that the LACWU and DOE will receive return flow credits for treated water that gets reinjected as a part of the chromium interim measure and/or the eventual remediation project; however, for planning purposes, the consultants feel that it would be premature to assume that any return flow credits will be obtained. This will be something to re-evaluate during the next update of the plan.

7. The San Juan-Chama project planning is entirely separate from this effort, and the scope of the 40-year water plan update does not call for evaluation of the potential impacts to White Rock Canyon from a potential project.

We thank you for taking the time to review the plan and provide valuable input. We would like to invite you and other members of the Alliance to discuss our conservation plan. Conservation is a common goal of our two organizations, and we see an opportunity to work together on future conservation efforts. I can be reached at 663-3420 or by email at james.alarid@lacnm.us.

Sincerely,

James Alarid
Deputy Utility Manager Engineering

Cc: Gaylyn Meyers, LAC
Amy Ewing, DBS&A
Tim Glasco, LAC

pajarito conservation alliance

http://pajarito.org
info@pajarito.org

Board:
Craig Martin, president
Carlos Chiquete, treasurer
Reid Priedhorsky, secretary

Jeff Johnson
Chair, Board of Public Utilities
Los Alamos, NM

December 21, 2016
RE: *Long Range Water Supply Plan*, Nov. 2016 draft

Dear Mr. Johnson and BPU members:

I write on behalf of the Pajarito Conservation Alliance, a non-profit community organization that supports the ecosystems and outdoor experience of the Pajarito Plateau.

We have reviewed the *Long Range Water Supply Plan* draft dated November 2016 and have several concerns, which are summarized in this letter under three themes.

First, the draft does not sufficiently consider water conservation. That is, the draft *says* that conservation is good but does not incorporate it into any of the scenarios. We believe this is insufficient for the following reasons:

1. The impact of conservation on demand is not quantified. As the draft states, "further reductions in per capita demand are expected" (p. 68), but rather than attempting to quantify these reductions, the draft instead assumes that conservation demand reductions equal the high-side error in LANL estimates. These two things are not the same, and it is inappropriate to misuse conservation to offset deficiencies in LANL-provided documents. Reasonable estimates of high and low conservation effects are available and should be used.
2. The draft understates conservation opportunities. Specifically, the goal of 12% per capita reduction in demand by 2050 (p. 89) is unrealistically low. For example, Las Vegas, Nevada reduced its per-capita demand by 40% in 25 years [1], and the Los Angeles Metro's water use was the same in 2014 as 1970 [2], despite growing from 10 to 18 million people.
3. The draft references legally required conservation planning on pp. 1–2 but does not address whether water supply plans must actually plan for conservation and what the relevant criteria are. These criteria along with a justification of how they are met should be included.

Second, we find the claim that San Juan-Chama water is a good hedge against supply/demand imbalance unconvincing:

1. Surface water such as SJC will be significantly less reliable than groundwater in a drier climate (p. 82). That is, the draft states that diversification of water sources is important (p. 42) but does not quantify the value of SJC water for this purpose. Quantifying the expected value of specific diversification scenarios will avoid false confidence. That is, simply having diverse water sources it not enough; the plan must convincingly justify each source in the proposed mix.
2. The alternative of drilling new groundwater wells upstream of potential contamination is not sufficiently analyzed. No financial analysis versus White Rock Canyon wells is presented. Several risks of new wells — that drilling permits might be unobtainable (p. 47), that "technical and legal fees" might be prohibitive (p. 43), that other municipalities "encountered difficulties" in trading or purchasing water rights (p. 46) — are advertised but not quantified. This produces an invalid cost/benefit analysis.
3. A scenario where LANL does not lease its water rights to the county but nevertheless forces the county to supply it with water (p. 74) seems farfetched and should be either convincingly justified or removed.
4. The draft does not quantify the possible effects of return flow credits (p. 47, etc.), which again distorts the cost/benefit analysis.

Third, the draft does not consider the impacts of San Juan-Chama water development on White Rock Canyon:

1. The canyon contains numerous springs. "[G]roundwater that would have naturally discharged to the river" does so via springs. This is the very definition of a spring: a place where groundwater emerges to the surface. Thus, an approach that develops SJC water via wells in or near White Rock necessarily impacts springs; the only question is which ones and by how much.
2. These springs support state-listed sensitive species that would also be impacted.
3. Regardless of whether the approach involves groundwater interception, development of SJC surface water anywhere in White Rock Canyon is likely to impact the White Rock Canyon Archaeological District.
4. We realize that the draft is not an environmental or cultural assessment. However, such assessments are expensive, and Los Alamos rate-payers should not be expected to shoulder those costs without a reasonable likelihood of success. This includes both an acceptable outcome of the assessments and a proper cost/benefit analysis supporting the alternative that requires the assessments.

In short, while the draft spends a lot of words on conservation, its proposed actions largely ignore conservation opportunities, and its cost/benefit analyses are distorted in favor of expensive, environmentally damaging policies. This way of thinking will harm the future of our community.

We urge you to revise this plan as described above, in order to incorporate the quantitative, evidence-based reasoning and conservation values prized by the citizens of Los Alamos. We look forward to remaining engaged with this water planning process.

Sincerely,

Reid Priedhorsky

Reid Priedhorsky
Secretary, Pajarito Conservation Alliance

Citations:

[1] Jonathan Thompson, *High Country News*, Jan. 23, 2014. The Vegas Paradox.

[2] Jon Christensen, High Country News, Jan. 23, 2014. Brave New L.A.

LOS ALAMOS

Department of Public Utilities

Electric, Gas, Water, and Wastewater Services

February 6, 2017

Ed Jacobson
White Rock, NM 87544
Sent via email

Dear Mr. Jacobson,

This letter is in response to your emails dated November 21 and December 6, 2016, and January 17, 2017 in regards to the Long-Range Water Supply Plan, November 2016 draft. In addition, we would like to express our appreciation to you for taking the time to meet in person on January 17, 2017.

Your earlier emails presented various objections to the County proceeding with development of the San Juan-Chama (SJC) water, and questioned why the Long-Range Water Supply plan included the SJC water in the planning effort. After meeting on January 17, 2017, you indicated (via email) that after the discussions that took place in our meeting, you recognize why the SJC water is a part of the County's water resource planning.

We want to ensure that you have received an adequate response from the DPU. If our assessment of your comments stated above are not correct, please let me know. The content of the final plan that will be presented for approval remains the same with respect to the SJC water, with exception of some clarifying statements to address comments from others.

If you have any questions or would like to discuss further please contact me at 663-3420 or by email at james.alarid@lacnm.us.

Sincerely,

James Alarid
Deputy Utility Manager Engineering

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Cc: Gaylyn Meyers, LAC
Amy Ewing, DBS&A
Tim Glasco, LAC

Alarid, James

From: A,E,A Jacobson <beepbeep@cybermesa.com>
Sent: Tuesday, January 17, 2017 10:45 PM
To: O'Leary, Susan
Cc: Chandler, Christine; Maggiore, Antonio; Glasco, Timothy; Alarid, James
Subject: A couple of comments re this morning's water plan mtg

Councilor O'Leary,

You, Councilor Chandler, and Councilor Maggiore asked good questions and Utilities Manager Glasco and Deputy Manager Alarid had good answers.
Such an exchange in which there are also answers to questions that didn't get asked means they were good questions, in my opinion.

New information that I hadn't thought about is the fact that Bureau of Reclamation interpretations of rules have varied depending on which BuRec lawyer was in charge at a given time. That doesn't surprise me, but I hadn't thought about county officials having to contend with that sort of variable in their planning. Not that it matters for this long range water plan, but State Engineers seem to have come and gone fairly frequently recently, too. I've been unable to find a list of those who served following Steve Reynolds, who had the job for 35 years until his death in 1990, but I'm pretty sure there have been two in the past three years.

It doesn't seem it would be necessary to put Section 9, Recommendations, in the document submitted to the OSE.

I recognize that San Juan-Chama water needs to be mentioned. Perhaps it would be sufficient to say that the County intends to continue to sell/lease/whatever the term is, its allocation to the Bureau of Reclamation, or to any other San Juan-Chama Project contractor if the Bureau no longer wants it. If the County at some time in the future needs the water, and any is still coming through the tunnels, it could then do the NEPA work necessary and drill the well(s) needed to produce it. (That source might be short-lived, as the eventual need for treatment for sediment removal could make it too costly to use.)

It was noted in brief discussion after the close of the meeting that the dollar amounts of San Juan-Chama maintenance costs and BuRec reimbursement are no longer balanced at $60K per year. Those amounts are now more like $30K per year.

Thanks again for the invitation to attend the meeting, Ed Jacobson

Alarid, James

From: A.E.A Jacobson <beepbeep@cybermesa.com>

Sent: Monday, December 05, 2016 7:26 AM
To: Reiss, Rick; O'Leary, Susan; Chrobocinski, James; Girrens, Steven; Henderson, Kristin; Izraelevitz, David; Sheehey, Pete
Cc: Alarid, James; McLin, Stephen
Subject: Long-Range Water Plan

12/5/16

Councilors,

Councilor O'Leary is to be commended for wanting to spend the time needed to get more familiar with the required periodic water plan for the Office of the State Engineer.

This e-mail will be an attempt to argue that any county funds spent to actually pump water from wells drilled in proximity to surface flow of the Rio Grande to draw from groundwater is an improper use of funds. (I should note that what little I know of the San Juan-Chama issue has been learned since I became interested as a result of comments made at a public meeting at which the Comprehensive Plan was being discussed. Any errors are due to ignorance, not an intentional attempt to mislead.)

1. The water is not needed. Even without recharge, at present rate of pumping, the water available is sufficient for hundreds of years.

2. Although perhaps it would not initially need to be treated, eventually, within 25 years is a number recalled being heard, there would be enough sediment that an expensive water treatment plant would be required and need a location. The reason is that wells said to be using San Juan-Chama water have to be close enough to the Rio Grande to actually be drawing from water that is being replaced by flow in the Rio Grande.

3. There is good reason to think that in the perhaps not too distant future there will not be any water flowing from the Colorado River Basin to the Rio Grande basin.

Support of 1. is provided in the DBSA Long-Range Water Supply Plan. Even if it is thought that it would be good for the county's population to increase, despite the fact that it is trending downward, water conservation measures are available. If there is money available to drill wells, they should be located with the intent to learn more about how recharge occurs. Just because the aquifer is good for hundreds of years is no reason not to try to learn if there is a way to replenish it or if it may already be getting recharged.

It's my impression that underground movement of water is a very complicated subject, and that there are real requirements/calculations for wells drilled near rivers. There are both legal and physical aspects for 2.

There can be talk about storage in the lakes on the Chama upstream from Los Alamos in which water from wet years can be kept for dry years, but it seems to be unreasonable to think that could keep 1200 acre-feet available for Los Alamos. It has already been the case that it has not been available.

Support for 3., in addition to other sources, can be found here:
https://www.abqjournal.com/518371/san-juan-water-dries-up-for-first-time-in-40-years.html

I don't think there are any villains. James Alarid and others at the county are on top of this and would be irresponsible not to be looking at San Juan-Chama water as a possible source for the county. The Daniel B. Stephens hydrologists have provided a tremendous amount of information, probably more than needed, but I don't have a problem with that -- it's good for the historical record. However, their conclusions and recommendations

from their findings don't have to be the conclusions of the county in the plan submitted to the Office of the State Engineer. The conclusion with regard to San Juan-Chama water can be simply to continue selling to the Bureau of Reclamation for $60K per year, about the share of the county's cost of maintaining the San Juan-Chama infrastructure. It's being put to beneficial use at the present, when there is flow. In the unlikely event the county somehow needed the water in the future, and the more likely case that it would not be available then, an impact statement could be funded, but not before.

One item I just noted this morning, which might be of interest:
http://www.ose.state.nm.us/Basins/Colorado/isc_CO_pilot_program.php

Thanks for you consideration,
Ed Jacobson
607 Meadow Lane

Alarid, James

From: A,E,A Jacobson <beepbeep@cybermesa.com>

Sent: Monday, November 21, 2016 11:09 PM
To: Alarid, James
Cc: ~County Council
Subject: Draft Long-Range Water Supply Plan

Mr. Alarid,

The November 20, 2016, Los Alamos Monitor states that comments on the draft Long-Range Water Supply Plan should be sent to you by November 22. It is noted that that's not a very long time to review a 111-page document.

My comments are summarized by this statement. San Juan-Chama water should not be considered as a source of water for Los Alamos County, and no money and staff time should be expended in pursuing it.

There is no need for it now, and should a need for additional water arise, San Juan-Chama water would likely not be available. Excerpts from five sections of the draft Plan are copied below with my comments in parentheses.

Section 3.2

Barring potential water quality issues, continued pumping of the regional aquifer at current rates is likely to be sustainable for hundreds of years. (This is even if there is no recharge, and it's not clear to me that recharge of this aquifer is understood. If water quality in the present wells becomes a problem, it will probably be even more of a problem for wells drilled close the Rio Grande.)

Section 4.1.2

Bringing the San Juan-Chama Project water online would diversify the water supply, helping the LACWU to mitigate any future effects due to contamination of existing wells and/or climate change. (If contamination becomes an issue in existing wells if may be even more of an issue in wells that are receiving some water from the Rio Grande.)

Section 4.3.3

The Navajo Water Rights Settlement, which was approved in August 2013, defines flows and other requirements in a manner that could result in shortages to the San Juan-Chama Project. These shortages would likely be shared on a pro rata basis among all contractors.

Although conditions giving rise to shortage sharing may be rare, implementation of the act could nonetheless reduce the quantity of San Juan-Chama water available to contractors in some years. (In a very dry year, there might be no diversion of Colorado River basin water.)

Section 7.2

The study additionally projected a decrease in native Rio Grande water by about a third and a decrease in tributary flow by about a quarter, increasing frequency, intensity, and duration of droughts and floods, earlier snowmelt runoff, and increased variability in the magnitude, timing, and spatial distribution of streamflow and other hydrologic variables. (It just makes sense not to rely on flow associated with the Rio Grande.)

Section 7.3

Higher temperatures will result in a longer and warmer growing season, resulting in

increased water demand for outdoor watering during the spring and summer months and

potentially lower rates of recharge. (If Los Alamos County was a major producer of alfalfa or chile, this might be a consideration, but the County is not. Even if the population of the county increased, which does not seem likely, outdoor watering could simply be reduced or eliminated.)

To repeat Section 3.2, "Barring potential water quality issues, continued pumping of the regional aquifer at current rates is likely to be sustainable for hundreds of years."

Thanks for your consideration,
Ed Jacobson
White Rock

LOS ALAMOS

Department of Public Utilities

Electric, Gas, Water, and Wastewater Services

February 3, 2017

C.M. Gillespie
427 Estante Way
Los Alamos, NM 87544

Dear Mr. Gillespie,

This letter is in response to your email dated November 22, 2016 in regards to the Long-Range Water Supply Plan, November 2016 draft. The purpose of this long-range (40-year) water plan is to provide the New Mexico Office of the State Engineer (OSE) with updated demand projections and a comparison of projected water demand to the water rights portfolio. Your comments have been reviewed and incorporated into the plan as described below.

A number of your comments were related to the County's San Juan-Chama (SJC) water rights and the potential future development of this water. This revised Long-Range Water Supply Plan does not endorse a specific SJC project. Our consultants recommend that the LACWU continue to plan for development of a San Juan-Chama project, given the uncertainty of water demand and the U.S. Department of Energy water rights lease, and the availability of the water. It will be up to the County and the public to select whether or not to construct a project, and to define its scope. Additional language has been added to the final plan to better explain how bringing San Juan-Chama project water online would diversify the water supply, and to discuss the potential effects of climate change on this source of supply.

We have removed Figure 6-1 from the plan. The figure was meant to show that at least under the high growth scenario, there is no room for losing any production due to contamination. We have covered that in the text.

The long-range water supply plan update reports on the LACWU's existing conservation program, but it is not intended to be a water conservation plan itself. While there has been opposition to water conservation in Los Alamos in the past, we agree that

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conservation could reduce demands in the future. We have added information about the volume of water that would be potentially conserved, and have discussed the possibility of per capita water use to be reduced to as low as the City of Santa Fe's 2015 value of 90 gallons per day.

In your comments, you question the consistency of various sections of the plan. The plan has been organized and content selected to be consistent with the requirements of the Office of the State Engineer. Although there are not published criteria, DBS&A has been contracted, due to their experience and knowledge of the OSE requirements, for the purpose of preparing a plan that meets the requirements of the OSE and best protects the County's unused water rights.

Your input has been valuable, and incorporating some of your suggestions has added to the quality of the plan. If you have any questions or would like to discuss further please contact me at 663-3420 or by email at james.alarid@lacnm.us.

Sincerely,

James Alarid
Deputy Utility Manager Engineering

Cc: Gaylyn Meyers, LAC
Amy Ewing, DBS&A
Tim Glasco, LAC

Comments on the Long-Range Water supply Plan Draft
Nov 2016

The last line in the top paragraph on page 42 of the report states "Bringing the SJC water online would diversify the water supply". This is not correct since the new wells proposed are just more wells in the regional aquifer and would be subject to the same threats as the other wells. Also, how does SJC water mitigate the effect of climate change, especially when the climate change envisioned could result in a reduction in our SJC allocation?

Section 5.4 (p68) states that water conservation beyond what has already been accomplished in the county has not been incorporated in the water demand projections. This means that the demand projections in Table 5-9 (p69) and Figures 5-5 and 5-6 (p70 &71) do not acknowledge plausible lower demand numbers at all. This is very unlike the high demand Scenario 2 (p75) and Figure 6-1 (p77) which depict plausible reductions in supply against the high demand projections.

The City of Santa Fe has accomplished water conservation that lowers their per capital water demand below that which has been accomplished in Los Alamos. This report should acknowledge this and show what the Los Alamos water demand would be if Los Alamos were to achieve the same conservation that has been done in Santa Fe. This could be done on the existing Figures 5-5 and 5-6 by crosshatching, for example.

Figure 6-1 (p 77) of the draft report is misleading. A well that was shut down due to some problem would not be a 40 year problem. It would be fixed in a few years by a repair, addition of a well-head purification technology, or by drilling a new well. This would return the orange bar to the level shown for 2010. If the OSE required a full offset for the repaired well as postulated in Section 6.2 (p75), the San Juan Chama water rights would be used for this offset and not be physically available for Los Alamos.

There is a major inconsistency in the report between the recommendations in Section 9 and the earlier discussion in Sections 4,5 and6.

The second bullet under "Water Supply (Quantity)" (p91) recommends an environmental assessment of the SJC project "---and evaluate whether to initiate steps toward implementation---. Bringing the San Juan Project water online would help the LACWU address the potential for contamination of the existing wells---". Note that as discussed elsewhere in the document, Section 4.1.2 (p41), and clarified in the discussion at the 11/16/16 meeting by the DPU, this is referring to the plan for three wells on the WR canyon rim as proposed in the CDM Smith study.

Various threats to existing LAC ground and SJC surface water rights in Sections 4.2.2; 4.2.3;4.2.4 (p43-45). Section 4.3 (p45) continues this discussion and makes the point that with respect to Senior Water Rights and Rio Grande Offset Requirements the OSE could required the LACWU to use SJC rights to meet these demands (p47). Section 4.3.3 further notes that the county SJC allocation could be reduced if there is not enough water available to meet existing allocations.

In Section 6.2 Scenario 2: High Water Use and Loss of Water Rights (p75) the third paragraph gives the assumptions used to derive Figure 6-1 (p77). Just why 1200 ac-ft/yr would disappear in the three years

from now to 2020 is not stated and seems unlikely, but it implies the need for very prompt action to avert a very serious problem.

Here is the problem. The first complete sentence on page 76 states "Under this scenario there is a gap between the diminished groundwater supply and projected demand starting in 2030 that would need to be addressed, either by bringing the San Juan-Project water supply online or through reduction in demand (water conservation)". We can only 'spend' the SJC rights once. If we choose to develop the SJC water, which seems to be the preferred course, we no longer have those rights to 'defend' our existing groundwater rights, for example, to enable new wells to be developed to replace contaminated wells or in the event OSE invokes demands on our water rights for Senior Users or Rio Grande Offset.

County of Los Alamos

Staff Report

February 15, 2017

Agenda No.:	7.C
Index (Council Goals):	BCC - N/A
Presenters:	Tim Glasco, Utilities Manager
Legislative File:	**9091-17**

Title

Discussion of Wastewater Fund Status, Rate and Future Capital Needs

Recommended Action

Discussion item only, no recommended motion.

Staff Recommendation

Staff recommends delaying construction of the White Rock Wastewater Treatment Plant replacement project until 2020, and implementing wastewater rate increases as discussed.

Body

Background

The flow of wastewater into our treatment plants has been steadily decreasing over at least the past ten years. (See attached graph of wastewater inflows into the LA and WR plants.) As this has occurred, the old original plants the County inherited from the Atomic Energy Commission have reached, and passed, their design life. The County borrowed $12 million from the New Mexico State Revolving Loan Fund to construct the Los Alamos Wastewater Treatment Plant. Repayment of that loan began in FY09 and added almost $1 million per year debt service payments to the wastewater budget. Traditionally, the wastewater rate was based on the winter water use average of customers. This approach had several problems, including overall low winter water use due to the unusually high number of people who travel out of the county during the winter months. A 24% adjustment factor was utilized in an attempt to match the low winter water use data to the actual flows entering the plant. Revenue still lagged expenses however, and in 2011 it was decided to change to a flat rate for residential users, and to raise the rate by a series of five 8% annual increases. The last of those increases took effect in July of 2016.

In examining the income statement of the wastewater utility it is apparent that revenues have still not kept up with declining sales and the utility is barely financially solvent. At the present income level, the utility can function, but is not accumulating money to bring reserves up to the amount called for in the DPU financial guidelines adopted by the Board. When payments on the estimated $14 million loan that will be required to construct the White Rock Wastewater Treatment plant are included, the fund flow into the wastewater utility becomes deeply negative.

The wastewater utility faces two large capital investments in the next five years, replacement of the White Rock Wastewater Treatment Plant and reconfiguring of the Los Alamos Wastewater Treatment Plant to achieve Class 1A effluent. Construction of the new White

Rock plant is currently estimated to cost around $12 million while alteration of the LA plant is estimated at $3.5 million. Those estimates are in 2017 dollars and according to Engineering News Record, inflation in the construction sector is currently running around 5% per year. Engineering design for those two projects is estimated to cost around $1.5-2 million. All this means that the wastewater utility will incur an additional $17 million in debt by the time these projects are finished. Debt service for that loan will run approximately $1.1 million per year. The loan for the LA plant will be paid off in 2029, so between construction of the WR plant and final payment on the LA plant loan we will be facing double debt service payments. To put this into perspective, the total wastewater expenditure for FY18 is projected to be $4.6 million dollars, which includes $1.1 million in existing debt service. Considering an $1.1 million in debt service added in, the expenditures would rise to $5.7 million with $2.2 million, or 39% of all expenses, going to debt service.

If the design and construction of the WR plant is delayed until FY20 and 21, and a rate increase of 8% for FY2018, followed by lesser increases in the following six years is pursued, then the fund will be allowed to grow and be in a condition to absorb the additional debt. The present WR plant just received a new NPDES permit that is good for another 5 years, so waiting another 3 years to begin design should not have any negative permit enforcement issues. Given the present state of wastewater fund, it is highly unlikely that a loan for construction of a new plant could be secured until significant rate increases are in place.

Alternatives

Institute one large 25% rate increase and proceed with design and construction of the WRWWTP in FY19, followed by additional outyear more moderate increases.

Replace failing equipment at the WRWWTP and continue with the trickling filter process until the LA plant note is paid off. (Note this will in all probability not be feasible due to expected NPDES permit actions).

Consider other scenarios for the sequence of rate increases.

Fiscal and Staff Impact

No staff impact.

