CITY OF PORTALES

2016 WATER CONSERVATION AND USE REPORT

Prepared for

City of Portales

Prepared by

Charles R. Wilson, Consultant, LLC

Santa Fe, New Mexico
Woodinville, Washington

September 6, 2016

EXECUTIVE SUMMARY

This report describes and evaluates the effectiveness of the City of Portales' water use and conservation program during the 2015 calendar year. This evaluation has been prepared to assist in the water supply planning efforts of the City Council and the City's Water Utility Department to document water supply and demand trends, to identify problems, and to update the information in Portales' 40-Year Water Development Plan. The need for continued water planning and increasing water conservation is particularly important for Portales because of its sole reliance on the Ogallala/High Plains Aquifer as a water source that has been progressively depleted by pumping throughout eastern New Mexico.

Compliant with current guidance of the New Mexico Office of the State Engineer (NMOSE), results of the American Water Works Association (AWWA) Water Loss Control Audit and NMOSE GPCD (Gallons per Capita per Day) Calculator for 2015 are included in this report. NMOSE is requiring annual updates of these results if Portales is to remain eligible for New Mexico Water Trust Board grant funding.

The City's total wellfield pumping in 2015, including exports to Roosevelt County Coop, was approximately 960 million gallons, or about 165 million gallons less than in 2014. The 2015 pumping was the lowest of record since 1995. This decrease is substantial and occurred in part due to an exceptionally high rainfall and in part due to an increasing conservation awareness on the part of Portales' residents. Substantial reductions in water use were achieved by the City's residents and industries, and by the City itself. These reductions are important because they will help to meet the City's goal of reducing total wellfield demand to 700 million gallons per year in 2016. Additional support for meeting this goal will be provided by the use of treated wastewater for irrigating City parks, which is expected to begin in 2016.

Portales' City Council adopted this aggressive goal of reducing wellfield demand in order to extend the life of the City's water supply in view of the continuing depletion of that supply. Because of this depletion, the continuing ability of the aquifer to serve as a high yield source of municipal supply is limited. The best alternative for Portales and other eastern New Mexico communities is to obtain a renewable surface water supply from Ute Reservoir on the Canadian River. Construction of a pipeline from Ute Reservoir to Portales has begun but additional water conservation is needed because the pipeline's completion may be delayed.

The importance of reducing water use has been recognized by the Portales community, as evidenced by the substantial reductions in residential water use year after year, by long-term reductions in water use at Eastern New Mexico University due to conversion to low water use landscaping, and by reductions in municipal use due to increasing irrigation efficiency in City parks and increased operational efficiency of the City's water supply and distribution system. The most significant among these is the decline in residential water use which has dropped by over 200 million gallons since 2000. In addition, the total per capita water use in the service area has dropped to an all-time low of 135 gallons

per person per day. Portales' community members are to be congratulated for their commitment to conserving the City's increasingly limited water supply.

Average groundwater levels in Portales' wellfield continued to decline in 2015 but by a slower rate due to the reduced demand. The average decline in groundwater level in the City's wells in 2015 was 1.1 feet as compared with 1.5 feet in 2014, 1.8 feet in 2013, and 2.7 feet in 2012. The average remaining aquifer saturated thickness in 2015 was 35 feet but the average remaining useable saturated thickness (after accounting for pumping drawdown and a 5-foot buffer) was only 22 feet. However, 22 feet represents an increase from 18 feet in 2014 and reflects an increase in extraction efficiency due to lower pumping rates.

Well yields have been declining along with the decreases in saturated thickness. In order to maintain adequate pumping capacity the City has embarked on an aggressive program to add new wells to the system. From 2011 to 2014 the City converted 17 agricultural wells to municipal use at an average rate of about 4 wells per year. A similar rate of expansion will likely be needed into the future. Most of the former agricultural wells in the City's groundwater reserve have now been converted to municipal use and most of the future wells that will be needed to maintain an adequate pumping capacity will be new. It will be important to maintain a depletion rate of less than 2 feet/year to conserve existing groundwater supplies until water from Ute Reservoir becomes available.

The AWWA water loss audit provides an assessment of the City's water distribution system. One important output of the audit is an Infrastructure Leakage Index or ILI. All water systems have losses and AWWA recognizes that some of those losses are unavoidable even if all of today's best technology could be successfully applied. The ILI is calculated as the actual loss divided by the unavoidable loss and is therefore a measure of the extent to which actual losses exceed unavoidable losses. Low ILI values, where actual losses range from 1 to 3 times the unavoidable losses, indicate that a city is closely controlling its water losses and is aware that its available water supplies are expensive and greatly limited. Mid ILI values, ranging from 3 to 5, occur when actual losses are higher and indicate management reflective of a decreasing concern of a limited supply. High ILI values, ranging from 5 to 8, indicate an even lower concern about waste and a belief that "Water resources are plentiful, reliable, and easily extracted." AWWA considers ILI values greater than 8 to represent an extravagant waste and a "…level of leakage [that] is not an effective utilization of water as a resource."

Portales' 2015 ILI of 3.46 represents a substantial improvement over the 2014 value of 5.68. The 2015 value falls in the lower end of the middle range but is still not indicative of Portales' actual water supply situation. Water supplies for Portales used to be "…plentiful, reliable, and easily extracted…" 60 years ago but today those supplies are becoming greatly limited, increasingly expensive, increasingly difficult to extract, and there is increasing rather than decreasing concern over a limited supply. Unaccounted-for system losses, such as pipeline leaks, amounted to 87 million gallons in 2015. While this is significantly less than the recent peak loss of 145 million gallons in 2014, it still represents a significant water volume. Portales' water supply situation today is more

consistent with the low range of ILI values and further reducing distribution system losses is an active and important water conservation goal.

Although Portales has a groundwater reserve that is only now being tapped, the aquifer supplying the City is clearly a finite resource and the current management plan of satisfying Portales' water needs by regularly increasing the number of wells and drawing on the City's groundwater reserve cannot continue indefinitely. As in the past, it is recommended that Portales continue its management plan of decreasing demand through increasingly strict water conservation, regularly increasing the number of active wells, seeking opportunities to increase its groundwater reserve, and pursuing opportunities to develop a supplemental, renewable water supply. The most viable option for acquiring a supplemental, renewable water supply continues to be a surface water supply from Ute Reservoir. It is to the City's credit that each of these recommendations continues to be diligently pursued.

