Recommended Alternative for Long-Term Water Supply Williams Acres Water and Sanitation District

Prepared for Northwest New Mexico Council of Governments
Gallup, New Mexico

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Daniel B. Stephens & Associates, Inc.

6020 Academy NE, Suite 100 • Albuquerque, New Mexico 87109

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Recommended Alternative for Long-Term Water Supply
Williams Acres Water and Sanitation District

1. Background and Overview

This document summarizes the recommendations for providing long-term public water service to the Williams Acres Water and Sanitation District (Williams Acres) in McKinley County, New Mexico (Figure 1). Water service for a number of existing or potential small rural water systems in McKinley County was examined in the report *McKinley County Small Rural Water Systems Appraisal Level Investigation*, prepared by Daniel B. Stephens & Associates, Inc. (DBS&A) in partnership with DePauli Engineering and Surveying Co. The report was published June 9, 2015. The Appraisal Level Investigation was prepared for McKinley County, through the Northwest New Mexico Council of Governments (NWNMCOG) pursuant to the Reclamation Rural Water Supply Act of 2006 (43 USC §§ 2401-2409 (Supp. 2011)) and appraisal criteria included in the U.S. Bureau of Reclamation's (USBR's) Rural Water Supply Program interim final rule (43 CFR Part 404).

2. Existing Conditions

The Williams Acres Water and Sanitation District was established in 1975 and encompasses the service area for several water systems just west of Gallup's municipal boundary (Figure 1). The District currently offers no water supply services, but does provide wastewater treatment. The seven water systems within the Water and Sanitation District include the following:

- Block A Well Co-op
- Caviggia's Trailer Park
- Cedar Ridge Trailer Park
- Manuelito Navajo Children's Home
- Rob Roy Trailer Park
- Sagebrush Water Co-op
- St. Williams Mobile Home Park

S:\PROJECTS\WR12.0084_MCKINLEY_COUNTY\GIS\MXDS\APPRAISAL_REPORT\FIG01_WATER_SYSTEMS.MXD

System	Number of Connections	
	2012	2060
Allison	31	38
Catalpa	97	120
Cipriano Lewis	27	33
Crestview	93	115
Coal Basin	34	42
Gamerco WSD	484	598
Twin Buttes	57	70
White Cliffs	48	59
Williams Acres	180	223
Yah ta hey	125	155
	1,176	1,453