Attachments

A - Graph of Wastewater Flows in the White Rock and LA Wastewater Treatment Plants

B - Wastewater Fund Financial Flow Spreadsheet

Los Alamos County Utilities Department
Financial Forecast
Wastewater System (WWC + WWT)

Expense Forecast		ACTUAL 2016	BUDGET 2017	BUDGET 2018	FORECAST 2019	FORECAST 2020	FORECAST 2021	FORECAST 2022	FORECAST 2023	FORECAST 2024	FORECAST 2025	FORECAST 2026	FORECAST 2027	FORECAST 2028	FORECAST 2029	FORECAST 2030	FORECAST 2031	FORECAST 2032	FORECAST 2033	FORECAST 2034	FORECAST 2035	FORECAST 2036
	1.50%																					
Wastewater Collection																						
Supervision, Misc Direct Admin		233,780	323,618	230,375	233,831	237,338	240,898	244,512	248,179	251,902	255,681	259,516	263,408	267,360	271,370	275,441	279,572	283,766	288,022	292,343	296,728	301,179
Wastewater Collection		426,571	421,571	367,602	373,116	378,713	384,393	390,159	396,012	401,952	407,981	414,101	420,312	426,617	433,016	439,512	446,104	452,796	459,588	466,482	473,479	480,581
Sewer Lift Stations		275,311	245,729	275,214	279,342	283,532	287,785	292,102	296,484	300,931	305,445	310,027	314,677	319,397	324,188	329,051	333,987	338,996	344,081	349,243	354,481	359,798
Total WWC Operation Expenses		935,662	990,918	873,191	886,289	899,583	913,077	926,773	940,675	954,785	969,107	983,643	998,398	1,013,374	1,028,574	1,044,003	1,059,663	1,075,558	1,091,691	1,108,067	1,124,688	1,141,558
Wastewater Treatment																						
LA WWTP Operations & Maintenance		833,992	969,358	915,703	929,439	943,380	957,531	971,894	986,472	1,001,269	1,016,288	1,031,533	1,047,006	1,062,711	1,078,651	1,094,831	1,111,254	1,127,922	1,144,841	1,162,014	1,179,444	1,197,136
WR WWTP Operations & Maintenance		506,298	418,951	402,897	408,433	414,559	420,778	427,090	433,496	439,998	446,598	453,297	460,097	466,998	474,003	481,113	488,330	495,655	503,090	510,636	518,296	526,070
Total WWT Operation Expenses		1,340,290	1,388,309	1,318,100	1,337,872	1,357,940	1,378,309	1,398,983	1,419,968	1,441,268	1,462,887	1,484,830	1,507,102	1,529,709	1,552,654	1,575,944	1,599,583	1,623,577	1,647,931	1,672,650	1,697,740	1,723,206
WW Sys. Interdepartmental Charges		372,692	416,582	646,445	656,142	665,984	675,974	686,113	696,405	706,851	717,454	728,216	739,139	750,226	761,479	772,901	784,495	796,262	808,206	820,329	832,634	845,124
WW Sys. Administrative Division Allocation		482,703	504,878	605,847	546,794	554,996	563,321	571,771	580,348	589,053	597,889	606,857	615,960	625,199	634,577	644,096	653,757	663,564	673,517	683,620	693,874	704,282
Debt Service (WWT)		1,155,799	1,155,799	1,155,799	1,155,799	1,155,799	2,268,142	2,268,141	2,268,041	2,268,142	2,174,357	2,080,573	2,080,572	2,077,231	2,191,498	2,191,498	1,226,609	1,226,609	1,226,609	1,471,392	1,471,392	1,471,392
Capital - WWC - CIP & R&R		479,000	425,000	200,000	684,000	1,061,000	573,000	478,000	517,000	415,000	255,000	558,000	743,000	348,000	236,000	240,000	910,000	751,000	668,000	732,000	549,000	589,000
Capital - WWT - CIP & R&R		-	-			1,372,000	515,000	-	135,000	-	555,000	85,000	286,000	-	-	-	91,000	-	-	317,000	-	98,000
Capital (Bond, Loan & Grant) - WWTP CIP							15,887,000							1,751,000					3,751,000			
Total WW System Operation Expenses		3,131,347	4,456,486	4,599,382	4,582,895	4,634,302	5,798,822	5,851,782	5,905,437	5,960,098	5,921,693	5,884,118	5,941,171	5,995,739	6,168,783	6,228,442	5,324,108	5,385,571	5,447,955	5,756,058	5,820,328	5,885,562
Total WW System Capital Expenditures		479,000	425,000	200,000	684,000	2,433,000	16,975,000	478,000	652,000	415,000	810,000	643,000	1,029,000	2,099,000	236,000	240,000	1,001,000	751,000	4,419,000	1,049,000	549,000	687,000
Total WW System Cash Outflow		3,610,347	4,881,486	4,799,382	5,266,895	7,067,302	22,773,822	6,329,782	6,557,437	6,375,098	6,731,693	6,527,118	6,970,171	8,094,739	6,404,783	6,468,442	6,325,108	6,136,571	9,866,955	6,805,058	6,369,328	6,572,562
Revenue Forecast																						
Number of Res SF Flat Rate Customers		6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629
Res SF Flat Rate		31.88	34.43	37.18	39.79	42.17	44.28	46.05	47.44	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38
Res SF Service Charge		8.81	9.51	10.27	10.99	11.65	12.23	12.72	13.10	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36
Rate Increase Percentage		-	**8.00%**	**8.00%**	**7.00%**	**6.00%**	**5.00%**	**4.00%**	**3.00%**	**2.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Total "Sales" Revenue from Res SF Flat Rate		3,204,440	3,460,386	3,737,217	3,998,822	4,238,751	4,450,689	4,628,716	4,767,578	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929
Number of Res MF Flat Rate Customers		75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Res MF Service Charge		8.81	9.51	10.27	10.99	11.65	12.23	12.72	13.10	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36
Number of Res MF Dwelling Units		1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585
Res MF Flat Rate		26.56	28.68	30.97	33.14	35.13	36.88	38.36	39.51	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30
Rate Increase Percentage		-	**8.00%**	**8.00%**	**7.00%**	**6.00%**	**5.00%**	**4.00%**	**3.00%**	**2.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Total "Sales" Revenue from Res MF Flat Rate		482,314	520,809	562,396	601,763	637,869	669,762	696,553	717,450	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799
Number of Non-Residential Customers		291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
Non-Residential Service Charge		8.81	9.51	10.27	10.99	11.65	12.23	12.72	13.10	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36
Non-Residential "Sales" in Kgal	-0.20%	47,713	47,618	47,522	47,427	47,332	47,238	47,143	47,049	46,955	46,861	46,767	46,674	46,580	46,487	46,394	46,301	46,209	46,116	46,024	45,932	45,840
Adjustment Factor		24.00%	24.00%	16.00%	8.00%	1.75%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Adjusted Non-Residential "Sales" in Kgal		59,164	59,046	55,126	51,221	48,161	47,238	47,143	47,049	46,955	46,861	46,767	46,674	46,580	46,487	46,394	46,301	46,209	46,116	46,024	45,932	45,840
Non-Residential Commodity Charge per Kgal		15.00	16.20	17.50	18.72	19.84	20.84	21.67	22.32	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77
Rate Increase Percentage		-	**8.00%**	**8.00%**	**7.00%**	**6.00%**	**5.00%**	**4.00%**	**3.00%**	**2.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.0%**	**0.00%**	**0.00%**
Total "Sales" Revenue from Non-Residential		890,680	960,058	970,338	967,361	966,488	996,158	1,034,018	1,062,997	1,082,179	1,080,105	1,078,036	1,075,970	1,073,909	1,071,852	1,069,798	1,067,749	1,065,704	1,063,664	1,061,627	1,059,594	1,057,565
Total "Sales" Revenue		4,577,434	4,941,253	5,269,950	5,567,946	5,843,108	6,116,609	6,359,287	6,548,025	6,676,907	6,674,833	6,672,764	6,670,698	6,668,637	6,666,579	6,664,526	6,662,477	6,660,432	6,658,391	6,656,354	6,654,322	6,652,293
Interest on Utility Reserves		18,711	12,357	13,439	20,699	25,525	274,155	28,409	29,278	29,576	34,547	34,212	36,910	32,971	38,339	42,841	46,425	52,182	60,823	69,872	68,689	73,994
Inter-Utility Loan																						
Bond Issue Proceeds						17,774,000								1,751,000					3,751,000			
Federal or State Grant/Loan		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Revenue		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bond Federal Subsidy		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflow		4,596,145	4,953,610	5,283,389	5,588,645	23,642,633	6,390,764	6,387,696	6,577,302	6,706,483	6,709,380	6,706,975	6,707,608	8,452,608	6,704,919	6,707,367	6,708,902	6,712,614	10,470,214	6,726,226	6,723,011	6,726,288
Net Cash Flow		985,798	72,124	484,007	321,749	16,575,330	(16,383,059)	57,914	19,866	331,384	(22,313)	179,857	(262,564)	357,869	300,135	238,925	383,794	576,044	603,259	(78,832)	353,683	153,726
Cumulative Net Cash Flow		985,798	1,057,922	1,541,929	1,863,679	18,439,009	2,055,950	2,113,864	2,133,730	2,465,115	2,442,801	2,622,658	2,360,095	2,717,964	3,018,099	3,257,024	3,640,819	4,216,862	4,820,121	4,741,289	5,094,973	5,248,698
Cash Balance		823,785	895,909	1,379,916	1,701,666	18,276,996	1,893,938	1,951,852	1,971,717	2,303,102	2,280,789	2,460,646	2,198,082	2,555,951	2,856,087	3,095,012	3,478,806	4,054,849	4,658,108	4,579,277	4,932,960	5,086,686
Recommended Cash Balance		3,646,473	3,506,143	4,061,590	5,802,347	20,370,051	5,011,482	5,211,962	5,001,739	5,424,120	5,191,025	5,511,346	6,609,872	4,772,485	4,920,140	5,710,970	4,526,359	8,225,090	4,886,282	4,662,725	4,832,860	4,968,477
Alter. One Residential SF Flat Rate Sewer /month		$40.69	$43.94	$47.46	$50.78	$53.82	$56.51	$58.78	$60.54	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75
Alter. One Residential MF Flat Rate Sewer / unit /month		$35.37	$38.19	$41.24	$44.13	$46.78	$49.11	$51.08	$52.61	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66
Alter. One Non-Residential Commodity Rate / Kgal		$15.00	$16.20	$17.50	$18.72	$19.84	$20.84	$21.67	$22.32	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77

NOTE 1: "WW Sys. Interdepartmental Charges" & "WW Sys. Administrative Division Allocation" are not divided into "Total WWC Operation Expenses" or "Total LA WWTP Operation Expenses" or "Total WR WWTP Operation Expenses".
NOTE 1 (cont'd): These charges are included in the "Total WW System Operation Expenses". This was done to equally compare relative operation expenses between all three Wastewater System sub-systems (WWC, LA WTP & WR WWTP).
NOTE 2:

SF & MF Monthly Flat Rate Estimates

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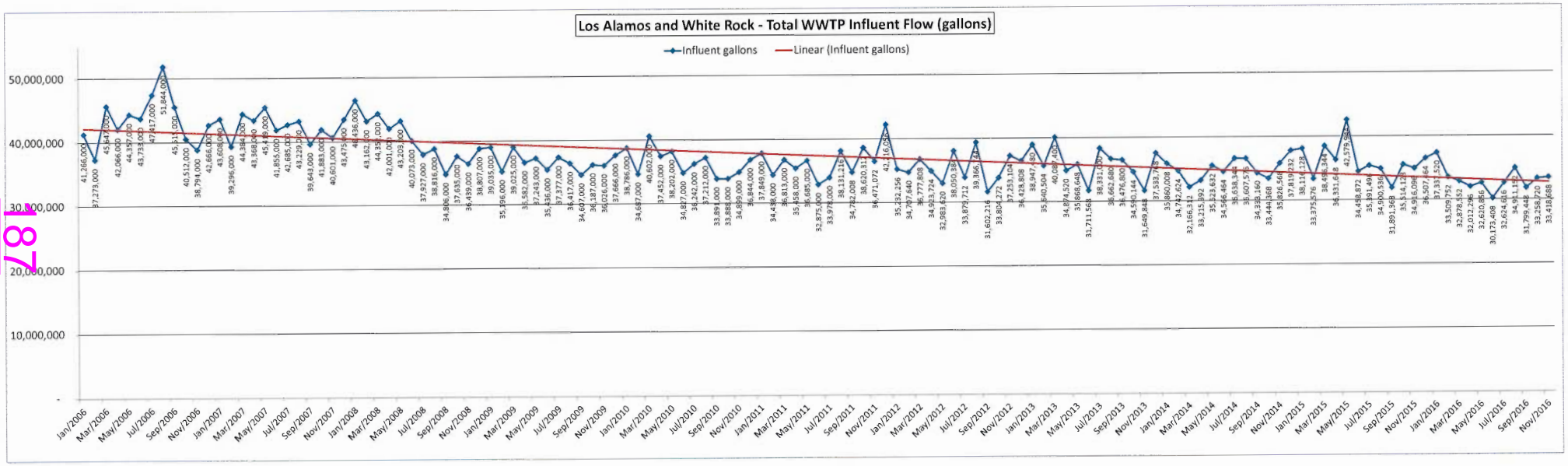
Los Alamos and White Rock - Total WWTP Influent Flow (gallons)
Influent gallons
Linear (Influent gallons)
50,000,000
40,000,000
30,000,000
20,000,000
10,000,000
-

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Los Alamos County Utilities Department
Financial Forecast
Wastewater System (WWC + WWT)

Expense Forecast		ACTUAL 2016	BUDGET 2017	BUDGET 2018	FORECAST 2019	FORECAST 2020	FORECAST 2021	FORECAST 2022	FORECAST 2023	FORECAST 2024	FORECAST 2025	FORECAST 2026	FORECAST 2027	FORECAST 2028	FORECAST 2029	FORECAST 2030	FORECAST 2031	FORECAST 2032	FORECAST 2033	FORECAST 2034	FORECAST 2035	FORECAST 2036
	1.50%																					
Wastewater Collection																						
Supervision, Misc Direct Admin		233,780	323,618	230,375	233,831	237,338	240,898	244,512	248,179	251,902	255,681	259,516	263,408	267,360	271,370	275,441	279,572	283,766	288,022	292,343	296,728	301,179
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Sewer Lift Stations		275,311	245,729	275,214	279,342	283,532	287,785	292,102	296,484	300,931	305,445	310,027	314,677	319,397	324,188	329,051	333,987	338,996	344,081	349,243	354,481	359,798
Total WWC Operation Expenses		935,662	990,918	873,191	886,289	899,583	913,077	926,773	940,675	954,785	969,107	983,643	998,398	1,013,374	1,028,574	1,044,003	1,059,663	1,075,558	1,091,691	1,108,067	1,124,688	1,141,558
Wastewater Treatment																						
LA WWTP Operations & Maintenance		833,992	969,358	915,703	929,439	943,380	957,531	971,894	986,472	1,001,269	1,016,288	1,031,533	1,047,006	1,062,711	1,078,651	1,094,831	1,111,254	1,127,922	1,144,841	1,162,014	1,179,444	1,197,136
WR WWTP Operations & Maintenance		506,298	418,951	402,897	408,433	414,559	420,778	427,090	433,496	439,998	446,598	453,297	460,097	466,998	474,003	481,113	488,330	495,655	503,090	510,636	518,296	526,070
Total WWT Operation Expenses		1,340,290	1,388,309	1,318,100	1,337,872	1,357,940	1,378,309	1,398,983	1,419,968	1,441,268	1,462,887	1,484,830	1,507,102	1,529,709	1,552,654	1,575,944	1,599,583	1,623,577	1,647,931	1,672,650	1,697,740	1,723,206
WW Sys. Interdepartmental Charges		372,692	416,582	646,445	656,142	665,984	675,974	686,113	696,405	706,851	717,454	728,216	739,139	750,226	761,479	772,901	784,495	796,262	808,206	820,329	832,634	845,124
WW Sys. Administrative Division Allocation		482,703	504,878	605,847	546,794	554,996	563,321	571,771	580,348	589,053	597,889	606,857	615,960	625,199	634,577	644,096	653,757	663,564	673,517	683,620	693,874	704,282
Debt Service (WWT)		1,155,799	1,155,799	1,155,799	1,155,799	1,155,799	2,268,142	2,268,141	2,268,041	2,268,142	2,174,357	2,080,573	2,080,572	2,077,231	2,191,498	2,191,498	1,226,609	1,226,609	1,226,609	1,471,392	1,471,392	1,471,392
Capital - WWC - CIP & R&R		479,000	425,000	200,000	684,000	1,061,000	573,000	478,000	517,000	415,000	255,000	558,000	743,000	348,000	236,000	240,000	910,000	751,000	668,000	732,000	549,000	589,000
Capital - WWT - CIP & R&R		-	-			1,372,000	515,000	-	135,000	-	555,000	85,000	286,000	-	-	-	91,000	-	-	317,000	-	98,000	
Capital (Bond, Loan & Grant) - WWTP CIP							15,887,000							1,751,000					3,751,000			
Total WW System Operation Expenses		3,131,347	4,456,486	4,599,382	4,582,895	4,634,302	5,798,822	5,851,782	5,905,437	5,960,098	5,921,693	5,884,118	5,941,171	5,995,739	6,168,783	6,228,442	5,324,108	5,385,571	5,447,955	5,756,058	5,820,328	5,885,562
Total WW System Capital Expenditures		479,000	425,000	200,000	684,000	2,433,000	16,975,000	478,000	652,000	415,000	810,000	643,000	1,029,000	2,099,000	236,000	240,000	1,001,000	751,000	4,419,000	1,049,000	549,000	687,000
Total WW System Cash Outflow		3,610,347	4,881,486	4,799,382	5,266,895	7,067,302	22,773,822	6,329,782	6,557,437	6,375,098	6,731,693	6,527,118	6,970,171	8,094,739	6,404,783	6,468,442	6,325,108	6,136,571	9,866,955	6,805,058	6,369,328	6,572,562
Revenue Forecast																						
Number of Res SF Flat Rate Customers		6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629
Res SF Flat Rate		31.88	34.43	37.18	39.79	42.17	44.28	46.05	47.44	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38	48.38
Res SF Service Charge		8.81	9.51	10.27	10.99	11.65	12.23	12.72	13.10	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36
Rate Increase Percentage		-	**8.00%**	**8.00%**	**7.00%**	**6.00%**	**5.00%**	**4.00%**	**3.00%**	**2.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Total "Sales" Revenue from Res SF Flat Rate		3,204,440	3,460,386	3,737,217	3,998,822	4,238,751	4,450,689	4,628,716	4,767,578	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929	4,862,929
Number of Res MF Flat Rate Customers		75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75	75
Res MF Service Charge		8.81	9.51	10.27	10.99	11.65	12.23	12.72	13.10	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36
Number of Res MF Dwelling Units		1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585
Res MF Flat Rate		26.56	28.68	30.97	33.14	35.13	36.88	38.36	39.51	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30	40.30
Rate Increase Percentage		-	**8.00%**	**8.00%**	**7.00%**	**6.00%**	**5.00%**	**4.00%**	**3.00%**	**2.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Total "Sales" Revenue from Res MF Flat Rate		482,314	520,809	562,396	601,763	637,869	669,762	696,553	717,450	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799	731,799
Number of Non-Residential Customers		291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291	291
Non-Residential Service Charge		8.81	9.51	10.27	10.99	11.65	12.23	12.72	13.10	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36	13.36
Non-Residential "Sales" in Kgal	-0.20%	47,713	47,618	47,522	47,427	47,332	47,238	47,143	47,049	46,955	46,861	46,767	46,674	46,580	46,487	46,394	46,301	46,209	46,116	46,024	45,932	45,840
Adjustment Factor		24.00%	24.00%	16.00%	8.00%	1.75%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Adjusted Non-Residential "Sales" in Kgal		59,164	59,046	55,126	51,221	48,161	47,238	47,143	47,049	46,955	46,861	46,767	46,674	46,580	46,487	46,394	46,301	46,209	46,116	46,024	45,932	45,840
Non-Residential Commodity Charge per Kgal		15.00	16.20	17.50	18.72	19.84	20.84	21.67	22.32	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77	22.77
Rate Increase Percentage		-	**8.00%**	**8.00%**	**7.00%**	**6.00%**	**5.00%**	**4.00%**	**3.00%**	**2.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.0%**	**0.00%**	**0.00%**
Total "Sales" Revenue from Non-Residential		890,680	960,058	970,338	967,361	966,488	996,158	1,034,018	1,062,997	1,082,179	1,080,105	1,078,036	1,075,970	1,073,909	1,071,852	1,069,798	1,067,749	1,065,704	1,063,664	1,061,627	1,059,594	1,057,565
Total "Sales" Revenue		4,577,434	4,941,253	5,269,950	5,567,946	5,843,108	6,116,609	6,359,287	6,548,025	6,676,907	6,674,833	6,672,764	6,670,698	6,668,637	6,666,579	6,664,526	6,662,477	6,660,432	6,658,391	6,656,354	6,654,322	6,652,293
Interest on Utility Reserves		18,711	12,357	13,439	20,699	25,525	274,155	28,409	29,278	29,576	34,547	34,212	36,910	32,971	38,339	42,841	46,425	52,182	60,823	69,872	68,689	73,994
Inter-Utility Loan																						
Bond Issue Proceeds						17,774,000								1,751,000					3,751,000			
Federal or State Grant/Loan		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other Revenue		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bond Federal Subsidy		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Cash Inflow		4,596,145	4,953,610	5,283,389	5,588,645	23,642,633	6,390,764	6,387,696	6,577,302	6,706,483	6,709,380	6,706,975	6,707,608	8,452,608	6,704,919	6,707,367	6,708,902	6,712,614	10,470,214	6,726,226	6,723,011	6,726,288
Net Cash Flow		985,798	72,124	484,007	321,749	16,575,330	(16,383,059)	57,914	19,866	331,384	(22,313)	179,857	(262,564)	357,869	300,135	238,925	383,794	576,044	603,259	(78,832)	353,683	153,726
Cumulative Net Cash Flow		985,798	1,057,922	1,541,929	1,863,679	18,439,009	2,055,950	2,113,864	2,133,730	2,465,115	2,442,801	2,622,658	2,360,095	2,717,964	3,018,099	3,257,024	3,640,819	4,216,862	4,820,121	4,741,289	5,094,973	5,248,698
Cash Balance		823,785	895,909	1,379,916	1,701,666	18,276,996	1,893,938	1,951,852	1,971,717	2,303,102	2,280,789	2,460,646	2,198,082	2,555,951	2,856,087	3,095,012	3,478,806	4,054,849	4,658,108	4,579,277	4,932,960	5,086,686
Recommended Cash Balance		3,646,473	3,506,143	4,061,590	5,802,347	20,370,051	5,011,482	5,211,962	5,001,739	5,424,120	5,191,025	5,511,346	6,609,872	4,772,485	4,920,140	5,710,970	4,526,359	8,225,090	4,886,282	4,662,725	4,832,860	4,968,477
Alter. One Residential SF Flat Rate Sewer /month		$40.69	$43.94	$47.46	$50.78	$53.82	$56.51	$58.78	$60.54	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75	$61.75
Alter. One Residential MF Flat Rate Sewer / unit /month		$35.37	$38.19	$41.24	$44.13	$46.78	$49.11	$51.08	$52.61	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66	$53.66
Alter. One Non-Residential Commodity Rate / Kgal		$15.00	$16.20	$17.50	$18.72	$19.84	$20.84	$21.67	$22.32	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77	$22.77

NOTE 1: "WW Sys. Interdepartmental Charges" & "WW Sys. Administrative Division Allocation" are not divided into "Total WWC Operation Expenses" or "Total LA WWTP Operation Expenses" or "Total WR WWTP Operation Expenses".
NOTE 1 (cont'd): These charges are included in the "Total WW System Operation Expenses". This was done to equally compare relative operation expenses between all three Wastewater System sub-systems (WWC, LA WTP & WR WWTP).
NOTE 2:

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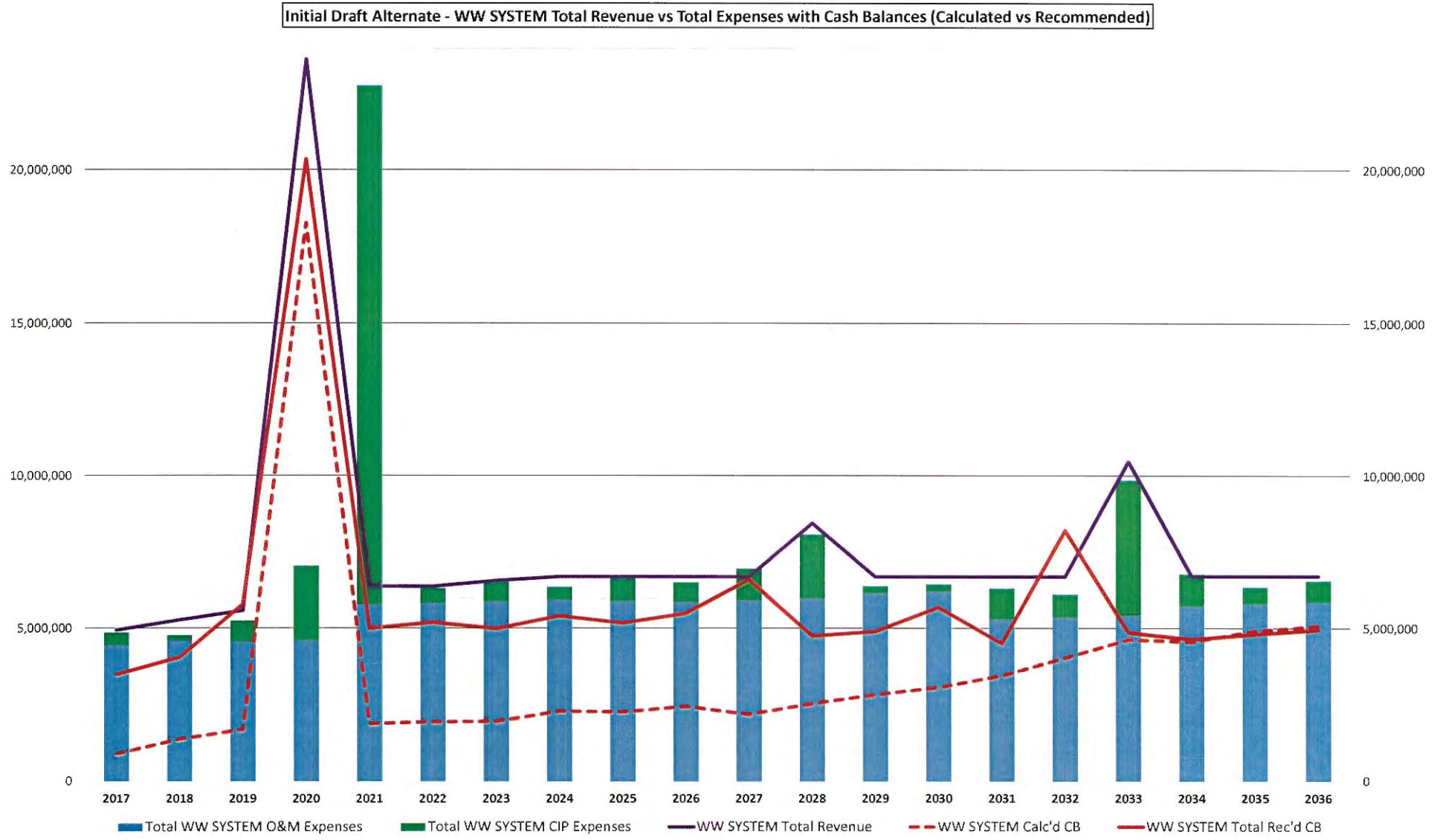
SF & MF Monthly Flat Rate Estimates


Initial Draft Alternate - WW SYSTEM Total Revenue vs Total Expenses with Cash Balances (Calculated vs Recommended)
20,000,000
15,000,000
10,000,000
5,000,000
0
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
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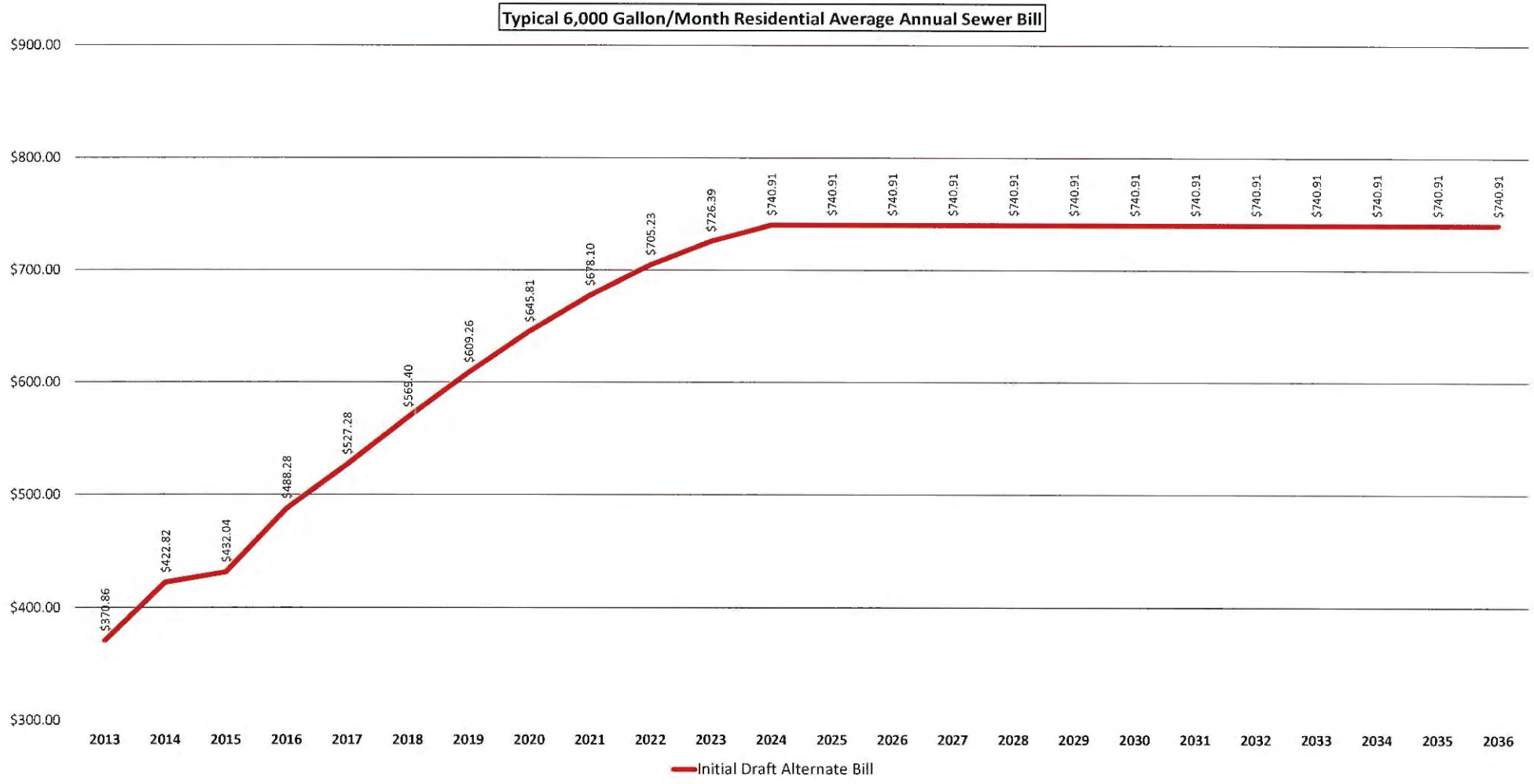
2028
2029
2030
2031
2032
2033
2034
2035
2036
Total WW SYSTEM O&M Expenses
Total WW SYSTEM CIP Expenses
WW SYSTEM Total Revenue
WW SYSTEM Calc'd CB
WW SYSTEM Total Rec'd CB


Typical 6,000 Gallon/Month Residential Average Annual Sewer Bill
$900.00
$800.00
$700.00
$600.00
$500.00
$400.00
$300.00
$370.86
$422.82
$432.04
$488.28
$527.28
$569.40
$609.26
$645.81
$678.10
$705.23
$726.39
$740.91
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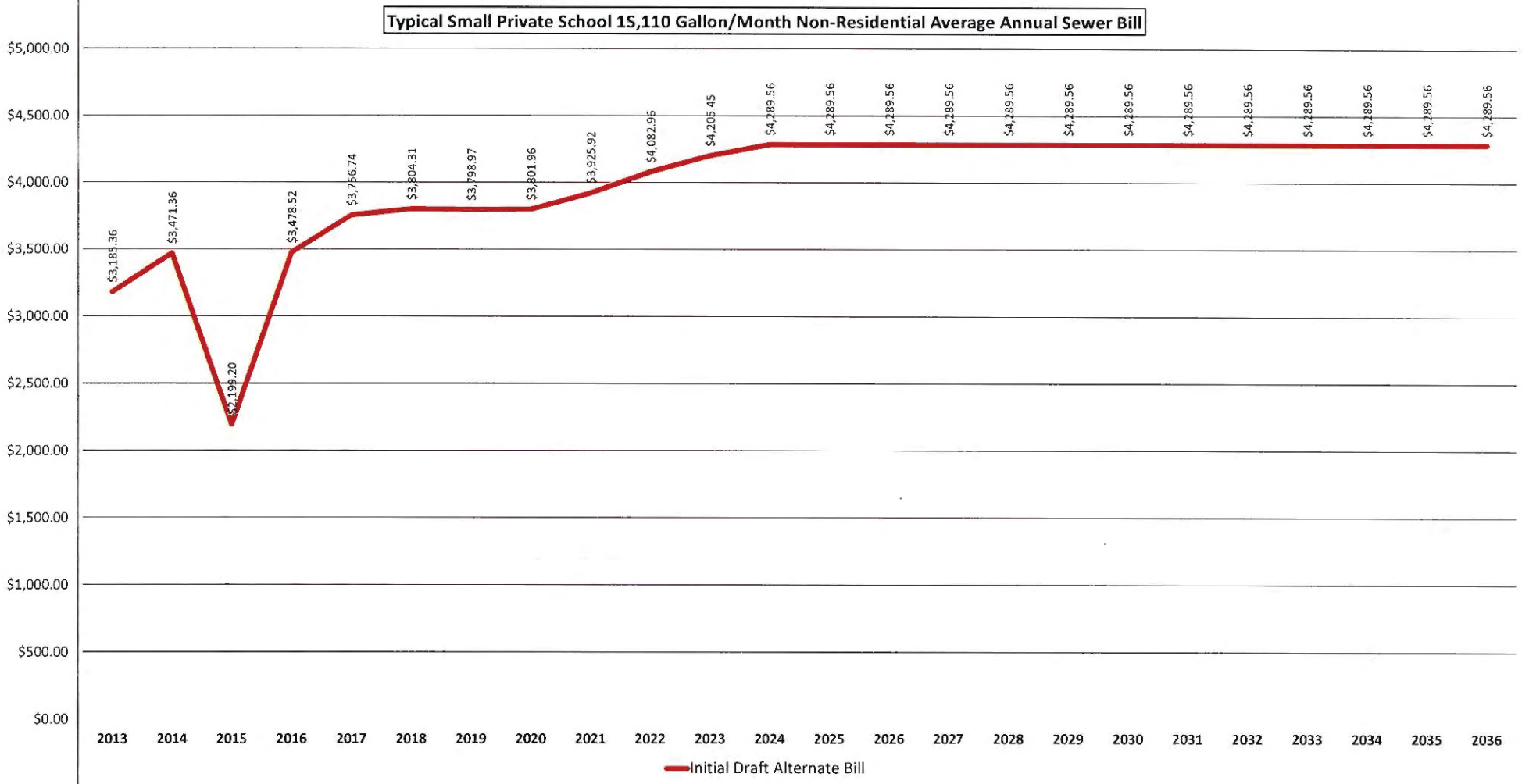
Initial Draft Alternate Bill


Typical Small Private School 1S,110 Gallon/Month Non-Residential Average Annual Sewer Bill
$5,000.00
$4,500.00
$4,000.00
$3,500.00
$3,000.00
$2,500.00
$2,000.00
$1,500.00
$1,000.00
$500.00
$0.00
$3,185.36
$3,471.36
$2,199.20
$3,478.52
$3,756.74
$3,804.31
$3,798.97
$3,801.96
$3,925.92
$4,082.96
$4,205.45
$4,289.56
2013
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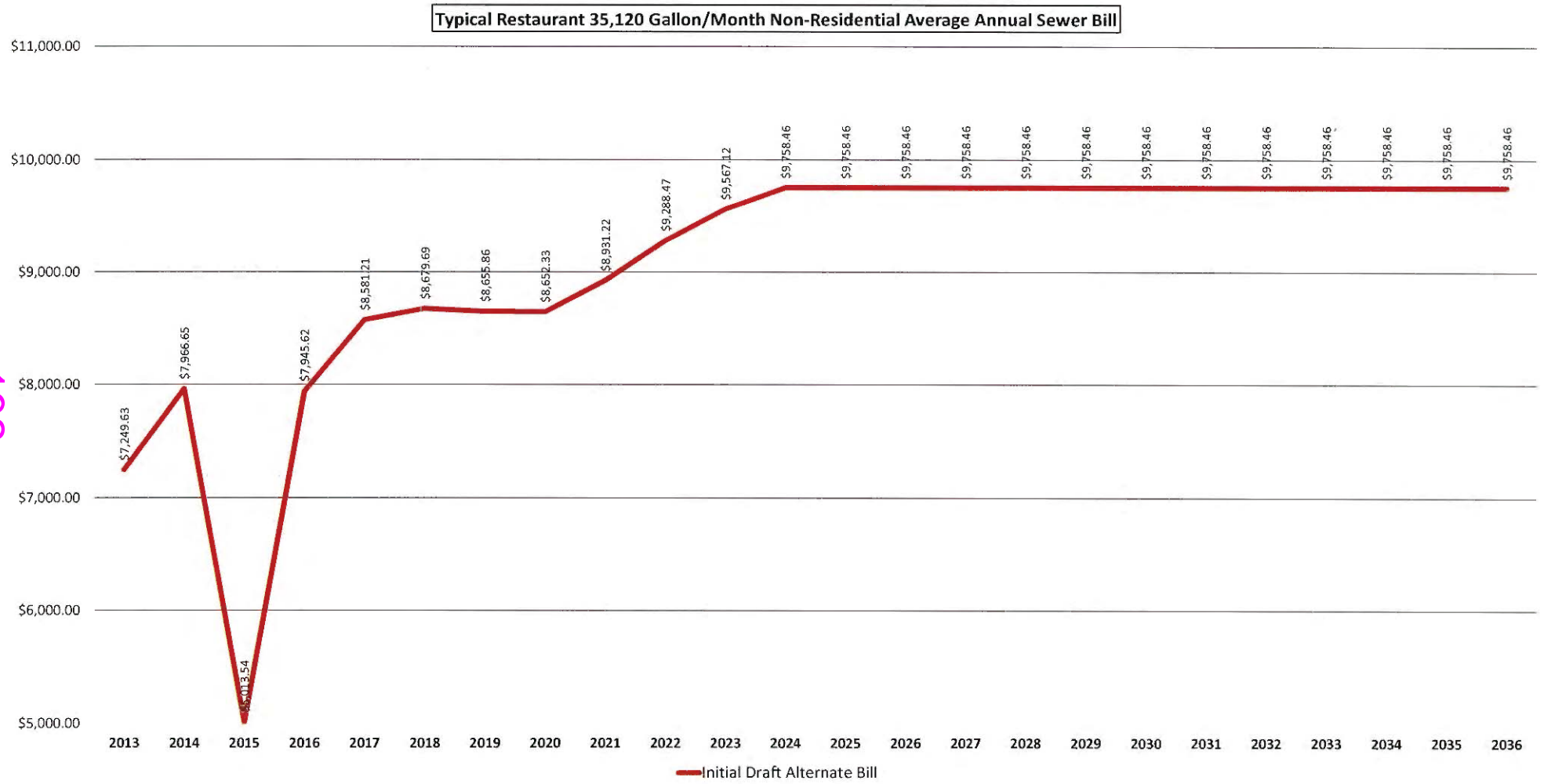
2036
Initial Draft Alternate Bill


Typical Restaurant 35,120 Gallon/Month Non-Residential Average Annual Sewer Bill
$11,000.00
$10,000.00
$9,000.00
$8,000.00
$7,000.00
$6,000.00
$5,000.00
$7,249.63
$7,966.65
$5,013.54
$7,945.62
$8,581.21
$8,679.69
$8,655.86
$8,652.33
$8,931.22
$9,288.47
$9,567.12
$9,758.46
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Initial Draft Alternate Bill

County of Los Alamos

Staff Report

February 15, 2017

Agenda No.:	7.D
Index (Council Goals):	BCC - N/A
Presenters:	Bob Westervelt, Deputy Utilities Manager - Finance/Admin
Legislative File:	**9093-17**

Title

Department of Public Utilities FY2018 Budget Presentation

Recommended Action

None - discussion item only. Budget will be presented in March for approval.

Staff Recommendation

None - discussion item only. Budget will be presented in March for approval.

Body

Attached is the proposed budget for FY2018. The budget as presented is a reduction of 1% from the fiscal year 2017 budget, and a reduction of 5% from the preliminary Fy2018 budget presented last year. The change from the preliminary budget reflects two significant planning changes. The White Rock Wastewater plant previously scheduled for construction in FY2018 has been moved out to FY2021due to funding constraints. Offsetting that reduction somewhat, the ski hill pipeline originally scheduled for FY2017 has been pushed out into FY2018, and $1.5M of the water well replacement project originally scheduled for FY7 has been pushed out to FY18.

Changes in each Utility sub fund are discussed below.

Note: this is a preliminary draft, some inputs are still being finalized and some numbers are likely to change between now and final presentation to the Board for approval in March. All changes will be noted when the Board considers the final budget for adoption in March.

Staffing changes

We have one additional limited term FTE on the admin roster, but that additional person is funded by the County ERP project to partially backfill staff resources that will be dedicated to the project. Included in the Electric Production budget is funding for double filling a Hydro Plant Maintenance technician for one year in anticipation of retirement of one of the existing staff in 2018. This double fill is utilizing an existing vacancy so does not result in an increased FTE count. The Plumbers and Pipefitters Union agreement is coming up for renewal, and negotiations are likely to result in some salary adjustment. There is also a reclassification of a staff position in the Admin division. $47,000 is included in the Admin budget to provide funding for these changes.

Budget Highlights

Per County Budget Office guidance, a 2% increase for salaries is assumed for this budget. The ten-year capital plan is included in the agenda packet, as well as more detailed descriptions of the projects planned for FY018.

Interdepartmental charges from the County (IDCs) increased by 637k, or 36%, mostly in legal, procurement, and IT support. Department admin costs increased by $425k, or 10%. This includes a planned reconfiguration of the Customer Care center budgeted at $250k, adding one Meter Reader that was scheduled for transfer to GWS back into the Admin budget due to the postponement of the AMI project, and adding $50k for an additional "off cycle" cost of service study to consider electric rate design. The allocation of these costs to the utilities is still being reworked, but preliminary allocations are included in each utility's O&M, so will not be discussed separately below.

Electric Distribution

No rate increases are projected in FY18 for electric distribution, although a rate restructuring may be proposed in response to recommendations of the Future Energy Resources Committee. The ten year forecast includes essentially inflationary increases of 1.5% per year after FY18. The Los Alamos Sub Station (LASS) project is scheduled for FY17, but there is $500k in the capital plan for substation feeders that were not included in the original project plan. The O&M budget in electric distribution is essentially flat compared to the preliminary budget presented last year.

Electric Production

The O&M budget for Electric Production is $1.9M lower then presented in the projection last year, due primarily to continuing low purchased power costs. There is $450k included for LAC's share of the COLA preparation for the Carbon Free Power Project.

Gas

The new NMMEAA deal guarantees a $0.274 discount, which is included in the budget for FY2018. Natural gas market prices remain low, and gas purchases are budgeted at $3.0014/MMBTU (before the NMMEAA discount). A ten percent rate reduction was implemented in FY17 to spend down some Gas Utility cash reserves, and it was projected that another ten percent reduction in FY18 would be viable while still retaining adequate cash reserves. This budget does propose that additional 10% reduction in the fixed portion of the commodity rate charged to consumers. The O&M budget for the Gas utility remains essentially as budgeted previously except for the increased IDC and admin allocations already discussed.

Water Production and Distribution

The capital plan for Water Production, like last year, includes non-potable projects that are funded through a partial grant/loan from the Water Trust Board (WTB). These projects will only occur if the WTB funding is realized. The capital plan also includes the ski hill pipeline construction, which is funded through transfers from the general County and from the ski hill

operator. $1.5M of the projected cost for the water well replacement project previously budged for FY17 has been budgeted for FY18 as well.

Pending further discussion and planning for the San Juan Chama utilization project, no San Juan Chama funding is included in the 10-year financial forecast or capital plan.
The O&M and capital budget for water production and distribution has been revised extensively to reflect the proposed twenty-year plan presented to the Board at the November, 2017 BPU meeting. Water sales appear to have stabilized more in line with the revised sales projections we adopted in last year's budget cycle. In accordance with the long range plan, an 8% increase in wholesale and retail potable rates is budgeted in FY18, as well as an increase for non-potable sales from $1.15 per thousand gallons to $2.50, reflecting the improved cost breakdown and accounting that now allows us to better determine the delivery cost of the non-potable commodity. As shown in the ten-year plan, additional modest rate increases are projected through 2021, then essentially inflationary increases thereafter.

Wastewater Division

The wastewater utility is facing some financial challenges and does not have the cash balance required to fund the planned White Rock treatment plant that was previously scheduled for FY18. This will be discussed at length in a separate agenda item this evening. A series of additional rate increases is proposed in the ten-year plan which if implemented should provide adequate resources to continue operations at the existing plant for a few more years and build sufficient cash reserves to support debt service on the design and construction of the White Rock plant in 2021. An 8% increase is budgeted for FY18. The O&M budget for the Wastewater utility is significantly reduced from the preliminary budget presented last year, due primarily to reduced debt service related to rescheduling the construction of the White Rock plant.

Alternatives

N/A

Fiscal and Staff Impact

See above

Attachments

A - Draft Fiscal Year 2018 Budget Packet

Los Alamos County Utilities Department
Fiscal Year 2018 Budget
Board Presentation 02-15-2017

Table Of Contents

Los Alamos County Department of Public Utilities
Fiscal Year 2018
Summary of Expenditure Budget

	Actual 2016	Jul-Nov Actual 2017	Adopted Budget 2017	1st Year Budget 2018	Proposed Budget 2018
Electric Production	37,416,741	16,774,857	38,384,715	40,936,357	39,424,828
Electric Distribution	14,893,792	7,469,673	16,107,497	15,069,661	15,323,264
Less Interdivision Electric Sales	(8,652,139)	(3,606,802)	(7,000,000)	(7,750,000)	(7,375,000)
Total Electric Fund	43,658,395	20,637,729	47,492,212	48,256,017	47,373,092
Gas	3,797,511	2,883,498	5,564,365	5,410,631	5,547,719
Water Production	4,979,019	2,700,963	11,583,707	4,786,622	11,120,151
Water Distribution	5,028,035	3,537,270	4,619,978	4,643,367	5,376,041
Less Interdivision Water Sales	(2,528,096)	(1,447,493)	(2,456,750)	(2,505,885)	(2,650,500)
Total Water Fund	7,478,958	4,790,740	13,746,935	6,924,104	13,845,693
Wastewater	5,086,077	2,728,520	5,501,226	14,993,314	4,799,382
Total Expenditure Budget	60,020,940	31,040,486	72,304,737	75,584,066	71,565,886

Los Alamos County Department of Public Utilities
Fiscal Year 2018
Summary of Expenditure Budget -- ELECTRIC PRODUCTION

	Actual 2016	Jul-Dec Actual 2017	Adopted Budget 2017	1st Year Budget 2018	Proposed Budget 2018
REVENUE					
Mwh Sales - LANL	449,550	255,144	556,653	548,242	542,688
Mwh Sales - LAC Distribution	116,469	58,653	123,681	125,536	125,530
Total Mwh Sales	566,018	313,797	680,334	673,778	668,218
Revenue per Mwh	$ 67.15	$ 47.69	$ 51.60	$ 55.94	$ 55.84
DOE Revenues	$ 29,354,498	$ 11,357,971	$ 28,104,483	$ 29,941,469	$ 29,941,469
Economy Sales	2,047,640	1,562,147	3,281,394	3,213,251	3,213,251
Interest on Reserves	18,711	16,310	25,000	25,000	25,000
Bond Federal Subsidy	31,664	16,992	33,984	33,984	33,984
TOTAL REVENUE	$ 31,452,513	$ 12,953,420	$ 31,444,861	$ 33,213,704	$ 33,213,704
OPERATING EXPENSES					
El Vado Generation	$ 492,445	$ 148,576	$ 628,454	$ 488,314	$ 568,653
Abiquiu Generation	324,465	88,683	399,655	399,088	403,881
Contract Administration	20,248	3,179	19,736	20,128	20,048
Load Control	2,067,004	775,343	1,696,876	1,531,455	1,576,030
Transmission - PNM	1,271,864	729,813	1,380,000	1,380,000	1,400,000
Transmission - Other	1,979,500	979,157	2,540,523	2,621,168	2,285,008
Purchased Power	11,684,780	6,167,656	14,147,976	14,972,854	13,219,781
Photovoltaic Array	62,379	21,979	92,000	92,000	117,000
Debt Service		1,251,951	2,529,392	2,536,071	2,635,071
Property Taxes	423,907	274,706	440,212	440,212	488,000
Insurance	106,189	114,844	115,000	115,000	160,000
San Juan Operations	12,729,696	4,136,769	9,354,837	11,425,255	11,213,148
Laramie River Operations	3,933,957	990,194	3,049,225	3,184,154	2,854,600
SMR Project	11,825	28,408	300,000	300,000	450,000
Non-Pool Expenses	-	-	-	-	-
Interdepartmental Charges	368,819	207,845	415,689	415,689	455,373
Administrative Allocation	633,806	294,716	770,140	764,968	903,234
TOTAL OPERATING EXPENSES	$ 36,110,884	$ 16,213,819	$ 37,879,715	$ 40,686,357	$ 38,749,828
OPERATING INCOME (LOSS)	**$ (4,658,371)**	**$ (3,260,399)**	**$ (6,434,854)**	**$ (7,472,653)**	**$ (5,536,124)**
CAPITAL EXPENDITURES					
Capital Expenditures	$ 1,305,857	$ 561,039	$ 505,000	$ 250,000	$ 675,000
OTHER FINANCING Forecast					
Transfer from Distribution Fund	$ 8,652,139	$ 3,606,802	$ 7,000,000	$ 7,750,000	$ 7,375,000
Bond Issue Proceeds		-			
NET INCOME (LOSS)	**$ 2,687,911**	**$ (214,635)**	**$ 60,146**	**$ 27,347**	**$ 1,163,876**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
Summary of Expenditure Budget -- ELECTRIC DISTRIBUTION