Table of Contents

List of Tables

List of Tables (Continued)

List of Figures

1.0 INTRODUCTION

This report is part of a series of annual reports describing and evaluating the effectiveness of the City of Portales' Water Conservation Program. The need for annual evaluations was described in the City's 2001 Water Conservation Plan (Wilson 2001a), in guidance provided by the New Mexico Office of the State Engineer (NMOSE 2001), and in the City's 2014 Water Conservation Plan (Wilson 2014). These evaluations assist in the planning efforts of the City Council and the City's Water Utility Department, document water supply and demand trends, identify problems, and update the information in the City's 40-Year Water Development Plan (Wilson 2001b). The need for continued water planning is particularly important to Portales because of its sole reliance on the depleting Ogallala/High Plains Aquifer as a water source. This report describes the City's water use and supply, conservation measure implementation, and water use trends for the 2015 calendar year. Water conservation and use reports have been prepared annually since 2002 and have covered calendar years 2000 through 2014. The most recent annual report was prepared by Wilson (2015) and covered calendar year 2014).

Pursuant to NMOSE guidance (NMOSE 2013), American Water Works Association (AWWA) Water Loss Control Audit and NMOSE GPCD (Gallons per Capita per Day) Calculator results for the City of Portales for 2015 have been included in this annual report. AWWA Audit and GPCD Calculator results for 2013 were included in the City's 2014 Water Conservation Plan and provided insights into water use patterns and the magnitude and cost of water losses in that year. The results for subsequent years have been included in the annual Water Conservation and Use Reports. A comparison of the results of these analyses on an annual basis can be used to demonstrate progress in water conservation and the wise use of this natural resource. NMOSE is requiring annual updates of these results if Portales is to remain eligible for New Mexico Water Trust Board grant funding. Portales' AWWA Audit and GPCD Calculator results for 2015 are reviewed in Section 2 and the detailed results are presented in Appendices A and B.

2.0 WATER USE

2.1 Water Demands

Water demands in the City's Water Utility Department service area are shown in Table 1 and plotted in Figures 1 and 2. These data do not include the estimated 1% water meter under registration that is included in the AWWA water loss audit. A map of the service area is presented in the City's 40-Year Water Development Plan (Wilson 2001b). Figure 1 shows the actual total annual water demand from 1995 through 2015 as well as the estimated future average demands as projected in the 40-Year Plan with and without additional water conservation. The City's total demand decreased significantly in 2015 and was the lowest of record since 1995. As illustrated in Figure 1, the City's total water demand has been progressively decreasing through both dry and wet years since 2005 and is due in large part to an increasing awareness of the importance of water conservation. As will be seen, reducing the demand on the City's primary Blackwater Wellfield is becoming increasingly important to

extend its useful life in view of uncertainty in when an alternative municipal supply will become available.

Figure 2 provides a graphical representation of the data on Table 1. Both the figure and the table were modified from previous years to separately depict water use by the Roosevelt County Water Coop. The Coop's water use was previously combined with the City's residential use but because the Coop is an independently operated water purveyor with its own management, distribution system and water conservation measures, the City's bulk water sales to the Coop are now treated as exported water.

Figure 2 and Table 1 show water use trends for seven categories of use: residential; commercial; industrial; Eastern New Mexico University (ENMU); other metered uses; Coop exports; and unmetered uses. All uses except the Coop exports occur within the City's Water Utility Department service area. As seen on the figure, residential use has been progressively decreasing since 1995. Annual residential use in 2015 dropped by about 33 million gallons to the lowest value in the 21-year period of record documented in these reports. This followed a drop of 29 million gallons in 2014 and an even larger drop of 58 million gallons in 2013. This was accompanied by decreases of about 54 million gallons in industrial use and 29 million gallons in other metered uses which include City use. Commercial and ENMU uses decreased slightly in 2015 while Coop exports increased slightly. These combined to create a significant overall decrease of about 165 million gallons in 2015.

The continued decreases in water use, and particularly in residential use, are heartening and indicative of the success of the City's water awareness and conservation measures among individual residents and the municipal government. This continuing awareness is particularly important among Portales' residents because they continue to constitute the largest single water use category and are the target user group for many of the City's conservation measures.

The largest use categories after residential are typically industrial, the County Coop, and unmetered uses. Industrial use declined in 2015 and was only slightly higher than the Coop's use, which has remained relatively constant at about 180 million gallons for several years. The City's total Water Utility Department service area demand in 2015, excluding water exported to the County Coop, was about 777 million gallons.

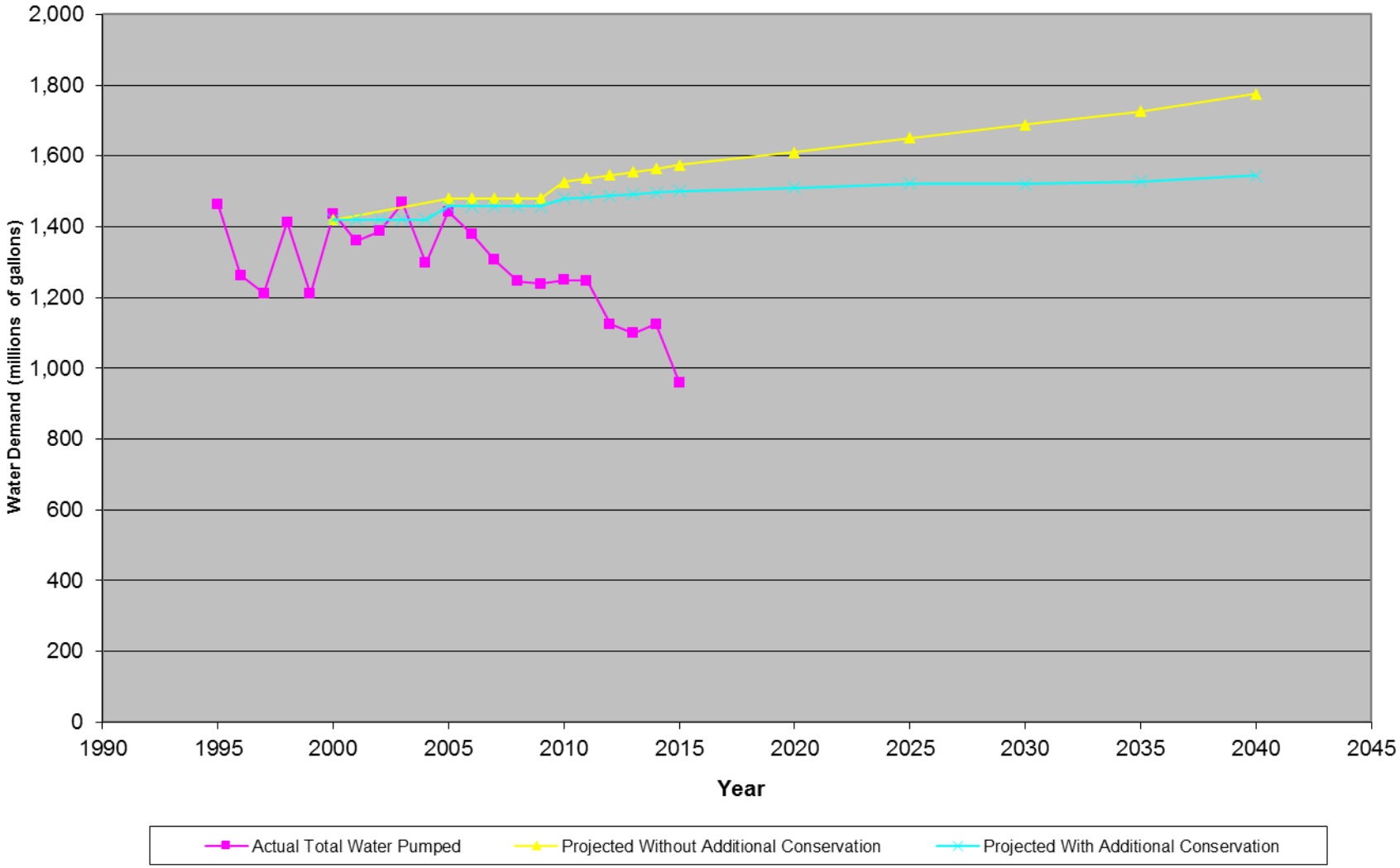
Unmetered and unbilled water use includes unmetered City uses, primarily for irrigating City parks, fire hydrant use, as well as system losses such as pipeline leaks and storage tank spills. Estimated allocations of unmetered water use have been prepared by the City and are presented in Table 2. Total unmetered water use decreased by 49 million gallons to about 106 million gallons in 2015 despite a large estimated increase of about 8 million gallons due to water main leaks. The City's total unmetered water use has typically been about 100 million gallons per year for the past two decades and represented 13.7% of the total Water Utility Department service area demand and 11.1% of total use (including Coop exports) in 2015.