Explanation

Catalpa Proposed water lines

Gamerco Existing water lines

Proposed water line

Existing water line

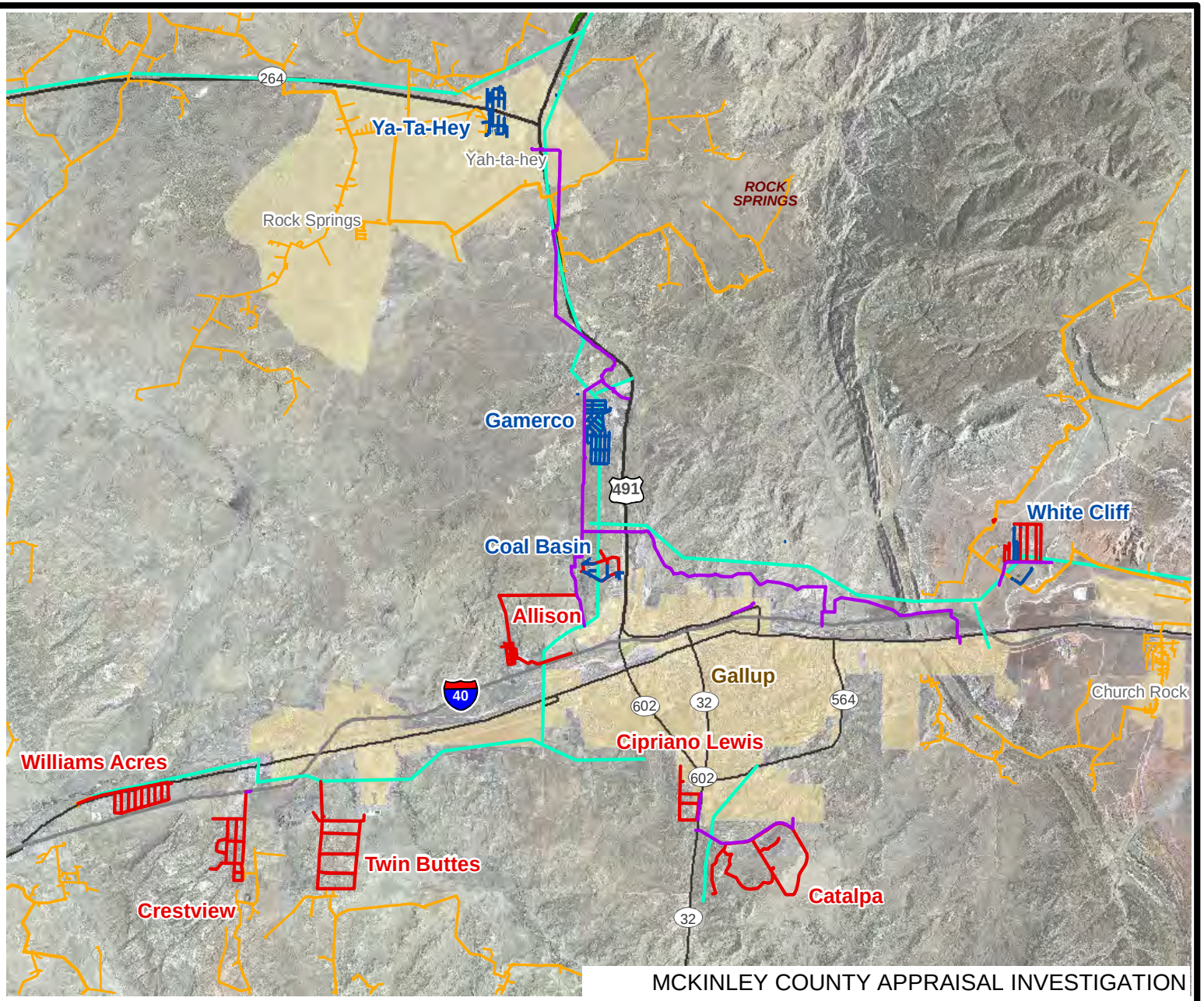
San Juan Lateral

Navajo Tribal Utility Authority pressurized main

Navajo Gallup Water Supply Pipeline water line

N

0 1 2 Miles



MCKINLEY COUNTY APPRAISAL INVESTIGATION

McKinley County Rural Water Systems and Navajo Gallup Water Supply Project

Figure 1

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4/21/2015

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3. Alternatives Examined

Three alternatives were examined for sustainable domestic water service to homes in Williams Acres: (1) No Action (Groundwater), (2) Connection to the Navajo Gallup Regional Water Supply Project (NGWSP) with a Master Meter, and (3) Connection to the NGWSP with individual meters.

To evaluate future infrastructure needs, population and water demand projections for the year 2060 were calculated. It is estimated that in 2060 Williams Acres will include 223 households—43 more than the current number of households—and will have an average demand of 44,241 gallons per day (gpd), or 49.6 acre-feet per year (ac-ft/yr).

The alternatives for William Acres will combine several independent water systems through a combination of 10-inch and 8-inch C-900 polyvinyl chloride (PVC) water line.

3.1 No Action Alternative

The storage tank and well for the no action alternative are proposed to be installed in the southeast corner of the system. The well would be completed to a depth of 1,800 feet with a 15-horsepower pump supplying 40 gallons per minute (gpm). The storage tank would have a capacity of 210,000 gallons. The buried 10-inch lines would total about 9,600 feet, and the 8-inch lines would total 11,100 feet. A total of 27 fire hydrants and 22 isolation valves would also be installed.