	Actual 2016	Jul-Dec Actual 2017	Adopted Budget 2017	1st Year Budget 2018	Proposed Budget 2018
REVENUE					
kWh Sales	116,468,682	58,653,104	123,681,000	125,536,000	125,496,000
Revenue per kWh	$ 0.1209	$ 0.1222	$ 0.1220	$ 0.1217	$ 0.1221
Sales Revenue	$ 14,077,035	$ 7,165,908	$ 15,088,911	$ 15,279,913	$ 15,318,453
Interest on Utility Reserves	57,023	35,980	(183,000)	(183,000)	(183,000)
Bond Federal Subsidy	63,316	33,971	67,942	67,942	67,942
Revenue on Recoverable Work	186,391	149,579	150,000	150,000	150,000
TOTAL REVENUE	$ 14,383,765	$ 7,385,438	$ 15,123,853	$ 15,314,855	$ 15,353,395
OPERATING EXPENSES					
Supervision, Misc Direct Admin	$632,824	$355,306	$685,771	$702,560	$710,342
Substation Maintenance	$25,540	$19,466	$37,100	$37,815	$36,663
Switching Station Maintenance	$25,523	$10,292	$28,129	$28,632	$29,115
Overhead Maintenance	$476,406	$207,430	$455,336	$462,907	$488,883
Underground Maintenance	$389,360	$265,996	$370,640	$377,228	$375,882
Meter Maintenance	$135,679	$96,062	$126,885	$128,416	$126,101
Interdepartmental Charges	$425,066	$214,485	$428,969	$428,969	$566,670
Eng. Cust Svc. MR and Admin	$536,000	$275,211	$986,831	$980,204	$932,632
In Lieu Taxes	$510,736	$391,794	$538,602	$542,422	$542,422
Debt Service	1,254,122	622,478	1,264,358	1,255,148	1,255,148
Cost of Power	8,652,139	3,606,802	7,000,000	7,750,000	7,375,000
TOTAL OPERATING EXPENSES	$ 13,063,395	$ 6,065,321	$ 11,922,621	$ 12,694,300	$ 12,438,858
OPERATING INCOME (LOSS)	**$ 1,320,370**	**$ 1,320,117**	**$ 3,201,232**	**$ 2,620,555**	**$ 2,914,537**
CAPITAL EXPENDITURES					
Capital Expenditures	$ 1,305,857	$ 1,404,353	$ 3,536,053	$ 1,718,324	$ 2,233,371
OTHER FINANCING					
Bond/Grant proceeds		$ -			
Profit Transfer to General Fund	(524,540)		(648,823)	(657,036)	(651,034)
BUDGETED NET INCOME (LOSS)	**$ (510,027)**	**$ (84,236)**	**$ (983,644)**	**$ 245,195**	**$ 30,131**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
Summary of Expenditure Budget -- GAS DISTRIBUTION

	Actual 2016	Jul-Dec Actual 2017	Adopted Budget 2017	1st Year Budget 2018	Proposed Budget 2018
REVENUE					
Therm Sales	8,416,085	2,542,267	8,463,113	8,463,113	8,455,275
Revenue per Therm	$ 0.5808	$ 0.7303	$ 0.6586	$ 0.5927	$ 0.6199
Sales Revenue	$ 4,887,955	$ 1,856,572	$ 5,573,587	$ 5,016,228	$ 5,241,503
Repayment of Inter-utility Loan					
Interest on Utility Reserves	34,421	87,402	82,000	82,000	82,000
Revenue on Recoverable Work	11,233	8,296	25,000	25,000	20,000
TOTAL REVENUE	$ 4,933,609	$ 1,952,270	$ 5,680,587	$ 5,123,228	$ 5,343,503
OPERATING EXPENSES					
Supervision, Misc Direct Admin	$298,000	$126,362	$297,661	$298,322	$256,975
Gas Distribution	273,909	180,307	341,235	337,217	280,994
Gas Meters	145,896	63,949	150,421	151,963	137,486
Interdepartmental Charges	259,528	142,518	285,035	285,035	351,003
Eng. Cust Svc. MR and Admin	535,341	300,231	706,460	701,716	816,091
In Lieu Taxes	179,606	144,703	207,857	196,710	205,330
Cost of Gas	1,845,485	982,794	2,505,410	2,505,410	2,537,766
TOTAL OPERATING EXPENSES	$3,537,763	$ 1,940,864	$ 4,494,078	$ 4,476,373	$ 4,585,644
OPERATING INCOME (LOSS)	**$ 1,395,846**	**$ 11,406**	**$ 1,186,509**	**$ 646,855**	**$ 757,859**
CAPITAL EXPENDITURES					
Capital Expenditures	$ 12,881	$ 942,634	$ 810,000	$ 700,000	$ 700,000
OTHER FINANCING SOURCES & USES					
Profit Transfer to General Fund	(246,867)		(260,287)	(234,258)	(262,075)
Budget Adjustment for ERP	(1,000,000)				
BUDGETED NET INCOME (LOSS)	**$ 1,136,098**	**$ (931,228)**	**$ 116,222**	**$ (287,403)**	**$ (204,216)**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
Summary of Expenditure Budget -- WATER PRODUCTION

	Actual 2016	Jul-Dec Actual 2017	Adopted Budget 2017	1st Year Budget 2018	Proposed Budget 2018
REVENUE					
Potable 1000-gallon production	974,848	607,366	1,150,000	1,150,000	1,150,000
Non-potable 1000-gallon production	45,718	16,782	66,584	66,584	86,400
Revenue per 1000 gallons	$ 3.4121	$ 3.4737	$ 3.1680	$ 3.0545	$ 3.1810
Potable Sales Revenue	$ 3,326,321	$ 2,109,794	$ 3,643,200	$ 3,716,064	$ 3,933,000
Repayment of Inter-utility Loan	187,568	72,956	187,569	187,569	187,569
Interest on Utility Reserves	34,871	131,848	92,000	63,750	63,750
Bond Federal Subsidy	25,683	13,788	27,576	27,576	27,576
Non Potable Revenue	52,575	20,171	76,572	166,460	216,000
TOTAL REVENUE	$ 3,627,018	$ 2,348,557	$ 4,026,917	$ 4,161,419	$ 4,427,895
OPERATING EXPENSES					
Supervision and Operations	$ 957,590	$ 442,806	$ 975,822	$ 991,861	$ 963,806
Pumping Power	523,277	271,052	800,000	800,000	800,000
Wells	83,118	31,803	137,508	138,775	135,631
Booster Pump Stations	165,298	28,334	125,236	126,754	123,587
Treatment	56,055	14,767	105,199	105,595	104,271
Storage Tanks	445,205	3,179	19,600	19,798	19,385
Transmission Lines	54,999	11,749	65,509	66,248	64,705
Non Potable System	179,863	175,847	642,187	372,422	393,018
Interdepartmental Charges	227,774	131,946	263,893	263,893	337,902
Eng. Cust Svc. MR and Admin	578,883	284,514	505,173	501,780	601,111
State Water Tax	34,855	19,008	45,000	45,000	45,000
Debt Service	220,520	116,027	254,182	279,496	235,735
TOTAL OPERATING EXPENSES	$ 3,527,436	$ 1,531,033	$ 3,939,307	$ 3,711,622	$ 3,824,151
OPERATING INCOME (LOSS)	**$ 99,582**	**$ 817,524**	**$ 87,610**	**$ 449,797**	**$ 603,744**
CAPITAL EXPENDITURES					
Capital Expenditures	$ 1,451,582	$ 1,169,930	$ 7,644,400	$ 1,075,000	$ 7,296,000
OTHER FINANCING					
Grant/Loan	$ 562,400	$ 72,956	$ 644,400	$ 825,000	$ 1,271,000
County/External Reimbursement			4,000,000		4,000,000
BUDGETED NET INCOME (LOSS)	**$ (789,601)**	**$ (279,450)**	**$ (2,912,390)**	**$ 199,797**	**$ (1,421,256)**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
Summary of Expenditure Budget -- WATER DISTRIBUTION

	Actual 2016	Jul-Dec Actual 2017	Adopted Budget 2017	1st Year Budget 2018	Proposed Budget 2018
REVENUE					
Sales in Thousand of Gallons	693,335	450,124	775,000	775,000	775,000
Revenue per thousand gallons	$ 5.6549	$ 5.6136	$ 5.7500	$ 5.7500	$ 6.3300
Sales Revenue	$ 3,920,763	$ 2,526,818	$ 4,456,250	$ 4,456,250	$ 4,905,750
Interest on Utility Reserves	12,300	17,460	21,000	21,000	9,161
Revenue on Recoverable Work	59,382	18,589	30,000	30,000	30,450
TOTAL REVENUE	$ 3,992,445	$ 2,562,867	$ 4,507,250	$ 4,507,250	$ 4,945,361
OPERATING EXPENSES					
Supervision, Misc Direct Admin	$ 217,881	$ 98,214	$ 182,979	$ 187,327	$ 184,778
Hydrants	71,088	15,279	58,860	59,924	60,645
Water Distribution	387,278	161,879	403,106	368,523	372,203
Water Meters	658,592	225,931	691,840	699,124	634,691
Interdepartmental Charges	225,566	125,825	251,649	251,649	328,386
Eng. Cust Svc. MR and Admin	505,593	243,845	574,794	570,935	594,839
Cost of Water	2,528,096	1,447,493	2,456,750	2,505,885	2,650,500
TOTAL OPERATING EXPENSES	$ 4,594,094	$ 2,318,466	$ 4,619,978	$ 4,643,367	$ 4,826,041
OPERATING INCOME (LOSS)	**$ (601,650)**	**$ 244,401**	**$ (112,728)**	**$ (136,117)**	**$ 119,320**
CAPITAL EXPENDITURES					
Capital Expenditures	$ 433,941	$ 1,218,804	$ -	$ -	$ 550,000
BUDGETED NET INCOME (LOSS)	**$ (1,035,591)**	**$ (974,403)**	**$ (112,728)**	**$ (136,117)**	**$ (430,680)**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
Summary of Expenditure Budget -- WASTEWATER COLLECTION AND TREATMENT

	Actual 2016	Jul-Dec Actual 2017	Adopted Budget 2017	1st Year Budget 2018	Proposed Budget 2018
REVENUE					
Thousands of Gallons Processed	408,234	204,369	430,000	430,000	430,000
Sales Revenue	$ 4,632,768	$ 2,486,397	$ 5,174,221	$ 5,174,221	$ 5,269,745
Interest on Bond Reserves					
Interest on Utility Reserves	14,379	19,679	23,000	23,000	13,516
Revenue on Recoverable Work	-		1,500	1,523	-
TOTAL REVENUE	$ 4,647,147	$ 2,506,076	$ 5,198,721	$ 5,198,744	$ 5,283,261
OPERATING EXPENSES					
Supervision, Misc Direct Admin	$ 159,691	$ 100,702	$ 323,618	$ 254,313	$ 230,375
Wastewater Collection	342,164	130,315	421,571	389,058	367,602
Lift Stations	336,649	105,709	245,729	248,686	275,214
Wastewater Treatment	1,240,841	571,932	1,388,309	1,380,071	1,318,100
Interdepartmental Charges	372,692	205,701	411,402	411,402	646,445
Eng. Cust Svc. MR and Admin	420,570	249,326	504,797	501,407	605,847
Debt Service	1,151,522	575,697	1,155,799	1,808,378	1,155,799
TOTAL OPERATING EXPENSES	$ 4,024,128	$ 1,939,383	$ 4,451,226	$ 4,993,314	$ 4,599,382
OPERATING INCOME (LOSS)	**$ 623,019**	**$ 566,693**	**$ 747,495**	**$ 205,430**	**$ 683,879**
CAPITAL EXPENDITURES					
Capital Expenditures	$ 1,061,949	$ 789,137	$ 1,050,000	$ 10,000,000	$ 200,000
OTHER FINANCING					
Grant/Loan Proceeds				$ 10,000,000	
Interfund Loans					
BUDGETED NET INCOME (LOSS)	**$ (438,930)**	**$ (222,444)**	**$ (302,505)**	**$ 205,430**	**$ 483,879**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
Summary of Expenditure Budget -- ADMINISTRATION AND GENERAL

	Actual 2016	Jul-Dec Actual 2017	Adopted Budget 2017	1st Year Budget 2018	Proposed Budget 2018
Meter Reading	354,410	183,437	278,892	286,245	350,877
Customer Service	510,942	258,009	552,237	564,514	840,167
Engineering	1,435,797	776,086	1,628,417	1,668,980	1,497,146
Administrative:					
Administration	463,586	215,158	829,237	722,273	793,040
Finance	609,440	305,552	783,522	796,678	974,152
Public Information	176,583	102,164	245,285	251,716	259,668
Subtotal - Administrative	1,249,610	622,874	1,858,044	1,770,666	2,026,860
Total Administrative Division	3,550,758	1,840,406	4,317,590	4,290,405	4,715,050

LOS ALAMOS DEPARTMENT OF PUBLIC UTILITIES
CASH & INVESTMENT BUDGET

	FY2016 ACTUAL	FY2017 ADOPTED BUDGET	FY2018 1ST YEAR BUDGET	FY2018 PROPOSED BUDGET
EP Cash & Investments - UNRESTRICTED	7,602,785	6,960,245	6,760,192	7,089,289
EP Cash & Investments - RESTRICTED	11,630,049	10,206,109	10,433,509	13,369,416
EP Cash & Investments - TOTAL	19,232,834	17,166,354	17,193,701	20,458,705
ED Cash & Investments - UNRESTRICTED	(7,887,776)	(5,960,945)	(5,715,751)	(2,812,444)
ED Cash & Investments - RESTRICTED	8,848,967	1,388,292	1,388,292	2,812,914
ED Cash & Investments - TOTAL	961,191	(4,572,653)	(4,327,458)	470
GAS Cash & Investments - UNRESTRICTED	6,397,463	6,078,231	5,790,829	6,311,140
GAS Cash & Investments - RESTRICTED	-	-	-	-
GAS Cash & Investments - TOTAL	6,397,463	6,078,231	5,790,829	6,311,140
DW Cash & Investments - UNRESTRICTED	637,389	1,417,326	1,281,209	95,198
DW Cash & Investments - RESTRICTED	-	-	-	-
DW Cash & Investments - TOTAL	637,389	1,417,326	1,281,209	95,198
WP Cash & Investments - UNRESTRICTED	10,294,284	7,277,625	7,477,423	5,948,992
WP Cash & Investments - RESTRICTED	179,962	192,838	192,838	192,838
WP Cash & Investments - TOTAL	10,474,246	7,470,464	7,670,261	6,141,831
WW Cash & Investments - UNRESTRICTED	(539,199)	154,834	360,264	(356,585)
WW Cash & Investments - RESTRICTED	1,362,985	1,362,985	1,362,985	1,362,985
WW Cash & Investments - TOTAL	823,786	1,517,818	1,723,248	1,006,400
DPU TOTAL Cash & Investments - UNRESTRICTED	16,504,946	15,927,316	15,954,166	16,275,590
DPU TOTAL Cash & Investments - RESTRICTED	22,021,963	13,150,225	13,377,625	17,738,153
DPU TOTAL Cash & Investments - TOTAL	$ 38,526,908	$ 29,077,541	$ 29,331,790	$ 34,013,743

Los Alamos County Department of Public Utilities
Fiscal Year 2018
10-Year Capital Plan

FY18 (1 July 2017 - 30 June 2018)	Budget
ELECTRIC PRODUCTION	**675,000**
Abiquiu Controls Upgrade	375,000
3 Ton Jib Crane Abiquiu	140,000
Replace Control System Batteries El Vado & Abiquiu	135,000
Uinterrupted Power Supply Electric SCADA	25,000
ELECTRIC DISTRIBUTION	**1,900,000**
Los Alamos URD Replacement (cables, jboxes, pedestals)	250,000
White Rock URD Replacement (cables, jboxes, pedestals)	250,000
WR Substation Switchgear1 Refurbishment	350,000
WR Substation Transformer Oil Retention Bay	150,000
Overhead System Replacement (polex, xarms, transformers)	400,000
LASS Substation Feeders	500,000
GAS DISTRIBUTION	**700,000**
Quemazon Loop Alternate PRV Feed	250,000
SCADA Improvements Phase 1	250,000
PRV Site Improvements Phase 1	200,000
WATER DISTRIBUTION	**550,000**
Aspen School Area Waterline Replacements Phase 1	550,000
WATER PRODUCTION	**7,296,000**
Ski Hill Supply Pipeline Construction **(County/Ski Hill 50/50 Funding, N/A DPU)**	4,000,000
Otowi Well No. 2 Well House & Pipeline Construction	1,500,000
PW5 MCC Replacement - Construction	275,000
RTU Replacement - 3 Each	75,000
Auto Valves 9,10,11 R&R	150,000
Uninterrupted Power Supply Water SCADA	25,000
Non Potable: Design Group 12 Tank, Bayo Booster & Overlook Booster (WTB)	495,000
Non-Potable: Bayo Booster Second Tank (WTB)	776,000
SEWER COLLECTION	**200,000**
Aspen School Area Sewerline Replacement/Rehabilitation - Phase 1	150,000
Canyon Road VCP Crossings (2 Each) Rehabilitation	50,000
WASTEWATER TREATMENT	**0**
WASTEWATER TREATMENT AND SEWER COLLECTION TOTAL	**200,000**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
10-Year Capital Plan

FY19 (1 July 2018 - 30 June 2019)	Budget
ELECTRIC PRODUCTION	**300,000**
El Vado Replace Main Transformer	300,000
ELECTRIC DISTRIBUTION	**3,000,000**
Los Alamos URD Replacement (cables, jboxes, pedestals)	300,000
White Rock URD Replacement (cables, jboxes, pedestals)	300,000
Overhead System Replacement (polex, xarms, transformers)	400,000
EA4 Feeder Replacement	2,000,000
GAS DISTRIBUTION	**450,000**
SCADA Improvements Phase 2	250,000
PRV Site Improvements Phase 2	200,000
WATER DISTRIBUTION	**558,000**
Aspen School Area Waterline Replacements Phase 2	558,000
WATER PRODUCTION	**1,979,000**
East Jemez Road PW3 to NM4 Pipeline R&R {DOT}	1,015,000
Non Potable: Construct Second Group 12 Tank (WTB)	964,000
SEWER COLLECTION	**684,000**
Rio Bravo Sewer Lift Station Rehabilitation	103,000
WR WWTP Interceptor Modifications	500,000
Aspen School Area Sewerline Replacement/Rehabilitation - Phase 2	81,000
WASTEWATER TREATMENT	**0**
WASTEWATER TREATMENT AND SEWER COLLECTION TOTAL	**684,000**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
10-Year Capital Plan

FY20 (1 July 2019 - 30 June 2020)		Budget
ELECTRIC PRODUCTION		**0**
ELECTRIC DISTRIBUTION		**1,800,000**
Los Alamos URD Replacement (cables, jboxes, pedestals)		300,000
White Rock URD Replacement (cables, jboxes, pedestals)		300,000
Overhead System Replacement (polex, xarms, transformers)		1,200,000
Townsite Circuit 15, 3 PHASE	($600K)	
White Rock Circuit1, 3PHASE	($600K)	
GAS DISTRIBUTION		**450,000**
SCADA Improvements Phase 3		250,000
PRV Site Improvements Phase 3		200,000
WATER DISTRIBUTION		**817,000**
Aspen School Area Waterline Replacements Phase 3		567,000
New Vactor		250,000
WATER PRODUCTION		**2,550,000**
NM SR 4 Pipeline R&R {DOT}		1,545,000
OB1 Replacement Design		155,000
Non Potable: Guaje Pines, North Mesa, Diamond Connections (WTB)		850,000
SEWER COLLECTION		**1,061,000**
SCADA Implementation		203,000
Aspen School Area Sewerline Replacement/Rehabilitation - Phase 3		93,000
Bayo Canyon Sewer Lift Station Elimination		515,000
New Vactor		250,000
WASTEWATER TREATMENT		**1,372,000**
LA WWTP Upgrades & Rehabilitation Project - Design		361,000
WRTP Design		1,011,000
WASTEWATER TREATMENT AND SEWER COLLECTION TOTAL		**2,433,000**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
10-Year Capital Plan

FY21 (1 July 2020 - 30 June 2021)		Budget
ELECTRIC PRODUCTION		**0**
ELECTRIC DISTRIBUTION		**1,850,000**
Los Alamos URD Replacement (cables, jboxes, pedestals)		300,000
White Rock URD Replacement (cables, jboxes, pedestals)		300,000
White Rock GWS & ED Facility		50,000
Overhead System Replacement (polex, xarms, transformers)		1,200,000
Townsite Circuit 13, 3 PHASE	($600K)	
White Rock Circuit2, 3 PHASE	($600K)	
GAS DISTRIBUTION		**300,000**
White Rock Steel Valve Project Phase 1		250,000
White Rock GWS & ED Facility		50,000
WATER DISTRIBUTION		**677,000**
Aspen School Area Waterline Replacements Phase 4		627,000
White Rock GWS & ED Facility		50,000
WATER PRODUCTION		**3,434,000**
OB1 Replacement Construction		3,173,000
Non Potable: Camp May Tank SCADA & Freeze Upgrades (WTB)		261,000
SEWER COLLECTION		**573,000**
Loma Vista Sewer Lift Station Rehabilitation		157,000
Aspen School Area Sewerline Replacement/Rehabilitation - Phase 4		105,000
North Community Backyard Sewer Mains & Services Regabilitation - Phase 1		261,000
White Rock GWS & ED Facility		50,000
WASTEWATER TREATMENT		**16,402,000**
LA WWTP Upgrades & Rehabilitation Project - Construction		3,137,000
(Filtration, High Efficiency Blowers, UV Controls, DO Meter Upgrades,		
Standby Power Upgrades, Compost Bin Safety)		
WRTP Construction		12,750,000
WRTP Construction Administration - Engineering/Inspection		515,000
WASTEWATER TREATMENT AND SEWER COLLECTION TOTAL		**16,975,000**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
10-Year Capital Plan

FY22 (1 July 2021 - 30 June 2022)		Budget
ELECTRIC PRODUCTION		**0**
ELECTRIC DISTRIBUTION		**2,000,000**
Los Alamos URD Replacement (cables, jboxes, pedestals)		400,000
White Rock URD Replacement (cables, jboxes, pedestals)		400,000
Overhead System Replacement (polex, xarms, transformers)		1,200,000
Townsite Circuit 16, 3 PHASE	($600K)	
White Rock Circuit1, 1 PHASE	($600K)	
GAS DISTRIBUTION		**250,000**
White Rock Steel Valve Project Phase 2		250,000
WATER DISTRIBUTION		**849,000**
North Mesa Distribution Upgrades		849,000
WATER PRODUCTION		**2,228,000**
Townsite 14" Pipeline R&R - Phase 1		1,061,000
Non Potable: White Rock Booster Replacement & Chamisa Pipeline (WTB)		1,167,000
SEWER COLLECTION		**478,000**
North Road Sewer Lift Station Elimination/Rehabilitation		478,000
WASTEWATER TREATMENT		**0**
WASTEWATER TREATMENT AND SEWER COLLECTION TOTAL		**478,000**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
10-Year Capital Plan