Table 1. Water Consumption Summary (thousands of gallons)

Year	Metered Water Use							Unmetered Water Use	Total Water Use	Percent Unmetered
	Residential	Commercial	Industrial	ENMU	Other	Coop Exports	Total			
1995	711,197	64,171	182,696	148,658	121,616		1,228,338	233,900	1,462,238	16.0
1996	677,391	64,479	114,751	124,913	109,396		1,090,930	171,797	1,262,727	13.6
1997	649,535	54,643	141,197	110,127	106,352		1,061,854	149,715	1,211,569	12.4
1998	793,650	59,699	196,016	129,068	138,792		1,317,225	94,705	1,411,930	6.7
1999	673,804	61,260	196,293	117,404	99,275		1,148,036	61,420	1,209,456	5.1
2000	573,213	63,306	214,943	103,939	83,290	233,965	1,272,656	163,815	1,436,471	11.4
2001	543,128	65,897	233,632	103,490	88,948	195,146	1,230,241	129,281	1,359,522	9.5
2002	548,340	63,822	240,073	139,837	71,031	198,977	1,262,080	124,520	1,386,600	9.0
2003	548,944	66,096	311,904	148,632	67,070	206,090	1,348,736	119,539	1,468,275	8.1
2004	463,391	64,718	327,268	90,935	49,804	197,290	1,193,406	104,194	1,297,600	8.0
2005	486,279	64,523	356,571	80,216	71,147	229,060	1,287,796	154,164	1,441,960	10.7
2006	500,634	65,046	329,008	80,421	85,986	216,595	1,277,690	101,716	1,379,406	7.4
2007	425,523	67,695	386,589	54,378	72,414	177,989	1,184,588	120,827	1,305,415	9.3
2008	432,160	69,034	345,454	57,300	71,002	197,348	1,172,298	73,894	1,246,192	5.9
2009	411,479	66,914	248,014	59,170	69,485	189,180	1,044,242	194,667	1,238,909	15.7
2010	402,158	61,067	245,839	55,305	55,417	188,105	1,007,891	241,742	1,249,633	19.3
2011	481,543	61,762	350,086	51,939	60,818	218,999	1,225,147	22,899	1,248,046	1.8
2012	458,133	56,348	173,895	57,365	79,730	183,678	1,009,149	115,759	1,124,908	10.3
2013	400,040	58,426	214,041	55,760	65,884	177,831	971,982	127,581	1,099,563	11.6
2014	371,321	55,306	256,865	36,765	71,964	177,695	969,922	154,944	1,124,866	13.8
2015	338,080	52,358	202,908	34,985	42,520	182,545	853,396	106,317	959,713	11.1
Five-Year Averages									1,111,419	9.7

Note: Prior to 2000 the Roosevelt County Water Coop exports were included in Residential water use.

Figure 1. Actual and Projected Total Water Demands



The top four use categories (residential, industrial, Coop exports, and unmetered use) constituted 86% of the City's total groundwater pumping. Portales' conservation goals are described in Section 4. Achieving those goals are important to maintaining an adequate water supply pending completion of the Ute pipeline and those goals cannot be achieved without significant decreases in water use in these four categories. A discussion of the Ute Reservoir water supply is presented in Section 4.1.

The three remaining use categories, commercial, ENMU, and other metered uses, remained relatively low in 2015. Commercial water use has been relatively stable and has been below 60 million gallons per year for the past four years. ENMU's 2015 water use of 35 million gallons is slightly less than the 37 million gallons used in 2014 and was significantly less than the 56 million gallons used in 2013. ENMU's water use continues to be approximately half of what it was a decade ago. This decrease was accomplished in large part by changing to low water use landscaping and shifting most irrigation use from City water to onsite wells. The "other metered use" category includes non-taxed institutions such as churches, hospitals, government offices and facilities, City use, schools, and several rural area ranches. The total 2015 other metered use of about 43 million gallons is considerably less than the 72 million gallons used in 2014.

2.2 Water Losses

Water losses due to theft, storage tank spills and pipeline leaks and breaks are generally unmetered. Some losses have been estimated by the City and the unaccounted-for remainder is calculated as the difference between the total supply and the total metered and estimated amounts. The unmetered use that has been accounted for in 2015 amounted to about 18% of the total unmetered use as compared to 6% of the total in 2014. This increase is a positive indication that the City's ability to account for its water use is improving. An increased knowledge of where the unmetered water is going represents a step toward reducing unaccounted-for losses, reducing waste, and increasing revenues.