3.2 Connection with Master Meter Alternative

The two connection alternatives are proposed to include the infrastructure to supply water to all the homes in the service area and tap into the Navajo Tribal Utility Authority (NTUA) transmission line west of the community. For the master meter alternative, an 8-inch flow meter and vault would be installed at that location. The buried 10-inch lines would total about 9,600 feet, and the 8-inch lines 13,700 feet. A total of 27 fire hydrants and 27 isolation valves would also be installed.

3.3 Connection with Individual Meters Alternative

Similar to the connection with master meter alternative, the connection with individual meters alternative is proposed to tap into the NTUA transmission line west of the community; it would include the infrastructure to supply water to all the homes in the service area. The buried 10-inch lines would total about 9,600 feet, and the 8-inch lines would total 13,700 feet. A total of 27 fire hydrants and 22 isolation valves would also be installed.

4. Recommended Project

The alternatives described in Section 3 were scored based on performance goals that were associated with performance measures and attributes. Scores were assigned from 1 to 100, and criteria were weighted from 1 to 5. The scores for Williams Acres alternatives are provided in Appendix A and summarized in Table 1. Based on the scoring, the connection alternative with individual meters is the preferred alternative, as shown in Figure 2.

Table 1. Alternative Scores

Alternative	Score
No action (groundwater)	1,480
Connection with master meter	2,310
Connection with individual meters	2,750

5. Costs

The estimated capital cost of the preferred alternative is $2,055,000. The annual household water cost (which would be billed to households by the City of Gallup) is $414. The operating and maintenance costs have not been calculated, as they are included in the rates the utility company would charge to the individual customers. The detailed capital cost estimate is provided as Appendix B.

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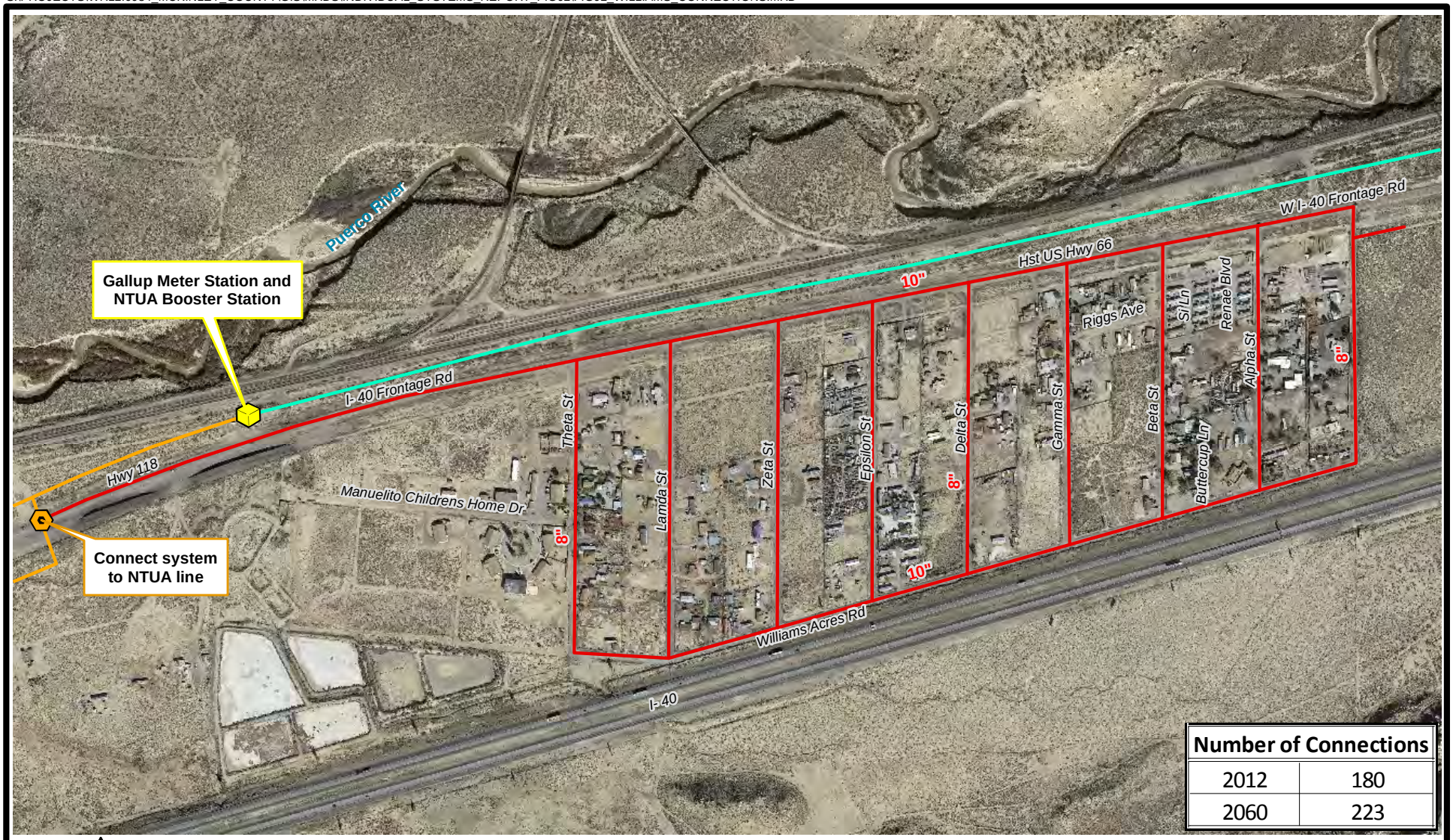

