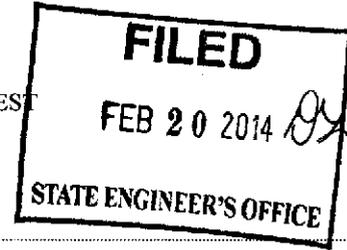


IN THE OFFICE OF THE STATE ENGINEER OF THE STATE OF NEVADA

IN THE MATTER OF APPLICATION NUMBER 83257  
FILED BY U.S. PROPERTY CORPORATION, LLC  
ON NOVEMBER 20, 20 13

PROTEST



Comes now PAHRUMP UTILITY COMPANY, INC.

Printed or typed name of protestant

whose post office address is 5250 HAFEN RANCH ROAD, PAHRUMP, NV 89061

Street No. or PO Box, City, State and ZIP Code

whose occupation is PUBLIC UTILITY

and protests the granting

of Application Number 83257

, filed on NOVEMBER 20

, 20 13

by U.S. PROPERTY CORPORATION, LLC

for the

waters of UNDERGROUND

situated in NYE

an underground source or name of stream, lake, spring or other source

County, State of Nevada, for the following reasons and on the following grounds, to wit:

SEE ATTACHED EXHIBIT "A".

RECEIVED  
2014 FEB 20 PM 3:50  
STATE ENGINEERS OFFICE

THEREFORE the Protestant requests that the application be

DENIED

Denied, issued subject to prior rights, etc., as the case may be

and that an order be entered for such relief as the State Engineer deems just and proper.

Signed

Agent or protestant

GREGORY T. HAFEN, II, MANAGER

Printed or typed name, if agent

Address

5250 HAFEN RANCH ROAD

Street No. or PO Box

PAHRUMP, NV 89061

City, State and ZIP Code

State of Nevada

County of NYE

Subscribed and sworn to before me on February 19, 2014

(775) 727-1629

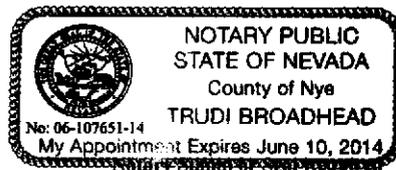
Phone Number

by Gregory T Hafen II

gth2@pucihafen.com

E-mail

Trudi Broadhead  
Signature of Notary Public Required



+ \$30 FILING FEE MUST ACCOMPANY PROTEST. PROTEST MUST BE FILED IN DUPLICATE.  
ALL COPIES MUST CONTAIN ORIGINAL SIGNATURE.

**EXHIBIT "A"**

*Pahrump Utility Company, Inc.*  
5250 Hafen Ranch Rd.  
Pahrump, NV 89061  
Phone (775) 727-1629 Fax (775) 727-9666

---

February 17, 2014

**Via Hand Deliver**

Jason King, Deputy State Engineer  
Department of Conservation & Natural Resources  
Division of Water Resources  
901 S. Stewart Street, Suite 2002  
Carson City, NV 89701

**RE: Applications 83257, 83258 and 83259 filed by U.S. Property Corporation, LLC**

Dear Mr. King:

Pahrump Utility Company, Inc., (PUCI), is writing this letter to you, the Nevada Department of Water Resources, Office of the State Engineer (NDWR-SE), requesting that you deny Applications 83257, 83258 and 83259 which essentially request new appropriations on the Manse Fan. Before issuing the requested change in the Point of Diversion, Place and Manner of Use under Applications 83257, 83258 and 83259 on the Manse fan sub-basin appurtenant to APN: 045-101-05, filed by U.S. Property Corporation, LLC (U.S. Property), the NDWR-SE should hold hearings and take evidence on whether the change in Point of Diversion, Place and Manner of Use from the Pahrump fan sub-basin to the Manse fan sub-basin will negatively impact PUCI's ability to serve its customers and negatively impact PUCI's currently existing wells on the floor of the Manse fan sub-basin which are being used to serve existing customers.

PUCI is a public utility regulated by the Public Utilities Commission of Nevada authorized to provide water service to its customers located in its service area. As a regulated public utility, PUCI "shall render reasonably and continuous and adequate service to the public within its service area and in pursuance of the authority granted" under its Certificates of Public Convenience and Necessity issued by the Public Utilities Commission of Nevada. PUCI provides water service to its customers under Permits/Certificates 65105, 65106, 65725, 68495, 69248, 69249, 69694, 70408, 70873, 71224, 72108, 73527, 73528, 73553, 73839, 73840, 74029, 74030, 74517, 74931, 74932, 74933, 75294, 75295, 75696, 75846, 76106, 77990, 77991, 80281, 80282, 80283, 80284, 80285, 80286, 80287, 80288, 80289, 80290, 80291, 80292, 80293, 80294, 80316, & 83019 issued by the NDWR-SE. PUCI provides water service to 461 metered customers, which include 455 residential customers, two commercial customers (Artesia Clubhouse and LDS Church), two elementary schools, and three landscape irrigation customers (Artesia HOA, Burson HOA, and Pleasant Valley

HOA). The equivalent dwelling unit (EDU) for these customers is 762. When it is fully built out, the service territory as defined today based on annexations and development agreements could potentially contain 12,197 water EDUs.

PUCI is filing protests to Change Applications 83257, 83258 and 83259 on the basis that granting the requested change in Point of Diversion, Place and Manner of Use will have a direct and detrimental impact on all of the floor wells owned by PUCI and used to serve its customer base. The protest is also based on the fact that PUCI owns several less senior water rights from wells which are located to the west and down gradient of the proposed U.S. Property well locations. Applications 83257, 83258 and 83259 seek a change in the Point of Diversion, Place and Manner of Use of water rights owned by U.S. Property that currently have points of diversions in the north end of the Pahrump Valley. The base water rights that are the subject of these change applications are currently located on the Pahrump fan sub-basin and the request is to move them to the Manse fan sub-basin located in the south end of the Pahrump Valley. The Pahrump fan and Manse fan are separate sub-basins of the Pahrump Valley Hydrographic Basin and have been identified as such by NDWR-SE in the past.

NDWR-SE should require evidence, including hydrogeological data, demonstrating whether the proposed locations of the wells will have a negative impact on or conflict with currently existing appropriated water rights and the wells of PUCI that are utilized to pump those existing water rights. No permits should be issued until the protests have been ruled upon by the NWDR-SE. This is particularly true when there is no emergency basis or good cause for issuing an irrigation permit in the proposed location. PUCI is informed and believes based upon the records of Nye County (see attached Nye County GIS map and Agriculture Zoning Matrix) that the current zoning of all or most of the proposed place of use does not allow agriculture.

The proposed location of the well will impact PUCI's wells, which are necessary to serve PUCI's existing and future customers. The impact on PUCI's wells can be demonstrated by the historical data available. Data shown in the Nye County Water District Water Supply Appraisal Investigation Report suggests that water levels of floor wells to the west of the proposed U.S. Property well location have been steadily decreasing over the past years. A copy of this report is attached. The proposed location of the U.S. Property proposed well is surrounded by PUCI's service area. It is directly west of PUCI's wells known as 3 and 3b and east of PUCI's Pleasant Valley wells 1 and 2. Allowing the proposed well and transfer of water rights from the Pahrump sub-basin to the Manse fan sub-basin could significantly decrease water production and impair PUCI's ability to serve its customers. If the U.S. Property Change Applications are approved, PUCI would request monitoring and mitigation measures and conditions for future unknown impacts to its production wells in the area. Ruling #5641 was issued by the NDWR office establishing a precedent for this in the area when the projected impacts to an existing domestic well were determined by the NDWR-SE to be minimal.

PUCI is also concerned that U.S. Property's water rights under these Change Applications have earlier priority dates than many of the water rights owned by PUCI. In severe drought

and water use restriction conditions, PUCI is concerned that it could lose its ability to serve all of its customers if the priority dates are not subordinated to those already existing in the Manse fan sub-basin.

Attached is a copy of the Manse fan sub-basis study prepared by Lumos & Associates, Inc. that was previously provided to your office in 2006. This study, as well as other criteria, support the treatment of the Manse fan as a separate sub-basin from the Pahrump fan. The report establishes that the Manse fan sub-basin is over appropriated and that the existing wells can pump more than the perennial yield of the sub-basin causing a decrease in water levels. See also, Rulings 3253 and 3519 which denied applications to change points of diversion for irrigation rights to the Pahrump fan on the grounds that change applications would constitute an additional appropriation of groundwater from the Pahrump Fan area, thus causing an increase in the overdrafts and thereby adversely affecting existing water rights.

PUCI requests that you deny the applications or at least delay approving any movement of water rights into the Manse fan sub-basin until the effects of the existing dedication requirements, effects of existing rapid infiltration basins, conservation, retirement, forfeiture and other measures are analyzed to show whether the Manse fan sub-basin could support additional water rights. PUCI is working with other parties that also want to move additional water rights into the Manse fan sub-basin to develop an analysis to determine if additional water rights in the Manse fan sub-basin could be accommodated.

Sincerely,

PAHRUMP UTILITY COMPANY, INC.



Gregory T. Hafen II,  
*Manager*

**NYE COUNTY GIS MAP AND  
AGRICULTURE ZONING MATRIX**





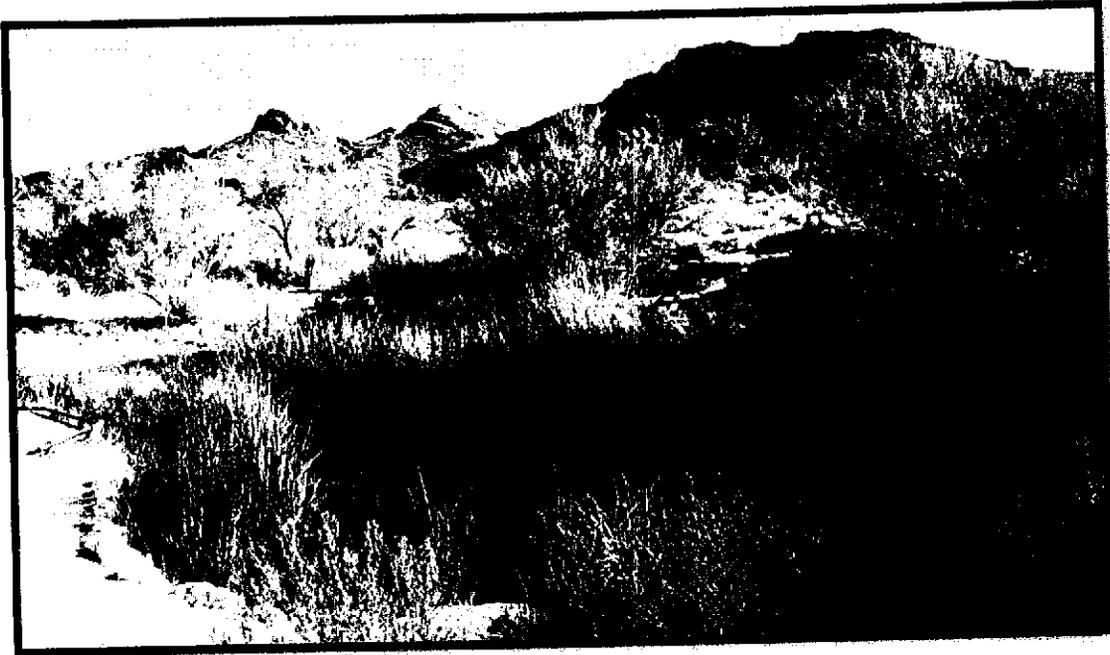


**NYE COUNTY WATER DISTRICT  
WATER SUPPLY APPRAISAL  
INVESTIGATION REPORT**

**Dated September 9, 2013**

# Nye County Water District

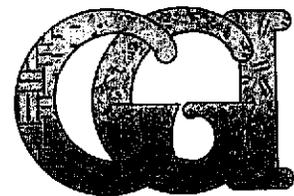
## Water Supply Appraisal Investigation Report



Prepared for Nye County Water District by:

Glorieta Geoscience, Inc.  
Meghan Hodgins  
Elke Naumburg, Ph.D.  
Jim Riesterer, P.G.  
BEC Environmental, Inc.

September 9, 2013



**Table of Contents**

Introduction ..... 1  
 Background ..... 2  
 U.S. Bureau of Reclamation Grant ..... 2  
 Investigation Objectives and Scope ..... 4  
 Statement of Problems, Needs and Opportunities ..... 4  
 Water Supply Issues ..... 8  
 Population Projections ..... 8  
 Business and Industry Projections ..... 9  
 Water Quantity ..... 9  
 Water Rights ..... 13  
 Water Demand ..... 13  
 Water Quality Issues ..... 17  
 Management Strategies for Sustainable Water Demand/Development ..... 20  
 Voluntary Programs ..... 20  
 Programs in Conjunction with NDWR ..... 21  
 Community and Basin Evaluations ..... 22  
 Pahrump Basin (Hydrographic Basin 162) ..... 22  
 Resources ..... 41  
 Water Rights versus Perennial Yield – Pahrump Basin ..... 41  
 Water Supply Needs - Pahrump ..... 41  
 Plan Formulation and Alternative Analysis ..... 44  
 No Action Alternative ..... 44  
 Viable Alternatives ..... 46  
 Proposed Alternatives ..... 67  
 Conclusions ..... 68  
 Recommendations ..... 68  
 References ..... 69

**List of Tables**

Table 1. Hydrographic Basins in Nye County Studied in the WSAI ..... 5  
 Table 2. Nye County's Hydrographic Regions [1], Basins and Sub-Basins ..... 10  
 Table 3. 2010 Per Capita Water Use Estimates for Water Systems in Nye County ..... 14  
 Table 4. Projected total ground water use in Pahrump Basin ..... 17  
 Table 5. Nye County community utility systems monitored by NDEP ..... 18  
 Table 6. Sample analysis results for Pahrump community water systems at the entry point of the distribution system as reported by the Nevada Division of Environmental Protection Bureau of Safe Drinking Water ..... 23

Table 7. Minor deficiencies found during NDEP sanitary surveys for Pahrump community water systems ..... 28

Table 8. Water supply for Pahrump Valley (Hydrographic Basin Number 162) ..... 30

Table 9. Population served and water rights associated with the Pahrump community water systems. 32

Table 10. Total Water Usage in Pahrump (in AFY) at Different Population and Gallons Per Capita per Day Rates (Kuver, 2012)..... 39

Table 11. Water supply need versus perennial yield - Pahrump ..... 41

Table 12. Alternatives ..... 44

Table 13. Project Cost Estimate for 5000 AFA Water Importation Project ..... 56

Table 14. Aquifer Storage and Recovery Project Cost Estimate ..... 67

**List of Figures**

Figure 1. Nye County, Nevada..... 3

Figure 2. Hydrographic Basins in Nye County Studied in WSAI ..... 7

Figure 3. Graph of Historic and Projected Population for Nye County..... 9

Figure 4. Hydrographic Basins (Areas) in Nye County..... 15

Figure 5. Graph of projected domestic water use for Nye County and Pahrump. .... 16

Figure 6. Graph of projected total ground water use for the Pahrump Basin..... 17

Figure 7. Community Water Systems located within Pahrump Valley Hydrographic Basin. .... 27

Figure 8. Map showing the number of wells per section in the Pahrump Basin, water utilities service area, and contours of water level changes from 2006 to 2011..... 49

Figure 9. Proposed ASR Infrastructure and Domestic Well Density, Pahrump Valley, Nevada..... 61

**List of Appendices**

- Appendix A: Report Summaries for informational and referenced reports used in appraisal investigation report (Includes CD with electronic copies of reports)
- Appendix B: Community and Basin Evaluation details and Water System Data Sheets
- Appendix C: Residential and Vacant Parcels in Pahrump Valley (Kuver, 2011) and Pahrump Regional Planning District Water Conservation Standards (Nye County Code Title 17.04.740)
- Appendix D: Funding Sources for Water System Improvements
- Appendix E: Water rights definitions
- Appendix F: Cost estimates for water importation alternative
- Appendix G: Population and Business and Industry Projections

## Introduction

The Nye County Water District (NCWD) was formed in 2007 by approval of the Nevada Legislature to direct development of sustainable sources of water in Nye County. The NCWD Governing Board is authorized to levy and collect certain taxes; to incur indebtedness and issue bonds; to acquire land, water rights and property; and to construct any works for the development, importation or distribution of water in the District. The NCWD service area includes all real property with the boundaries of Nye County, Nevada (NCWD website, 2012).

The Nye County Water District's (NCWD) directive is to support sustainable development with the County that preserves water sources that are vital to long-term economic development, environmental protection and the health and well-being of the County residents. The District's primary concerns are the history of rapid population growth, industrial development, and ground water supply and quality. All of the community water systems in Nye County were investigated as part of this Water Supply Appraisal Investigation (WSAI) and most were found to be in compliance with water quality and water rights regulations. All of the water systems operated by public entities were in compliance and are not in need of additional sources of water or water rights to meet projected future demand. However, many of the privately owned water systems and numerous domestic wells are not expected to be able to meet future water demand.

The history of population growth for most towns in Nye County follows a "boom and bust" pattern following mining industry growth and decline. Most of Nye County population growth has occurred within the Pahrump area at a steadier rate than the rest of the County. The Pahrump Basin is over-allocated with respect to water rights and ground water withdrawals and is the primary area of concern for NCWD and this WSAI.

Ground water withdrawal in the Pahrump Basin currently exceed the perennial yield of the basin, and at the current rate of population growth the future water demand is expected to double in the next 35 years. The valley fill aquifer beneath Pahrump has already experienced significant declines in water level since the agricultural development of the valley in the 1960's. While most of the agricultural land has since been developed for residential use, the water levels in parts of the valley continue to decline due to withdrawal.