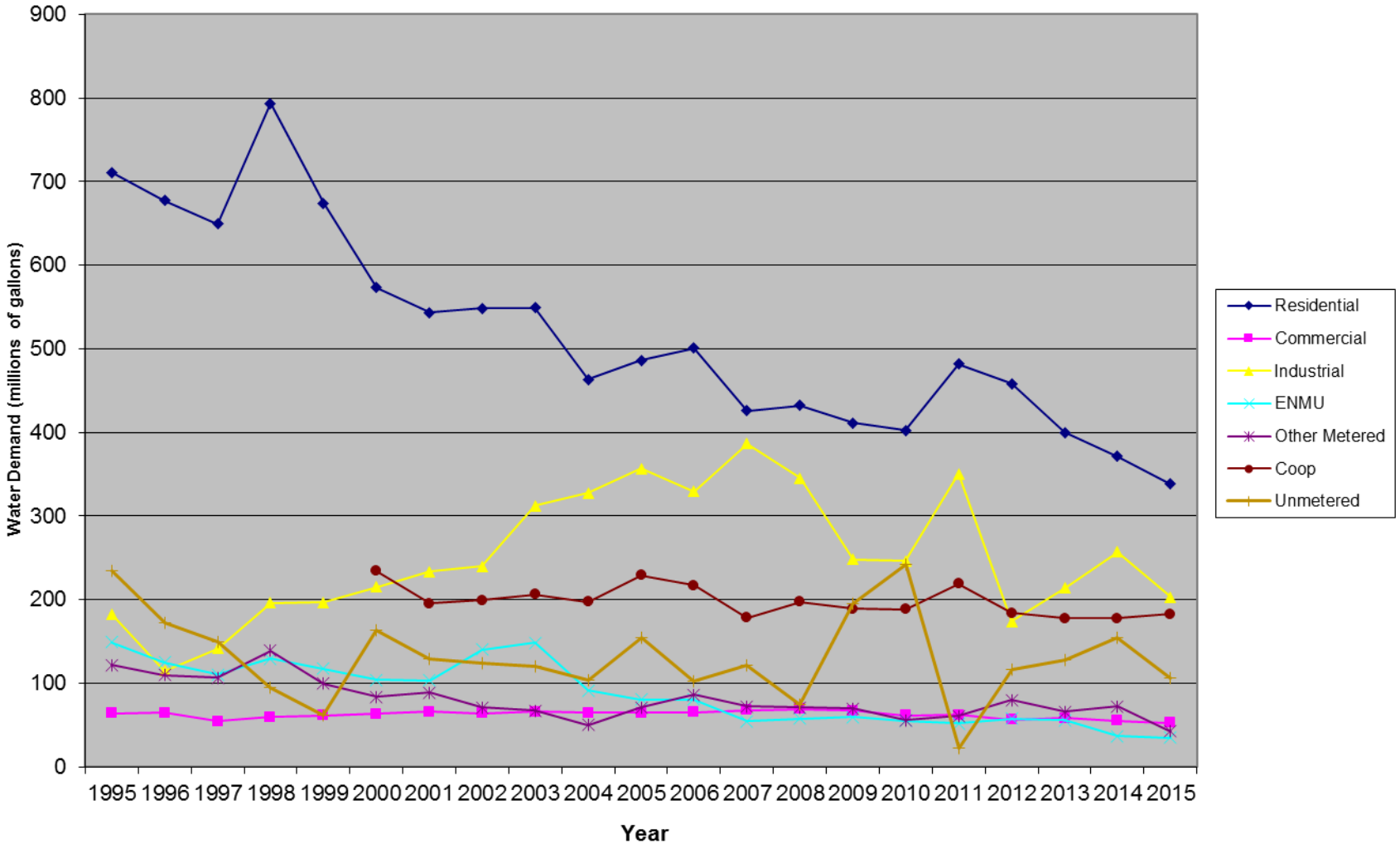
The remaining unmetered use not included in the City's estimates is unaccounted-for and may be primarily due to unknown pipeline leaks. The unaccounted-for system losses increased from about 116 million gallons in 2013 to 145 million gallons in 2014 and dropped substantially to 88 million gallons in 2015. Unaccounted-for system losses amounted to 15% of total water department service area demand in 2014 and decreased to 11% of total demand in 2015. By comparison, values less than 10 percent are nominally considered good in communities with ample water supplies. Although the City's unaccounted-for losses slightly exceeded this benchmark in 2015, the improvement is substantial. Further reducing such losses provides an opportunity for increased water savings and conserving an increasingly scarce resource. As discussed above, unmetered use is the fourth largest water use category and significant reductions may be required to meet the City's water conservation goals.

Table 2. Unmetered Water Use Estimates (thousands of gallons)

Year	City Parks	Fire Hydrant Use	Storage Tank Overflows	Known Leaks	Other Unmetered[a]	Unaccounted For	Total Unmetered	Total Water Use	Percent Unaccounted For
1999	20,435	12,506	5,000	1,000	0	22,479	61,420	1,209,456	1.9
2000	20,212	1,335	20	100	0	142,148	163,815	1,436,471	9.9
2001	10,217	1,170	0	250	0	117,644	129,281	1,359,522	8.7
2002	10,217	203	0	275	650	113,175	124,520	1,386,600	8.2
2003	10,217	175	0	150	625	108,372	119,539	1,468,275	7.4
2004	7,400	1,045	[b]	[b]	[b]	95,749	104,194	1,297,600	7.4
2005	10,217	175	0	150	625	142,997	154,164	1,441,960	9.9
2006	10,217	175	0	150	625	90,549	101,716	1,379,406	6.6
2007	10,217	225	50	1,250	650	108,435	120,827	1,305,415	8.3
2008	10,217	225	50	150	625	62,627	73,894	1,246,192	5.0
2009	10,217	225	50	150	625	183,400	194,667	1,238,909	14.8
2010	10,217	225	50	150	625	230,475	241,742	1,249,633	18.4
2011	10,217	225	50	150	625	11,632	22,899	1,248,046	0.9
2012	10,217	225	50	150	625	104,492	115,759	1,124,908	9.3
2013	5,900	600	1	500	0	116,314	127,581	1,099,563	10.6
2014	5,900	1,000	350	1,500	1,020	145,174	154,944	1,124,866	12.9
2015	5,900	1,200	100	9,500	2,100	87,517	106,317	959,713	9.1
Five-Year Averages								1,111,419	8.6

a. The "Other Unmetered" category includes construction and fire suppression uses.
b. The “Fire Hydrant Use” category includes hydrant and water main flushing.

Figure 2. Historic Annual Water Demand by Category



2.2.1 AWWA Water Loss Audit

An analysis of Portales' distribution system losses in 2015 was conducted using American Water Works Association (AWWA) Water Loss Audit software. The data inputs and results of this audit provide additional guidance on water loss reduction practices tailored to the City's needs. Detailed audit inputs and results are presented on the software spreadsheets in Appendix A. Annual updates of AWWA audit results are recommended and expected by NMOSE if the water purveyor is to continue to qualify for New Mexico Water Trust Board grant funding.