FY23 (1 July 2022 - 30 June 2023)		Budget
ELECTRIC PRODUCTION		**0**
ELECTRIC DISTRIBUTION		**2,000,000**
Los Alamos URD Replacement (cables, jboxes, pedestals)		400,000
White Rock URD Replacement (cables, jboxes, pedestals)		400,000
Overhead System Replacement (polex, xarms, transformers)		1,200,000
Townsite Ski Hill Circuit, 3 PHASE	($600K)	
White Rock Circuit2, 1 PHASE	($600K)	
GAS DISTRIBUTION		**250,000**
White Rock Steel Valve Project Phase 3		250,000
WATER DISTRIBUTION		**970,000**
Denver Steel Area East Portion Pipeline {PW-WA 5}		970,000
WATER PRODUCTION		**1,915,000**
Townsite 14" Pipeline R&R - Phase 2		1,077,000
Non Potable: Bayo Booster Station (WTB)		838,000
SEWER COLLECTION		**517,000**
Paseo Penasco Sewer Lift Station Rehabilitation		162,000
Denver Steel Area East Portion Sewerline R&R {PW-WA 5}		86,000
North Community Backyard Sewer Mains & Services Regabilitation - Phase 2		269,000
WASTEWATER TREATMENT		**135,000**
Equipment/Vehicle Replacement		135,000
WASTEWATER TREATMENT AND SEWER COLLECTION TOTAL		**652,000**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
10-Year Capital Plan

FY24 (1 July 2023 - 30 June 2024)		Budget
ELECTRIC PRODUCTION		**0**
ELECTRIC DISTRIBUTION		**2,000,000**
Los Alamos URD Replacement (cables, jboxes, pedestals)		400,000
White Rock URD Replacement (cables, jboxes, pedestals)		400,000
Overhead System Replacement (polex, xarms, transformers)		1,200,000
Townsite Circuit 15, 1 PHASE	($600K)	
White Rock Circuit1, Wire 3 PHASE	($600K)	
GAS DISTRIBUTION		**250,000**
Pipeline Repair & Replacement / Equipment		250,000
WATER DISTRIBUTION		**601,000**
Denver Steel Area West Portion Water Line Replacements		601,000
WATER PRODUCTION		**1,913,000**
Townsite 14" Pipeline R&R - Phase 3		1,093,000
Non Potable: Rover & Pinon Park Pipeline Connections (WTB)		820,000
SEWER COLLECTION		**415,000**
El Gancho Sewer Lift Station Rehabilitation		164,000
Arkansas Area Backyard Sewer Mains & Services Rehabilitation		164,000
Denver Steel Area West Portion Sewerline R&R		87,000
WASTEWATER TREATMENT		**0**
WASTEWATER TREATMENT AND SEWER COLLECTION TOTAL		**415,000**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
10-Year Capital Plan

FY25 (1 July 2024 - 30 June 2025)		Budget
ELECTRIC PRODUCTION		**0**
ELECTRIC DISTRIBUTION		**2,000,000**
Los Alamos URD Replacement (cables, jboxes, pedestals)		400,000
White Rock URD Replacement (cables, jboxes, pedestals)		400,000
Overhead System Replacement (polex, xarms, transformers)		1,200,000
Townsite Circuit 13, 1 PHASE	($600K)	
White Rock Circuit2, Wire 3 PHASE	($600K)	
GAS DISTRIBUTION		**250,000**
Pipeline Repair & Replacement / Equipment		250,000
WATER DISTRIBUTION		**777,000**
Denver Steel Area Orange Street Portion Pipeline {PW-WA 6}		777,000
WATER PRODUCTION		**1,970,000**
Otowi Well 4 - 2nd Tank (Anniversary)		1,110,000
RTU Replacement - 5 Each		139,000
Non Potable: Barranca Mesa Pipeline Connections (WTB)		721,000
SEWER COLLECTION		**255,000**
Ridge Park Sewer Lift Station Rehabilitation		166,000
Denver Steel Area Orange Street Portion Sewerline R&R {PW-WA 6}		89,000
WASTEWATER TREATMENT		**555,000**
LA WWTP Non-Potable Pressure Line		555,000
WASTEWATER TREATMENT AND SEWER COLLECTION TOTAL		**810,000**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
10-Year Capital Plan

FY26 (1 July 2025 - 30 June 2026)		Budget
ELECTRIC PRODUCTION		**0**
ELECTRIC DISTRIBUTION		**2,000,000**
Los Alamos URD Replacement (cables, jboxes, pedestals)		400,000
White Rock URD Replacement (cables, jboxes, pedestals)		400,000
Overhead System Replacement (polex, xarms, transformers)		1,200,000
Townsite Circuit 16, 1 PHASE	($600K)	
White Rock Circuit1, Wire 1 PHASE	($600K)	
GAS DISTRIBUTION		**250,000**
Pipeline Repair & Replacement / Equipment		250,000
WATER DISTRIBUTION		**676,000**
41st/45th/46th/47th Pipeline {PW-WA 7}		676,000
WATER PRODUCTION		**2,168,000**
West Pajarito Road Pipeline R&R - Phase 1		1,126,000
Non Potable: Bayo BS Winter Storage Facility (WTB)		1,042,000
SEWER COLLECTION		**558,000**
Old Pueblo Sewer Canyon Drop Replacement		355,000
41st/45th/46th/47th Sewerline R&R {PW-WA 7}		90,000
Ponerosa Sewer Lift Station Rehabilitation		113,000
WASTEWATER TREATMENT		**85,000**
LA & WR WWTP SCADA Upgrades		85,000
WASTEWATER TREATMENT AND SEWER COLLECTION TOTAL		**643,000**

Los Alamos County Department of Public Utilities
Fiscal Year 2018
10-Year Capital Plan

FY27 (1 July 2026 - 30 June 2027)		Budget
ELECTRIC PRODUCTION		**0**
ELECTRIC DISTRIBUTION		**2,000,000**
Los Alamos URD Replacement (cables, jboxes, pedestals)		400,000
White Rock URD Replacement (cables, jboxes, pedestals)		400,000
Overhead System Replacement (polex, xarms, transformers)		1,200,000
Townsite Circuit 16, 1 PHASE	($600K)	
White Rock Circuit1, Wire 1 PHASE	($600K)	
GAS DISTRIBUTION		**250,000**
Pipeline Repair & Replacement / Equipment		250,000
WATER DISTRIBUTION		**858,000**
Eastern Area Pipeline - Phase 1		858,000
WATER PRODUCTION		**772,000**
Guaje Well 1 Booster Design		172,000
Non Potable: Upper Townsite Pipeline Connections (WTB)		600,000
SEWER COLLECTION		**743,000**
Airport Canyon Sewer Canyon Drop Replacement		629,000
Eastern Area Sewerline R&R - Phase 1		114,000
WASTEWATER TREATMENT		**286,000**
Equipment / Vehicle		286,000
WASTEWATER TREATMENT AND SEWER COLLECTION TOTAL		**1,029,000**

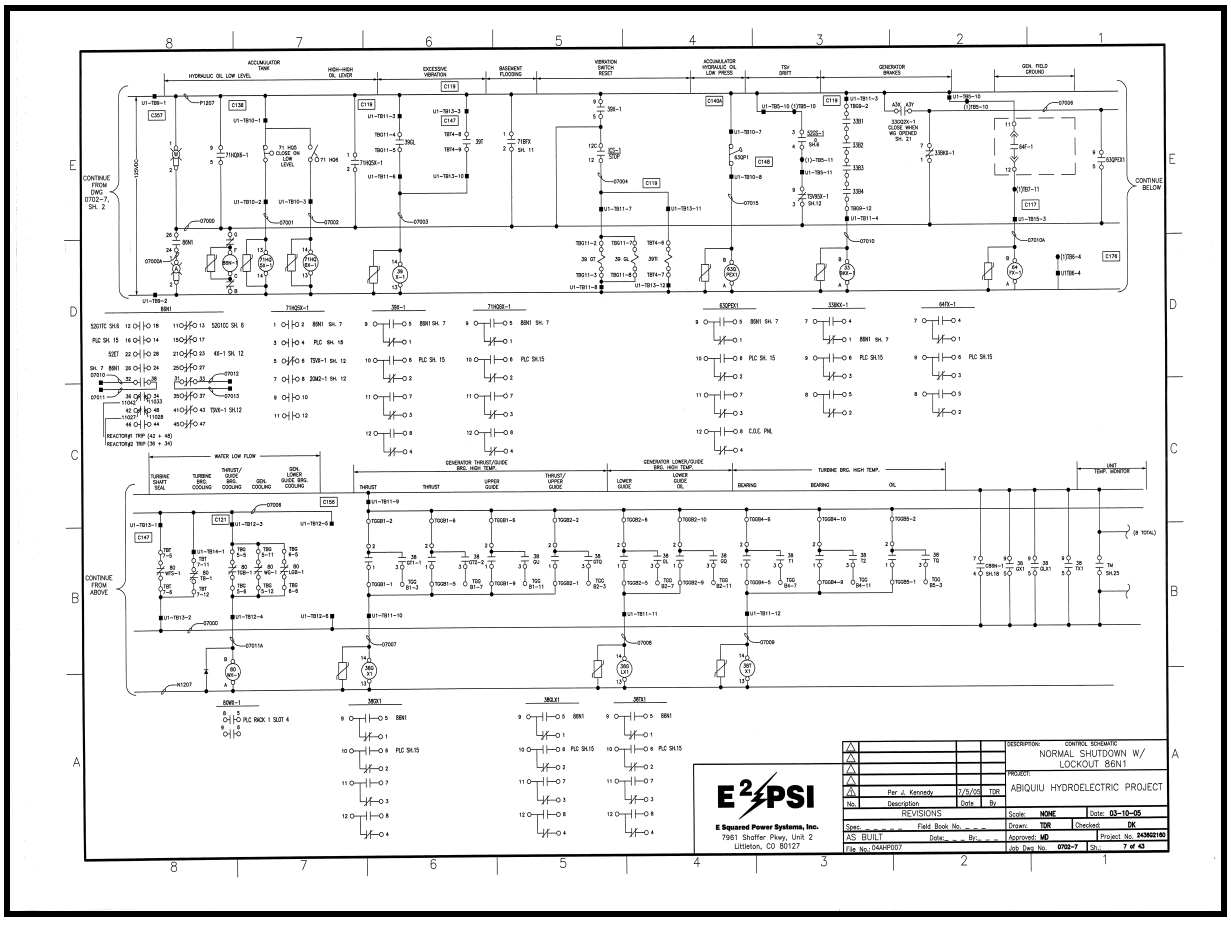
ELECTRIC PRODUCTION

FY18: Abiquiu Controls Upgrade

Project Scope: Installation of new software and hardware to replace the existing controls system in the Abiquiu hydroelectric plant. The new upgrade will integrate the controls of the low-flow turbine and the two larger turbines into one process logic controller. The improvements are a reliability upgrade that will provide safe and efficient operation for the next 10 to 15 years.

Budget: $ 375,000

Schedule: Winter 2017/2018



ELECTRIC PRODUCTION

FY18: Abiquiu 3-Ton Jib Crane

Project Scope: A new 3-ton jib crane will be installed on the north deck of the Abiquiu hydroelectric plant to raise and lower the gates to the energy dissipating chambers. Currently, access to the gates is limited due to the location of the plant electrical gear that must be navigated through by a crane or boom truck.

Budget: $ 140,000

Schedule: Spring 2018

ELECTRIC PRODUCTION

FY18: Abiquiu and El Vado Battery Replacement

Project Scope: The batteries in both plants area approximately 11 years old. Annual testing has indicated a declining trend in their capacity in recent years. The batteries are the power supply for the plant controls system.

Budget: $ 135,000

Schedule: Winter 2017/2018

ELECTRIC PRODUCTION

FY18: Electric SCADA Uninterruptible Power Source Replacement

Project Scope: An uninterruptible power supply (UPS) is a critical feature of the water and electric supervisory controls and data acquisition system (SCADA). The existing UPS at the Pajarito Cliffs serves both the water and electric SCADA systems and is over 15 years old. The UPS is beyond its service life and will be replaced.

Budget: $25,000

Schedule: Spring 2018.

ELECTRIC DISTRIBUTION

FY18: Overhead System Replacement

Project Scope: Much of the utilities' overhead infrastructure is > 50 years and operating near or past its useful plant life. The department's Asset Management Program (AMP) prioritizes O&M projects based on root cause analysis after power outages, quarterly line inspections, etc. The O&M program includes replacement of poles, cross-arms, and other pole hardware including transformers. Priority is placed on the three phase backbone and areas affecting the highest number of consumers.

1. White Rock service area $200,000.
2. Los Alamos service area $200,000.

Budget: $ 400,000
Schedule: Year round design and construction

ELECTRIC DISTRIBUTION

FY18: URD (UG residential distribution) Replacements

Project Scope: The underground system contains 1970s infrastructure which was direct-buried and in direct contact with the earth. Portions or segments of the underground system which have experienced 3 or more failures are targeted for replacement because they will fail again. Old and obsolete live-front transformers are routinely replaced due to safety and arc-flash concerns. New loop segments are designed for radial power lines which serve large amounts of customers.

1. Los Alamos town site area after three failure replacements $250,000.
2. White Rock area after three failure replacements $250,000.

Budget: $ 500,000
Schedule: Year round design and construction

ELECTRIC DISTRIBUTION

FY18: White Rock Substation Tran 1 O&M

Project Scope: The original White Rock transformer and switchgear is often utilized when LANL switches or powers OFF the NL 115KV line and refeeds White Rock from the RL 115KV line. The system often remains under this configuration from a few days up to 2 weeks. The switchgear is at least 50 years and has not been maintained nor refurbished. A failure to the switchgear would result in a very prolonged power outage. Federal rules require that substations have oil containment systems in the event of a transformer leakage or rupture.

1. Switchgear 1 refurbishment $350,000.
2. Substation transformers oil retention $150,000.

Budget: $ 500,000
Schedule: Year round design and construction

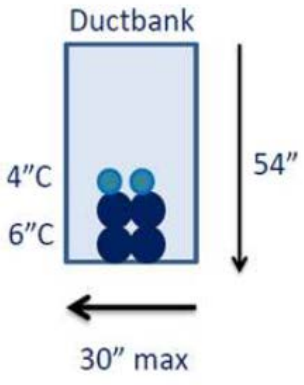
ELECTRIC DISTRIBUTION

FY18: LASS Substation Feeders (in and out)

Project Scope: Powering LASS requires the installation of two new source feeders from LANL substation called LS1 and LS2. The LASS substation would then have 8 outgoing load feeders to power 4 town site feeders and 3 other LANL feeders that power LAC loads; S6, SM6, and S18.

3.	Incoming Source Feeders (2); LS1 and LS2	$200,000.
4.	Outgoing Load Feeders, (8)	$300,000.

Budget: $ 500,000
Schedule: Continuation of FY 17



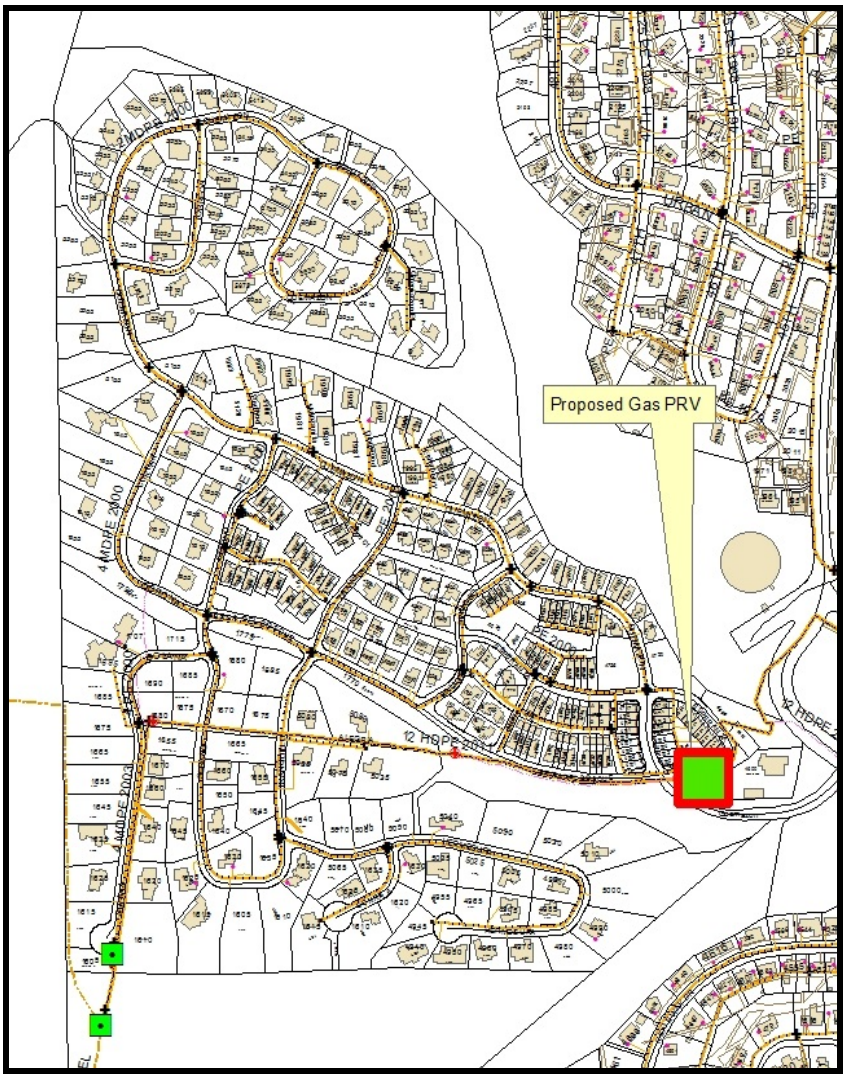
GAS DISTRIBUTION

FY18: Western Area / Quemazon Loop Alternative PRV Feed

Project Scope: Install a new gas pressure reducing valve (PRV), to allow a back feed (loop feed) into the Quemazon distribution system. The system currently has only one supply of natural gas, this project will provide a second feed providing redundancy and reliability.

Budget: $ 250.000

Schedule: Construct Fall 2017



GAS DISTRIBUTION
FY18: PRV Site Improvements Phase 1

Project Scope: New enclosures for existing gas PRV stations will be constructed. The current facilities are not adequately protected against security threats, or natural hazards such as fire. Facilities also are extremely limited in terms of the space they provide for safe O&M activities, as well as ingress and egress.

Budget: $ 200,000

Schedule: FY18

New East Park PRV enclosure (above)

Typical enclosure (above)

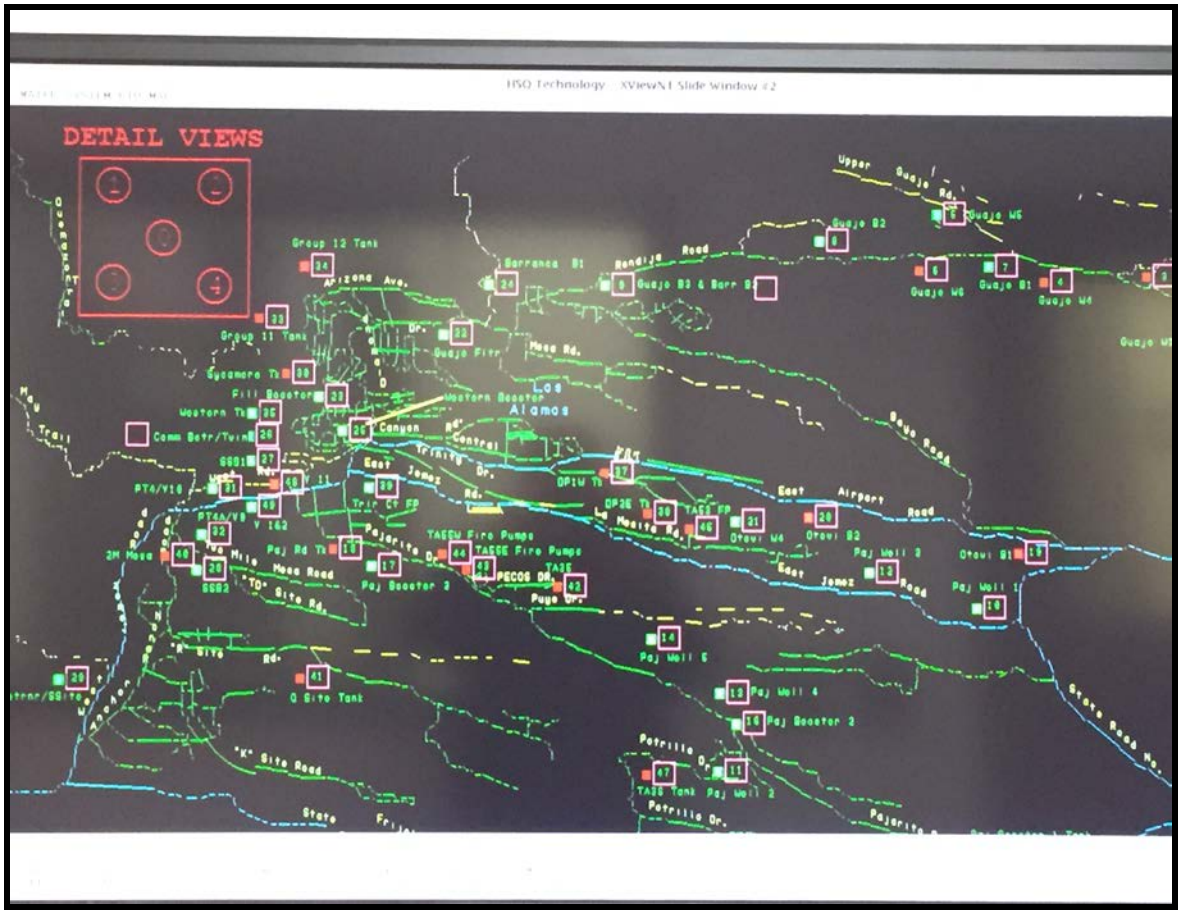
GAS DISTRIBUTION

FY18: SCADA Improvements Phase 1

Project Scope: Install SCADA transmitting (RTU's) at gas PRV stations, as well as other critical locations throughout Los Alamos and White Rock gas distribution system. SCADA alarms would alert GWS and Engineering personnel when system is operating outside of established parameters. System would also be used to monitor and demonstrate that operations are in compliance with State and Federal regulations.

Budget: $250,000

Schedule: FY 18



Example: Photo of Water SCADA Control Board

WATER DISTRIBUTION
FY 18: Aspen School Area Waterline Replacements Phase 1

Project Scope: The waterlines in the neighborhood surrounding Aspen School are the original 6" lead joint cast iron pipes installed in the 1950's. The first of three phases of replacement projects will be in fiscal year 2018. The work will include replacement of the water mains, fire hydrants, water services and meter cans.

Budget: $550,000

Schedule: Bid Spring 2018 / Construct Summer to fall 2018

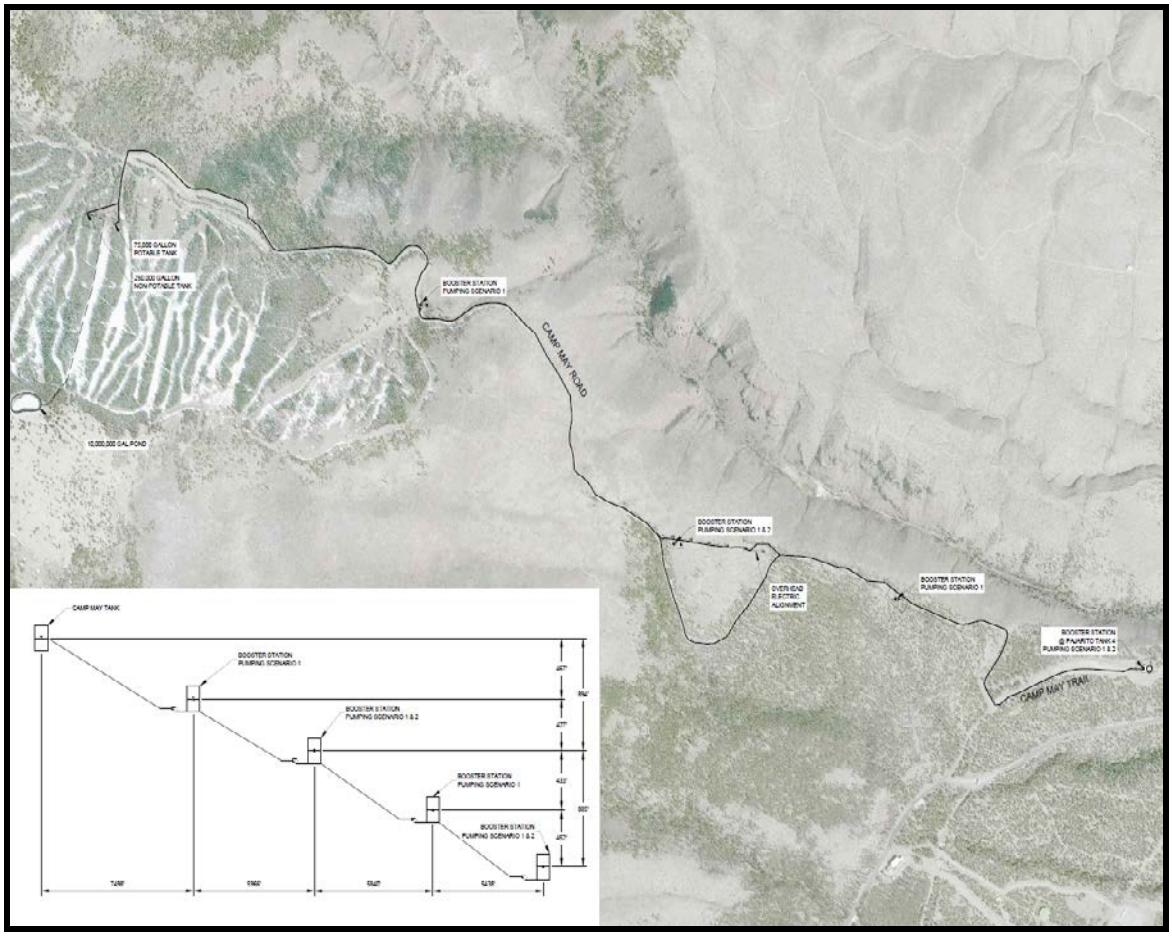
WATER PRODUCTION

FY18: Camp May Potable Water Supply Extension-Construction

Project Scope: This project will significantly improve fire suppression capabilities for the recreational facilities in Camp May, plus extend the potable water supply for current and future developments in the area. Cost will be shared under a private-public partnership between the County and the recreational facility operator.