The research conducted for the WSAI led to the conclusion that the most imminent water supply issues in Nye County is the over-diversion of ground water in the Pahrump Basin. The perennial yield of Pahrump Basin is currently exceeded and with predicted increases in population in the near future, the water levels in the basin are expected to continue to decline. The declining water levels will lead to increased cost for drilling and pumping water from wells and property damage from land subsidence. There is therefore, a need for water supply projects.

NCWD will take the information gathered in this appraisal investigation to update the water resource plan for the County. A County or basin-by-basin conservation and groundwater management plan is also under consideration by NCWD.

## Background

Nye County, which is located in the south-central part of the state, is the largest county in the state of Nevada with an area of 18,147 square miles (Figure 1) (NACo, 2011). Nye County was organized in 1864, and the current county seat is in the town of Tonopah. The County is rural with a 2011 estimated population of 44,513. The vast majority of the County population occurs in the town of Pahrump, with a population of 36,995. The remaining population occurs primarily in small towns and communities. Unincorporated towns in Nye County include Amargosa, Beatty, Gabbs, Manhattan, Pahrump, Round Mountain and Tonopah. Outside of towns, the County is sparsely populated and only about 2 percent of the land area is privately owned.

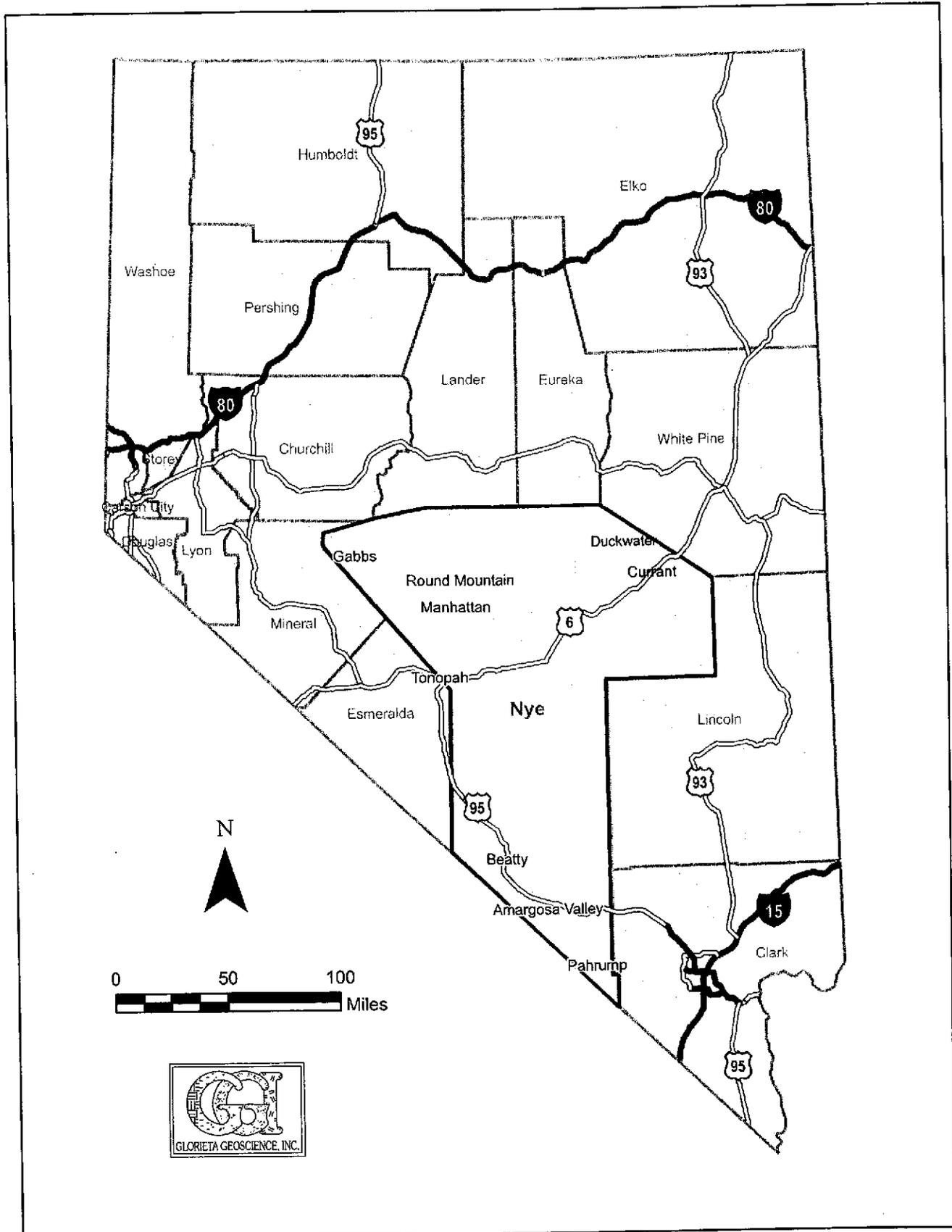
Approximately 98 percent of the land area in Nye County is managed by the federal government: U.S. Bureau of Land management (BLM), U.S. Department of Defense (DOD), U.S. Department of Energy (DOE), U.S. Fish and Wildlife Service (FWS), U.S. Forest Service (USFS), and National Park Service (NPS). About 23 percent of the federally controlled land has restricted access: Nevada National Security Site (NNSS) (formerly called the Nevada Test Site), Nevada Test and Training Range, Tonopah Test Range and Central Nevada Test Area (Nye County, 2011).

## U.S. Bureau of Reclamation Grant

This Water Supply Appraisal Investigation Project is funded by the U.S. Department of the Interior Bureau of Reclamation (USBR) Rural Water Supply Program under grant agreement number R11AP30014. The USBR grant was issued on June 29, 2011. Nye County issued a Request for Qualifications (RFQ) requesting hydrology consulting firms to provide services in support of the USBR funded Appraisal Investigation Project. Glorieta Geoscience, Inc. (GGI) responded to the RFQ and was awarded the contract (agreement number WD 12-001) on January 31, 2012.

The USBR defines an Appraisal Investigation: "An analysis of domestic, municipal, and industrial water supply problems, needs and opportunities in the planning area, primarily using existing data. An appraisal investigation includes a preliminary assessment of alternatives to address the identified water supply problems and needs. The purpose of an appraisal investigation is to determine if there is at least one viable alternative that warrants a more detailed investigation through a feasibility study." (43 CFR Part 404)

Figure 1. Nye County, Nevada



### Investigation Objectives and Scope

NCWD is conducting an appraisal of the quantity and quality of existing water resources in the County, which is essential to support planning efforts for community and economic development. The appraisal identifies existing and projected demands, and determines the infrastructure required to continue to serve existing and projected population growth in Nye County. The appraisal will be used to plan management strategies that can be implemented to ensure the availability of an adequately clean water supply, bring (and keep) water systems in compliance with acceptable drinking water supply standards and identify back-up sources of drinking water.

The NCWD encompasses all of Nye County including 43 of the 44 hydrographic basins within the County. This report addresses eight of the 44 basins that contain community water systems. The scope of the investigation involves all community water systems operating within Nye County and an investigation of the water rights, water supply and water quality in each basin containing a community water system. Water systems that are owned and operated by public entities (political subdivision of a state, Indian tribe or tribal organization, or an entity created under state law such as a water district or water association) are eligible for funding through the USBR Rural Water Supply Program. This report includes the privately owned community systems as well as the public systems because the private systems supply the majority of water in the County. However, since these systems are not eligible for USBR funding, the evaluation of the private system needs is minimally presented in the report. Appendix D contains information on potential funding sources that may be available for publicly and privately owned water systems to finance improvements.

The results of the appraisal investigation will be used to update the Nye County Water Resource Plan and Water Management Plans in key hydrographic basins within the County. The information gathered in this investigation may be used in grant applications to governmental funding agencies for money to upgrade water system infrastructure in Nye County communities.

### Statement of Problems, Needs and Opportunities

The District's purpose is to direct sustainable development within the County to preserve sources of water that are vital to long-term economic development, environmental protection and the health and well-being of residents. To meet NCWD's goal, GGI has compiled the status of all community water systems within the County to determine the needs of the systems to meet water demand, water quality standards, and water conservation measures. The systems are all dependent on ground water for drinking water supply and many of the aquifers in which the systems are completed have natural or anthropogenic contaminants that require treatment or alternate sources of water in order to meet water quality standards. The primary water quality concerns are for naturally occurring contaminants: arsenic, fluoride, alpha particle radiation and uranium. Nitrate contamination is a concern in areas with close proximity of septic systems and shallow domestic wells. In addition to the aquifer contamination issues, many of the water systems in the County have aging, undersized, or poorly constructed infrastructure that are in need of repairs and replacement. These water quality, infrastructure and water supply issues present a potential threat to public health and safety.

This report addresses eight of the 44 hydrographic basins within Nye County that contain community water systems (Figure 2). Most of the basins studied have been designated by NDWR due to concerns over ground water depletion. A designated ground water basin (also referred to as an administered basin) is a basin where permitted ground water rights approach or exceed the estimated average annual recharge and the water resources are being depleted or require additional administration by NDWR. Four of the eight basins studied are over-allocated, meaning that the water rights exceed the calculated perennial yield of the basin (Table 1). Perennial yield is the maximum amount of ground water that can be salvaged each year over the long-term without depleting the ground water reservoir. The perennial yield cannot exceed than the natural recharge of the groundwater reservoir and is usually limited to the maximum amount of natural discharge (NDCNR, 2012). Pahrump Valley is the only hydrographic basin in Nye County that currently has a ground water use that exceeds the basin perennial yield.

**Table 1. Hydrographic Basins in Nye County Studied in the WSAI**

Hydrographic Basin/ Sub-Basin Name	Basin Number	Studied in WSAI	WR over- allocated (as of 2012)	Towns in Basin with Community Water Systems
Upper Reese River Valley	56	No	-	-
<b>Gabbs Valley</b>	<b>122</b>	<b>Yes</b>	<b>Yes</b>	<b>Gabbs</b>
Smith Creek	134	No	-	-
Ione Valley	135	No	-	-
<b>Big Smoky Valley/Tonopah Flat</b>	<b>137A</b>	<b>Yes</b>	<b>Yes</b>	<b>Tonopah, Manhattan</b>
<b>Big Smoky Valley/Northern Part</b>	<b>137B</b>	<b>Yes</b>	<b>No</b>	<b>Round Mountain</b>
Monitor Valley/Northern Part	140A	No	-	-
Monitor Valley/Southern Part	140B	No	-	-
<b>Ralston Valley</b>	<b>141</b>	<b>Yes</b>	<b>No</b>	<b>Tonopah</b>
Alkali Spring Valley	142	No	-	-
Lida Valley	144	No	-	-
Stonewall Flat	145	No	-	-
Sarcobatus Flat	146	No	-	-
Gold Flat	147	No	-	-
Cactus Flat	148	No	-	-
Stone Cabin Valley	149	No	-	-
Little Fish Lake Valley	150	No	-	-
Antelope Valley	151	No	-	-
Little Smoky Valley/Northern Part	155A	No	-	-
Little Smoky Valley/Central Part	155B	No	-	-
Little Smoky Valley/Southern Part	155C	No	-	-
Hot Creek	156	No	-	-
Kawich Valley	157	No	-	-
Emigrant Valley/Groom Lake Valley	158A	No	-	-

Hydrographic Basin/ Sub-Basin Name	Basin Number	Studied in WSAI	WR over- allocated (as of 2012)	Towns in Basin with Community Water Systems
Emigrant Valley/Papoose Valley	158B	No	-	-
Yucca Flat	159	No	-	-
Frenchman Flat	160	No	-	-
Indian Springs Valley	161	No	-	-
<b>Pahrump Valley</b>	<b>162</b>	<b>Yes</b>	<b>Yes</b>	<b>Pahrump</b>
Penoyer Valley (Sand Spring Valley)	170	No	-	-
Coal Valley	171	No	-	-
Garden Valley	172	No	-	-
<b>Railroad Valley/Northern and Southern Parts</b>	<b>173A, 173B</b>	<b>Yes</b>	<b>No</b>	<b>Duckwater</b>
White River Valley	207	No	-	-
Pahroc Valley	208	No	-	-
Mercury Valley	225	No	-	-
Rock Valley	226	No	-	-
Fortymile Canyon/Jackass Flats	227A	No	-	-
Fortymile Canyon/Buckboard Mesa	227B	No	-	-
<b>Oasis Valley</b>	<b>228</b>	<b>Yes</b>	<b>No</b>	<b>Beatty</b>
Crater Flat	229	No	-	-
<b>Amargosa Desert</b>	<b>230</b>	<b>Yes</b>	<b>Yes</b>	<b>Beatty, Lathrop Wells</b>
Grapevine Canyon	231	No	-	-

Source Data: Office of the State Engineer, Nevada Division of Water Resources, Department of Conservation and Natural Resources.

approach to land development that treats storm water runoff as a resource rather than a waste product. Green infrastructure can be used to further reduce storm water discharge, restore the natural hydrology and improve the watershed. The Leadership in Energy and Environmental Design principles are additional techniques to promote water efficiency within a structure and throughout the building site (U.S. Green Building Council, 2013).

#### Legal Issues

The BOCC does not have the ability to retroactively restrict wells or water use on existing lots, so restricting domestic well use may only be a viable alternative for addressing basin over-diversion in the future. However, the legal and political ramifications need to be fully vetted before such severe measures are considered.

#### Environmental, Cultural Resources and Social Impacts

The Land Development Regulations alternative is not projected to involve any specific environmental or cultural resources. Regulations that will lead to a slowing of growth in Pahrump Valley are expected to be received well by most of the current residents. Land developers and owners of large parcels of land that may plan future subdivisions are likely to disapprove of any regulation that makes land division more difficult or more costly. Reducing water use by restricting pumping from new domestic wells and promotion of green building practices may have the environmental benefit of helping to reduce the rate of water level decline in the basin fill aquifer.

#### Cost Estimate

No direct cost estimate is available for this option, because the issues involved are broad and the exact changes to ordinances, zoning, etc. have not yet been determined. Nye County staff members are currently researching these options and presenting them to the Water District Governing Board for consideration. Cost items that must be considered include: legal counsel; staff time for research, outreach, and public meetings; BOCC time; NCWD Governing Board time; and legal advertisement expenses.

#### *Alternative 3: Basin-Wide Utility*

Construction of a basin-wide water and wastewater utility has the potential to better control and significantly reduce water use in the Pahrump Basin. Water use would be reduced by providing an economic incentive to users for conservation through a tiered water rate structure common among municipalities in the desert southwest. Water demand would be further reduced by implementation of a wastewater re-use program that would allow treated effluent to be utilized for irrigation purposes (parks, golf courses, green-spaces, etc.) or, potentially, for aquifer recharge via rapid infiltration basins or other methods. If all of the water users were also connected to a basin-wide sewer utility, it is reasonable to think that 35-50% of the fresh water produced could be available for re-use in the form of treated effluent for irrigation. A basin-wide utility would also allow pumping centers to be redistributed and managed in a way that would reduce pumping (drawdown) effects in the most affected portions of the basin. Studies of water levels in the Pahrump Basin by Nye County staff show that water levels have risen in the recent past in the fan area east of Pahrump (recharge area for the basin fill aquifer) and have been declining in the areas of the basin floor with the greatest densities of domestic wells (Figure 8). A basin-wide utility would be able to install production wells in the fan area and, by working with domestic users to connect to the

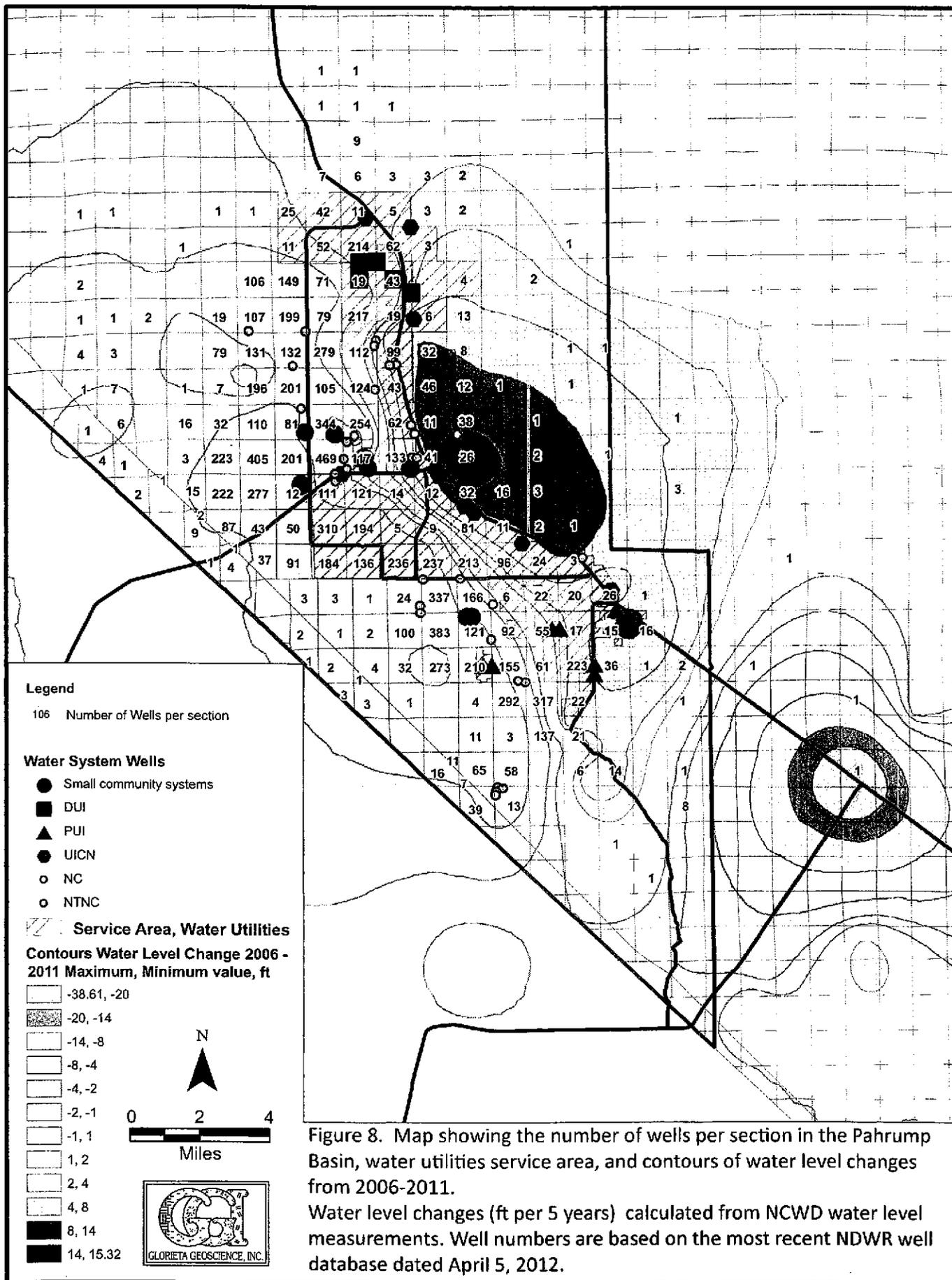


Figure 8. Map showing the number of wells per section in the Pahrump Basin, water utilities service area, and contours of water level changes from 2006-2011. Water level changes (ft per 5 years) calculated from NCWD water level measurements. Well numbers are based on the most recent NDWR well database dated April 5, 2012.