The AWWA Water Loss Control Committee's water loss audit provides information that can be used to determine whether Portales' Water Utility Department water losses are consistent with the cost and availability of its water supply. This determination is based on the assumption that higher distribution system losses can be more readily accepted in communities with an abundant, low cost water supply than in communities where water is expensive and scarce. Increasing scarcity and increasing cost increase the cost-effectiveness of maintaining a distribution system with lower losses.

The audit was prepared using AWWA Version 5.0 water loss software that was updated by AWWA from the version used in the City's 2014 Water Conservation Plan. The use of this software is recommended in the NMOSE's current water conservation planning guidelines (NMOSE 2013). This software was developed by AWWA in Excel spreadsheet format and provides a nationally recognized, systematic method for documenting and evaluating annual water losses within the City's Water Utility Department's service area. The goal of this audit is to provide information to help reduce water losses by demonstrating the cost of those losses and thereby improving overall water supply management.

2.2.2 Audit Input Data

The AWWA categorizes water use as Authorized Consumption, Apparent Losses, and Real Losses. Authorized Consumption includes all known and approved billed and unbilled water demands. Apparent Losses are losses that could potentially be identified and either billed or avoided. They include known or estimated water theft and other unauthorized consumption, customer water meter inaccuracies (they currently read an average of 1% low), and data handling errors. Although a 1% water meter under registration is included in AWWA audit calculations, this metering discrepancy is not considered in most other data presented in this report. Water not included in the first two categories is called a Real Loss. Such losses include pipeline breaks and storage tank spills that cannot be billed and are not readily anticipated or avoided. Losses and other non-billed water are non-revenue water. Financial data for the water supply system is used to determine the cost to the City of non-revenue water.

Input data for calendar year 2015 are shown in Figure A-2. The total water supplied in 2015 from the City's wellfield, including an estimated 1% meter underreading error, was about 969 million gallons. Of that, 19% or about 184 million gallons, also including meter error, was sold to the Roosevelt County Water Coop. This water is treated as being exported to an

external water supplier because the Coop operates its own water distribution and billing systems, and is not included in the City's Water Conservation Plan. The total water supplied to the City's service area was 785 million gallons when meter error is included or about 172 million gallons less than in 2014. The total authorized consumption was about 690 million gallons in 2015 as compared with 802 million gallons in 2014.

System losses also decreased substantially in 2015. Apparent losses decreased by 3.5 million gallons to 8.0 million gallons and the unaccounted-for losses, which AWWA calls real losses, decreased by 56 million gallons to about 87 million gallons. As previously noted, the real losses in 2015 amounted to 11% of the total service area demand. As demonstrated by the foregoing data, the substantial decreases in 2015 total water demand are due to decreases in both water consumption and water losses.

The total operating budget for the City's Water Utility Department was about $2.3 million in 2015. The total variable cost was about $293,000 in 2015 and included the cost of pumping as well as the cost of drinking water treatment. Wastewater treatment costs in Portales are based on water use and combined with the monthly water bill. The volume weighted average customer unit retail cost including wastewater treatment was $6.06 per 1,000 gallons in 2015.

Data entries into the audit spreadsheet on Figure A-2 are accompanied by a self-determined 'grade' ranging from 1 to 10 that provides an indication of data accuracy. Portales' Water Utility Department assigned grades of 8 or above for all entries except for the following.

1) Master water meter error adjustment received the same grade of 3 as in 2014 because the master metering data are not automatically logged into an electronic database; however, storage tank levels are automatically logged and frequently reviewed during periods of high demand.
2) The grade for unauthorized consumption was increased from 4 to 6 in 2015 because of an increasing level of oversight. Procedures now exist to document the key forms of observed unauthorized consumption. Higher grades require clear policies as well as auditable recordkeeping of unauthorized consumption.
3) The average operating water pressure continued to receive a grade of 5 because telemetry pressure monitoring is not conducted for pressure zones; however, elevation changes within the City are minimal and the distribution system is operated as a single zone.
4) Variable production cost information continued to receive a grade of 4 because the information only includes estimates of variable pumping and variable water treatment costs. Higher grades are given where cost accounting systems are in place that automatically identify the variable costs of production as well as other, less significant variable costs.

2.2.3 Audit Results

The water audit performance indicator results are presented in Figure A-3. Performance is reported as both financial and operational efficiency indicators.

The financial indicators provide information about the relative amounts of non-revenue water and the cost of water losses in 2015. Non-revenue water (all water that is not sold including losses) amounted to 16.1 % of the total service area demand in 2015 as compared with 19.7% in 2014. The cost to the City of non-revenue water in 2015 was about $84,000 or 3.7% of the cost of operating the system. Non-revenue water consists of unbilled authorized consumption, apparent losses, and real losses. A breakdown of the cost of non-revenue water to the City in 2015 is presented in Table 3.

Table 3. Cost to Portales of Non-Revenue Water in 2015

Type of Non-Revenue Water	Water Volume (million gallons)	Cost Basis	Unit Cost ($ per million gallons)	Total Cost
Unbilled, authorized consumption	30.648	Variable cost of production	$305.66	$9,368
Apparent losses	7.959	Customer retail unit cost	$6,060.00	$48,232
Real losses	87.408	Variable cost of production	$305.66	$26,717
Totals	**126.015**			**$84,317**

Unbilled, authorized consumption consists of municipal and other community uses. This water is intentionally determined by the City to be unbilled and is valued by the AWWA at the variable cost of production. Apparent losses are losses traceable to known and potentially avoidable causes such as theft and meter inaccuracies. Because these losses are potentially avoidable or could be translated into revenue water, the AWWA assigns a high value equal to the average cost of water to the consumer. Real losses are due primarily to pipeline leaks that are not readily anticipated or avoided. Because real losses are from unknown or unavoidable causes they are valued by AWWA at the variable cost of production. The AWWA audit provides this type of information to increase awareness of the costs involved in the various types of non-revenue water and to provide an idea of the amount that could be spent annually on conservation or improved infrastructure to reduce those costs. For Portales, there is an additional concern of a dwindling groundwater availability which is an even greater incentive to reduce the substantial amount of real losses that occurred in 2015.

Operational efficiency indicators address water losses and are provided by the audit in several forms. As tabulated above, the total apparent water loss in 2015 was about 8 million gallons and the total real loss was 87 million gallons. The amount of this real loss that was considered by AWWA to be unavoidable was 25.26 million gallons. The unavoidable annual real loss is a theoretical reference value used by AWWA to represent the lower limit of leakage that could be achieved if all of today's best technology could be successfully applied. AWWA notes that it is not practical for water utilities to set this level as a target for real losses unless water is unusually expensive, scarce, or both. The residual avoidable real loss is therefore 62 million gallons or about 8% of the City’s total service area demand. As previously noted, losses greater than 10% are generally considered high and avoidable. Reducing these real losses is an opportunity for additional water conservation.