Number of Connections	
2012	180
2060	223

October 2012 aerial photograph from Google Earth

N

0 250 500 Feet

Explanation

- Proposed water system (23,300 ft total pipe length)
- Navajo Gallup Water Supply Pipeline water line (Reach 27.1)
- Navajo Tribal Utility Authority water line
- Booster station
- Tie-in

Figure 2

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6/22/2015
JN WR12.0084

MCKINLEY COUNTY APPRAISAL INVESTIGATION

Williams Acres Proposed Water System Preferred Alternative

6. Permitting and Environmental Compliance

6.1 Biological Setting

The Southwest Regional Gap Analysis Project (SWReGAP) maps the Williams Acres area as developed (medium-high intensity), inter-mountain basins big sagebrush shrubland, inter-mountain basins greasewood flat, inter-mountain basins mixed salt desert scrub, and inter-mountain basins semi-desert grassland. These vegetation categories (termed "ecological systems"), together with typical wildlife of McKinley County, are described in Appendix C.

6.2 Special-Status Species

Federally listed endangered and threatened plant and animal species receive protection under the Endangered Species Act (ESA) of 1973. In McKinley County the black-footed ferret (*Mustela nigripes)*, the southwestern willow flycatcher (*Empidonax traillii extimus*), the least tern (*Sternula antillarum athalassos*), and the Zuni bluehead sucker (*Catostomus discobolus yarrowi*) are all listed as endangered, and the Mexican spotted owl (*Strix occidentalis lucida*), yellow-billed cuckoo (*Coccyzus americanus*), and Zuni fleabane (*Erigeron rhizomatus*) are listed as threatened.

Some of the above species, along with others, also receive protection under New Mexico's Wildlife Conservation Act [17-2-37 to 17-2-46 NMSA 1978] or at the Navajo Nation level. All of these species, including the bald eagle (*Haliaeetus leucocephalus*), peregrine falcon (*Falco peregrinus*), Costa's hummingbird (*Calypte costae*), and gray vireo (*Vireo vicinior*) must be considered for planning purposes.