**FOR THE REMAINDER OF THE REPORT  
PLEASE DOWNLOAD AT**

<https://app.box.com/s/h13nov9x9clwfwe4xmso>



**DELINEATION OF THE  
MANSE FAN AND  
ESTIMATED PERENNIAL YIELD,  
PAHRUMP BASIN, NEVADA**

***Prepared For:***

**Pahrump Utility Company, Inc.**  
1321 S. Hwy 160; Suite One  
Pahrump, NV 89048

***Prepared By:***

**LUMOS & ASSOCIATES, INC.**  
5401 Longley Lane, Suite 5  
Reno, Nevada 89511  
Phone: (775) 827-6111  
FAX: (775) 827-6122



September 26, 2006  
Job No. 6785.000

**DELINEATION OF THE  
MANSE FAN AND  
ESTIMATED PERENNIAL YIELD,  
PAHRUMP BASIN, NEVADA**

**TABLE OF CONTENTS**

	<b>Page</b>
SECTION 1: BACKGROUND AND OBJECTIVES _____	1
1.1 BACKGROUND _____	1
1.2 OBJECTIVES _____	2
SECTION 2: GEOLOGIC SETTING _____	2
SECTION 3: MANSE FAN ANALYSIS _____	3
3.1 DELINEATION _____	3
3.2 PERENNIAL YIELD _____	6
3.3 APPROPRIATED WATER RIGHTS _____	6
SECTION 4: AQUIFER RESPONSE ANALYSIS _____	7
4.1 GROUNDWATER DATA _____	7
4.2 HYDROLOGIC BUDGET ANALYSIS _____	9
SECTION 5: CONCLUSIONS _____	10
SECTION 6: LIMITATIONS OF INVESTIGATIONS _____	11
SECTION 7: REFERENCES _____	12
SECTION 8: APPENDICES _____	13
A. Manse Fan Appropriated Water Rights as of September 2006	
B. USGS Monitoring Well Site Records for the Study Area	
C. Manse Fan Water Use Analysis 1962 through 1978	
D. Manse Fan Groundwater Pumpage Inventory 1985 through 2005	
E. NDWR Code Definitions	
F. PLATE I – SITE PLAN	
PLATE II – HYDROLOGIC SETTING	
FIGURES:	
1. LOCATION MAP AND HYDROLOGIC SETTING _____	4
2. SITE PLAN _____	5
3. SWL Records for Well Site 10AAC (1946 to 2006) _____	7
4. Well Site 10AAC (1960 to 1980) _____	8
5. Groundwater Budget at USGS Monitoring Well 10AAC _____	9

## **SECTION 1: BACKGROUND AND OBJECTIVES**

### **1.1 BACKGROUND**

Pahrump Utility Company, Inc. (PUCI) is a water and wastewater utility company owned and operated by HRD Inc. The privately owned utility company, located five miles south-east of Pahrump, Nevada, was initially started to accommodate a residential subdivision developed by the Hafen Family that required a wastewater treatment facility. The Hafen Family continued to develop subdivisions which resulted in the PUCI expanding the utility to include a water system.

The State Engineer has issued several restrictions for portions of the Pahrump Basin (Basin 162), specific to alluvial fan areas to help reduce potential over-drafting from aquifer systems that are associated with valley-fill deposits. Consequentially, the Nevada Division of Water Resources (NDWR) has delineated that portion of the basin where the alluvial fan makes a transition to what is referred to as the basin floor.

The source of groundwater for PUCI's water system comes from the alluvial fan (known as fan water rights) on the eastern side of the Pahrump Basin. Within this alluvial fan is an unofficial sub-fan locally known as the Manse Fan. The water rights, owned by PUCI, are predominantly located on the Manse Fan and have priority dates extending back to the 1920's. The portion of the Manse Fan that is the subject of this report (the study area) is generally described as property contained in Township 21S, Range 54E, Sections: 01, 02, 03, 04, 09, 10, 11, 12, 15 and 16.

The present concern by PUCI is the transfer of several hundred acre-feet of water rights onto the study area to support a large proposed Planned Unit Development (PUD). The duty required to handle the large development alone would require 4 to 8 new production wells. PUCI would like to know if additional groundwater production from this portion of the Manse Fan might have a negative impact to the aquifer system, directly affecting their ability to service the customers they have made legal commitment to. PUCI has procured this hydrogeology study to investigate the perennial yield (safe yield) from the aquifers within the Manse Fan and determine if the existing and future transfer of water rights to this area may overdraft the aquifer(s) and impact PUCI's existing production wells.

## 1.2 OBJECTIVE

The primary objectives of this study are to:

1. Delineate the total area identified as the Manse Fan in order to estimate the number of acre-feet of water annually recharged to the Manse Fan as a function of the total perennial yield for the basin.
2. Determine the number of acre-feet of groundwater appropriated on the Manse Fan.
3. Evaluate historical pumping records during the 1960's and 1970's when groundwater production was at its highest due to agricultural water use practices.
4. Evaluate historical pumping records within the study area from 1985 through 2004 when groundwater levels appear to first stabilize and then recover as a response to changes in water use.
5. Research static groundwater level changes and trends as recorded by the United States Geological Survey (USGS), for monitoring wells on the Manse Fan, from 1944 through 2004, to determine the effects of groundwater withdrawals from the Manse Fan Aquifer system.
6. Determine what affects the transfer of additional water rights from other areas of the alluvial fan to the Manse Fan area will have on the Manse Fan aquifer system.

## SECTION 2: GEOLOGIC SETTING

The Pahrump Valley Hydrographic Basin (162) is located in the southern portion of the Basin and Range physiographic Province. The basin includes about 1,050 square miles in Clark and Nye Counties, southern Nevada, and Inyo and San Bernardino Counties, southeastern California (Malmberg, 1967). The valley is bounded on the northeast and east by the Spring Mountains, and by the topographically lower Montgomery Mountains, the Nopah Range, and the Kingston Range on the northwest, west and southwest, respectively. The Pahrump Valley is a closed alluvial basin with no surface outflows. All of the mountain ranges surrounding the basin are composed of Paleozoic and Late Proterozoic carbonate and clastic rocks (Sweetkind and others, 2003).

Large alluvial fans characterize the northeastern side of the basin. The two most prominent of these are the Pahrump Fan to the north and the Manse Fan to the south. The Spring Mountain Range remains the dominant topographic feature of the basin and the source area for virtually all of the water recharge to the Manse Fan and the Pahrump valley (Malmberg, 1967, Harrill, 1986). Typical for valleys of the region, the sedimentary deposits of the alluvial fans and valley floors are generally thick. The Manse alluvial fan is composed of what may be kilometers-deep Tertiary alluvium or basin filling sedimentary rocks (Sweetkind and others, 2003).

The primary aquifer systems that support agriculture and public water systems comes from the groundwater aquifer systems in the basin-fill formations. Geologic maps show that the uppermost portion of these basin fill deposits, or those deposits closest to the surface, where production wells penetrate, consist largely of unconsolidated coarse-grained alluvial materials.

## **SECTION 3: MANSE FAN ANALYSIS**

### **3.1 DELINEATION**

For the purpose of identifying the area and estimating the number of acre-feet of water recharged annually to the Manse Fan, two delineations of the alluvial fan and associated watersheds of the Spring Mountains were interpolated to produce a final delineation of the Manse Fan. The two delineations were based on the use of USGS topographic relief maps and specialized computer modeling software. A third delineation of the alluvial fan provided by the NDWR is also discussed.

The delineation generated from USGS topographic relief maps extends from the valley floor and includes two major drainages, the Carpenter Canyon and Trout Canyon drainages (Figure 1). These drainages come from the Spring Mountains and reflect the area that contributes groundwater recharge to the alluvial fan known as the Manse Fan.

The computer modeled delineation was generated using the ESRI (Environmental Systems Research Institute) Hydrology Modeling Extension within the ESRI ArcGIS® computer program (Figure 1). The computer model also includes the two major drainages, the Carpenter Canyon and Trout Canyon drainages. The model suggests an interpretation of surface drainage that is more to the north in the area of the valley floor than that shown by the topographic relief map delineation. The computer-modeled area extends to the eastern slopes of the Nopah Mountains that are not recognized as contributing to the groundwater recharge of the basin and thus will be disregarded when evaluating recharge (Harrill, 1986).

A third delineation of the alluvial fan area that further distinguishes that sub-portion of the fan that is considered the valley floor is provided by the NDWR. The NDWR delineation includes only the geologic unit that is identified for water resource management as the alluvial fan area (Figures 1 and 2). All but three of the wells of the study area are within the NDWR delineation of the Manse Fan. They are the PUCI well numbers 3, 3b and a third well, the Hafen well. These wells are located within a mile west of the NDWR delineated alluvial fan (Figure 2).

The final (interpolated) delineation of the Manse Fan used for the analysis of Perennial yield (Section 3.2) and in conjunction with the NDWR delineation for the analysis of water rights (Section 3.3), considered the following observations. Because the Spring Mountains are the source of virtually all of the water recharged to the alluvial fan, the computer-modeled area that extends to the Nopah Mountains was omitted. The computer model does interpret topographic drainages, particularly where the Manse Fan intersects the NDWR alluvial fan delineation. These elements were addressed in the resulting delineation for the Manse Fan. The estimated acreage of this delineation was determined to be approximately 156,719 acres or 245 square miles.

### 3.2 PERENNIAL YIELD

The State Engineer reports that the area encompassing the Pahrump Basin (Hydrographic Basin 162) is approximately 504,960 acres and has an allocated annual perennial yield of 19,000 AFA (Acre-Feet Annually). Perennial yield is defined as the amount of usable water of a ground water reservoir that can be withdrawn and consumed economically each year for an indefinite period of time. It cannot exceed the sum of the natural recharge, the artificial or induced recharge, and the incidental recharge without causing depletion of the groundwater reservoir. Based on total acreages, the regional recharge for the Manse Fan and associated study area has been calculated as a percentage of the perennial yield for the entire basin, thus yielding an estimate for the perennial yield of the Manse Fan.

Given:

Manse Fan Acreage = 156,719 acres  
Total Pahrump Basin Acreage = 504,960 acres  
Pahrump Basin Perennial Yield = 19,000 AFA

Then:

The perennial yield for the Manse Fan area may be approximated as:

$$(156,719 \text{ ac} / 504,960 \text{ ac}) (19,000 \text{ AFA}) = 5,897\text{AFA}$$

### 3.3 APPROPRIATED WATER RIGHTS

Appropriated water rights identify the quantity of water from wells, streams, rivers, reservoirs, or other sources reserved for a specific use and place of use under state water-right laws, statutes, or regulations. A review and analysis of the NDWR water rights database was conducted for the common area shared by both the Manse Fan delineation and the NDWR alluvial fan delineation. The analysis revealed that the majority of appropriated water rights for the Manse Fan area as a whole occur within the NDWR delineated fan area. More specifically, the majority of water rights occur in the study area that is generally described as the property contained in Township 21S, Range 54E, sections: 01, 02, 03, 04, 09, 10, 11, 12, 15 and 16.

The study area had historically supported extensive agricultural water use (i.e. irrigated cotton). In recent times, the "Manner of Use" for many of these water rights have been converted from irrigation to quasi-municipal uses as economic trends and population growth occurred. "Points of Diversion" for these water rights tended to remain on the NDWR delineated alluvial fan area. The complete list of sections that describe the area common to both delineations and used to identify the total appropriated, supplemental adjusted water rights for the area are found in Appendix: A (Section 8.0).

Records indicate active water rights for this area as Certificated, Decreed, Vested or Permitted, currently total approximately 13,120 AFA (Section 8.0). Noteworthy also is an additional 516 AFA of water rights for a point of diversion that is less than 1400 feet to the north of the delineation in section 30, Township 20S, Range 54E.

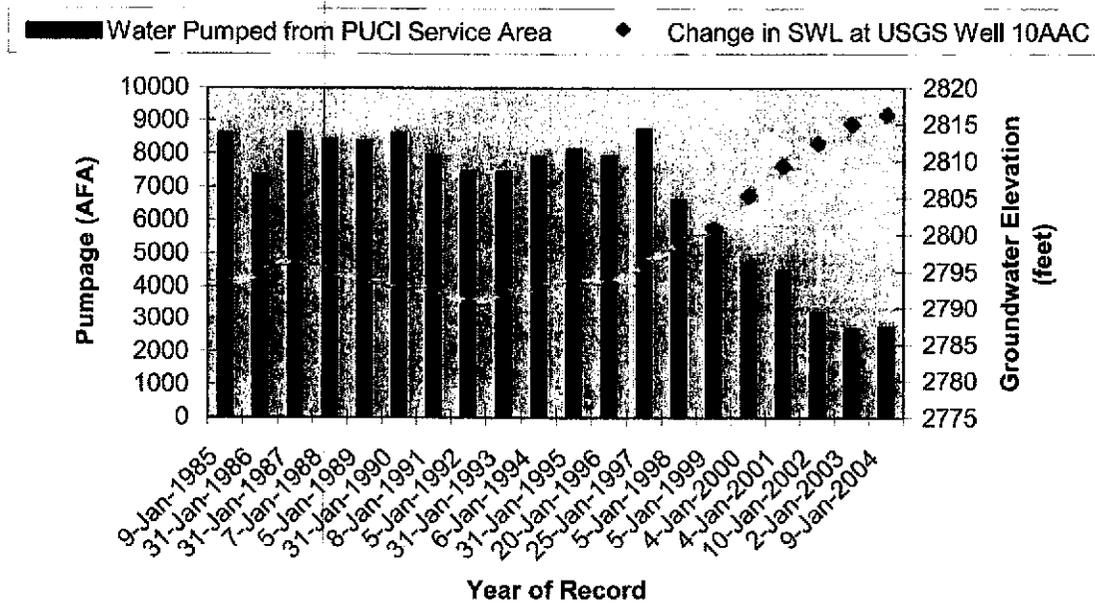
#### 4.2 HYDROLOGIC BUDGET ANALYSIS

NDWR records for annual groundwater withdrawal within the study area were also analyzed for the period from 1985 through 2004. This data reflects the changing trend of water use from irrigated agriculture to those associated with urban development, such as an increase in the number of municipal water systems (Section 8.0). As seen from the USGS records for SWL at monitoring well 10AAC, groundwater levels slightly recovered following these initial changes in water use in the early 1980's (Figure 3). The USGS records are in both SWL units (feet) and altitude or elevation (feet above sea level). The SWL may be attained by subtracting the recorded elevation from the elevation of the wellhead at the surface or 2885 feet.

Both sets of recorded data for the study area, from the USGS monitoring well and NDWR pumpage records, show a leveling trend for the 13-year period from 1985 through 1997. The SWL at the USGS monitoring site leveled off at an approximate groundwater elevation of 2794 feet above sea level. Recorded NDWR pumpage levels for the same 13-year period averaged 8,135 AFA from 1985 to 1997 (Section 8.0). This stability in the resulting storage level of the study area's aquifer system, sustained over a significant period of time (13 years), strongly suggests a possible safe yield for the system of approximately that equal to the average level of groundwater withdrawal or 8,135 AFA.

With a slow decline in the rate of groundwater withdrawals from 1998 to 2004, the SWL at the monitoring well again responded with a SWL recovery (Figure 5). The aquifer system has currently recovered to the extent that natural artesian flow has resumed at the Manse Spring, approximately a mile to the northwest of USGS monitoring well 10AAC (Verbal communication, Tim Hafen).