Based on the input data and assigned grades discussed above, the audit provided Portales with an overall Water Audit Data Validity Score of 82 out of 100. This represents a small improvement over the 2014 score of 81. The audit results provided the following recommendations for improving the accuracy of the results:

1. Volume from own sources: Improve the accuracy of metering wellfield production. This has largely been accomplished.
2. Variable production cost: Improve the accuracy of the variable production cost. This will provide a more accurate estimate of the cost to the City of real losses.
3. Unauthorized consumption: Improve the confidence in unauthorized consumption data.

Portales' Water Audit Data Validity Score is based on a weighted scale for the components of consumption and water loss. A score of 82 places Portales in AWWA's Level IV, which comprises a data range of 71 to 90. The following AWWA recommendations are applicable to this level:

- Audit Data Collection: Refine data collection practices and establish as routine business process.
- Short Term Loss Control: Refine, enhance, or expand ongoing programs based upon economic justification.
- Long Term Loss Control: Conduct detailed planning, budgeting, and launch of comprehensive improvements for metering, billing, or infrastructure management.
- Target-setting: Establish mid-range (5 year horizon) apparent and real loss reduction goals.
- Benchmarking: Performance benchmarking - the Infrastructure Leakage Index (ILI) is meaningful [for Portales] in comparing real loss standing.

Another result of the AWWA water audit is the water balance information provided in Figures A-4 and A-5. Entries in red on Figure A-4 are unbilled authorized consumption and water losses. Both are non-revenue water and represent potential sources of income as well as water savings. Monitoring trends in these values over time will provide important indicators of the success of the City's water conservation and loss management programs.

The City's apparent loss amounted to 4.01 gallons per service connection per day. This was down from 5.77 gallons per service connection per day in 2014 and represents an improvement. The City's real loss was 44.02 gallons per service connection per day. This was down from 72.28 gallons per service connection per day in 2014 and represents a substantial improvement.

The AWWA's Infrastructure Leakage Index (ILI = total real losses divided by unavoidable real losses) is an important indicator that also shows substantial improvement. The City's 2015 ILI was 3.46 as compared with the 2014 value of 5.68 and the 2013 value of 4.37. This index is an indicator for comparing the performance of utilities in operational management of real losses. The ILI provides a measure of the degree to which the City's water pricing and water loss management policies are consistent with the City's water supply availability, cost,

and abundance. Low ILI values, ranging from 1 to 3 times the unavoidable real losses, occur when real losses are relatively low. The AWWA interprets these lower values as indicating that a city is closely controlling its water losses and is aware that its available water supplies are expensive and greatly limited. Mid ILI values, ranging from 3 to 5, occur when total real losses are higher and indicate management reflective of a decreasing concern of a limited supply. High ILI values, ranging from 5 to 8 indicate a lower concern about waste and a belief that "Water resources are plentiful, reliable, and easily extracted." Portales' 2015 ILI falls in the lower end of the mid-range. AWWA believes that ILI values greater than 8 represent an extravagant waste and a "…level of leakage [that] is not an effective utilization of water as a resource."

As stated above, Portales' ILI in 2015 was 3.46 and was in the lower end of the mid-range. The progressive reduction in this indicator over the past three years demonstrates an increasing awareness of the value of water. It is consistent with a loss control performance appropriate for a city with an increasing concern about the limitations of its water supply. The AWWA interprets Portales's ILI score as indicative of the situation in the left column of the following tabulation, but Portales' water situation is actually more accurately described in the right column. Reducing Portales' ILI score to below 3 is directly related to the City's distribution system loss reduction goals described in Section 6.0.

Current ILI Range 3 to 5	**ILI Desired Range 1 to 3**
With regard to financial considerations, the water system is being managed as if "Water resources can be developed or purchased at reasonable expense; periodic water rate increases can be feasibly imposed and are tolerated by the customer population."	With regard to financial considerations, the water system is being managed as if "Water resources are costly to develop or purchase; ability to increase revenues via water rates is greatly limited because of regulation or low ratepayer affordability."
With regard to operational considerations, the water system is being managed as if "Existing water supply infrastructure capability is sufficient to meet long-term demand as long as reasonable leakage management controls are in place."	With regard to operational considerations, the water system is being managed as if "Operating with system leakage above this level would require expansion of existing infrastructure and/or additional water resources to meet the demand."
With regard to water resources considerations, the water system is being managed as if "Water resources are believed to be sufficient to meet long-term needs, but demand management interventions (leakage management, water conservation) are included in the long-term development plan."	With regard to water resources considerations, the water system is being managed as if "Available resources are greatly limited and are very difficult and/or environmentally unsound to develop."
Portales' 2015 ILI Score is 3.46	

The results of the ILI scoring leads to the following conclusions:

- With regard to financial considerations, the availability of water resources at a reasonable expense has been historically true for Portales, but the City's continuing well drilling program and the imported Ute Reservoir water that Portales will have to rely upon in the future will increase those costs.

- With regard to operational considerations, the increasing scarcity of water places a burden on the City to reduce wasteful water losses because additional water resources to meet the demand are not readily available.
- With regard to water resources, it is historically true that water demands could easily be met because of abundant groundwater supplies. This would continue to be true if depletion of the Ogallala/High Plains Aquifer was not a problem, but depletion is a problem and loss control is becoming increasingly important.

It has become increasingly evident over the past 15 years that Portales' existing water resources are no longer believed to be sufficient to meet long-term needs and that Portales is in a transition stage from water system management policies consistent with inexpensive, abundant groundwater supplies to policies consistent with an increasing awareness of the limitations of that supply. According to AWWA standards, Portales' current ILI of 3.46 is more consistent with the City's current water supply situation than the ILI values for previous years but further reductions in this index value should be sought. Reducing Portales' ILI to below 3.0 would, by AWWA standards, more closely reflect the City's current water supply situation.

The following summary conclusions are based on the AWWA audit results:

- With regard to financial considerations, the AWWA audit finds that the City's water rates are somewhat low and potentially inconsistent with the cost of obtaining a supplemental supply. City's policy of progressively increasing water rates is consistent with the need to reduce demand and fund efforts to reduce both apparent and real losses.
- With regard to operational considerations, the AWWA audit finds that improved leakage management controls would better reflect the City's water supply situation. AWWA's 2007 Distribution System Water Loss benchmark survey for water purveyors in the South region of the United States found that the median real system loss was 8.9% of total water use, which is considered a benchmark for comparison in this region. As noted above, Portales' real loss was 11% of total water use in 2015.
- With regard to water resources considerations, local water resources are no longer believed to be sufficient to meet long-term needs. Demand management interventions in the form of water-conserving City ordinances, promotion of water conservation through rate structuring and example, water conservation education, and wastewater reuse are being actively pursued and are community goals along with water loss reduction.