6.3 Permitting and Compliance

Prior to construction of the preferred alternative, the contractor would be required to address applicable state and federal requirements for construction, including right-of-way for water lines. Additionally, this project falls within the project area of the NGWSP. Key requirements for that project are included here for reference. The *Record of Decision for the Navajo-Gallup Water Supply Project Planning Report and Final Environmental Impact Statement* (USBR, 2009)

indicates steps needed for meeting all environmental compliance regarding final designs. Construction of water lines is expected to create temporary turbidity and other water quality concerns, and USBR is tasked with obtaining required permits under Section 404 of the Clean Water Act (CWA) for impacts associated with jurisdictional waters of the United States. Nationwide permits authorization under Nationwide Permits (NWPs) No. 12 (Utility Line Activities) will be requested for temporary construction disturbances to perennial and intermittent stream pipeline crossings. Compliance with General Condition 18, Endangered Species, is required for all NWPs.

The New Mexico Wildlife Conservation Act (WCA) (NMSA 17-2-37) authorizes the New Mexico Department of Game and Fish to create a list of endangered or threatened wildlife within the state, and to take steps to protect and restore populations of species on the list. Actions causing the death of a state listed endangered animal are in violation of the WCA. For all of these reasons, in addition to other federal and state regulations and guidelines, the planning phase for any proposed new water line should include a biological survey with the following objectives:

- Determination of the ordinary high water mark at each stream crossing, in order to determine disturbance acreages for jurisdictional waters
- Wetland delineations, as needed
- Identification of noxious weeds along the route of the proposed water line
- Assessment of habitat for federal and state threatened and endangered species, as well as any additional species listed by the Navajo Nation, as needed

The Migratory Bird Treaty Act makes it unlawful to hunt, take, capture, kill, possess, import, or export any migratory birds, their nests, and eggs. Construction of the new water line should therefore occur outside the nesting season or be preceded by nest surveys to locate and protect any active nest at risk from construction activities.

Archaeological surveys are also needed along the route of the proposed new water line to avoid or mitigate losses of cultural resources that could be affected by the construction and operation

of the water line. Native American human remains, funerary objects, or objects of cultural patrimony may also be encountered during the construction of new water lines of the NGWSP. Therefore, prior to issuing any approvals or permits for activities related to the NGWSP, USBR is tasked with not just the implementation of a program to avoid and mitigate the loss of cultural resources, but also full compliance with the relevant sections of the Native American Graves Protection and Repatriation Act (NAGPRA) and 43 CFR 10.3 (USBR, 2009).

References

U.S. Bureau of Reclamation (USBR). 2009. Planning report and final environmental impact statement, Navajo-Gallup Water Supply Project New Mexico – Arizona. July 2009. Available at <http://www.usbr.gov/uc/envdocs/eis/navgallup/FEIS/index.html>.

Appendix A

Alternative Scoring

Alternative Evaluation

Name of System: **Williams Acres**

Alternative:

No Connection Alternative: Drill New or Supplemental well with service from small system	X
Connection with master meter to Gallup or NTUA (Water system still responsible for service)	
Connection to Gallup or NTUA, who provides service to individual customers (water system no longer in place)	

Goals	Performance Measures/Attributes	Score (0–100)	Criteria Weight	Evaluation Total
Long-term sustainable supply	Renewable water supply	35	4	140
Implementable	Project complexity	40	3	120
	Water right acquisition or transfer	10	4	40
Cost	Projected capital and O&M costs	40	4	160
Local environmental and health and safety benefits	Environmental considerations	50	4	200
	Health, safety, and welfare	60	4	240
	Watershed and regional approach	20	4	80
Community preference	Reliability of service	60	5	300
	Complexity of managerial and operations and maintenance requirements for systems and communities	50	4	200
			Total	**1480**

Alternative Evaluation

Name of System: **Williams Acres**

Alternative:

No Connection Alternative: Drill New or Supplemental well with service from small system	
Connection with master meter to Gallup or NTUA (Water system still responsible for service)	X
Connection to Gallup or NTUA, who provides service to individual customers (water system no longer in place)	

Goals	Performance Measures/Attributes	Score (0–100)	Criteria Weight	Evaluation Total
Long-term sustainable supply	Renewable water supply	70	4	280
Implementable	Project complexity	70	3	210
	Water right acquisition or transfer	50	4	200
Cost	Projected capital and O&M costs	50	4	200
Local environmental and health and safety benefits	Environmental considerations	60	4	240
	Health, safety, and welfare	70	4	280
	Watershed and regional approach	90	4	360
Community preference	Reliability of service	60	5	300
	Complexity of managerial and operations and maintenance requirements for systems and communities	60	4	240
			Total	**2310**

Alternative Evaluation

Name of System: **Williams Acres**

Alternative:

No Connection Alternative: Drill New or Supplemental well with service from small system	
Connection with master meter to Gallup or NTUA (Water system still responsible for service)	
Connection to Gallup or NTUA, who provides service to individual customers (water system no longer in place)	**X**

Goals	Performance Measures/Attributes	Score (0–100)	Criteria Weight	Evaluation Total
Long-term sustainable supply	Renewable water supply	70	4	280
Implementable	Project complexity	70	3	210
	Water right acquisition or transfer	95	4	380
Cost	Projected capital and O&M costs	60	4	240
Local environmental and health and safety benefits	Environmental considerations	60	4	240
	Health, safety, and welfare	70	4	280
	Watershed and regional approach	90	4	360
Community preference	Reliability of service	80	5	400
	Complexity of managerial and operations and maintenance requirements for systems and communities	90	4	360
			Total	**2750**

Appendix B

Preliminary Cost Estimate for Preferred Alternative

COST ESTIMATE SUMMARY

FEATURE:	Williams Acres - Connection alternative - Connect to NTUA and individual meters	**PROJECT:**	**McKinley County Regionalizaton Planning**
		WOID:	**ESTIMATE LEVEL: Appraisal**
		REGION:	**UNIT PRICE LEVEL: October 1, 2013**
		FILE:	**S:\Projects\WR12.0084_McKinley_County\Engineering\Cost Estimates\Cost Estimate- Improvements.xlsx**

PAY ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	AMOUNT
1	Waterline (8")	13,700	LF	$ 22.24	$ 304,688
2	Waterline (10")	9,600	LF	$ 26.66	$ 255,936
3	Fittings	$ 304,688	%	15%	$ 45,703
4	Fire hydrants	27	EA	$ 3,500.00	$ 95,900
5	Water valves (8")	27	EA	$ 875.06	$ 23,977
6	Service connections, incl. tap	223	EA	$ 1,750.00	$ 389,441
7	Storage tank	0	GAL	$ 1.50	$ -
8	Tie-in 18"	1	EA	$ 3,800	$ 3,800
					$ -
					$ -
					$ -
					$ -
					$ -
					$ -
					$ -
					$ -
				SUBTOTAL	$ 1,119,445
	Contractor Overhead and Administration Costs	12.1%	(%)	$ 1,119,445	$ 135,117
	SUBTOTAL CONSTRUCTION				$ 1,254,562
	Design Contingency	10.0%	(%)	$ 1,254,562	$ 125,456
	SUBTOTAL WITH DESIGN CONTINGENCY				$ 1,380,019
	Engineering Design	12.0%	(%)	$ 1,380,019	$ 165,602
	QA/QC	6.0%	(%)	$ 1,380,019	$ 82,801
	Construction Administration	6.0%	(%)	$ 1,380,019	$ 82,801
	Environmental Assessment	4.0%	(%)	$ 1,380,019	$ 55,201
	Archaeological Survey	4.0%	(%)	$ 1,380,019	$ 55,201
	Biological Survey	4.0%	(%)	$ 1,380,019	$ 55,201
	SUBTOTAL, PROFESSIONAL SERVICES				$ 496,807
		SUBTOTAL, CAPITAL COSTS			*$ 1,751,369*
	Tax	8.3125%	(%)	$ 1,751,369	$ 145,583
	Contingency, % of capital costs	9%	(%)	$ 1,751,369	$ 157,623
	TOTAL CAPITAL COST				**$ 2,054,575**