**Groundwater Level vs. Pumpage Over Time**



**Figure 5: Groundwater Budget at USGS Monitoring Well 10AAC**  
 (SWL level equals surface elevation of 2885 feet minus groundwater elevation)

## SECTION 4: AQUIFER RESPONSE ANALYSIS

A second means of estimating the perennial yield was quantified by comparing field-measured rates of groundwater withdrawal (pumpage) to monitored static groundwater levels (SWL). The hydrologic budget, also referred to as the water balance, is determined through analysis of documented gains and losses of groundwater to the aquifer system within the alluvial fan over time. The perennial yield for the aquifer system is then shown by identifying when aquifer equilibrium or balance between the gain and loss of groundwater within the water budget, reveals no net change in groundwater storage over time.

Extensive data for both pumpage and monitored SWL (feet below the surface of the ground) are available for the study area through NDWR and USGS databases. This groundwater system has several years of hydrologic records to support the credibility of trend determinations such as those values for perennial yield. The following discussion also considers data that reflects trends of depletion and surplus.

### 4.1 GROUNDWATER DATA

The USGS has maintained a monitoring program through the National Water Information System (NWIS) that, for the study area, dates back to the early 1940's. The NWIS database contains information for 16 sites within T21S, R54E. Four NWIS well sites that are within the study area have extensive groundwater level data (Section 8.0). The USGS site with the largest and longest running data set is a well site centrally located in the wellfield and locally referred to as the Bowman well (USGS site number: 360836115531701 162 S21 E54 10AAC). The well is believed to be cased to 472 feet and has a total depth of 800 feet. Initial readings taken in the 1940s show the groundwater at a depth of less than 30-feet below ground level (bgl). Records beginning in October of 1944, and continuing through to July of 2004, include 2,054 individual readings (Figures 3).

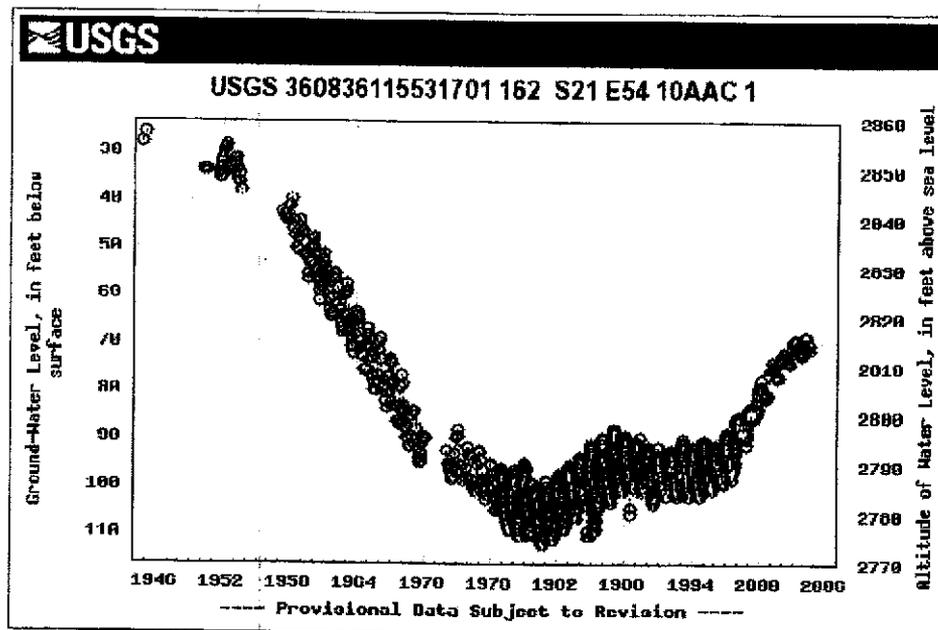


Figure 3: SWL Records for Well Site 10AAC (1946 TO 2006)

NDWR records for the study area document the annual pumpage or groundwater withdrawal from the aquifer system from the 1960s to 2005. Water use reports for two time frames, 1962 through 1968 and 1970 through 1978, were analyzed to determine the annual average acre-feet pumped in the study area. The water use reports for this period reflect a use dominated by irrigated agriculture. The average groundwater production for the 7-year period from 1962 through 1968 was 10,812 AFA. The average groundwater production for the 9-year period from 1970 through 1978 increased to 12,472 AFA (Section 8.0). The average use therefore was approximately 11,746 AFA for the Manse Fan reflecting peak years of water production.

Based on the central location of the USGS monitoring well within the study area, the SWL trends for this site are indicative of those for the wellfield (Figure 2). During the same period of time, there is a significant decrease in the SWL of over 70 feet, as documented from the monitoring well data (1960 through 1978). Water use in the area reached its height and then slows, by the early 1980s, when groundwater levels declined to over 110 feet below the ground surface. The steady decline in the SWL that precedes 1980 is illustrated by the USGS data from the monitoring well records for this period (Figure 4).

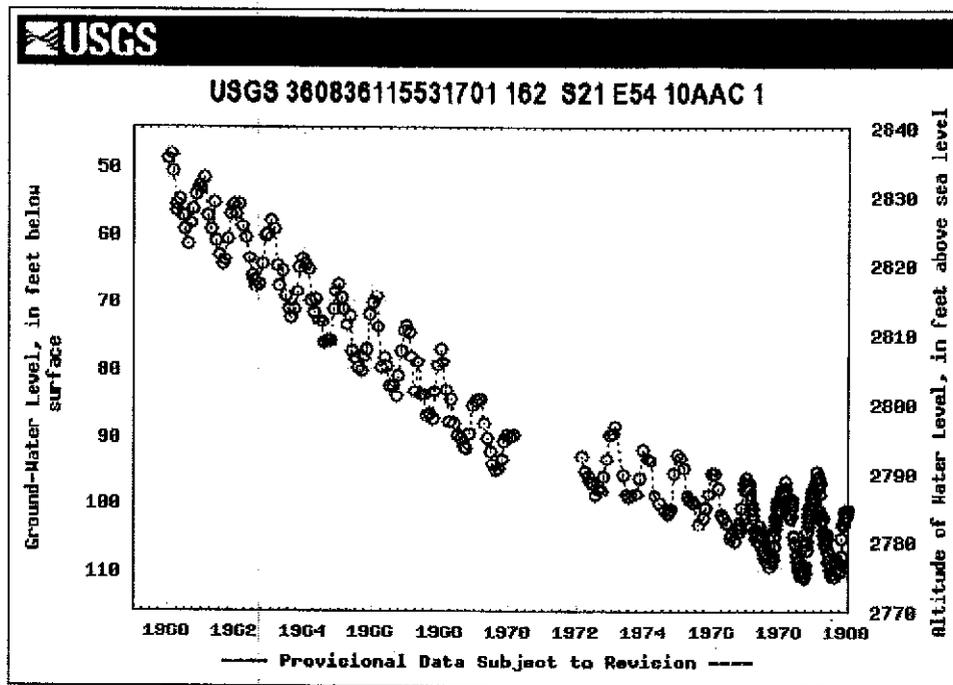


Figure 4: Well Site 10AAC (1960 TO 1980)

## **SECTION 5: CONCLUSIONS**

The Nevada Division of Water Resources (NDWR) has delineated the alluvial fan located on the eastern side of the Pahrump Valley Hydrographic Basin (Basin 162). A sub-delineation of the alluvial fan was conducted to determine the study area referred to as the Manse Fan. This area was determined to encompass 156,719 acres or 245 square miles. Using the fractural percentage of this area to the total area of Basin 162 (504,960 acres), the study area (Manse Fan) represents approximately 31% of the total basin. The perennial yield of the Basin 162, as determine by the NDWR, is 19,000 acre-feet annually. Based on the data, 31% of the perennial yield for the Manse Fan area equates to approximately 5,897 acre-feet.

Historical pumping records for the study area (Manse Fan) during the highest water production years from 1962 through 1979 averaged 11,642 acre-feet annually. Groundwater static water levels collected by the USGS, during this same period, indicate a depletion of groundwater. Groundwater withdrawal rates and static groundwater levels were also analyzed for a period of relative water use stabilizing from 1985 to 1997, to determine the hydrologic budget for the area. Through a trend analysis for this period, an approximate perennial yield for the Manse Fan was shown to be 8,135 AFA. The data suggests that the actual perennial yield for the Manse Fan can be conservatively targeted between the delineated estimate of 5,897 AFA and the estimated hydrologic budget value of 8,145 AFA.

Presently, 13,120 AFA of groundwater has been appropriated from the Manse Fan area (supplementally adjusted). The data evaluated in this report suggests that the present appropriated water rights associated with the Manse Fan area exceed the sub-basin's perennial or safe yield. Based on the analysis, the transfer of additional water rights to the Manse Fan area will create a trend of over-drafting of the sub-basin aquifers within the study area.

## **SECTION 6: LIMITATIONS OF INVESTIGATIONS**

This investigation is being performed using the degree of care and skill ordinarily exercised on similar circumstances, by experienced environmental professionals practicing in this or similar locations. No warranty, expressed or implied, is made as to the conclusions and professional advice included in the referenced reports.

The interpretations and conclusion contained in the referenced report are based on our review of the referenced materials and our field investigation described herein. As in most projects, conditions revealed by additional subsurface investigation may be at variance with preliminary findings. If this occurs, the experienced professional must evaluate the changed conditions and design must be adjusted as required or alternate designs and plans recommended.

The findings of this report are valid as of the present date. However, changes in the conditions of the property can and do occur with the passage of time, whether they be due to natural processes or the work of people on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of the referenced report may be invalidated wholly or partially by changes outside of our control. Therefore, the referenced report is subject to review and revision as changed conditions are identified.

## **SECTION 7: REFERENCES**

Harrill, James R., 1986, "Ground-water Storage Depletion In Pahrump Valley, Nevada – California, 1962 – 75"; U.S. Geographical Survey Water – Supply Paper 2279, p. 3.

Malmberg, Glenn T., 1967, "Hydrology of the Valley-Fill and Carbonate-Rock Reservoirs, Pahrump Valley Nevada-California"; U.S. Geographical Survey Water–Supply Paper 1832, p. 3.

Sweetkind, Donald S., Taylor, E., Putnam, H., 2003, "Stratigraphic inferences derived from borehole data of Tertiary basin-filling rocks of the Pahrump Valley basin, Nevada and California"; U.S. Geographical Survey open-File Report 2003-03-051, p.4

## **SECTION 8: APPENDICES**

Appendix A: Manse Fan Appropriated Water Rights as of September 2006

Appendix B: USGS Monitoring Well Site Records for the Study Area

Appendix C: Manse Fan Water Use Analysis 1962 through 1978

Appendix D: Manse Fan Groundwater Pumpage Inventory 1985 through 2005

Appendix E: NDWR Code Definitions

Appendix F: PLATE I – SITE PLAN  
DESERT UTILITIES, INC. PROPOSED WATER DIVERSION  
RELOCATIONS

PLATE II – HYDROLOGIC SETTING  
DESERT UTILITIES, INC. PROPOSED WATER DIVERSION  
RELOCATIONS

**Appendix A:**

**Manse Fan Appropriated Water Rights as of September 2006**

CEC  
MANSE FAN

**Appendix A:**  
**Manse Fan Appropriated Water Rights**  
As of September, 2006  
Prepared by Lumos and Associates

**Database search and input criteria for the spreadsheet that follows (next page):**

- Data was retrieved for sections that are in both, the Manse Fan delineation and NDWR alluvial fan delineation.
- Spreadsheet is sorted by ascending permit numbers
- Basin: 162
- Application Status: CER,PER,VST,DEC
- Use: All classifications
- Unit conversions: conducted for MGD to AFA
- Permits with points of diversion within the listed sections but outside the delineations were omitted.

**Database query was for the following areas**

Township,20S, Range 54E:

sections: 14,15,16,21,22,24,25,26,27,28,29,30,32,33,34,35,36  
19 records

Township,20S, Range 55E:

sections: 16,17,19,20,21,26,27,28,29,30,31,32,33,34,35  
no records found

Township,21S, Range 54E:

sections: 01,02,03,04,09,10,11,12,13,14,15,16,20,21,22,23,24,25,26,27,28,29,32,33,34,35,36  
164 records

Township,21S, Range 55E:

sections: 03,04,05,06,07,08,09,10,11,14,15,16,17,18,19,20,21,22,26,27,28,29,30,31,32,33,34,35  
no records found

Township,22S, Range 54E:

sections: 01,02,03,04,05,10,11,12,14,15  
6 records

Township,22S, Range 55E:

sections: 03,04,05,06,07,08,09,10,16,17,18  
no records found

**Appendix A: Manse Fan Appropriated Water Rights**  
as of September, 2006  
prepared by Lumos and Associates, Inc.

<u>App</u>	<u>Cert</u>	<u>File Date</u>	<u>Status</u>	<u>Sour</u>	<u>QQ</u>	<u>Qtr</u>	<u>Sec</u>	<u>Twn</u>	<u>Rng</u>	<u>Type</u>	<u>Sup</u>	<u>Ann</u>	<u>Duty</u>	<u>Units</u>	<u>Owner of Record</u>
10571	24323		CAN	UG											
10571	2987	10/26/1940	CER	UG	SE	NW	3	21S	54E	IRR			318.705	AFA	CALVIN MURTON BOWMAN
10571	19031		CER	UG											
10571	70652		PER	UG											
11678	3772	8/24/1946	CER	UG	SW	NW	34	21S	54E	STK			2.19	AFA	ANDERSON, IMOGENE
13669	4621	4/2/1951	CER	UG	SE	SE	9	21S	54E	IRR			100	AFA	BOWMAN, PERRY L. & NORMA
13669	73839		RFA	UG											
13669	72968		WDR	UG											
13875	4363	10/11/1951	CER	UG	SE	SE	9	21S	54E	IRR			800	AFS	ADAVEN MANAGEMENT, INC.
13875	72388		RFA	UG											
13875	73840		RFA	UG											
13875	72969		WDR	UG											
19030	70993		CAN	UG											
19030	6768	7/18/1960	CER	UG	SW	NE	3	21S	54E	IRR			185	AFA	CHI OF NEVADA LLC
19030	66920		PER	UG											
19030	68734		PER	UG											
19030	68817		PER	UG											
19030	68908		PER	UG											
19030	69222		PER	UG											
19030	69223		PER	UG											
19030	71362		PER	UG											
19031	6866	7/18/1960	CER	UG	SE	NW	3	21S	54E	IRR	Y		303.945	AFA	ADAVEN MANAGEMENT, INC.
19031	70651		PER	UG							Y				
19031	71871		RFA	UG							Y				
19334	6845	11/15/1960	CER	SPR	SW	NW	3	21S	54E	IRR			342.05	AFA	BOWMAN, MURTON
19335	6817	10/15/1960	CER	SPR	SW	NW	3	21S	54E	IRR			433.5	AFA	BOWMAN, MELVIN
22735	74583		APP	UG											
22735	6938	8/25/1965	CER	UG	SW	SE	3	21S	54E	IRR			1885.68	AFA	ADAVEN MANAGEMENT, INC.
22735	59414		CER	UG											
22735	58501T		EXP	UG											
22735	63964		PER	UG											
22735	72389		RFA	UG											

App	Cert	File Date	Status	Sour	QQ	Qtr	Sec	Twn	Rng	Type	Sup	Ann	Duty	Units	Owner of Record
22735	72970		WDR	UG											
24773	52367		ABR	UG											
24773	65460		ABR	UG											
24773	7032	11/21/1988	CER	UG	NE	SW	3	21S	54E	IRR			5	AFA	CENTRAL NEVADA UTILITIES COMPANY
24773	58626		PER	UG											
26079	9010	4/26/1971	CER	UG	NW	SE	29	20S	54E	COM			26.98	AFA	BROWN NORMAN L.
26510	9157	1/31/1972	CER	UG	NE	NE	9	21S	54E	QM			5.94	AFA	HAFEN, M. KENT
29941	9947	1/26/1976	CER	UG	SE	NE	16	21S	54E	QM			4.65	AFA	HAFEN, M. KENT
41157	13213	4/23/1980	CER	UG	SE	SE	16	21S	54E	IRR	Y		34.22	AFA	ADAVEN MANAGEMENT, INC.
41157	65106		PER	UG							Y				
41157	69249		PER	UG							Y				
41157	72050		PER	UG							Y				
41157	73075		PER	UG							Y				
41158	13214	4/23/1980	CER	UG	SE	SE	16	21S	54E	IRR	Y		4.86	AFA	ADAVEN MANAGEMENT, INC.
41158	72049		PER	UG							Y				
41158	73076		PER	UG							Y				
41159	13215	4/23/1980	CER	UG	NE	SE	16	21S	54E	IRR	Y		88.33	AFA	ADAVEN MANAGEMENT, INC.
41159	65105		PER	UG							Y				
41159	69248		PER	UG							Y				
41159	69694		PER	UG							Y				
41159	72048		PER	UG							Y				
41159	73077		PER	UG							Y				
41159	41159R01		RLP	UG							Y				
41160	13216	4/23/1980	CER	UG	NE	SE	16	21S	54E	IRR	Y		10.11	AFA	ADAVEN MANAGEMENT
41160	72047		PER	UG							Y				
41160	73078		PER	UG							Y				
41161	13217	4/23/1980	CER	UG	SE	SE	16	21S	54E	IRR	Y		20.87	AFA	ADAVEN MANAGEMENT
41161	68495		PER	UG							Y				
41161	72046		PER	UG							Y				
41161	73079		PER	UG							Y				
41162	13218	4/23/1980	CER	UG	SE	NE	16	21S	54E	IRR	Y		71.94	AFA	HAFEN FAMILY LIMITED PARTNERSHIP
41162	60911		CER	UG							Y				
41162	61125T		EXP	UG							Y				
41162	70408		PER	UG							Y				
41162	72045		PER	UG							Y				
41162	73080		PER	UG							Y				