2.3 Water Use and Weather Conditions

Natural rainfall normally has a strong influence on the amount of water that must be supplied by a city, particularly for residential landscape irrigation use. The 25.30 inches of rain that Portales received in 2015 was the second highest in the past two decades and almost equaled the record of 25.87 inches in 2004. Total annual and five-year running average precipitation at Portales are presented in Table 4 and plotted in Figure 3 for the period from 1990 through 2015. The annual amounts can be quite variable and the five-year averages better illustrate longer-term trends. The total annual rainfall of 25.30 inches in 2015 was well above both the

long-term, 104-year, average of 16.60 inches and the running five-year average of 14.50 inches. Despite the high rainfall in 2015, both the running average and the average since 1990 are below the long-term average and indicate that the City is continuing to experience a prolonged, relatively dry period.

A plot of annual precipitation versus total annual water demand for Portales is shown in Figure 4 for the period from 1995 through 2015. This time period includes 10 years when the rainfall was greater than or equal to the long-term average of 16.60 inches and 11 years when the rainfall was less than that average. The unique position of the data point for 2015 corresponds to near record high rainfall with record low water demand. Although the high rainfall likely contributed to the low demand, the data for 2004 where the rainfall was also high show that the demand that year was not particularly low. The much lower demand in 2015 coupled with a rainfall nearly the same as in 2004 is evidence that water conservation awareness has increased dramatically in Portales.

When these annual reports were first prepared 15 years ago, the nonlinear trend line showed a distinct inverse correlation between precipitation and water demand, with increasing precipitation related to decreasing water demand. However, this correlation has become weaker over time and today the trend line is nearly linear and nearly flat. This also indicates that water demand is becoming increasingly independent of precipitation, which would be expected as conservation awareness increases and residents switch from water intensive to more xeric landscaping.

2.4 Per Capita Water Demand

Because of Portales' unusual position of being a water exporter as well as hosting a major university, per capita water demand has been calculated on the basis of the benefitting population and also on the basis of the resident population. The benefitting population consists of the number of people routinely using and therefore benefitting from the City's water supply. These include single family and multi-family residents within the City's Water Utility Department service area, the residents served by the County Coop using exported water, and the students at ENMU. The resident population is smaller than the benefitting population and consists of single family and multi-family residents within the City's Water Utility Department service area, and resident students at ENMU.

Table 4. Annual Precipitation at Portales

Calendar Year	Total Annual Precipitation (inches)	Five-Year Running Average Precipitation (inches)
1990	13.99	18.63
1991	21.06	19.28
1992	18.99	18.01
1993	16.37	17.05
1994	11.17	16.32
1995	15.56	16.63
1996	17.93	16.00
1997	20.96	16.40
1998	13.16	15.76
1999	17.15	16.95
2000	16.00	17.04
2001	12.74	16.00
2002	16.35	15.08
2003	7.66	13.98
2004	25.87	15.72
2005	13.27	15.18
2006	17.91	16.21
2007	17.91	16.52
2008	13.90	17.77
2009	17.13	16.02
2010	17.07	16.78
2011	8.11	14.82
2012	8.31	12.90
2013	18.29	13.78
2014	12.47	12.85
2015	25.30	14.50
Average (1990-2015)	15.95	- -
Long Term Average (1912-2015)	**16.60**	- -