Budget: $4,000.000 ($2,000,000 General Fund / remainder by third party)

Schedule: Design and environmental documents are currently in progress.

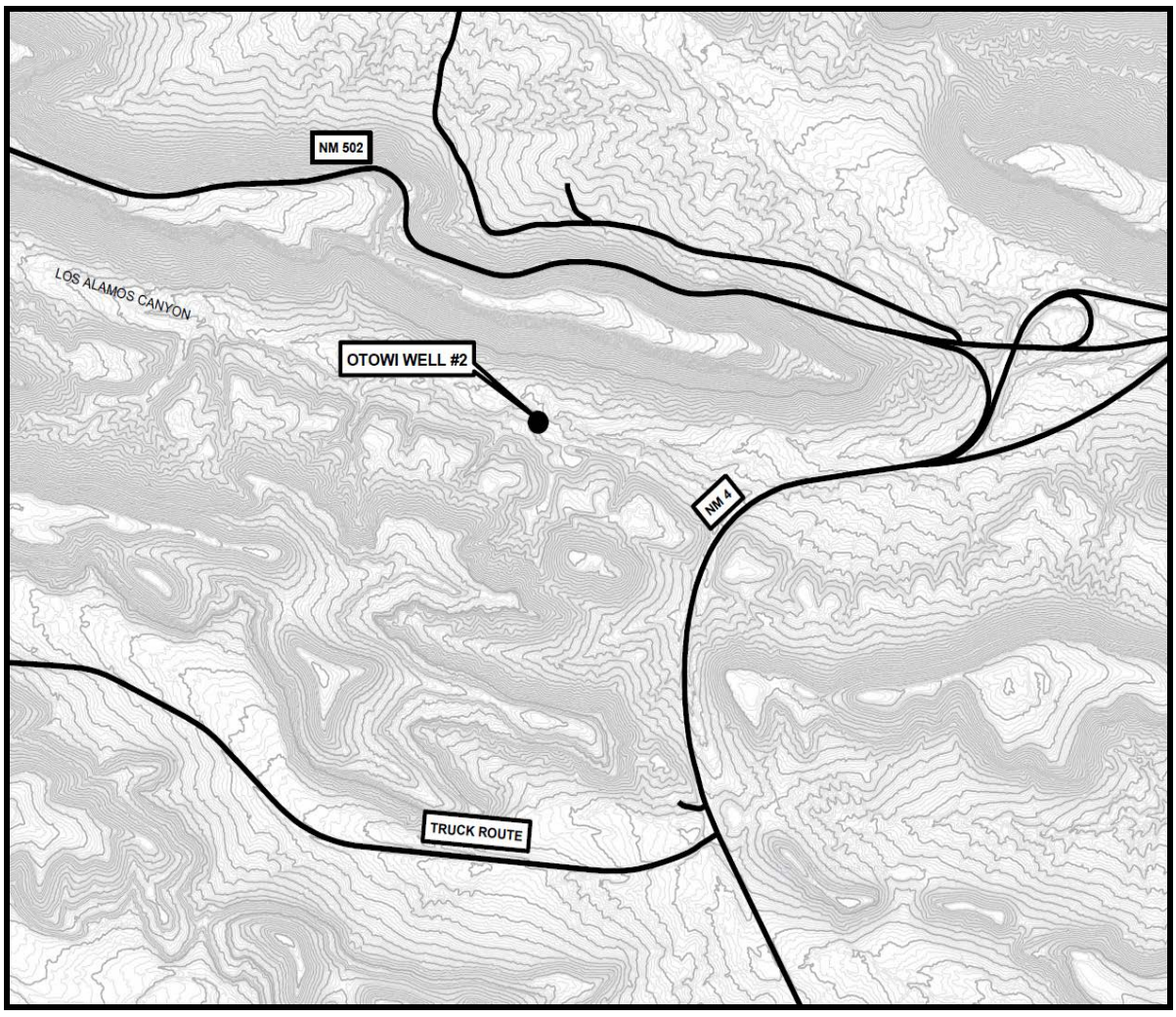


WATER PRODUCTION
FY18: Otowi Well No. 2 Pump House and Pipeline Design & Construction

Project Scope: The project will be executed in two phases. The first phase of the project will be a design-build contract for the design, drilling and development of the well scheduled for completion in the fall of 2017. The second phase of the project will be design and construction of the well house, electric gear and pipeline. The well is scheduled to be online by summer of 2018.

Budget: $1,500,000

Schedule: Well to be drilled and developed in summer 2017. The well house and pipeline will be constructed in the summer of 2018.



WATER PRODUCTION

FY18: Pajarito Well No. 5 Motor Control Center Replacement

Project Scope: The MCC equipment on the Pajarito Well No. 5 is becoming obsolete. Parts are no longer available on the open market. The DPU has maintained this equipment using parts from spare units. New equipment is required to avoid system breakdowns and to keep the system functioning properly. This project is part of a system wide effort to update all motor control centers and control equipment so they meet current codes and maintain reliable service.

Budget: $275,000

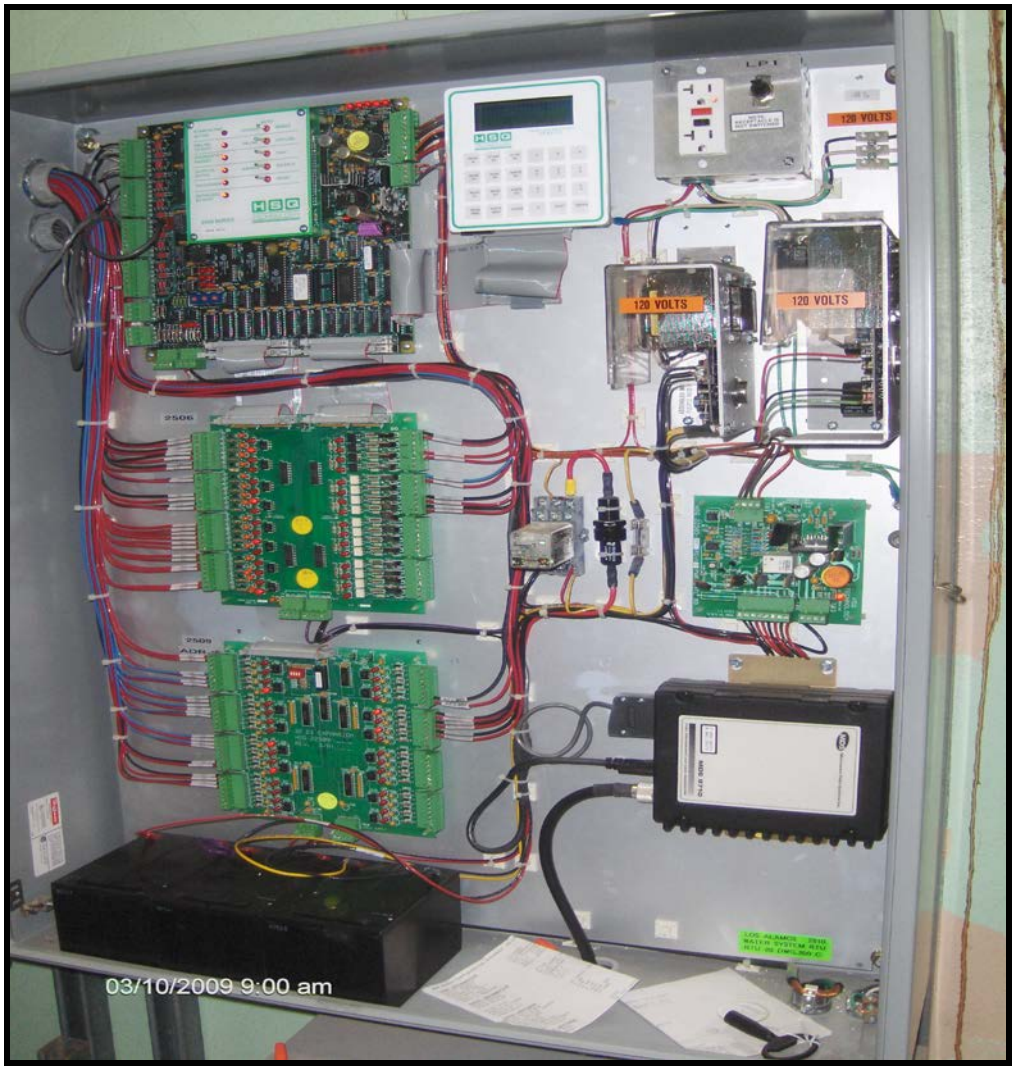
Schedule: Design and construction will occur in the spring/summer of 2018.

WATER PRODUCTION
FY18: Water SCADA Radio transmitter Unit (RTU) Replacement

Project Scope: Replace three water production Radio Transmitter Units (RTUs) associated with wells, boosters and tanks. The three most unreliable units will be replaced by in-house staff. New RTUs are being phased in each year throughout the system to maintain a reliable communications system.

Budget: $75,000

Schedule: Spring 2018.



WATER PRODUCTION

FY18: Automatic Well Replacement: Valves 9, 10 & 11.

Project Scope: These automatic valves are needed to open and close pipelines to transfer water efficiently from one section of the potable water system to other sections whenever there is a need due to a booster station or well pump failure. The mechanical and electrical portions of these valves do not function properly. Further, the equipment was manufactured overseas and it is extremely difficult to order and receive parts.

Budget: $150,000

Schedule: Spring 2018.

WATER PRODUCTION

FY18: Water SCADA Uninterruptible Power Source Replacement

Project Scope: An uninterruptible power supply (UPS) is a critical feature of the water and electric supervisory controls and data acquisition system (SCADA). The existing UPS at the Pajarito Cliffs serves both the water and electric SCADA systems and is over 15 years old. The UPS is beyond its service life and will be replaced.

Budget: $25,000

Schedule: Spring 2018.

WATER PRODUCTION

FY18: Non-Potable Design of Booster Stations and Tank Construction

Project Scope: The next phase of non-potable capital improvements recommended by the Master Plan are related to increasing non–potable water storage and refurbishing aged booster stations. A project has been scoped to design multiple booster station replacements and a second water tank adjacent to the existing Group 12 tank. A second project to construct a new water tank adjacent to the Bayo Booster Station has also been scoped. This new tank will maximize the capture of water during peak periods which is now discharged to the environment.

Budget: $495,000 Design
$776,000 Tank Construction

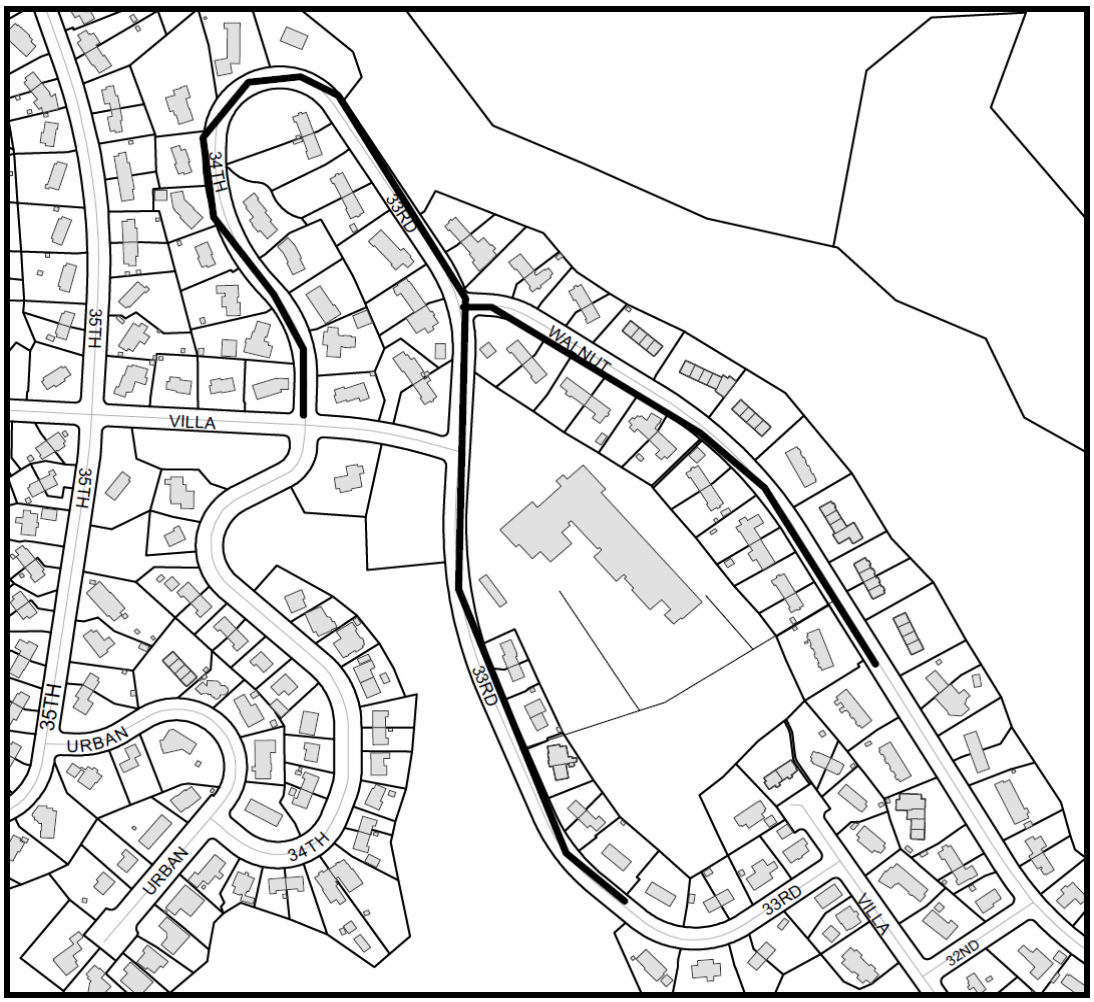
Schedule: Spring 2018.

WASTEWATER COLLECTION
FY-18: Aspen School Area Sewer Line Replacement / Rehabilitation Phase 1

Project Scope: Isolated problem areas in the sewer collection system will be repaired or rehabilitated as part of the waterline replacement project. The sewer lines in the area will be inspected by video camera and the need for repairs will be assessed.

Budget: $ 150,000

Schedule: Bid Spring 2018 / Construct Summer and Fall 2018



WASTEWATER COLLECTION
FY-18: Canyon Road Vitrified Clay Crossings Rehabilitation

Project Scope: Sewer problems have occurred in two locations where the sewer lines crosses Canyon Road. Video inspection of the lines revealed structural damage that will require sections of the pipelines be replaced.

Budget: $ 50,000

Schedule: Bid Spring 2018 / Construct Summer 2018

Los Alamos County Utilities Department
10-Year Financial Forecast - FY2018-FY2027
Electric Distribution

1.50%	BUDGET 2018	FORECAST 2019	FORECAST 2020	FORECAST 2021	FORECAST 2022	FORECAST 2023	FORECAST 2024	FORECAST 2025	FORECAST 2026	FORECAST 2027
Expenditure Forecast										
Supervision, Misc Direct Admin	710,342	720,997	731,812	742,789	753,931	765,240	776,718	788,369	800,195	812,198
Substation Maintenance	36,663	37,213	37,771	38,338	38,913	39,497	40,089	40,691	41,301	41,920
Switching Station Maintenance	29,115	29,552	29,995	30,445	30,902	31,365	31,836	32,313	32,798	33,290
Overhead Maintenance	488,883	496,216	503,660	511,215	518,883	526,666	534,566	542,585	550,723	558,984
Underground Maintenance	375,882	381,521	387,243	393,052	398,948	404,932	411,006	417,171	423,429	429,780
Meter Maintenance	126,101	127,992	129,912	131,861	133,839	135,846	137,884	139,952	142,051	144,182
Interdepartmental Charges	566,670	575,170	583,798	592,555	601,443	610,465	619,621	628,916	638,350	647,925
Administrative Division Allocation	932,632	944,463	956,471	968,659	981,030	993,587	1,006,331	1,019,268	1,032,398	1,045,725
In Lieu Taxes	542,422	429,528	437,438	445,547	453,861	462,383	471,120	480,076	489,258	498,670
Debt Service	1,255,148	1,271,957	1,253,438	1,253,443	1,133,909	982,377	984,776	1,015,816	1,178,311	1,178,311
Profit Transfer	-	676,235	693,242	710,677	728,551	746,874	765,658	784,914	804,654	824,891
Cost of Power	7,375,000	7,827,826	8,317,058	8,249,972	8,240,559	8,519,385	8,714,375	8,929,365	9,144,355	9,359,345
Total Operations Expenses	12,438,858	13,518,670	14,061,838	14,068,553	14,014,767	14,218,616	14,493,981	14,819,435	15,277,823	15,575,222
Capital	2,233,371	3,030,000	1,836,180	1,906,057	2,081,208	2,102,020	2,123,040	2,144,271	2,165,713	2,187,371
Total Cash Outflow	14,672,230	16,548,670	15,898,018	15,974,610	16,095,975	16,320,636	16,617,022	16,963,706	17,443,536	17,762,593
Revenue Forecast										
KWh Sales	125,496,000	126,934,000	128,203,340	129,485,373	130,780,227	132,088,029	133,408,910	134,742,999	136,090,429	137,451,333
Revenue per KWh	$0.1221	$0.1239	$0.1258	$0.1276	$0.1296	$0.1315	$0.1335	$0.1355	$0.1375	$0.1396
Rate Increase Percentage		**1.5%**	**1.5%**	**1.5%**	**1.5%**	**1.5%**	**1.5%**	**1.5%**	**1.5%**	**1.5%**
Total Sales Revenue	15,318,453	15,726,390	16,121,908	16,527,374	16,943,038	17,369,155	17,805,990	18,253,810	18,712,893	19,183,523
Bond/Loan proceeds										
Bond Federal Subsidy	67,942	67,942	67,942	67,942	67,942	67,942	66,045	64,099	58,759	47,731
Interest on Utility Reserves	(183,000)	-	(15,108)	(4,440)	14,716	41,709	74,414	111,399	151,789	192,537
Revenue on Recoverable Work	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Total Cash Inflow	15,353,395	15,944,332	16,324,742	16,740,876	17,175,696	17,628,807	18,096,448	18,579,309	19,073,442	19,573,790
R&R and Cash Flows										
Net Cash Flow	681,165	(604,338)	426,724	766,266	1,079,721	1,308,170	1,479,427	1,615,603	1,629,906	1,811,198
Cumulative Net Cash Flow	681,165	76,828	503,552	1,269,818	2,349,539	3,657,709	5,137,136	6,752,739	8,382,644	10,193,842
Cash Balance	-	(604,338)	(177,614)	588,653	1,668,373	2,976,544	4,455,970	6,071,573	7,701,479	9,512,677
Recommended Cash Balance	5,495,965	4,289,832	4,368,941	4,558,184	4,563,435	4,561,130	4,597,758	4,642,002	4,719,574	4,493,722
Capital R&R Fund	-	65,618	(664,080)	(221,193)	165,104	386,188	590,881	778,648	948,940	1,101,195
Transfer to R&R Fund	(65,618)	-	(462,810)	(392,933)	(217,782)	(196,970)	(175,949)	(154,719)	(133,276)	(111,619)

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Los Alamos County Utilities Department
10-Year Financial Forecast - FY2018-FY2027
Electric Production

	BUDGET 2018	FORECAST 2019	FORECAST 2020	FORECAST 2021	FORECAST 2022	FORECAST 2023	FORECAST 2024	FORECAST 2025	FORECAST 2026	FORECAST 2027
1.50%										
Expenditure Forecast										
El Vado Generation	403,881	409,939	416,088	422,330	428,665	435,095	441,621	448,245	454,969	461,794
Abiquiu Generation	20,048	20,349	20,654	20,964	21,279	21,598	21,922	22,251	22,584	22,923
Contract Administration	1,576,030	1,599,671	1,623,666	1,648,021	1,672,741	1,697,832	1,723,299	1,749,149	1,775,386	1,802,017
Load Control	1,400,000	1,421,000	1,442,315	1,463,950	1,485,909	1,508,198	1,530,821	1,553,783	1,577,090	1,600,746
Transmission - PNM	2,285,008	2,319,283	2,354,072	2,389,383	2,425,224	2,461,603	2,498,527	2,536,005	2,574,045	2,612,655
Transmission - Other	13,219,781	13,418,078	13,619,349	13,823,639	14,030,994	14,241,459	14,455,080	14,671,907	14,891,985	15,115,365
Purchased Power	117,000	118,755	120,536	122,344	124,180	126,042	127,933	129,852	131,800	133,777
Photovoltaic Array	-	-	-	-	-	-	-	-	-	-
Debt Service	488,000	495,320	502,750	510,291	517,945	525,715	533,600	541,604	549,728	557,974
Property Taxes	160,000	162,400	164,836	167,309	169,818	172,365	174,951	177,575	180,239	182,942
Insurance	11,213,148	11,381,345	11,552,065	11,725,346	11,901,227	12,079,745	12,260,941	12,444,855	12,631,528	12,821,001
San Juan Operations	2,854,600	2,897,419	2,940,880	2,984,993	3,029,768	3,075,215	3,121,343	3,168,163	3,215,686	3,263,921
Laramie River Operations	450,000	456,750	463,601	470,555	477,614	484,778	492,049	499,430	506,922	514,525
SMR Project	-	-	-	-	-	-	-	-	-	-
Non-Pool Expenses	455,373	462,204	469,137	476,174	483,316	490,566	497,925	505,393	512,974	520,669
Interdepartmental Charges	903,234	916,783	930,534	944,492	958,660	973,040	987,635	1,002,450	1,017,486	1,032,749
Administrative Allocation	38,749,828	39,331,075	39,921,041	40,519,857	41,127,655	41,744,570	42,370,738	43,006,299	43,651,394	44,306,165
Capital	675,000	300,000	-	-	-	-	-	-	-	-
Total Operation Expenses	74,295,931	75,410,370	76,541,526	77,689,649	78,854,993	80,037,818	81,238,386	82,456,961	83,693,816	84,949,223
Total Capital Expenditures	675,000	300,000	-	-	-	-	-	-	-	-
Total Cash Outflow	74,970,931	75,710,370	76,541,526	77,689,649	78,854,993	80,037,818	81,238,386	82,456,961	83,693,816	84,949,223
1.01%										
Revenue Forecast										
Mwh Sales - LANL	542,688	548,169	553,706	559,298	564,947	570,653	576,417	582,238	588,119	594,059
Mwh Sales - LAC Distribution	125,530	126,798	128,079	129,372	130,679	131,999	133,332	134,678	136,039	137,413
Total Mwh Sales	$668,218	$674,967	$681,784	$688,670	$695,626	$702,652	$709,748	$716,917	$724,158	$731,472
Revenue per Mwh	**44.81**	**56.62**	**57.44**	**57.44**	**57.53**	**58.03**	**58.41**	**58.81**	**59.20**	**59.60**
DOE Revenues	29,941,469	30,390,591	30,846,450	31,309,147	31,778,784	32,255,466	32,739,298	33,230,387	33,728,843	34,234,776
Economy Sales	3,213,251	3,261,450	3,310,372	3,360,027	3,410,427	3,461,584	3,513,508	3,566,210	3,619,703	3,673,999
Interest on Reserves	25,000	25,003	(19,509)	(63,866)	(109,195)	(155,434)	(202,222)	(249,678)	(297,788)	(346,568)
Bond Federal Subsidy	33,984	(33,984)	(33,984)	(33,984)	(33,984)	(33,984)	(30,867)	(27,669)	(24,080)	(19,561)
Bond Issue proceeds										
Transfer from Distribution Fund	-	7,827,826	8,317,058	8,249,972	8,240,559	8,519,385	8,714,375	8,929,365	9,144,355	9,359,345
Total Cash Inflow	33,213,704	41,470,885	42,420,387	42,821,295	43,286,591	44,047,016	44,734,092	45,448,616	46,171,033	46,901,991
Net Cash Flow	(41,757,227)	(34,239,485)	(34,121,139)	(34,868,353)	(35,568,402)	(35,990,802)	(36,504,294)	(37,008,346)	(37,522,783)	(38,047,232)
Cumulative Net Cash Flow	(41,757,227)	(75,996,712)	(110,117,852)	(144,986,205)	(180,554,607)	(216,545,409)	(253,049,703)	(290,058,048)	(327,580,831)	(365,628,064)
Cash Balance	19,232,835	(15,006,650)	(49,127,789)	(83,996,143)	(119,564,545)	(155,555,347)	(192,059,641)	(229,067,986)	(266,590,769)	(304,638,001)
Recommended Cash Balance	22,873,983	22,852,593	23,135,381	23,422,412	23,713,748	24,009,455	24,309,596	24,614,240	24,923,454	25,237,306