App	Cert	File Date	Status	Sour	QQ	Qtr	Sec	Twn	Rng	Type	Sub	Ann	Duty	Units	Owner of Record
41162	41162R01		RLP	UG							Y				
41162	57076		WDR	UG							Y				
41163	13219	4/23/1980	CER	UG	SE	NE	16	21S	54E	IRR	Y		160.82	AFA	HAFEN FAMILY LIMITED PARTNERSHIP
41163	72044		PER	UG							Y				
41163	73081		PER	UG							Y				
41167	13221	4/23/1980	CER	UG	SW	SE	3	21S	54E	IRR	Y		184.24	AFA	HAFEN FAMILY LIMITED PARTNERSHIP
41167	70873		PER	UG							Y				
41167	71224		PER	UG							Y				
41167	72042		PER	UG							Y				
41167	73083		PER	UG							Y				
41167	72974		WDR	UG							Y				
41170	13223	4/23/1980	CER	UG	SW	SE	3	21S	54E	IRR	Y		3.31	AFA	HAFEN FAMILY LIMITED PARTNERSHIP
41170	72040		PER	UG							Y				
41170	73085		PER	UG							Y				
45574	13196	4/22/1982	CER	UG	SW	SE	16	21S	54E	QM			3.2	AFA	SANTOVITO, JEANE
46235	12753	10/19/1982	CER	UG	SE	NW	29	21S	54E	QM			2.25	AFA	HOFFMAN, VICTOR
46826		4/20/1983	PER	UG	SE	NW	3	21S	54E	MUN	Y		272.8	AFA	UTILITIES INC OF CENTRAL NEVADA
46827		4/20/1983	PER	UG	SE	NW	3	21S	54E	MUN	Y		862.2	AFA	UTILITIES INC OF CENTRAL NEVADA
48221	14395	7/18/1984	CER	UG	NW	NE	12	21S	54E	IRR			7	AFA	BRADSHAW, J. K. & GARDETTO, J. F.
48221	61363		CER	UG											
48221	69955		PER	UG											
48221	71199		PER	UG											
49290	13964	8/21/1985	CER	UG	NE	SE	29	20S	54E	IND	Y		5	AFA	WULFENSTEIN, RAY
49456	56800		CAN	UG											
49456	15113	10/18/1985	CER	UG	SW	SW	28	20S	54E	IND			1	AFA	DAFFER, DANIEL I.
57129		2/3/1992	PER	UG	NE	SW	3	21S	54E	COM			2.02	AFA	ANTHONY M. MCKOY TRUST AE 101
58982	15766	7/1/1993	CER	UG	NE	SE	29	20S	54E	IND	Y		12.3	AFA	WULFENSTEIN TRUST R-501
58983	15767	7/1/1993	CER	UG	NE	SE	29	20S	54E	IND	Y		42.3	AFA	WULFENSTEIN TRUST R-501
59414	16497	12/1/1993	CER	UG	NE	SE	9	21S	54E	IRR			226.05	AFA	BOWMAN, DEBRA J.
59414	64887		PER	UG											
59414	72972		WDR	UG											
60911	15181	2/9/1995	CER	UG	SW	NE	16	21S	54E	IRR			10.31	AFA	TIM HAFEN RANCHES, INC.
63964		3/18/1998	PER	UG	SW	SE	3	21S	54E	COM			4	AFA	GOFF FAMILY TRUST U/A/D 2/3/98
64244		6/22/1998	PER	UG	NW	NW	33	20S	54E	COM			5.04	AFA	WULFENSTEIN, RAY
64244	70945		PER	UG											
64245		6/22/1998	PER	UG	NE	SE	33	20S	54E	COM	Y		20	AFA	WULFENSTEIN, RAY

App	Cert	File Date	Status	Sour	QQ	Qtr	Sec	Twn	Rng	Type	Sup	Ann	Duty	Units	Owner of Record
				UG	NE	SE	33	20S	54E	COM	Y		9.96	AFA	WULFENSTEIN, RAY
64361		7/31/1998	PER	UG	NE	SE									
64361	71008		PER	UG	NW	NW	10	21S	54E	IRR			10	AFA	GRAMMER, JAMES ALLEN
64551		10/23/1998	PER	UG	NE	SW	10	21S	54E	COM			2	AFA	BOWMAN, MARK E. & DEBRA J.
64887		3/4/1999	PER	UG	NE	SE	16	21S	54E	MUN	Y		83.83	AFA	PAHRUMP UTILITY COMPANY, INC.
65105		5/5/1999	PER	UG	SE	SE	16	21S	54E	MUN	Y		126.73	AFA	HHH INVESTMENTS, LLC
65106		5/5/1999	PER	UG	SE	SE	16	21S	54E	MUN	Y		155	AFA	GOFF FAMILY TRUST DATED 2/3/98
65734		12/17/1999	PER	UG	SW	NE	3	21S	54E	IRR			1	AFA	D & E JOHNSON TRUST 5/12/98
65744		12/22/1999	PER	UG	NW	NW	3	21S	54E	COM					
66302	74568		APP	UG											
66302		4/21/2000	PER	UG	SW	SE	3	21S	54E	IRR			19.15	AFA	HAFEN, JANE M.
66920		11/3/2000	PER	UG	NW	SW	3	21S	54E	IRR			14.14	AFA	TRIPLE TECH, LLC
66924		11/6/2000	PER	UG	SW	NW	15	21S	54E	QM			4.5	AFA	LICATTA, DAVID
68495		2/15/2002	PER	UG	SE	SE	16	21S	54E	MUN			37.44	AFA	HHH INVESTMENTS, LLC
68801		5/10/2002	PER	UG	NW	NE	3	21S	54E	IND	Y		1	AFA	WULFENSTEIN TRUST R-501
68817	74721		APP	UG											
68817		5/15/2002	PER	UG	SW	NE	3	21S	54E	IRR			17.82	AFA	CHRISTENSEN, HANS
68817	73981		RFA	UG											
68908		6/20/2002	PER	UG	SW	NE	3	21S	54E	QM	Y		299.05	AFA	CHRISTENSEN, EDGAR LYLE
69222		10/7/2002	PER	UG	NW	NE	3	21S	54E	COM	Y		50	AFA	WULFENSTEIN TRUST R501 DATED 4/28/9
69248		10/16/2002	PER	UG	NE	SE	16	21S	54E	MUN	Y		67.464	AFA	HAFEN RANCH ESTATES
69249		10/16/2002	PER	UG	SE	SE	16	21S	54E	MUN	Y		134.66	AFA	HAFEN RANCH ESTATES
69372		12/6/2002	PER	UG	SW	NW	29	21S	54E	COM			0.3	AFA	PET CREMATION SERVICES
69694		2/27/2003	PER	UG	NE	SE	16	21S	54E	MUN	Y		22.83	AFA	HAFEN RANCH ESTATES
70269		7/28/2003	PER	UG	SW	NE	3	21S	54E	COM			10	AFA	NEVADA STAR INC.
70325		8/19/2003	PER	UG	NE	SW	3	21S	54E	QM	Y		1395.39	AFA	ADAVEN MANAGEMENT INC.
70325	72390		RFA	UG											
70326		8/19/2003	PER	UG	NE	SW	3	21S	54E	QM	Y		46.98	AFA	MOUNTAIN FALLS ACQUISITION CORP.
70327		8/19/2003	PER	UG	NE	SW	3	21S	54E	QM	Y		311.826	AFA	MOUNTAIN FALLS, LLC
70408		9/15/2003	PER	UG	SE	NE	16	21S	54E	MUN	Y		130.8	AFA	HHH INVESTMENTS, LLC
70651		11/19/2003	PER	UG	SE	NW	3	21S	54E	QM	Y		659.055	AFA	MOUNTAIN FALLS, LLC
70652		11/19/2003	PER	UG	SE	NW	3	21S	54E	QM	Y		281.515	AFA	MOUNTAIN FALLS, LLC
70873		2/12/2004	PER	UG	SE	NE	16	21S	54E	MUN	Y		240.38	AFA	HHH INVESTMENTS, LLC
70945		3/15/2004	PER	UG	NE	SE	29	20S	54E	COM	Y		105	AFA	WULFENSTEIN, RAY
71008		4/5/2004	PER	UG	NW	NE	3	21S	54E	COM	Y		10	AFA	WULFENSTEIN, RAY
71224		5/14/2004	PER	UG	NE	SE	16	21S	54E	MUN	Y		139.49	AFA	HHH INVESTMENTS, LLC
71362		6/22/2004	PER	UG	SW	NE	3	21S	54E	QM	Y		779.99	AFA	MOUNTAIN FALLS, LLC

App	Cert	File Date	Status	Sour	QQ	Qtr	Sec	Iwn	Rng	Type	Sup	Ann	Duty	Units	Owner of Record
72040		12/15/2004	PER	UG	SW	SE	3	21S	54E	QM	Y	5.44	AFA	ADAVEN MANAGEMENT, INC.	
72042		12/15/2004	PER	UG	SW	SE	3	21S	54E	QM	Y	288.41	AFA	ADAVEN MANAGEMENT, INC.	
72044		12/15/2004	PER	UG	SE	NE	16	21S	54E	QM	Y	253.78	AFA	ADAVEN MANAGEMENT, INC.	
72045		12/15/2004	PER	UG	SE	NE	16	21S	54E	QM	Y	118.11	AFA	ADAVEN MANAGEMENT, INC.	
72046		12/15/2004	PER	UG	SE	SE	16	21S	54E	QM	Y	34.26	AFA	ADAVEN MANAGEMENT, INC.	
72047		12/15/2004	PER	UG	NE	SE	16	21S	54E	QM	Y	16.59	AFA	ADAVEN MANAGEMENT, INC.	
72048		12/15/2004	PER	UG	NE	SE	16	21S	54E	QM	Y	145.02	AFA	ADAVEN MANAGEMENT, INC.	
72049		12/15/2004	PER	UG	SE	SE	16	21S	54E	QM	Y	7.97	AFA	ADAVEN MANAGEMENT, INC.	
72050		12/15/2004	PER	UG	SE	SE	16	21S	54E	QM	Y	56.76	AFA	ADAVEN MANAGEMENT, INC.	
72953		6/20/2005	PER	UG	SW	NE	33	20S	54E	COM	Y	5	AFA	SPRING MOUNTAIN RACEWAY, LLC	
72954		6/20/2005	PER	UG	SW	NE	33	20S	54E	COM	Y	2.1	AFA	SPRING MOUNTAIN RACEWAY, LLC	
72955		6/20/2005	PER	UG	SW	NE	33	20S	54E	COM	Y	3.15	AFA	SPRING MOUNTAIN RACEWAY, LLC	
72956		6/20/2005	PER	UG	SW	NE	33	20S	54E	COM	Y	0.5	AFA	SPRING MOUNTAIN RACEWAY, LLC	
73075		7/21/2005	PER	UG	SE	SE	16	21S	54E	QM	Y	47.89	AFA	ADAVEN MANAGEMENT, INC.	
73076		7/21/2005	PER	UG	SE	SE	16	21S	54E	QM	Y	6.8	AFA	ADAVEN MANAGEMENT, INC.	
73077		7/21/2005	PER	UG	NE	SE	16	21S	54E	QM	Y	123.16	AFA	ADAVEN MANAGEMENT, INC.	
73078		7/21/2005	PER	UG	NE	SE	16	21S	54E	QM	Y	14.14	AFA	ADAVEN MANAGEMENT, INC.	
73079		7/21/2005	PER	UG	SE	SE	16	21S	54E	QM	Y	29.21	AFA	ADAVEN MANAGEMENT, INC.	
73080		7/21/2005	PER	UG	SE	NE	16	21S	54E	QM	Y	100.71	AFA	ADAVEN MANAGEMENT, INC.	
73081		7/21/2005	PER	UG	SE	NE	16	21S	54E	QM	Y	216.38	AFA	ADAVEN MANAGEMENT, INC.	
73083		7/21/2005	PER	UG	SW	SE	3	21S	54E	QM	Y	245.91	AFA	ADAVEN MANAGEMENT, INC.	
73085		7/21/2005	PER	UG	SW	SE	3	21S	54E	QM	Y	4.63	AFA	ADAVEN MANAGEMENT, INC.	
V02287	19334		CER	SPR											
V02287	19335		CER	SPR											
V02287		1/6/1937	DEC	SPR	SW	NW	3	21S	54E	DEC		0	AFA	BOWMAN, CALVIN MURTON	

NOTE:  
Corrections include omitting "border" permits that were in the reported sections but fell outside the NDWR/Manse Fan delineation and the following correction for total reported duties (1715.17 AFA) that exceeded the supplemental total combined duty for the same permits (1474.63 AFA) by 240.54 AFA (see below).

Final calculated appropriated water rights for the area equal 13120.49 AFA.



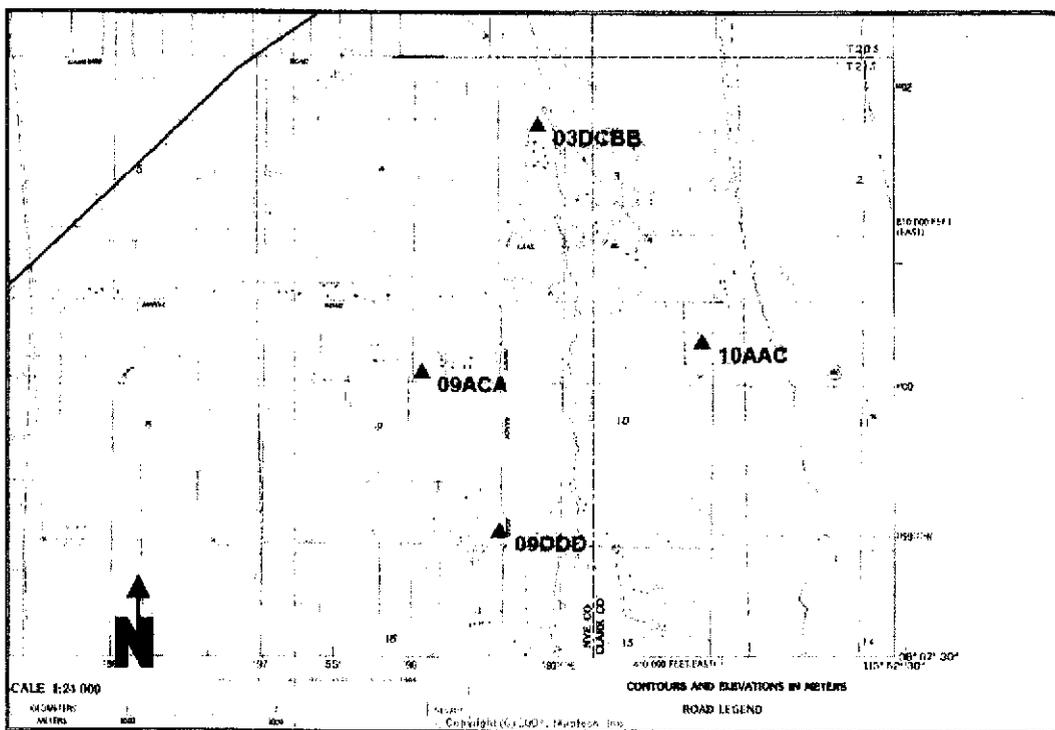
**Appendix B:**

**USGS Monitoring Well Site Records for the Study Area**

USGS  
WATER RESOURCES DIVISION  
1225 R STREET, NW  
WASHINGTON, DC 20004  
202-854-4000

**Appendix B:**

**USGS Monitoring Well Site Records for the Study Area**



**USGS Pahrump Quadrangle, NAD 83**

**USGS Monitoring Well Locations**

USGS 360755115541801 162 S21 E54 09DDD 1

Nye County, Nevada  
 Latitude 36°07'55",  
 Longitude 115°54'18" NAD27  
 Land-surface elevation  
 2,760. feet above sea level NGVD29  
 The depth of the well is 745 feet below  
 land surface.  
 The depth of the hole is 745 feet below  
 land surface.