QUANTITIES		**PRICES**	
BY:	M. Anderson	**BY:**	M. Anderson
DATE:		**DATE:**	
CHECKED:		**CHECKED:**	
DATE:		**DATE:**	

Appendix C

Vegetation and Wildlife

Appendix C. Vegetation and Wildlife

C.1 Vegetation

The Southwest Regional Gap Analysis Project (SWReGAP) maps the Williams Acres area as developed (medium-high intensity), inter-mountain basins big sagebrush shrubland, inter-mountain basins greasewood flat, inter-mountain basins mixed salt desert scrub, and inter-mountain basins semi-desert grassland. These vegetation categories (termed "ecological systems") are described in the following subsections.

C.1.1 Developed, Medium-High Intensity

Includes areas with a mixture of constructed materials and vegetation. Impervious surface accounts for 50 to 79 percent of the total cover. These areas most commonly include single-family housing units.

C.1.2 Inter-Mountain Basins Big Sagebrush Shrubland

This ecological system occurs throughout much of the western United States, typically in broad basins between mountain ranges, plains and foothills between 1,500 and 2,300 meters in elevation. Soils are typically deep, well-drained and non-saline. These shrublands are dominated by *Artemisia tridentata* ssp. *tridentata* and/or *Artemisia tridentata* ssp. *wyomingensis*. Scattered *Sarcobatus vermiculatus* and *Atriplex* spp. may be present in some stands. *Ericameria nauseosa* or *Chrysothamnus viscidiflorus* may co-dominate disturbed stands. Perennial herbaceous components typically contribute less than 25 percent vegetative cover. Common graminoid species include *Achnatherum hymenoides, Bouteloua gracilis, Elymus lanceolatus, Festuca idahoensis, Hesperostipa comata, Leymus cinereus, Pleuraphis jamesii, Pascopyrum smithii, Poa secunda*, or *Pseudoroegneria spicata*.

C.1.3 Inter-Mountain Basins Greasewood Flat

This ecological system occurs in intermountain basins throughout much of the western United States and extends onto the western Great Plains. It typically occurs near drainages on stream terraces and flats or may form rings around more sparsely vegetated playas. Sites typically have saline soils and a shallow water table and flood intermittently, but remain dry for most growing seasons. The water table remains high enough to maintain vegetation, despite salt accumulations. This system usually occurs as a mosaic of multiple communities, with open to moderately dense shrublands dominated or co-dominated by greasewood (*Sarcobatus vermiculatus*). Fourwing saltbush (*Atriplex canescens*), shadscale saltbush (*Atriplex confertifolia*), or winterfat (*Krascheninnikovia lanata*) may be present to co-dominant. Occurrences are often surrounded by mixed salt desert scrub. The herbaceous layer, if present, is usually dominated by graminoids. There may be inclusions of alkali sacaton (*Sporobolus airoides*), saltgrass (*Distichlis spicata*) (where water remains ponded the longest), or common spikerush (*Eleocharis palustris*) herbaceous types.