Los Alamos County Utilities Department
10-Year Financial Forecast - FY2018-FY2027
Gas Distribution

1.50%	BUDGET 2018	FORECAST 2019	FORECAST 2020	FORECAST 2021	FORECAST 2022	FORECAST 2023	FORECAST 2024	FORECAST 2025	FORECAST 2026	FORECAST 2027
Supervision, Misc Direct Admin	256,975	260,829	264,742	268,713	272,743	276,835	280,987	285,202	289,480	293,822
Gas Distribution	280,994	285,209	289,487	293,829	298,237	302,710	307,251	311,860	316,538	321,286
Gas Meters	137,486	139,548	141,641	143,766	145,922	148,111	150,333	152,588	154,876	157,200
Interdepartmental Charges	351,003	356,268	361,612	367,036	372,542	378,130	383,802	389,559	395,402	401,333
Administrative Division Allocation	816,091	825,722	835,498	845,420	855,492	865,714	876,090	886,621	897,310	908,160
In Lieu Taxes	205,330	119,830	119,830	119,830	119,830	119,830	119,830	119,830	119,830	119,830
Profit Transfer	262,075	244,778	244,778	244,778	244,778	244,778	244,778	244,778	244,778	244,778
Cost of Gas	2,537,766	2,575,833	2,614,470	2,653,687	2,693,493	2,733,895	2,774,903	2,816,527	2,858,775	2,901,656
TOTAL Operations Expenses	4,847,719	4,808,017	4,872,058	4,937,060	5,003,037	5,070,003	5,137,974	5,206,964	5,276,990	5,348,065
Capital	700,000	454,500	459,045	309,090	260,151	262,753	265,380	268,034	270,714	273,421
TOTAL Cash Outflow	**5,547,719**	**5,262,517**	**5,331,103**	**5,246,150**	**5,263,188**	**5,332,756**	**5,403,354**	**5,474,998**	**5,547,704**	**5,621,487**
Revenue Forecast										
Therm Sales	8,455,275	8,455,275	8,455,275	8,455,275	8,455,275	8,455,275	8,455,275	8,455,275	8,455,275	8,455,275
Revenue per Therm	$ 0.620	$ 0.620	$ 0.620	$ 0.620	$ 0.620	$ 0.620	$ 0.620	$ 0.620	$ 0.620	$ 0.620
Rate Increase Percentage	**-10.00%**									
Total Sales Revenue	$ 5,241,503	5,241,503	5,241,503	5,241,503	5,241,503	5,241,503	5,241,503	5,241,503	5,241,503	5,241,503
Interest on Utility Reserves	82,000	83,230	84,478	85,746	87,032	88,337	89,662	91,007	92,372	93,758
Revenue on Recoverable Work	20,000	20,300	20,605	20,914	21,227	21,546	21,869	22,197	22,530	22,868
TOTAL Cash Inflow	5,343,503	5,345,033	5,346,586	5,348,162	5,349,762	5,351,386	5,353,034	5,354,707	5,356,405	5,358,129
Net Cash Flow	(204,216)	82,516	15,483	102,012	86,574	18,630	(50,320)	(120,291)	(191,299)	(263,358)
Cummulative net cash flow	(204,216)	(121,701)	(106,218)	(4,206)	82,369	100,999	50,679	(69,612)	(260,910)	(524,268)
Cash Balance	6,397,463	6,479,979	6,495,462	6,597,474	6,684,048	6,702,678	6,652,359	6,532,068	6,340,769	6,077,412
Recommended Cash Balance	1,016,470	1,005,897	862,293	819,800	828,944	838,212	847,607	857,129	866,780	850,408
Capital R&R Fund	1,050,000	669,628	527,148	377,274	374,357	420,320	464,602	507,142	547,878	586,749
Transfer to R&R Fund	-	-	-	-	(38,477)	(35,875)	(33,248)	(30,594)	(27,914)	(25,206)

Los Alamos County Utilities Department
10-Year Financial Forecast - FY2018 through FY2027
Water Distribution

1.50%	BUDGET 2018	FORECAST 2019	FORECAST 2020	FORECAST 2021	FORECAST 2022	FORECAST 2023	FORECAST 2024	FORECAST 2025	FORECAST 2026	FORECAST 2027
Expenditure Forecast										
Supervision, Misc Direct Admin	184,778	187,550	190,363	193,218	196,117	199,058	202,044	205,075	208,151	211,273
Hydrants	60,645	61,555	62,478	63,415	64,367	65,332	66,312	67,307	68,316	69,341
Water Distribution	372,203	377,786	383,453	389,204	395,042	400,968	406,983	413,087	419,284	425,573
Water Meters	634,691	700,000	700,000	225,000	228,375	231,801	235,278	238,807	242,389	246,025
Interdepartmental Charges	328,386	333,312	338,311	343,386	348,537	353,765	359,071	364,458	369,924	375,473
Administrative Division Allocation	594,839	603,762	612,818	622,010	631,340	640,811	650,423	660,179	670,082	680,133
Cost of Water	2,650,500	2,828,750	2,983,750	3,115,500	3,239,500	3,348,000	3,448,750	3,534,000	3,611,500	3,681,250
Capital	550,000	558,000	817,000	677,000	849,000	970,000	601,000	777,000	676,000	858,000
Total Operation Expenses	4,826,041	5,092,714	5,271,173	4,951,734	5,103,278	5,239,735	5,368,861	5,482,912	5,589,646	5,689,068
Total Capital Expenditures	550,000	558,000	817,000	677,000	849,000	970,000	601,000	777,000	676,000	858,000
Total Expenditures	5,376,041	5,650,714	6,088,173	5,628,734	5,952,278	6,209,735	5,969,861	6,259,912	6,265,646	6,547,068
Revenue Forecast										
kgal Sales	775,000	775,000	775,000	775,000	775,000	775,000	775,000	775,000	775,000	775,000
Revenue per kgal	$ 6.33	$ 6.73	$ 7.06	$ 7.36	$ 7.62	$ 7.81	$ 7.97	$ 8.11	$ 8.23	$ 8.35
Rate Increase Percentage	**8.00%**	**6.25%**	**5.00%**	**4.25%**	**3.50%**	**2.50%**	**2.00%**	**1.75%**	**1.50%**	**1.50%**
Total Sales Revenue	4,905,750	5,212,359	5,472,977	5,705,579	5,905,274	6,052,906	6,173,964	6,282,008	6,376,239	6,471,882
Interest on Utility Reserves	9,161	7,870	1,876	-	-	-	-	-	-	-
Revenue on Recoverable Work	30,450	30,907	31,370	31,841	32,319	32,803	33,295	33,795	34,302	34,816
Total Cash Inflow from Operations	4,945,361	5,251,136	5,506,224	5,737,420	5,937,593	6,085,709	6,207,259	6,315,803	6,410,540	6,506,698
R&R and Cash Flows										
Net Cash Flow	(430,680)	(399,578)	(581,949)	108,685	(14,685)	(124,025)	237,399	55,891	144,894	(40,370)
Cumulative Net Cash Flow	(430,680)	(830,258)	(1,412,207)	(1,303,522)	(1,318,207)	(1,442,232)	(1,204,833)	(1,148,942)	(1,004,048)	(1,044,418)
Cash Balance	**524,661**	**125,084**	**(456,865)**	**(348,180)**	**(362,865)**	**(486,891)**	**(249,492)**	**(193,601)**	**(48,706)**	**(89,076)**
Recommended Cash Balance	1,551,885	1,832,991	1,698,856	1,758,059	1,885,944	1,523,934	1,707,028	1,613,228	1,802,536	1,744,536
Capital R&R Fund	152,355	360,586	564,982	514,466	602,939	521,182	316,790	477,310	465,040	553,525
Transfer to R&R Fund	(205,184)	(197,184)	-	(78,184)	-	-	(154,184)	-	(79,184)	-

Los Alamos County Utilities Department
10-Year Financial Forecast - FY2018 through FY2027
Water Distribution

Rates										
Commodity rate per kgal										
Residential Tier 1 - < 9,000 gals	4.98	5.29	5.55	5.79	5.99	6.14	6.26	6.37	6.47	6.57
Residential Tier 2 - 9 to 15,000 gals	5.29	5.62	5.90	6.15	6.37	6.53	6.66	6.78	6.88	6.98
Residential Tier 3 - > 15,000 gals	6.32	6.71	7.05	7.35	7.61	7.80	7.96	8.10	8.22	8.34
Multi-Family Tier 1 - < 9,000 gals	4.98	5.29	5.55	5.79	5.99	6.14	6.26	6.37	6.47	6.57
Multi-Family Tier 2 - 9 to 15,000 gals	5.23	5.55	5.83	6.08	6.29	6.45	6.58	6.70	6.80	6.90
Multi-Family Tier 3 - > 15,000 gals	5.35	5.68	5.96	6.21	6.43	6.59	6.72	6.84	6.94	7.04
Commercial All Tiers	4.98	5.29	5.55	5.79	5.99	6.14	6.26	6.37	6.47	6.57
County & Schools All Tiers	4.98	5.29	5.55	5.79	5.99	6.14	6.26	6.37	6.47	6.57
Customer Charge per Meter Size										
= or < 1.25"	9.42	10.01	10.51	10.96	11.34	11.62	11.85	12.06	12.24	12.42
1.5"	29.84	31.71	33.30	34.72	35.94	36.84	37.58	38.24	38.81	39.39
2"	44.55	47.33	49.70	51.81	53.62	54.96	56.06	57.04	57.90	58.77
2.5" to 3"	87.91	93.41	98.08	102.25	105.83	108.48	110.65	112.59	114.28	115.99
4"	149.69	159.04	166.99	174.09	180.18	184.68	188.37	191.67	194.55	197.47
6"	316.01	335.76	352.55	367.53	380.39	389.90	397.70	404.66	410.73	416.89
8"	522.13	554.76	582.50	607.26	628.51	644.22	657.10	668.60	678.63	688.81

Los Alamos County Utilities Department
10-Year Financial Forecast - FY2018 through FY2027
Water Production

1.5%	BUDGET 2018	FORECAST 2019	FORECAST 2020	FORECAST 2021	FORECAST 2022	FORECAST 2023	FORECAST 2024	FORECAST 2025	FORECAST 2026	FORECAST 2027
Expenditure Forecast										
Supervision and Operations	963,806	978,263	992,937	1,007,831	1,022,949	1,038,293	1,053,867	1,069,675	1,085,720	1,102,006
Pumping Power	800,000	774,300	774,300	774,300	774,300	774,300	774,300	774,300	774,300	774,300
Wells	135,631	137,665	139,730	141,826	143,954	146,113	148,305	150,529	152,787	155,079
Booster Pump Stations	123,587	125,441	127,323	129,233	131,171	133,139	135,136	137,163	139,220	141,308
Treatment	104,271	105,835	107,422	109,034	110,669	112,329	114,014	115,724	117,460	119,222
Storage Tanks	19,385	19,676	19,971	20,271	20,575	20,883	21,197	21,515	21,837	22,165
Transmission Lines	64,705	65,676	66,661	67,661	68,676	69,706	70,751	71,813	72,890	73,983
Non Potable System	393,018	398,913	404,897	410,970	417,135	423,392	429,743	436,189	442,732	449,372
Interdepartmental Charges	337,902	342,971	348,115	353,337	358,637	364,016	369,477	375,019	380,644	386,354
Administrative Division Allocation	601,111	610,128	619,280	628,569	637,997	647,567	657,281	667,140	677,147	687,304
State Water Tax	45,000	45,675	46,360	47,056	47,761	48,478	49,205	49,943	50,692	51,453
Debt Service	235,735	300,961	329,249	363,657	383,583	668,186	682,822	556,213	391,332	391,332
Capital	2,025,000	1,015,000	1,700,000	3,173,000	1,061,000	1,077,000	1,093,000	1,249,000	1,126,000	172,000
Capital Paid with Debt/Grants/Reimb	3,771,000	964,000	850,000	261,000	1,167,000	838,000	820,000	721,000	1,042,000	600,000
Capital Paid with Cash	1,500,000									
Total Operations Expenses	3,824,151	3,905,504	3,976,245	4,053,744	4,117,406	4,446,402	4,506,097	4,425,223	4,306,761	4,353,878
Total Capital Expenditures	7,296,000	1,979,000	2,550,000	3,434,000	2,228,000	1,915,000	1,913,000	1,970,000	2,168,000	772,000
Total Cash Outflow	11,120,151	5,884,504	6,526,245	7,487,744	6,345,406	6,361,402	6,419,097	6,395,223	6,474,761	5,125,878
Revenue Forecast										
Non-potable										
Non-potable production in kgals	86,400	90,400	90,400	94,500	94,500	108,600	136,500	136,500	136,500	136,500
Non-potable rate per 1000 gallons	$ 2.50	$ 2.70	$ 2.89	$ 3.08	$ 3.27	$ 3.47	$ 3.66	$ 3.84	$ 4.01	$ 4.17
Rate Increase Percentage	**117%**	**8.00%**	**7.00%**	**6.50%**	**6.25%**	**6.00%**	**5.50%**	**5.00%**	**4.50%**	**4.00%**
Non-potable sales revenue	$ 216,000	$ 244,080	$ 261,256	$ 291,060	$ 309,015	$ 376,842	$ 499,590	$ 524,160	$ 547,365	$ 569,205

Los Alamos County Utilities Department
10-Year Financial Forecast - FY2018 through FY2027
Water Production

1.5%	BUDGET 2018	FORECAST 2019	FORECAST 2020	FORECAST 2021	FORECAST 2022	FORECAST 2023	FORECAST 2024	FORECAST 2025	FORECAST 2026	FORECAST 2027
Potable										
Production in thousand gallons	1,150,000	1,150,000	1,150,000	1,150,000	1,150,000	1,150,000	1,150,000	1,150,000	1,150,000	1,150,000
Revenue per thousand gallons	$ 3.42	$ 3.65	$ 3.85	$ 4.02	$ 4.18	$ 4.32	$ 4.45	$ 4.56	$ 4.66	$ 4.75
Rate Increase Percentage	**8.00%**	**6.75%**	**5.50%**	**4.50%**	**4.00%**	**3.25%**	**3.00%**	**2.50%**	**2.25%**	**2.00%**
Potable sales revenue	$ 3,933,000	$ 4,197,500	$ 4,427,500	$ 4,623,000	$ 4,807,000	$ 4,968,000	$ 5,117,500	$ 5,244,000	$ 5,359,000	$ 5,462,500
Total Sales Revenue	**$ 4,149,000**	**$ 4,441,580**	**$ 4,688,756**	**$ 4,914,060**	**$ 5,116,015**	**$ 5,344,842**	**$ 5,617,090**	**$ 5,768,160**	**$ 5,906,365**	**$ 6,031,705**
Repayment & Interest on Inter-Utility Loans	187,569	187,569	187,569	187,569	187,569	187,569	187,569	93,784	-	-
Interest on Utility Reserves	109,233	-	-	-	-	-	-	-	-	-
Bond Federal Subsidy	27,576	27,576	27,576	27,576	27,576	27,576	21,338	14,940	10,459	8,496
Econ Dev Fund/Ski Hill Reimb	4,000,000									
Federal or State Grant/Loan	1,271,000	964,000	850,000	261,000	1,167,000	838,000	820,000	721,000	1,042,000	600,000
Total Cash Inflow	9,744,378	5,620,725	5,753,901	5,390,205	6,498,160	6,397,987	6,645,997	6,597,884	6,958,824	6,640,201
R&R and Cash Flows										
Net Cash Flow	(1,375,773)	(263,779)	(772,344)	(2,097,539)	152,754	36,585	226,900	202,661	484,062	1,514,322
Cumulative Net Cash Flow	(1,375,773)	(1,639,552)	(2,411,896)	(4,509,435)	(4,356,681)	(4,320,096)	(4,093,197)	(3,890,536)	(3,406,474)	(1,892,151)
Cash Balance	**(2,912,390)**	**(3,176,169)**	**(3,948,513)**	**(6,046,052)**	**(5,893,298)**	**(5,856,713)**	**(5,629,814)**	**(5,427,153)**	**(4,943,091)**	**(3,428,768)**
Recommended Cash Balance	2,597,839	3,352,097	4,863,998	2,797,179	2,844,039	3,155,740	3,337,641	3,099,466	1,992,189	3,489,120
Capital R&R Fund	8,000,000	7,025,994	7,042,508	6,374,352	4,219,834	4,134,224	4,030,903	3,909,515	3,629,700	3,467,288
Transfer to R&R Fund	-	-	-	-	-	-	-	-	-	(718,994)

Los Alamos County Utilities Department
10-Year Financial Forecast - FY2018-FY2027
Wastewater Division

1.50%	BUDGET 2018	FORECAST 2019	FORECAST 2020	FORECAST 2021	FORECAST 2022	FORECAST 2023	FORECAST 2024	FORECAST 2025	FORECAST 2026	FORECAST 2027
EXPENSE FORECAST										
WASTEWATER COLLECTION										
Supervision, Misc Direct Admin	230,375	233,831	237,338	240,898	244,512	248,179	251,902	255,681	259,516	263,409
Wastewater Collection Operations	367,602	373,116	378,713	384,394	390,160	396,012	401,952	407,981	414,101	420,313
Sewer Lift Stations	275,214	279,342	283,532	287,785	292,102	296,483	300,931	305,444	310,026	314,677
Total WWC Operations Expenses	873,191	886,289	899,583	913,077	926,773	940,675	954,785	969,107	983,643	998,398
WASTEWATER TREATMENT										
LA WWTP Operations & Maintenance	869,508	882,550	895,788	909,225	922,864	936,707	950,757	965,019	979,494	994,186
WR WWTP Operations & Maintenance	448,592	455,321	462,151	469,083	476,119	483,261	490,510	497,868	505,336	512,916
Total WWT Operations Expenses	1,318,100	1,337,871	1,357,939	1,378,308	1,398,983	1,419,968	1,441,267	1,462,886	1,484,830	1,507,102
Interdepartmental Charges	646,445	656,142	665,984	675,974	686,113	696,405	706,851	717,454	728,216	739,139
Administrative Division Allocation	605,847	613,432	621,130	628,944	636,875	644,925	653,095	661,389	669,806	678,350
Debt Service (WWT)	1,155,799	1,155,799	1,155,799	2,236,725	2,236,725	2,236,625	2,236,726	2,142,941	2,049,156	2,049,156
Capital	200,000	843,350	2,878,722	3,770,902	497,409	685,259	440,531	868,430	696,277	1,125,402
Capital Paid with WTB Loan				12,000,000						
Total Operations Expenses	4,599,381	4,649,532	4,700,436	5,833,028	5,885,469	5,938,597	5,992,724	5,953,776	5,915,651	5,972,145
Total Capital Expenditures	200,000	843,350	2,878,722	15,770,902	497,409	685,259	440,531	868,430	696,277	1,125,402
Total Cash Outflow	4,799,381	5,492,882	7,579,158	21,603,930	6,382,878	6,623,855	6,433,255	6,822,206	6,611,928	7,097,547
REVENUE FORECAST										
Mgal Processed	*430,000*	*430,000*	*430,000*	*430,000*	*430,000*	*430,000*	*430,000*	*430,000*	*430,000*	*430,000*
Res'l Single-Family Flat Rate Customers	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629	6,629
Res'l Single Family Flat Rate	37.18	40.15	42.66	44.79	46.69	48.32	49.53	50.52	51.40	52.17
Res'l Single-Family Service Charge	10.27	11.09	11.78	12.37	12.90	13.35	13.68	13.95	14.19	14.40
Rate Increase Percentage	***8.00%***	***8.00%***	***6.25%***	***5.00%***	***4.25%***	***3.50%***	***2.50%***	***2.00%***	***1.75%***	***1.50%***
Total Revenue from Res'l SF Flat Rate	3,736,807	4,035,279	4,287,287	4,501,494	4,692,863	4,856,668	4,977,947	5,077,175	5,165,378	5,242,555

Los Alamos County Utilities Department
10-Year Financial Forecast - FY2018-FY2027
Wastewater Division

		BUDGET 2018	FORECAST 2019	FORECAST 2020	FORECAST 2021	FORECAST 2022	FORECAST 2023	FORECAST 2024	FORECAST 2025	FORECAST 2026	FORECAST 2027
	1.50%										
Res'l Multi-Family Flat Rate Customers		75	75	75	75	75	75	75	75	75	75
Res'l Multi-Family Service Charge		10.27	11.09	11.78	12.37	12.90	13.35	13.68	13.95	14.19	14.40
No. of Res'l Multi-Family Dwelling Units		1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585	1,585
Res'l Multi-Family Flat Rate		30.97	33.45	35.54	37.32	38.91	40.27	41.28	42.11	42.85	43.49
Rate Increase Percentage		***8.00%***	***8.00%***	***6.25%***	***5.00%***	***4.25%***	***3.50%***	***2.50%***	***2.00%***	***1.75%***	***1.50%***
Total Revenue from Res'l MF Flat Rate		562,395	607,428	645,378	677,702	706,578	731,273	749,610	764,678	778,111	789,731
Non-Residential Customers		291	291	291	291	291	291	291	291	291	291
Non-Residential Service Charge		10.27	11.09	11.78	12.37	12.90	13.35	13.68	13.95	14.19	14.40
Non-Residential Sales in Kgal	-0.20%	47,522	47,427	47,332	47,237	47,143	47,049	46,955	46,861	46,767	46,673
Adjustment Factor		16.00%	8.00%	1.75%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Adjusted Non-Residential Sales in Kgal		55,126	51,221	48,160	47,237	47,143	47,049	46,955	46,861	46,767	46,673
Non-Res'l Commodity Charge per Kgal		17.50	18.90	20.08	21.08	21.98	22.75	23.32	23.79	24.21	24.57
Rate Increase Percentage		***8.00%***	***8.00%***	***6.25%***	***5.00%***	***4.25%***	***3.50%***	***2.50%***	***2.00%***	***1.75%***	***1.50%***
Total Revenue from Non-Residential		970,543	976,601	977,951	1,007,792	1,048,812	1,083,466	1,108,469	1,128,623	1,146,326	1,161,139
Total Sales Revenue		5,269,745	5,691,324	6,047,032	6,349,384	6,619,232	6,850,905	7,022,178	7,162,622	7,287,968	7,397,287
Interest on Utility Reserves		13,516	15,077	10,337	244,301	9,539	2,194	(2,791)	(5,978)	(7,015)	(5,538)
Bond Issue Proceeds				17,272,000							
Revenue on Recoverable Work		-	-	-	-	-	-	-	-	-	-
Total Cash Inflow		5,283,261	5,706,402	23,329,369	6,593,685	6,628,771	6,853,099	7,019,387	7,156,644	7,280,953	7,391,749
Net Cash Flow		(529,692)	(316,052)	15,597,639	(15,650,816)	(489,678)	(332,328)	(212,439)	(69,133)	98,454	109,631
Cumulative Net Cash Flow		(529,692)	(845,744)	14,751,896	(898,920)	(1,388,598)	(1,720,926)	(1,933,365)	(2,002,498)	(1,904,045)	(1,794,414)
Cash Balance		1,005,160	689,108	16,286,748	635,931	146,254	(186,074)	(398,513)	(467,646)	(369,193)	(259,562)
Recommended Cash Balance		3,360,044	5,407,954	18,312,860	4,133,210	4,334,170	4,102,649	4,544,155	4,291,927	4,641,182	4,279,903
Capital R&R Fund		(1,050,000)	(67,929)	459,605	621,368	1,274,367	2,035,425	2,637,705	3,489,030	3,962,382	4,612,201
Transfer to R&R Fund		(1,013,571)	(529,571)	(152,571)	(640,571)	(735,571)	(561,571)	(798,571)	(403,571)	(570,571)	(184,571)

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Agenda No.:	8.A
Index (Council Goals):	BCC - N/A
Presenters:	Board of Public Utilities
Legislative File:	**9084-17**

Title

Status Reports

Body

Each month the Board receives in the agenda packet informational reports on various items.
No presentation is given, but the Board may discuss any of the reports provided.