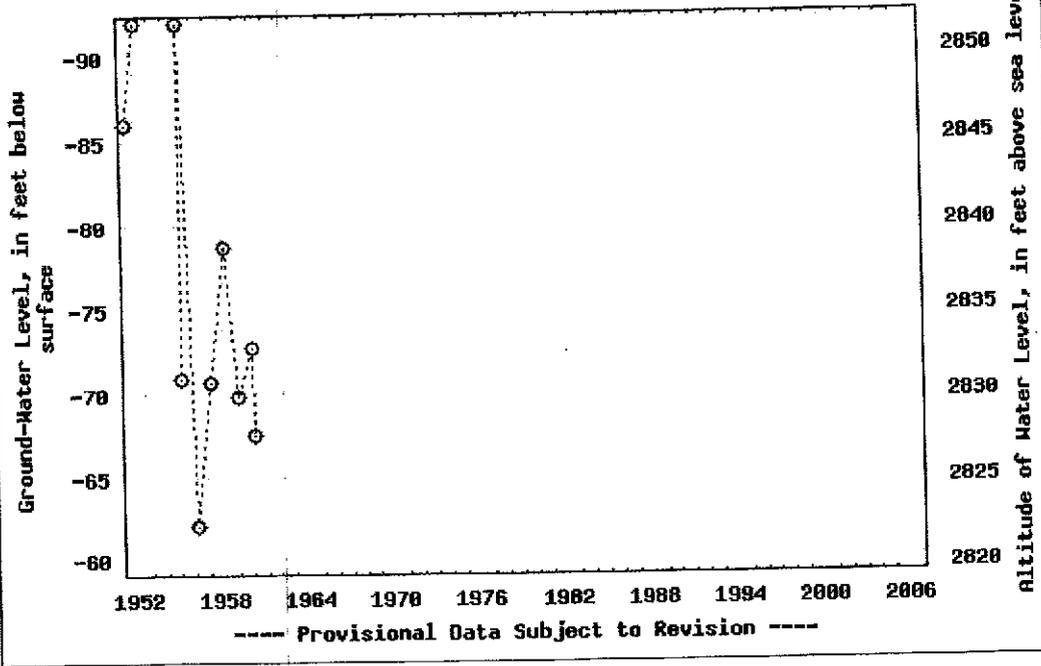
Output formats

Table of data
Tab-separated data
Graph of data
Reselect period

Date	Time	Water level, feet below land surface	<input type="checkbox"/> Status	Date	Time	Water level, feet below land surface	<input type="checkbox"/> Status
1951-05-01		-86		1968-11-19			P
1952-02-13		-92.0		1969-03-20			F
1955-02-11		-70.8		1969-07-30			P
1955-02-13		-92.0		1969-12-17			F
1956-02-10		-62.0		1970-04-10			P
1957-02-13		-70.6		1970-08-19			P
1958-02-14		-78.7		1970-12-09			F
1959-01-29		-69.8		1971-03-10			P
1960-02-04		-72.7		1971-08-30			P
1960-02-18		-67.5		1971-12-02			F
1966-10-13			F	1972-03-21			P
1967-01-19			P	1972-06-08			P
1967-04-11			P	1972-10-12			P
1967-05-17			P	1973-01-31			F
1967-10-17			P	1973-05-22			P
1968-01-16			F	1973-11-21			F
1968-04-18			F	1974-03-14			P
1968-08-20			P	1974-07-24			P
				1974-10-24			P



USGS 360755115541801 162 S21 E54 09DDD 1



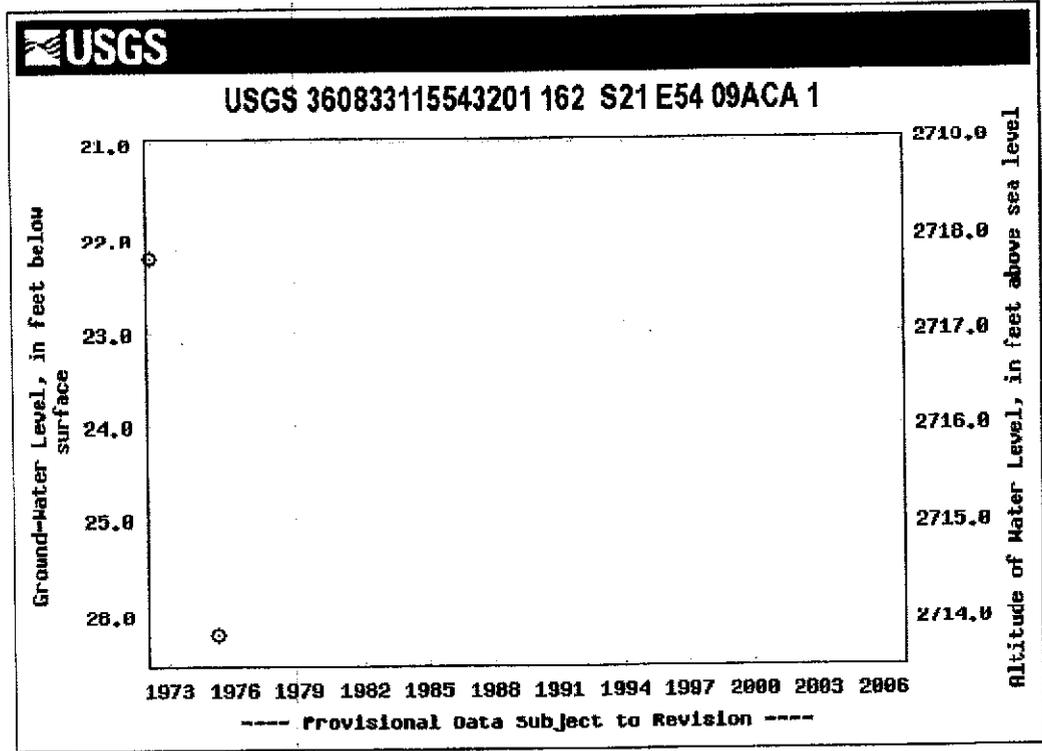
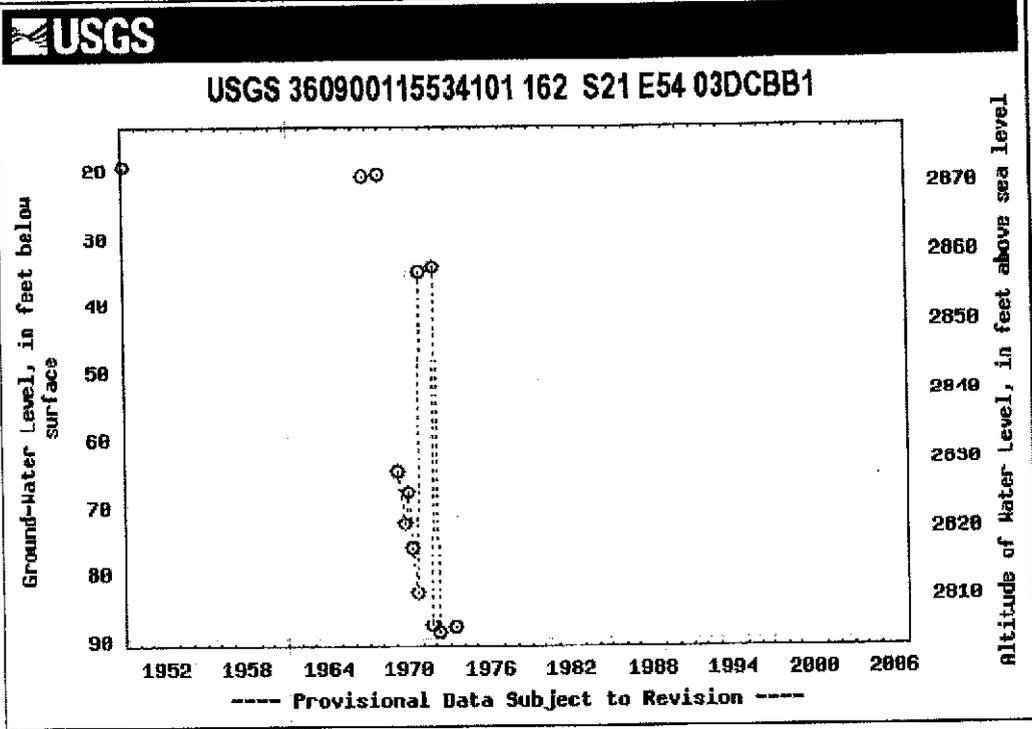
**USGS 360900115534101 162 S21 E54 03DCBB1**

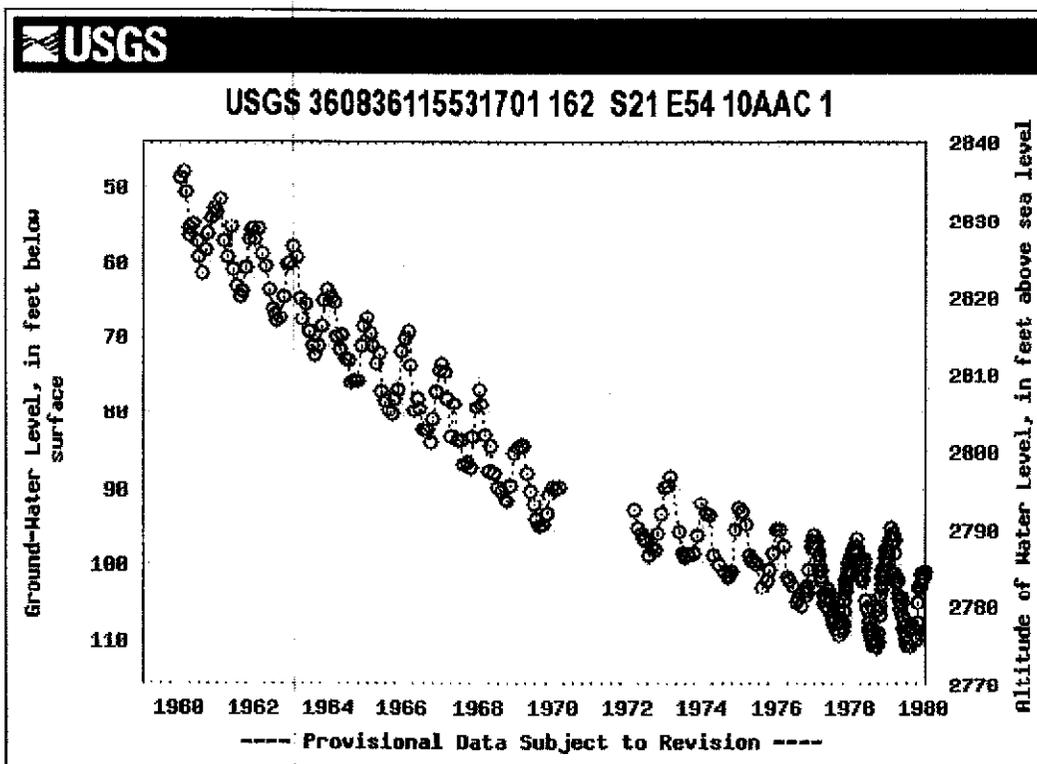
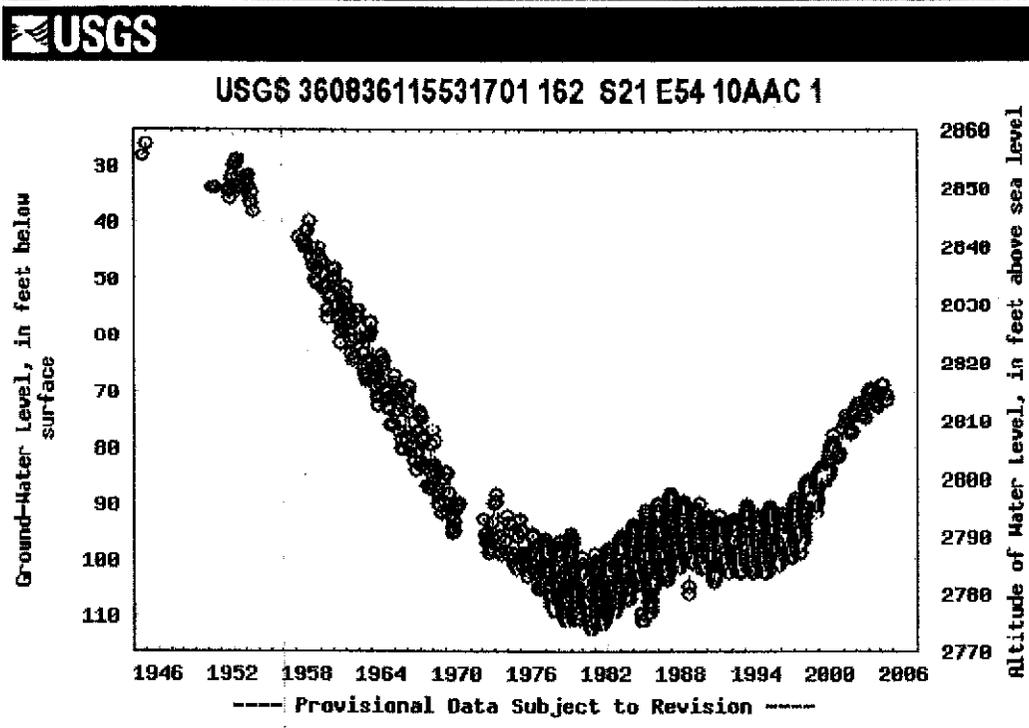
Clark County, Nevada  
 Latitude 36°09'00",  
 Longitude 115°53'41" NAD27  
 Land-surface elevation  
 2,893. feet above sea level NGVD29  
 The depth of the well is 970. feet below  
 land surface.  
 The depth of the hole is 970. feet below  
 land surface.

**Output formats**

Table of data
Tab-separated data
Graph of data
Reselect period

Date	Time	Water level, feet below land surface	<input type="checkbox"/> Status	Date	Time	Water level, feet below land surface	<input type="checkbox"/> Status
1949-02-22		19.70		1970-04-10		76.40	P
1950-02-15			N	1970-08-18		83.25	P
1966-10-13		21.40		1970-12-09		35.40	
1967-01-19			P	1971-03-10			P
1967-04-11			P	1971-08-16		87.95	
1967-07-18			P	1971-12-02		34.76	
1967-10-17			P	1972-03-21		89.00	P
1968-01-16		21.00		1972-06-08			P
1968-04-18			P	1972-10-12			P
1968-08-20			P	1973-01-31			P
1968-11-19			P	1973-05-22		88.24	
1969-03-20		65.20		1973-11-21			P
1969-08-21		73.00	P	1974-03-14			P
1969-12-17		68.12	P	1974-07-24			P
				1974-10-24			P





**Appendix C:**

**Manse Fan Water Use Analysis 1962 through 1978**

COPIED

1978

1978

**Appendix C: Manse Fan Water Use Analysis 1962-1978**

prepared by Lumos and Associates, Inc.

record for T21S, R54E Sections: 01, 02, 03, 04, 09, 10, 11, 12, 15, 16

Year	Permit #	Certificate#	Log #	Section	(spring AF)	Total acre-feet	Name	status (changes)	Year Total AFA
1962	12547	4051	1093	3	3	406.56	E. S. Bowman	ABR	6491.59 0
	10571	2987	11018	3	3	457.84	E. S. Bowman	CER	
	13844	4103	97752	3	3	741.444	E. S. Bowman	ABR(POU, 10599)	
	11132	2989		3	3	1,368.67	E. S. Bowman	ABR(POD, 10593)	
	10472	2986	12039	3	3	874.63	A. J. Frehner	ABR	
	10600	2988		3	3	820.383	P. Bowman	ABR	
	13669	4621	1664	9	9	669.841	P. Bowman	CER	
	15310	4284		16	16	632.086	M. Hafen & Sons	ABR(POU, 13668)	
	12545		884	16	16	520.136	M. Hafen & Sons	ABR	
						6491.59			
1963						0			
1964	12547	4051	1093	3	3	1,317.41	Mevin Bowman	ABR	11828.08
	10571	2987	11018	3	3	1,573.49	Murton Bowman	CER	
	11132	2989		3	3	1,777.78	Anderson	ABR(POD, 10593)	
	13844	4103	97752	3	3	1,602.26	Christensen	ABR(POU, 10599)	
	10472	2986	12039	3	3	1,254.12	Hafen	ABR	
	10600	2988		3	3	1,356.48	P. Bowman	ABR	
	13669	4621	1664	9	9	1,253.89	P. Bowman	CER	
	15310	4284		16	16	981.50	Hafen	ABR	
	12545		884	16	16	711.14	Hafen	ABR	
						11,828.08			
1965	12547	4051	1093	3	3	1,360.66	Mevin Bowman	ABR	10815.29
	10571	2987	11018	3	3	1,533.64	Murton Bowman	CER	
	11132	2989		3	3	2,175.83	Anderson	ABR(POD, 10593)	
	13844	4103	97752	3	3	1,141.67	Christensen	ABR(POU, 10599)	
	10472	2986	12039	3	3	848.40	Hafen	ABR	
	10600	2988		3	3	1,457.96	P. Bowman	ABR	
	13669	4621	1664	9	9	1,219.21	P. Bowman	CER	
	15310	4284		16	16	649.28	Hafen	ABR	
	12545		884	16	16	428.64	Hafen	ABR	
						10,815.29			

Year	Permit #	Certificate#	Log #	Section	(spring AF)	Total acre-feet	Name	status (changes)	Year Total AFA	
1966	12547	4051	1093	3	426.685	1,278.51	Mevin Bowman	ABR		
	10571	2987	11018	3	644.225	1,482.06	Murton Bowman	CER		
	11132	2989		3		1,740.59	Anderson	ABR(POD,10593)		
	13844	4103	97752	3		1,098.23	Christensen	ABR(POU,10599)		
	10472	2986	12039	3		1,292.59	Tim Hafen Ranches	ABR		
	15309	4285		16		555.222	Tim Hafen Ranches	ABR(POU,13862)		
	15310	4284		16		0	Tim Hafen Ranches	ABR(POU,13668)		
	15308	4820	884	16		218.566	Tim Hafen Ranches	ABR(POU,12545)		
	10600	2988		3		1,469.26	P. Bowman	ABR		
	13669	4621	1664	9		1,767.08	P. Bowman	CER		
							10,902.11			10,902.11
	1967	12547	4051	1093	3	0	996.82	Mevin Bowman	ABR	
		10571	2987	11018	3	1,100.11	2,166.13	Murton Bowman	CER	
11132		2989		3		1,758.03	Anderson	ABR(POD,10593)		
13844		4103	97752	3		1,075.03	Christensen	ABR(POU,10599)		
10472		2986	12039	3		818.10	Tim Hafen Ranches	ABR		
15309		4285		16		664.62	Tim Hafen Ranches	ABR(POU,13862)		
15310		4284		16		0.00	Tim Hafen Ranches	ABR(POU,13668)		
15308		4820	884	16		362.86	Tim Hafen Ranches	ABR(POU,12545)		
10600		2988		3		1,498.22	P. Bowman	ABR		
13669		4621	1664	9		1,050.52	P. Bowman	CER		
							10,390.32			10,390.32
1968		12547	4051	1093	3	0	1,347.52	Mevin Bowman	ABR	
		10571	2987	11018	3	861.4	3,003.43	Murton Bowman	CER	
	11132	2989		3		2,391.02	Anderson	ABR(POD,10593)		
	13844	4103	97752	3		1,228.27	Christensen	ABR(POU,10599)		
	10472	2986	12039	3		1,804.90	Tim Hafen Ranches	ABR		
	15309	4285		16		1,062.60	Tim Hafen Ranches	ABR(POU,13862)		
	15310	4284		16		0	Tim Hafen Ranches	ABR(POU,13668)		
	15308	4820	884	16		343.76	Tim Hafen Ranches	ABR(POU,12545)		
	10600	2988		3		2,086.51	P. Bowman	ABR		
	13669	4621	1664	9		899.36	P. Bowman	CER		
							14,167.37			14,167.37