C.1.4 Inter-Mountain Basins Mixed Salt Desert Scrub

This extensive ecological system includes open-canopied shrublands of typically saline desert basins, alluvial slopes, and plains across the Intermountain western United States. This type also extends in limited distribution into the southern Great Plains. Substrates are often saline and calcareous, medium- to fine-textured, alkaline soils, but include some coarser-textured soils. The vegetation is characterized by a typically open to moderately dense shrubland composed of one or more Atriplex species such as *Atriplex confertifolia*, *Atriplex canescens*, *Atriplex polycarpa*, or *Atriplex spinifera*. Other shrubs present to co-dominant may include *Artemisia tridentata* ssp. *wyomingensis*, *Chrysothamnus viscidiflorus*, *Ericameria nauseosa*, *Ephedra nevadensis*, *Grayia spinosa*, *Krascheninnikovia lanata*, *Lycium* spp., *Picrothamnus desertorum*, or *Tetradymia* spp. *Sarcobatus vermiculatus* is generally absent, but if present does not co-dominate. The herbaceous layer varies from sparse to moderately dense and is dominated by perennial graminoids such as *Achnatherum hymenoides*, *Bouteloua gracilis*, *Elymus lanceolatus* ssp. *lanceolatus*, *Pascopyrum smithii*, *Pleuraphis jamesii*, *Pleuraphis rigida*, *Poa secunda*, or *Sporobolus airoides*. Various forbs are also present.

C.1.5 Inter-Mountain Basins Semi-Desert Grassland

This widespread ecological system occurs throughout the Intermountain western United States on dry plains and mesas, at approximately 1,450 to 2,320 meters (4,750 to 7,610 feet) in elevation. These grasslands occur in lowland and upland areas and may occupy swales, playas, mesa tops, plateau parks, alluvial flats, and plains, but sites are typically xeric. Substrates are often well-drained sandy- or loamy-textured soils derived from sedimentary parent materials, but are quite variable and may include fine-textured soils derived from igneous and metamorphic rocks. When they occur near foothills grasslands they will be at lower elevations. The dominant perennial bunch grasses and shrubs within this system are all very drought-resistant plants. These grasslands are typically dominated or co-dominated by *Achnatherum hymenoides, Aristida* spp., *Bouteloua gracilis, Hesperostipa comata, Muhlenbergia torreyana*, or *Pleuraphis jamesii*, and may include scattered shrubs and dwarf-shrubs of species of *Artemisia, Atriplex, Coleogyne, Ephedra, Gutierrezia*, or *Krascheninnikovia lanata*.

C.2 Wildlife

Mammals occurring in McKinley County and in the Great Basin Conifer Woodland biotic community (Brown and Lowe, 1977; Brown, 1982) typically include small mammals such as squirrels, mice, gophers, rats, rabbits, badgers, raccoon, and skunks, as well as larger mammals such as gray, kit, and red foxes (*Urocyon cinereoargenteus*, *Vulpes macrotis*, *V. vulpes*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and mule deer (*Odocoileus hemionus*).

Resident and migratory birds expected in the area include western kingbird (*Tyrannus verticalis*), northern mockingbird (*Mimus polyglottos*), broad-tailed and rufous hummingbirds (*Selasphorus platycercus, S. rufus*), black-chinned hummingbird (*Archilochus alexandri*), redheaded woodpecker (*Melanerpes erythrocephalus*), northern flicker (*Colaptes auratus*), dark-eyed junco (*Junco hyemalis*), red-breasted, white-breasted, and pygmy nuthatches (*Sitta canadensis*, *S. carolinensis*, *S. pygmaea*), western meadowlark (*Sturnella neglecta*), pinyon jay (*Gymnorhinus cyanocephalus*), common raven (*Corvus corax*), great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), American kestrel (*Falco sparverius*), northern

harrier (*Circus cyaneus*), turkey vulture (*Cathartes aura*), several species of warblers, vireos, wrens, swallows, and sparrows, and numerous others.

References

Brown, D. E. 1982. *Desert plants: Biotic communities of the American Southwest-United States and Mexico.* University of Arizona, Superior, Arizona.

Brown, D.E., and C.H. Lowe. 1977. *Biotic communities of the Southwest map.* USDA Forest Service, Ft. Collins, Colorado.