Attachments

A - Electric Reliability Report
B - Accounts Recievables Report
C - Safety Report

STATUS REPORTS

ELECTRIC RELIABILITY

Los Alamos County Utilities

Electric Distribution Reliability

February 16, 2017

Stephen Marez
Senior Engineer

Twelve Month History	January 2017	
Total # Accounts	9045	
Total # Interruptions	48	
Sum Customer Interruption Durations	5442:38:00	hours:min:sec
# Customers Interrupted	4466	
SAIFI(APPA AVG. = 1.0)	.49	int./cust.
SAIDI (APPA AVG. = 1:00)	:36	hours:min
CAIDI	1:13	hours:min/INT
ASAI	99.9997%	% available

- **SAIFI - System Average Interruption Frequency Index**
  A measure of interruptions per customer (Per Year)

  SAIFI= (Total number of customer interruptions)
  (Total number of customers served)

- **SAIDI – System Average Interruption Duration Index**
  A measure of outage time per customer if all customers were out at the same time (hours per year)

  SAIDI=(Sum of all customer outage durations)
  (Total number of customers served)

- **CAIDI – Customer Average Interruption Duration Index**
  A measure of the average outage duration per customer (hours per interruption)

  CAIDI=(Sum of all customer outage durations) = SAIDI
  (Total number of customers interruptions) SAIFI

- **ASAI – Average System Availability Index**
  A measure of the average service availability (Per unit)

  ASAI= (Service hours available) = 8760-SAIDI
  (Customer demand hours) 8760

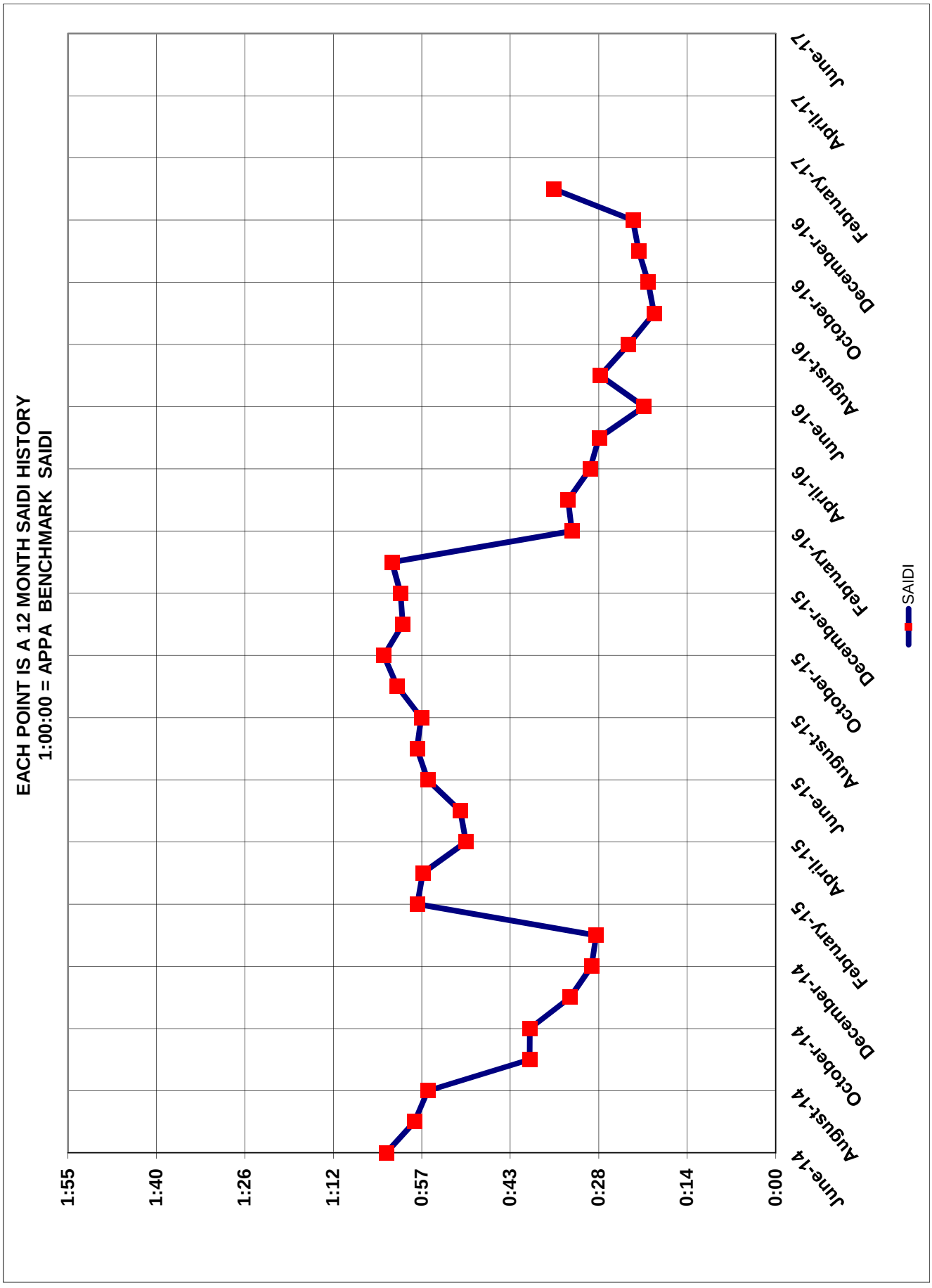
Electric Distribution Reliability Study
Twelve Month Outage History

Prepared by Stephen Marez
Senior Engineer L.A.C.U.

Date	Call Rcd.	Circuit	Cause	Start Time	End Time	Duration	Customers Affected (Meters)	Combined Customer Outage Durations	Total Outage H:M:S	Running SAIDI
2/11/2016	Utilities	WR1	Planned	9:00	9:30	0:30	8	4:00:00	4:00:00	0:00:02
3/2/2016	Utilities	EA4	OH Failure	14:40	15:09	0:29	18	8:42:00	12:42:00	0:00:05
3/2/2016	Utilities	WR2	Planned	9:00	10:40	1:40	10	16:40:00	29:22:00	0:00:12
3/10/2016	Utilities	WR2	Planned	9:30	10:30	1:00	7	7:00:00	36:22:00	0:00:15
3/28/2016	Utilities	16	URD Failure	19:36	22:30	2:54	30	87:00:00	123:22:00	0:00:49
4/3/2016	Utilities	WR2	URD Failure	11:18	13:00	1:42	12	20:24:00	143:46:00	0:00:57
4/3/2016	Utilities	16	URD Failure	21:15	22:20	1:05	50	54:10:00	197:56:00	0:01:19
4/13/2016	Utilities	13	Unknown	10:00	10:20	0:20	24	8:00:00	205:56:00	0:01:22
4/28/2016	Dispatch	WR1	OH Failure	22:15	23:30	1:15	30	37:30:00	243:26:00	0:01:37
5/10/2016	Utilities	16	Planned	9:00	9:10	0:10	18	3:00:00	246:26:00	0:01:38
5/17/2016	Utilities	15	Planned	9:00	10:00	1:00	7	7:00:00	253:26:00	0:01:41
5/21/2016	Utilities	WR2	Planned	10:00	10:15	0:15	7	1:45:00	255:11:00	0:01:42
6/9/2016	Utilities	13	Planned	9:00	10:00	1:00	27	27:00:00	282:11:00	0:01:53
6/9/2015	Utilities	14	URD Failure	1:45	4:00	2:15	24	54:00:00	336:11:00	0:02:14
6/10/2016	Utilities	WR2	Planned	9:00	11:00	2:00	17	34:00:00	370:11:00	0:02:28
6/23/2016	Utilities	WR2	Weather	19:00	0:00	5:00	4	20:00:00	390:11:00	0:02:36
7/12/2016	Utilities	16	URD Failure	1:44	3:00	1:16	306	387:36:00	777:47:00	0:05:11
7/15/2016	Utilities	13	URD Failure	10:30	13:30	3:00	88	264:00:00	1041:47:00	0:06:56
7/15/2016	Dispatch	WR1	URD Failure	21:40	0:00	2:20	21	49:00:00	1090:47:00	0:07:16
7/16/2016	Utilities	14	Animal	12:00	13:22	1:22	537	733:54:00	1824:41:00	0:12:09
7/19/2016	Utilities	18	Planned	0:00	5:00	5:00	4	20:00:00	1844:41:00	0:12:17
7/19/2016	Utilities	EA4	HUMAN	16:30	22:30	6:00	3	18:00:00	1862:41:00	0:12:24
7/20/2016	Utilities	13	Unknown	20:00	20:45	0:45	20	15:00:00	1877:41:00	0:12:30
7/27/2016	Utilities	14	URD Failure	8:17	9:30	1:13	120	146:00:00	2023:41:00	0:13:29
7/28/2016	Dispatch	WR1	URD Failure	2:30	5:30	3:00	12	36:00:00	2059:41:00	0:13:43
8/3/2016	Utilities	13	Planned	9:00	10:15	1:15	13	16:15:00	2075:56:00	0:13:46
8/10/2016	Utilities	17	URD Failure	3:10	3:30	0:20	209	69:40:00	2145:36:00	0:14:14
8/10/2016	Utilities	WR1	Planned	9:00	10:20	1:20	8	10:40:00	2156:16:00	0:14:18
8/11/2016	Utilities	WR1	Planned	9:00	11:00	2:00	6	12:00:00	2168:16:00	0:14:23
8/16/2016	Utilities	WR1	URD Failure	12:30	13:00	0:30	80	40:00:00	2208:16:00	0:14:39
9/23/2016	Utilities	18	Planned	9:00	10:25	1:25	3	4:15:00	2212:31:00	0:14:41
10/3/2016	Utilities	WR2	HUMAN	11:00	12:05	1:05	16	17:20:00	2229:51:00	0:14:48
10/22/2016	Utilities	14	HUMAN	10:53	11:52	0:59	539	530:01:00	2759:52:00	0:18:18
10/28/2016	Utilities	WR1	URD Failure	21:20	22:30	1:10	15	17:30:00	2777:22:00	0:18:25
11/2/2016	Utilities	14	URD Failure	17:47	18:40	0:53	129	113:57:00	2891:19:00	0:19:11
11/10/2016	Utilities	17	URD Failure	8:15	12:30	4:15	6	25:30:00	2916:49:00	0:19:21
11/15/2016	Utilities	14	Planned	8:30	9:30	1:00	54	54:00:00	2970:49:00	0:19:42
11/28/2016	Utilities	15	Unknown	6:00	6:45	0:45	25	18:45:00	2989:34:00	0:19:54
11/28/2016	Utilities	15	Unknown	6:00	8:05	2:05	25	52:05:00	3041:39:00	0:20:15
11/28/2016	Utilities	14	URD Failure	10:15	14:15	4:00	6	24:00:00	3065:39:00	0:20:20
12/16/2016	Utilities	13	Tree	9:17	13:00	3:43	13	48:19:00	3113:58:00	0:20:39
12/17/2016	Utilities	13	OH Failure	9:17	10:30	17:00	10	170:00:00	3283:58:00	0:21:47
1/1/2017	Utilities	15	Animal	13:00	13:45	0:45	25	18:45:00	3302:43:00	0:21:55
1/16/2016	Utilities	13	Weather	20:15	23:59	3:44	5	18:40:00	3321:23:00	0:22:02
1/29/2017	Utilities	15	Animal	2:20	3:00	0:40	1145	763:20:00	4084:43:00	0:27:06
1/29/2017	Utilities	15	Animal	2:20	3:15	0:55	131	120:05:00	4204:48:00	0:27:54
1/29/2017	Utilities	15	Animal	2:20	3:40	1:20	72	96:00:00	4300:48:00	0:28:32
1/29/2017	Utilities	15	Animal	2:20	4:30	2:10	527	1141:50:00	5442:38:00	0:36:06

CIRCUIT SAIDI IS CALCULATED ACCORDING TO THE NUMBER OF CUSTOMERS IN EACH CIRCUIT RESPECTIVELY

Running SAIDI Circuit 13	Running SAIDI Circuit 14	Running SAIDI Circuit 15	Running SAIDI Circuit 16	Running SAIDI Circuit 17	Running SAIDI Circuit 18	SAIDI Circuit EA4 & Royal Crest	Running SAIDI Circuit WR1	Running SAIDI Circuit WR2	Monthly SAIDI		Monthly Customer Minutes out of service	WEATHER SAIDI
							0:00:09		FEBRUARY	0:00:02	4:00:00	
						0:04:01						
								0:01:50				
								0:04:06				
			0:02:50						MARCH	0:00:48	119:22:00	
								0:13:03				
			0:04:36									
0:00:17												
							0:01:34		APRIL	0:00:48	230:44:00	
			0:04:42									
		0:00:13										
								0:28:57	JUNE	0:00:05	11:45:00	
0:01:15												
	0:06:01											
								0:52:01				
								0:24:19	JULY	0:00:54	135:00:00	0:00:08
			0:17:21									
0:10:43												
							0:03:25					
	1:27:42											
					0:05:38							
						0:12:19						
0:11:15												
	1:43:58											
							0:04:46		AUGUST	0:11:04	1017:54:00	
0:11:50												
				0:20:00								
							0:05:11					
							0:05:38					
							0:07:09		SEPTEMBER	0:00:59	148:35:00	
					0:06:50				OCTOBER	0:00:02	4:15:00	
								2:18:56				
	2:42:58											
							0:00:40		NOVEMBER	0:03:45	564:51:00	
	2:55:39											
				0:27:19								
	3:01:39											
		0:00:50										
		0:02:30										
	3:04:20								DECEMBER	0:01:55	288:17:00	
0:13:35												
0:19:45									JANUARY	0:01:27	218:19:00	
		0:00:36										
0:00:41												0:00:07
		0:24:29										
		0:28:20										
		0:31:25										
		1:08:02							FEBRUARY	0:14:19	2158:40:00	
										SAIDI TOTAL		WEATHER
Circ 13	Circ 14	Circ 15	Circ 16	Circ 17	Circ 18	Circ EA4	Circ WR1	Circ WR2	Total	0:36:06		0:00:15
1655	539	1875	1842	209	213	165	1586	961	9045			


EACH POINT IS A 12 MONTH SAIDI HISTORY
1:00:00 = APPA BENCHMARK SAIDI
1:55
1:40
1:26
1:12
0:57
0:43
0:28
0:14
0:00
June-14
August-14
October-14
December-14
February-15
April-15
June-15
August-15
October-15
December-15
February-16
April-16
June-16
August-16
October-16
December-16
February-17
April-17
June-17
SAIDI

STATUS REPORTS

ACCOUNTS RECEIVABLES

Los Alamos County Utilities Department
Active Receivables Over 90 Days Past Due
February 1, 2017

Account	*Acct Type*	*Comments*	*90 - 119*	*120 +*
2018076	COMM	Refuse account, fixed billing & customer sending payment	107.00	-
2125578	RES	Payment $340.40 2/3/17	149.51	-
2013117	RES	Payment $260.00 2/3/17	163.01	-
2103168	RES	Turnoff scheduled for 2/7/17 if payment not received 2/6/17	206.24	-
2126218	RES	Refuse account, customer sending payment	2,042.93	-
2072488	RES	Payment $350.00 2/3/17	176.63	17.24
2119588	RES	Doortag issues, payment due 2/9/17	240.42	72.80
2102168	RES	Payment plan on file	164.58	77.72
2122958	COMM	Refuse account, pending info from Enviromential Services	24.47	91.36
2011697	RES	Customer requested audit, sent on 2/3, waiting to hear back	-	251.95
2090328	RES	Turnoff scheduled for 2/7/17 if payment not received 2/6/17	209.57	471.30
2122788	COMM	Certified letter sent to business	499.80	2,811.20
			3,984.16	3,793.57
			TOTAL	**$ 7,777.73**

Los Alamos County Utilities Department
Receivables More than 60 Days Inactive
February 1, 2017

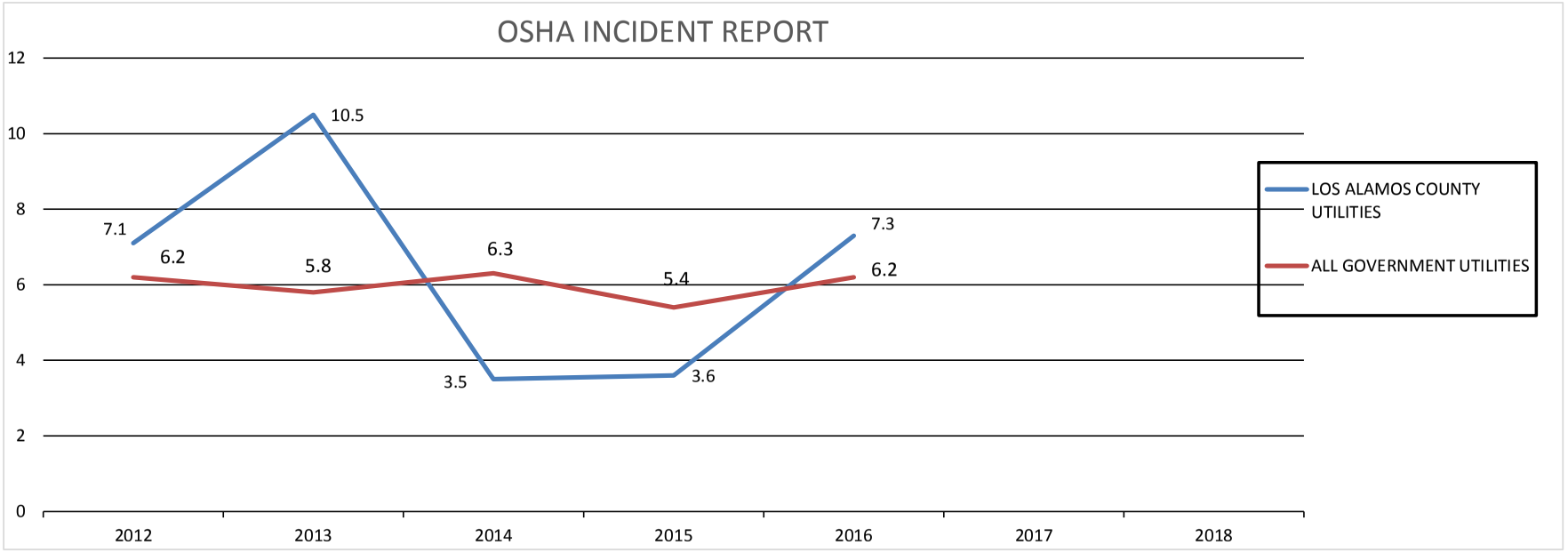
YEAR	*OUTSTANDING 2/1*	*# OF ACCOUNTS*	*OUTSTANDING 1/3*	*# OF ACCOUNTS*
FY13	16,726.55	73	16,726.55	73
FY14	30,414.07	98	30,414.07	98
FY15	28,454.69	103	28,454.69	103
FY16	22,765.53	148	23,257.46	151
FY17	26,044.91	126	18,038.25	85
TOTAL	**$ 124,405.75**	**548**	**$ 116,891.02**	**510**

STATUS REPORTS

SAFETY

	ADMIN	EL DIST	EL PROD	GWS	WA PROD	WWTP
MONTH						
Jan - 2017	2612.0	1286.0	1602.0	2857.0	1066.0	987.0
Feb - 2016	3588.0	1416.0	1838.8	3376.0	1248.0	1320.5
Mar - 2016	5275.0	2172.8	2606.0	5330.0	1995.5	2029.0
Apr - 2016	3553.8	1490.0	1772.0	3615.0	1359.0	1322.0
May - 2016	3656.5	1410.5	1675.0	3759.6	1395.5	1338.5
June - 2016	4122.0	1462.3	1606.1	3773.0	1422.5	1376.3
July - 2016	4122.0	1462.3	1606.1	3773.0	1422.5	1376.3
Aug - 2016	3599.0	1567.0	718.0	3730.0	987.0	1210.0
Sept - 2016	5389.0	2064.0	2472.0	5772.0	1722.0	1775.0
Oct - 2016	3724.0	1298.0	1604.0	3749.0	956.0	1348.0
Nov - 2016	3753.0	1329.0	1443.0	3574.0	1165.0	1248.0
Dec - 2016	3022.0	1435.0	1502.0	3390.0	1203.0	1081.0
	46416.3	18392.9	20445.0	46698.6	15942.0	16411.6
INJURIES	0	0	0	0	0	0
INC RATE	0	0	0	0	0	0
LOST/RSTR CASES	0	0	0	0	0	0
LOST/RSTR RATE	0	0	0	0	0	0

OSHA INCIDENT 2016 YEAR-END REPORT						
MONTH	**ADMIN**	**EL DIST**	**EL PROD**	**GWS**	**WA PROD**	**WWTP**
Jan - 2016	2874.0	1315.0	1520.0	3075.0	1068.0	1459.0
Feb - 2016	3588.0	1416.0	1838.8	3376.0	1248.0	1320.5
Mar - 2016	5275.0	2172.8	2606.0	5330.0	1995.5	2029.0
Apr - 2016	3553.8	1490.0	1772.0	3615.0	1359.0	1322.0
May - 2016	3656.5	1410.5	1675.0	3759.6	1395.5	1338.5
June - 2016	4122.0	1462.3	1606.1	3773.0	1422.5	1376.3
July - 2016	4122.0	1462.3	1606.1	3773.0	1422.5	1376.3
Aug - 2016	3599.0	1567.0	718.0	3730.0	987.0	1210.0
Sept - 2016	5389.0	2064.0	2472.0	5772.0	1722.0	1775.0
Oct - 2016	3724.0	1298.0	1604.0	3749.0	956.0	1348.0
Nov - 2016	3753.0	1329.0	1443.0	3574.0	1165.0	1248.0
Dec - 2016	3022.0	1435.0	1502.0	3390.0	1203.0	1081.0
	46678.3	18421.9	20363.0	46916.6	15944.0	16883.6
INJURIES	0	0	0	6	0	0
INC RATE	0.0	0.0	0	25.6	0.0	0.0
LOST/RSTR CASES	0	0	0	2	0	0
LOST/RSTR RATE	0.0	0	0	8.5	0	0.0
				UTILITIES WIDE FOR ALL DEPARTMENTS	7.3	
				BUREAU OF LABOR STATISTICS 2015 AVG FOR ALL UTILITIES	2.2	
				BUREAU OF LABOR STATISTICS 2015 AVG FOR GOV UTILITIES	6.2	
						YEAR-END 2015
				UTILITIES WIDE FOR ALL DEPARTMENTS	3.6	
				BUREAU OF LABOR STATISTICS 2014 AVG FOR ALL UTILITIES	2.4	
				BUREAU OF LABOR STATISTICS 2014 AVG FOR GOV UTILITIES	5.4	
INJURIES	0	1	0	0	0	2
INC RATE	0.0	11.1	0	0.0	0.0	22.0
LOST/RSTR CASES	0	0	0	0	0	1
LOST/RSTR RATE	0.0	0	0	0.0	0	11.0
						YEAR-END 2014
				UTILITIES WIDE FOR ALL DEPARTMENTS	3.5	
				BUREAU OF LABOR STATISTICS 2013 AVG FOR ALL UTILITIES	2.1	
				BUREAU OF LABOR STATISTICS 2013 AVG FOR GOV UTILITIES	6.3	
INJURIES	1	0	0	0	2	0
INC RATE	3.7	0	0	0.0	22.0	0.0
LOST/RSTR CASES	0	0	0	0	0	0
LOST/RSTR RATE	0	0	0	0.0	0	0.0



RATE = $\frac{\text{\# INJURIES} \quad * \ 200{,}000}{\text{HOURS WORKED}}$

YEAR	2012	2013	2014	2015	2016	2017	2018		5 YEAR
LAC UTILITIES	7.1	10.5	3.5	3.6	7.3			6.4	AVG
GOV UTILITIES ONLY*	6.2	5.8	6.3	5.4	6.2			6.0	AVG
ALL UTILITIES*	3.5	2.8	2.1	2.4	2.2			2.6	AVG

* Comparative Data From Bureau of Labor Statistics https://www.bls.gov/iif/