Year	Permit #	Certificate#	Log #	Section	(spring AF)	Total acre-feet	Name	status (changes)	Year Total AFA	
1969	12547	4051	1093	3	0	1,140.88	Mevin Bowman	ABR		
	10571	2987	11018	3	714.532	1,628.85	Murton Bowman	CER		
	11132	2989		3		1,630.66	Anderson	ABR(POD, 10593)		
	13844	4103	97752	3		995.32	Christensen	ABR(POU, 10599)		
	10472	2986	12039	3		1,638.49	Tim Hafen Ranches	ABR		
	15309	4285		16		751.82	Tim Hafen Ranches	ABR(POU, 13862)		
	15310	4284		16		0.00	Tim Hafen Ranches	ABR(POU, 13668)		
	15308	4820	884	16		263.01	Tim Hafen Ranches	ABR(POU, 12545)		
	10600	2988		3		2,135.94	P. Bowman	ABR		
	13669	4621	1664	9		904.25	P. Bowman	CER		
							11,089.21			11,089.21
	<b>1962 to 1969 Total Acre-Feet</b>									
	1969		75683.97							
	1970	19032	6867		3		1,248.15	Melvin Bowman	ABR (POU, 12547)	
19031		6866		3		1,050.72	Murton Bowman	CER(POU, 10571)		
2287		Manse Spring			441.65	441.65	Murton Bowman	CER(POU, 10571)		
19029		7031		3		2,390.76	Linford Anderson	ABR (POU, 11132)		
19030		6768	62100(82)	3		1,644.98	Lyle Christensen	CER (POU, 13844)		
24157		7600		3		1,711.14	Tim Hafen Ranches	ABR (POU, MOU10472)		
18070			2696	9		0.00	Tim Hafen Ranches	ABR (POU, POD, 14242)		
24158			9214	16		1,160.00	Tim Hafen Ranches	ABR (POU, POD, 17884)		
24159		7957	2696	9		0.00	Tim Hafen Ranches	ABR (POU, POD, 17884)		
24153		7601	1702	16		580.72	Tim Hafen Ranches	ABR (POU, POD, 18070)		
24154		7602	884	16		305.45	Tim Hafen Ranches	ABR (POU, POD, 18070)		
24156		7986	9214	16		1,153.62	Tim Hafen Ranches	ABR (POU, POD, 18070)		
10600		2988		3		1,924.23	Perry Bowman	ABR (POU, 13667)		
13669		4621	1664	9		969.85	Perry Bowman	ABR		
							14,581.27			14,581.27

Year	Permit #	Certificate#	Log #	Section	(spring AF)	Total acre-feet	Name	status (changes)	Year Total AFA
1971	19032	6867		3		1,314.92	Melvin Bowman	ABR (POU, 12547)	13,028.47
	19031	6866		3		1,635.06	Murton Bowman	CER(POU, 10571)	
	2287	Manse Spring			715.4	715.40	Murton Bowman	CER(POU, 10571)	
	19029	7031		3		1,780.88	Linford Anderson	ABR (POU, 11132)	
	19030	6768	62100(&2)	3		1,524.96	Lyle Christensen	CER (POU, 13844)	
	24157	7600		3		1,307.64	Tim Hafen Ranches	ABR (POU, MOU10472)	
	18070		2696	9		0.00	Tim Hafen Ranches	ABR (POU, POD, 14242)	
	24158		9214	16		965.12	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24159	7957	2696	9		0.00	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24153	7601	1702	16		480.70	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24154	7602	884	16		233.93	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24156	7956	9214	16		979.44	Tim Hafen Ranches	ABR (POU, 13667)	
	10600	2988		3		1,113.21	Perry Bowman	ABR	
	13669	4621	1664	9		977.22	Perry Bowman	CER	
1972	19032	6867		3		1,033.50	Melvin Bowman	ABR (POU, 12547)	12,468.14
	19031	6866		3		1,654.73	Murton Bowman	CER(POU, 10571)	
	2287	Manse Spring			715.4	715.40	Murton Bowman	CER(POU, 10571)	
	19029	7031		3		1,659.12	Linford Anderson	ABR (POU, 11132)	
	19030	6768	62100(&2)	3		1,376.70	Lyle Christensen	CER (POU, 13844)	
	24157	7600		3		1,168.20	Tim Hafen Ranches	ABR (POU, MOU10472)	
	24158		9214	16		0.00	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24159	7957	2696	9		1,056.38	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24153	7601	1702	16		665.00	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24154	7602	884	16		287.57	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24156	7956	9214	16		788.04	Tim Hafen Ranches	ABR (POU, 13667)	
	26511	7960		16		140.80	Tim Hafen Ranches	REL(POU, 25829)	
	10600	2988		3		1,205.40	Perry Bowman	ABR	
	13669	4621	1664	9		717.30	Perry Bowman	CER	

Year	Permit #	Certificate#	Log #	Section	(Spring AF)	Total acre-feet	Name	status (changes)	Year Total AFA
1973	19032	6867		3		1,119.40	Melvin Bowman	ABR (POU, 12547)	
	19031	6866		3		1,239.52	Murton Bowman	CER(POU, 10571)	
	2287	Manse Spring			576.7	576.7	Murton Bowman	CER(POU, 10571)	
	19029	7031		3		2,096.20	Linford Anderson	ABR (POU, 11132)	
	19030	6768	62100(&2)	3		1,546.14	Lyle Christensen	CER (POU, 13844)	
	24157	7600		3		1,669.70	Tim Hafen Ranches	ABR (POU, MOU10472)	
	24158	7957	9214	16		0.00	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24159	7601	2696	9		1,115.84	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24153	7602	1702	16		936.32	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24154	7602	884	16		117.71	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24156	7956	9214	16		1,346.40	Tim Hafen Ranches	ABR (POU, 13667)	
	26511	7960		16		140.80	Tim Hafen Ranches	REL(POU, 25829)	
	10600	2988		3		885.60	Perry Bowman	ABR	
	13669	4621	1664	9		1,114.83	Perry Bowman	CER	
						13,905.16			13,905.16
1974	19032	6867		3		1,505.40	Melvin Bowman	ABR (POU, 12547)	
	19031	6866		3		1,305.56	Murton Bowman	CER(POU, 10571)	
	2287	Manse Spring			395	395	Murton Bowman	CER(POU, 10571)	
	19029	7031		3		1,784.00	Linford Anderson	ABR (POU, 11132)	
	19030	6768	62100(&2)	3		1,461.42	Lyle Christensen	CER (POU, 13844)	
	24157	7600		3		1,233.10	Tim Hafen Ranches	ABR (POU, MOU10472)	
	24159	7957	9214	16		0.00	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24158	7601	2696	9		972.40	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24153	7602	1702	16		750.12	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24154	7956	884	16		154.96	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24156	7956	9214	16		1,100.88	Tim Hafen Ranches	ABR (POU, 13667)	
	26511	7960		16		0.00	Tim Hafen Ranches	REL(POU, 25829)	
	10600	2988		3		971.70	Perry Bowman	ABR	
	13669	4621	1664	9		1,089.20	Perry Bowman	CER	
						12,723.74			12,723.74

Year	Permit #	Certificate#	Log #	Section	(spring AF)	Total acre-feet	Name	status (changes)	Year Total AFA
1975	19032	6867		3		1,370.48	Melvin Bowman	ABR (POU, 12547)	
	19031	6866		3		1,559.56	Murton Bowman	CER(POU, 10571)	
	19031	Old well				130.24	Murton Bowman	CER(POU, 10571)	
	19029	7031		3		1,810.76	Linford Anderson	ABR (POU, 11132)	
	19030	6768	62100(&2)	3		1,616.74	Lyle Christensen	CER (POU, 13844)	
	24157	7600		3		949.90	Tim Hafen Ranches	ABR (POU, MOU10472)	
	24159		9214	16		446.17	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24158	7957	2696	9		782.34	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24153	7601	1702	16		736.82	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24154	7602	884	16		320.35	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24156	7956	9214	16		891.00	Tim Hafen Ranches	ABR (POU, 13667)	
	26511	7960		16		0.00	Tim Hafen Ranches	REL(POU, 25829)	
	10600	2988		3		947.10	Perry Bowman	ABR	
	13669	4621	1664	9		1,120.32	Perry Bowman	CER	12,681.78
1976	19032	6867		3		1,389.00	Melvin Bowman	ABR (POU, 12547)	
	19031	6866		3		1,452.88	Murton Bowman	CER(POU, 10571)	
	19031	Old well				112.64	Murton Bowman	CER(POU, 10571)	
	19029	7031		3		1,757.24	Linford Anderson	ABR (POU, 11132)	
	19030	6768	62100(&2)	3		1,249.62	Lyle Christensen	CER (POU, 13844)	
	24157	7600		3		1,280.30	Tim Hafen Ranches	ABR (POU, MOU10472)	
	24159		9214	16		423.72	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24158	7957	2696	9		795.60	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24153	7601	1702	16		593.31	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24154	7602	884	16		341.21	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24156	7956	9214	16		914.76	Tim Hafen Ranches	ABR (POU, 13667)	
	26511	7960		16		0.00	Tim Hafen Ranches	REL(POU, 25829)	
	10600	2988		3		897.90	Perry Bowman	ABR	
	13669	4621	1664	9		1,131.99	Perry Bowman	CER	12,340.17

Year	Permit #	Certificate#	Log #	Section	(spring AF)	Total acre-feet	Name	status (changes)	Year Total AFA
1977	19032	6867		3		1,389.00	Melvin Bowman	ABR (POU, 12547)	
	19031	6866		3		1,447.80	Murton Bowman	CER(POU, 10571)	
	19031	Old well				274.56	Murton Bowman	CER(POU, 10571)	
	19029	7031		3		2,854.40	Linford Anderson	ABR (POU, 11132)	
	19030	6768	62100(&2)	3		1,291.98	Lyle Christensen	CER (POU, 13844)	
	24157	7600		3		1,191.80	Tim Hafen Ranches	ABR (POU, MOU10472)	
	24159		9214	16		102.96	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24158	7957	2696	9		680.68	Tim Hafen Ranches	ABR (POU, POD, 17884)	
	24153	7601	1702	16		53.20	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24154	7602	884	16		198.17	Tim Hafen Ranches	ABR (POU, POD, 18070)	
	24156	7956	9214	16		700.92	Tim Hafen Ranches	ABR (POU, 13667)	
	10600	2988		3		688.80	Perry Bowman	ABR	
	13875	4363	18551	9		198.39	Adaven Management, Inc.	CER	
						11,072.66			11,072.66
	1978	19032	6867		3		1,389.00	Melvin Bowman	ABR (POU, 12547)
19031		6866		3		838.20	Murton Bowman	CER(POU, 10571)	
19031		Old well				415.88	Murton Bowman	CER(POU, 10571)	
19029		7031		3		2,283.52	Linford Anderson	ABR (POU, 11132)	
19030		6768	62100(&2)	3		1,320.22	Lyle Christensen	CER (POU, 13844)	
24157		7600		3		784.70	Tim Hafen Ranches	ABR (POU, MOU10472)	
24159			9214	16		118.80	Tim Hafen Ranches	ABR (POU, POD, 17884)	
24160		7957	2696	9		539.24	Tim Hafen Ranches	ABR (POU, POD, 17884)	
15310		4284		16		0.00	Tim Hafen Ranches	ABR (POU, 13668)	
24154		7602	884	16		235.42	Tim Hafen Ranches	ABR (POU, POD, 18070)	
24156		7956	9214	16		491.04	Tim Hafen Ranches	ABR (POU, 13667)	
10600		2988		3		467.40	Perry Bowman	ABR	
13875		4363	18551	9		564.04	Adaven Management, Inc.	CER	
						9,447.46			9,447.46
1970 to 1978		112,248.85	Total Acre-Foot			Average over 7 years =	12472 AFA		
1962 to 1969	75683.97	Total Acre-Foot			Average over 9 years =	10812 AFA			
1962 to 1978	187,932.82	Total Acre-Foot			Average over 16 years =	11746 AFA			

**Appendix D**

**Manse Fan Groundwater Pumpage Inventory 1985 through 2005**

RECEIVED  
MAY 15 2007  
SOUTH CAROLINA DEPARTMENT OF  
NATURAL RESOURCES

Appendix D: Manse Fan Groundwater Pumpage Inventory										
Prepared by Lumos and Associates										
1985 through 2005										
Records are for points of diversion (POD) on Sections: 01,02,03,04,09,10,11,12,15,16										
Year	Application/Permit numbers	Certificate Y/N	POU* Sections	Total (AFA)	Owner of Record	Total for Year (AFA)				
1985	10571, 14291, 19031, 21183	Y	04, 05	1,476.00	Murton Bowman					
	19334									
	11132, 14241, 19029, 24773	Y	03, 04, 05	928	Linford Anderson					
	13669, 13875, 22735	Y	09, 16, 17	1,968.50	Perry Bowman					
	19030	Y	04, 05	1,148.00	Edgar Christense					
	41157, 41158, 41159, 41160	N	08, 09, 16, 17	3,097.50	Tim Hafen Ranches Inc.					
	41161, 41162, 41163, 41164									
41167, 41169, 41170, 41171										
41172, 49838									8,618.00	
1986	10571, 14291, 19031, 21183	Y	04, 05	1,176.55	Murton Bowman					
	19334									
	11132, 14241, 19029, 24773	Y	03, 04, 05	1228	Linford Anderson					
	13669, 13875, 22735	Y	09, 16, 17	1,934.00	Perry Bowman					
	19030	Y	04, 05	1,073.00	Edgar Christense					
1987	41157, 41158, 41159, 41160	N	08, 09, 16, 17	3,148.00	Tim Hafen Ranches Inc.					
	41161, 41162, 41163, 41164									
	41167, 41169, 41170, 41171									
	41172, 49838									7,383.00
	10571, 14291, 19031, 21183	Y	04, 05	934.50	Murton Bowman					
19334										
11132, 14241, 19029	Y	03, 04, 05	1228	Linford Anderson						
13669, 13875, 22735	Y	09, 16, 17	1,934.00	Perry Bowman						
19030	Y	04, 05	1,073.00	Edgar Christense						
41157, 41158, 41159, 41160	N	08, 09, 16, 17	3,464.00	Tim Hafen Ranches Inc.						
41161, 41162, 41163, 41164										
41167, 41169, 41170, 41171										
41172, 49838									8,633.50	

\* POU = points of use, have been checked against corresponding POD)

Year	Application/Permit numbers	Certificate Y/N	POU* Sections	Total (AFA)	Owner of Record	Total for Year (AFA)
1988	10571, 14291, 19031, 21183	Y	04, 05	1,016.30	Murton Bowman	8,432.50
	11132, 14241, 19029, 24773	Y	03, 04, 05	1028	Linford Anderson	
	13669, 13875, 22735	Y	09, 16, 17	1,934.00	Perry Bowman	
	19030	Y	04, 05	990.20	Edgar Christense	
	41157, 41158, 41159, 41160	N	08, 09, 16, 17	3,464.00	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
41172, 49838						
1989	10571, 14291, 19031, 21183	Y	04, 05	1,125.00	Murton Bowman	8,383.70
	11132, 14241, 19029, 24773	Y	03, 04, 05	1028	Linford Anderson	
	13669, 13875, 22735	Y	09, 16, 17	1,934.00	Perry Bowman	
	19030	Y	04, 05	990.20	Edgar Christense	
	41157, 41158, 41159, 41160	N	08, 09, 16, 17	3,306.50	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
41172, 49838						
1990	10571, 14291, 19031, 21183	Y	04, 05	1,125.00	Murton Bowman	8,621.90
	11132, 14241, 19029, 24773	Y	03, 04, 05	970.5	Linford Anderson	
	13669, 13875, 22735	Y	09, 16, 17	1,934.00	Perry Bowman	
	19030	Y	04, 05	829.00	Edgar Christense	
	41157, 41158, 41159, 41160	N	08, 09, 16, 17	3,763.40	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
41172, 49838						

Year	Application/Permit numbers	Certificate Y/N	POU* Sections	Total (AFA)	Owner of Record	Total for Year (AFA)
1991	10571, 14291, 19031, 21183	Y	04, 05	931.80	Murton Bowman	7,971.30
	1132, 14241, 19029, 24773	Y	03, 04, 05	1,140.50	Linford Anderson	
	13669, 13875, 22735	Y	09, 16, 17	1,858.50	Perry Bowman	
	19030	Y	04, 05	776.50	Edgar Christense	
	41157, 41158, 41159, 41160	N	08, 09, 16, 17	3,264.00	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
41172, 49838						
1992	10571, 14291, 19031, 21183	Y	04, 05	864.55	Murton Bowman	7,502.55
	1132, 14241, 19029, 24773	Y	03, 04, 05	1,115.50	Linford Anderson	
	13669, 13875, 22735	Y	09, 16, 17	1,616.00	Perry Bowman	
	19030	Y	04, 05	731.00	Edgar Christense	
	41157, 41158, 41159, 41160	N	08, 09, 16, 17	3,175.50	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
41172, 49838						
1993	10571, 14291, 19031, 21183	Y	04, 05	889.05	Murton Bowman	7,477.15
	1132, 14241, 19029, 24773	Y	03, 04, 05	826.50	Linford Anderson	
	13669, 13875, 22735	Y	09, 16, 17	1,516.00	Perry Bowman	
	19030	Y	04, 05	878.00	Edgar Christense	
	41157, 41158, 41159, 41160	N	08, 09, 16, 17	3,367.60	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
41172, 49838						

Year	Application/Permit numbers	Certificate Y/N	POU* Sections	Total (AFA)	Owner of Record	Total for Year (AFA)
1994	10571, 14291, 19031, 21183	Y	04, 05	1,174.05	Murton Bowman	
	11132, 14241, 19029, 24773	Y	03, 04, 05	626.50	Linford Anderson	
	13669, 13875, 22735	Y	09, 16, 17	1,641.00	Perry Bowman	
	19030	Y	04, 05	878.00	Edgar Christense	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	3,589.50	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
	41172, 49838					7,909.05
1995	10571, 14291, 19031, 21183	Y	04, 05	1,549.05	Murton Bowman	
	11132, 14241, 19029, 24773	Y	03, 04, 05	500.00	Linford Anderson	
	13669, 13875, 22735	Y	09, 16, 17	1,641.50	Perry Bowman	
	19030	Y	04, 05	1,094.00	Edgar Christense	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	3,356.00	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
	41172, 49838					8,140.55
1996	10571, 14291, 19031, 21183	Y	04, 05	1,326.55	Murton Bowman	
	11132, 14241, 19029, 24773	Y	03, 04, 05	578.00	Linford Anderson	
	13669, 13875, 22735, 59414	Y (except 59414)	09, 16, 17	1,643.50	Perry Bowman	
	19030	Y	04, 05	1,094.00	Edgar Christense	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	3,290.50	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164	(except 58956 and 60911)				
	41167, 41169, 41170, 41171					
	41172, 49838, 58956, 60911					
	57337	N	15	4.5	Hepburn	7,937.05

Year	Application/Permit numbers	Certificate Y/N	POJ* Sections	Total (AFA)	Owner of Record	Total for Year (AFA)
1997	10571, 14291, 19031, 21183	Y	04, 05	1,326.55	Murton Bowman	105750.75 8134.67 AFA
	11132, 14241, 19029, 24773	Y	03, 04, 05	663.00	Linford Anderson	
	13669, 13875, 22735, 59414	Y (except 59414)	09, 16, 17	2,039.50	Perry Bowman	
	19030	Y	04, 05	1,094.00	Edgar Christense	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	3,609.55	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164	(except 58956 and 60911)				
	41167, 41169, 41170, 41171					
	41172, 49838, 58956, 60911					
	26510, 29941					
	45574	Y	16	3.40	Santovito	
1998	57337	N	15	4.5	Heppburn	8,740.50
	Total for 13-years = (1985 to 1997)					105750.75
	Average over 13-year period =					8134.67 AFA
	10571, 14291, 19031, 21183	Y	04, 05	0.00	Murton Bowman	6,615.30
	11132, 14241, 19029, 24773	Y	03, 04, 05	37.65	Linford Anderson	
	13669, 13875, 22735, 59414	Y (except 59414)	09, 16, 17	1,854.50	Perry Bowman	
	19030	Y	04, 05	1,013.00	Edgar Christense	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	3,699.75	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164	(except 58956 and 60911)				
	41167, 41169, 41170, 41171					
41172, 49838, 58956, 60911						
26510, 29941						
45574	Y	16	3.40	Santovito		
57337, 57338	N	15	5	Heppburn		
63142	N	19	2	Markut		

Year	Application/Permit numbers	Certificate Y/N	POU* Sections	Total (AFA)	Owner of Record	Total for Year (AFA)
1999	10571, 14291, 19031, 21183	Y	04, 05, 06	680.00	Murton Bowman	5,765.42
	11132, 14241, 19029, 24773	Y	03, 04, 05	0.00	Linford Anderson	
	13669, 13875, 22735, 59414	Y (except 59414)	09, 16, 17	1,635.50	Perry Bowman	
	19030	Y	04, 05	619.00	Edgar Christense	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	2,822.37	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164	(except 58956 and 60911)				
	41167, 41169, 41170, 41171					
	41172, 49838, 58956, 60911					
	26510, 29941					
	45574	Y	16	3.40	Santovito	
2000	57337, 57338	N	15	5	Hepburn	
	63142	N	19	0.14	Markut	
	63145	N	19	0.01	US Post Office	
	10571, 14291, 19031, 21183	Y	04, 05, 06	362.50	Murton Bowman	
	11132, 14241, 19029, 24773	Y	03, 04, 05	0.00	Linford Anderson	
	13669, 13875, 22735, 59414	Y (except 59414)	09, 16, 17	1,635.50	Perry Bowman	
	19030	Y	04, 05	0.00	Edgar Christense	
	24873	Y	19	2.00	Oxborrow	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	2,690.14	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164	(except 58956)				
41167, 41169, 41170, 41171						
41172, 49838, 58956, 60911						
26510, 29941						
45574	Y	16	7.74	Santovito		
57337, 57338	N	15	5.84	Hepburn		
63142	N	19	0.53	Markut		
63145	N	19	0.01	US Post Office		
64551	N	10	2.00	Grammer		
65105, 65106	N	16, 17	3.00	HHH Investments		
65459, 65460, 65461	N	3	0.10	Collins		
					4,709.36	

Year	Application/Permit numbers	Certificate Y/N	POU* Sections	Total (AFA)	Owner of Record	Total for Year (AFA)
2001	10571, 14291, 19031, 21183	Y	04, 05, 06	0.00	Murton Bowman	4,522.66
	11132, 14241, 19029, 24773	Y	03, 04, 05	0.00	Linford Anderson	
	13669, 13875, 22735, 59414	Y (except 59414)	09, 16, 17	1,497.50	Perry Bowman	
	19030	Y	04, 05	117.88	Edgar Christense	
	24873	Y	19	2.00	Oxborrow	
	24874	Y	19	45.00	Kent Leonard	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	2,711.43	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164	(except 58956)				
	41167, 41169, 41170, 41171					
	41172, 49838, 58956, 60911					
	26510, 29941					
	45574	Y	16	5.48	Santovito	
	57337, 57338	N	15	3.28	Hepburn	
	63142	N	19	0.1	Markut	
63145	N	19	0.01	US Post Office		
64551	N	10	8.76	Grammer		
65105, 65106	N	16, 17	11.00	HHH Investments		
65459, 65460, 65461	N	3	120.22	Collins		

Year	Application/Permit numbers	Certificate Y/N	POU* Sections	Total (AFA)	Owner of Record	Total for Year (AFA)
2002	10571, 14291, 19031, 21183	Y	04, 05, 06	0.00	Murton Bowman	
	11132, 14241, 19029, 24773	Y	03, 04, 05	0.00	Linford Anderson	
	13669, 13875, 22735, 59414	Y (except 59414)	09, 16, 17	737.10	Perry Bowman	
	19030	Y	04, 05	58.77	Edgar Christense	
	24874	Y	19	0.00	Kent Leonard	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	2,275.84	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
	41172, 49838, 58956, 60911					
	26510, 29941					
	45574	Y	16	5.60	Santovito	
	57337, 57338	Y	15	0.25	Hepburn	
	63142	N	19	0.06	Markut	
	63145	N	19	0.01	US Post Office	
	63964	N	3	2.00	Goff Family Trust	
	64551	N	10	10.25	Grammer	
	64887	N	10	1.00	Bowman	
	65105, 65106	N	16, 17	43.79	HHH Investments	
	65459, 65460, 65461	N	3	55.08	Collins	
	66920	N	3	1.00	Christensen	
	66924	N	15	1.00	Terrel	
	67336	N	10	1.00	Gangadharan	
						3,192.75

Year	Application/Permit numbers	Certificate Y/N	POU* Sections	Total (AFA)	Owner of Record	Total for Year (AFA)
2003						
	10571, 14291, 19031, 21183	Y	04, 05, 06	0.00	Murton Bowman	
	11132, 14241, 19029, 24773	Y	03, 04, 05	0.00	Linford Anderson	
	13669, 13875, 22735, 59414	Y (except 59414)	09, 16, 17	923.00	Perry Bowman	
	19030	Y	04, 05	111.12	Edgar Christense	
	24874	Y	19	0.00	Kent Leonard	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	1,326.14	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
	41172, 49838, 58956, 60911					
	26510, 29941					
	45574	Y	16	3.40	Santovito	
	57337, 57338	Y	15	0.25	Hepburn	
	63142	N	19	0	Markut	
	63145	N	19	0.01	US Post Office	
	63964	N	3	1.49	Goff Family Trust	
	64551	N	10	11.19	Grammer	
	64887	N	10	0.00	Bowman	
	65105, 65106, 68495, 69248	N	16, 17	174.88	HHH Investments	
	69249					
	65459, 65460, 65461	N	3	131.25	Collins	
	66920	N	3	1.00	Christensen	
	66924	N	15	1.00	Terrel	
	67336	N	10	1.00	Gangadharan	
	68801	N	3	0.50	Wuifenstein	
						2,686.23

Year	Application/Permit numbers	Certificate Y/N	POU* Sections	Total (AFA)	Owner of Record	Total for Year (AFA)
2004	10571, 14291, 19031, 21183	Y	04, 05, 06	0.00	Murton Bowman	
	11132, 14241, 19029, 24773	Y	03, 04, 05	0.00	Linford Anderson	
	13669, 13875, 22735, 59414	Y (except 59414)	09, 16, 17	1,062.10	Perry Bowman	
	19030	Y	04, 05	180.71	Edgar Christense	
	24874	Y	19	0.00	Kent Leonard	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	1,073.89	Tim Haifen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
	41172, 49838, 58956, 60911					
	26510, 29941					
	45574	Y	16	7.20	Santovito	
	57337, 57338	Y	15	0.25	Hepburn	
	63142	N	19	0	Markut	
	63145	N	19	0.01	US Post Office	
	63964	N	3	0.00	Goff Family Trust	
	64551	N	10	9.63	Grammer	
	64887	N	10	0.00	Bowman	
	65105, 65106, 68495, 69248	N	16, 17	158.58	HHH Investments	
	69249, 69694, 70408					
	65459, 65460, 65461	N	3	207.61	Collins	
	66920	N	3	0.00	Christensen	
	66924	N	15	1.00	Terrel	
	67336	N	10	0.79	Gangadharan	
	68801	N	3	53.38	Wulfenstein	
	68988	N	19	0.95	Hernandez	
	69825	N	19	1.12	Cavallo	
						2,757.22

Year	Application/Permit numbers	Certificate Y/N	POU* Sections	Total (AFA)	Owner of Record	Total for Year (AFA)
2005						
	10571, 14291, 19031, 21183	Y	04, 05, 06	0.00	Murton Bowman	
	11132, 14241, 19029, 24773	Y	03, 04, 05	0.00	Linford Anderson	
	13669, 13875, 22735, 59414	Y (except 59414)	09, 16, 17	0.00	Perry Bowman	
	19030	Y	04, 05	220.51	Edgar Christense	
	24874	Y	19	0.00	Kent Leonard	
	41157, 41158, 41159, 41160	Y	08, 09, 16, 17	159.26	Tim Hafen Ranches Inc.	
	41161, 41162, 41163, 41164					
	41167, 41169, 41170, 41171					
	41172, 49838, 58956, 60911					
	26510, 29941	Y				
	45574	N	16	5.80	Santovito	
	57129	N	3	1.44	McKoy Trust	
	57337, 57338	Y	15	0.08	Hepburn	
	58847	N	19	1.00	Heidi Horner	
	63142	N	19	0.07	Markut	
	63145	N	19	0.01	US Post Office	
	63964	N	3	0.00	Goff Family Trust	
	64551	N	10	8.83	Grammer	
	64887	N	10	0.00	Bowman	
	65105, 65106, 68495, 69248	N	16, 17	162.85	HHH Investments	
	69249, 69694, 70408					
	66920	N	3	0.00	Christensen	
	66924	N	15	1.00	Terrel	
	67336	N	10	1.29	Gangadharan	
	68801, 71008	N	3	143.53	Wulferstein	
	68988	N	19	0.95	Hernandez	
	69127, 69128, 69129	N	19	1.00	Lioubas	
	69825	N	19	1.12	Cavallo	
	70325, 70326, 70327, 70651	N	3	181.84	Mountain Falls	
	70652					890.58

**Appendix E**

**NDWR Code Definitions**

RECORDED  
INDEXED  
MAY 19 1965  
STATE OF NEW YORK  
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

# CODE DEFINITIONS FOR WATER RIGHTS DATABASE

APPLICATION STATUS
ABN ABANDONED
AGR APPROGATED
APP APPLICATION
CAN CANCELLED
CER CERTIFICATE
CUR CURTAILED
DEC DECEASED
DEN DENIED
EXP EXPIRED
FOR FORFEITED
PER PERMIT
RFA READY FOR ACTION
RFP READY FOR ACTION (PROTESTED)
RLP RELINQUISH A PORTION
REL RELINQUISHED
RES RESERVED
RVP REVOCABLE PERMIT
RVK REVOKED
SUP SUPERCEDED
SUS SUSPENDED
VST VESTED RIGHT
WDR WITHDRAWN
REC REJECTED

COUNTY
AL ALBANY
CC CARSON CITY
CH CHURCHILL
CL CLARK
DO DOUGLAS
EL ELKO
ES ESMERALDA
EU EUREKA
HU HUMBOLDT
LA LANDER
LI LINCOLN
LY LYON
MI MINERAL
NY NYE
PE PERSHING
ST STOKES
WA WASHOE
WP WHITE PINE

USE
COM COMMERCIAL
CON CONSTRUCTION
DEC AS DECEASED
DOM DOMESTIC
DWR DEWATERING
ENV ENVIRONMENTAL
IND INDUSTRIAL
IRC IRRIGATION-CAREY ACT
IRD IRRIGATION-DLE
IRR IRRIGATION
MM MINING AND MILLING
MUN MUNICIPAL
OTH OTHER
PWR POWER
QM QUASI-MUNICIPAL
REC RECREATIONAL
STK STOCKWATERING
STO STORAGE
UKN UNKNOWN
WLD WILDLIFE

SOURCE
EFF EFFLUENT
GEO GEOTHERMAL
LAK LAKE
OGW OTHER GROUND WATER
OSW OTHER SURFACE WATER
RES RESERVOIR
SPR SPRING
STO STORAGE
STR STREAM
UG UNDERGROUND
UKN UNKNOWN

Division of Water Resources Home Department of Conservation and Natural Resources State of Nevada



State of Nevada

Department of Conservation & Natural Resources

**Division of Water Resources**

Tracy Taylor, P. E. State Engineer

## Code Definitions

<b>Site Type</b>		<b>Proposed Use</b>	
E	Existing (deepen)	A	Air conditioning AC
N	New	B	Bottling BOT
P	Proprietary-new	C	Commercial COM
Y	Proprietary-existing	D	Dewater DWR
		E	Power PWR
		F	Fire FIR
		G	Monitoring Well MON
		H	Domestic DOM
		I	Irrigation IRR
		J	Industrial-Cooling IND
		K	Mining MM
		M	Medicinal MED
		N	Industrial IND
		P	Public Supply - Municipal MUN
		Q	Aquaculture AQC
		R	Recreation REC
		S	Stock STK
		T	Institution INS
		U	Unused UNU
		X	Test Well TST
		Y	Desalination DES
		Z	Other (explain in remarks) OTH
<b>Drilling Method</b>		<b>Test Method</b>	
A	Air rotary	A	Air Lift
B	Bored or augered	B	Bucket
C	Cable tool	C	Centrifugal Pump
D	Dug	J	Jet Pump
H	Hydraulic Rotary-Mud	P	Piston Pump
J	Jetted	R	Rotary
P	Air percussion	S	Submergible Pump
R	Reverse rotary	T	Turbine
T	Trenching		
U	Unknown		
V	Driven		
W	Drive and wash		
Z	Other (explain in remarks)		
<b>Work Type</b>			
D	Deepen		
G	Geothermal		
N	New		
O	Other (explain in remarks)		
P	Plug or abandonment		
R	Recondition		
S	Replacement Well		
T	Test		

**Lat/Long Accuracy**

- M Accurate to 1 minute, about 6,060 feet
- T Accurate to 10 seconds, about 1010 feet
- F Accurate to 5 seconds, about 505 feet
- G GPS Data (Accuracy not yet defined)

- U Unknown
- Z Other (explain in remarks)

**Appendix F:**

**PLATE I - SITE PLAN  
DESERT UTILITIES, INC. PROPOSED WATER DIVERSION  
RELOCATIONS**

**PLATE II - HYDROLOGIC SETTING  
DESERT UTILITIES, INC. PROPOSED WATER DIVERSION  
RELOCATIONS**

APPROVED

DATE

BY