Figure 3. Annual Precipitation at Portales

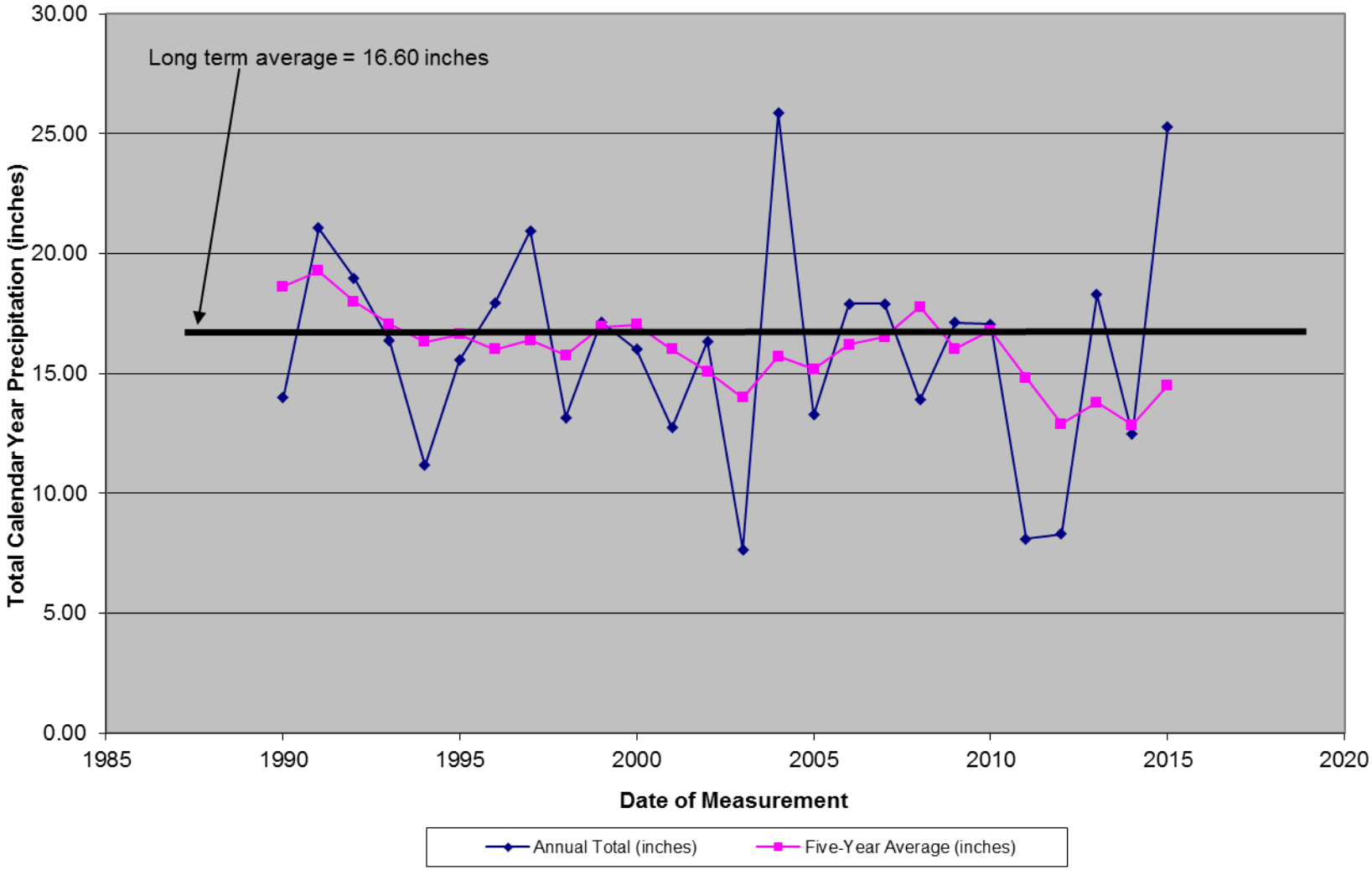
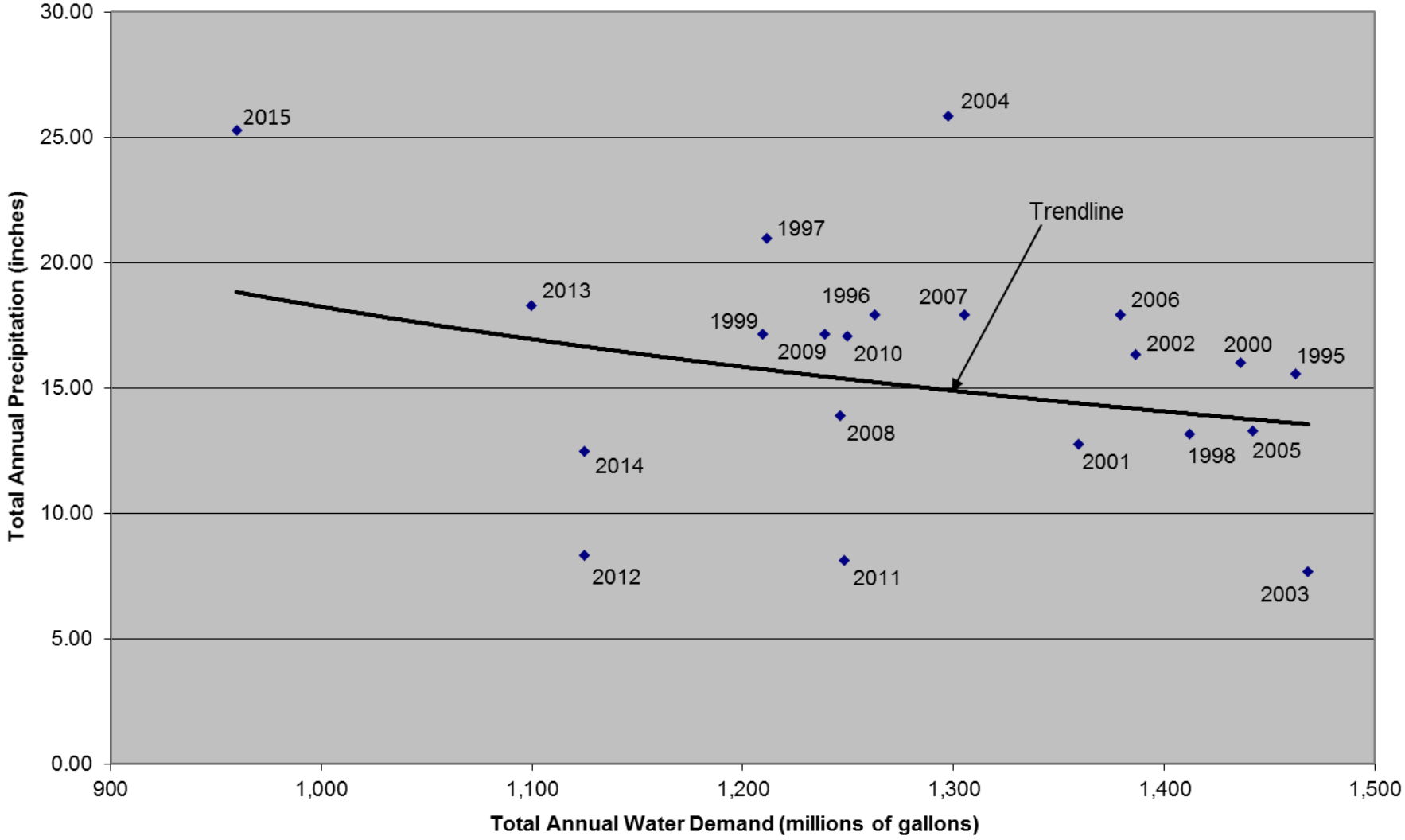


Figure 4. Precipitation vs. Water Demand



2.4.1 Per-Capita Water Demand of Benefitting Population

Estimates of the benefitting population within the City's Water Utility Department service area are shown in Table 5. These estimates are based on U.S. Census Bureau data and on information from the ENMU planning staff and the Roosevelt County Water Coop. Prior to 2014, the estimated service area population was based only on U.S. Census data for the City of Portales and the estimated annual rates of population increase. However, this estimate only included residents within the City limits while the Water Utility Department service area extends beyond those limits. Beginning in 2014, the method for estimating the benefitting service area population was changed to be consistent with the method used in the NMOSE GPCD Calculator to include all service area residents. This method is based on the number of active water service connections for single family residents, the number of multi-family (apartment) housing units and their occupancy rate, and the average number of persons per household from the most recent U.S. Census.

Annual per capita water use information is presented for the City's benefitting population in Table 6 and Figure 5. Per capita use is each person's share of the average daily water consumption for all uses benefiting those living within the service area. Per capita water use therefore includes water use for schools, parks, and industries as well as residential use. The NMOSE defines per capita water use as including all uses that are debited against the water rights of the public water supplier (Wilson et al. 2003, p. 10).

Per capita water use for Portales' benefitting population has been calculated with and without industrial consumption because extensive water use by a few water-consuming industries specific to Portales should not mask the advances Portales has made in water conservation when making comparisons with other communities. When including all water uses except industrial consumption, the per capita water use of the benefitting population in 2015 was 84 gallons per person per day (GPCD). When industrial consumption is included, per capita water use in 2015 was 106 GPCD. These values are well below the standard American benchmark of 200 GPCD, which has been considered good. However, increasing water shortages in the American West are changing this outlook to one of how much individual communities with limited supplies can afford to use. The plotted data in Figure 5 demonstrate long-term, generally downward trends in per capita use both with and without industrial consumption, and it will be important for these trends to continue.

2.4.2 Per-Capita Water Demand of Resident Population

The per capita water demand of Portales' Water Utility Department resident population was calculated consistent with the method used in the NMOSE GPCD Calculator. This method considers the resident population in three groups: the single family residence (SFR) population, the multi-family residence (MFR) population, and the population living in group quarters. These groups are differentiated because of differences in water use patterns that can be used to help select and target alternative water conservation strategies. Multi-family residents are generally apartment dwellers. Single family residences typically have more extensive lawns and gardens than multi-family residences and therefore have greater outdoor

Table 5. Estimated Water Utility Department Benefitting Population

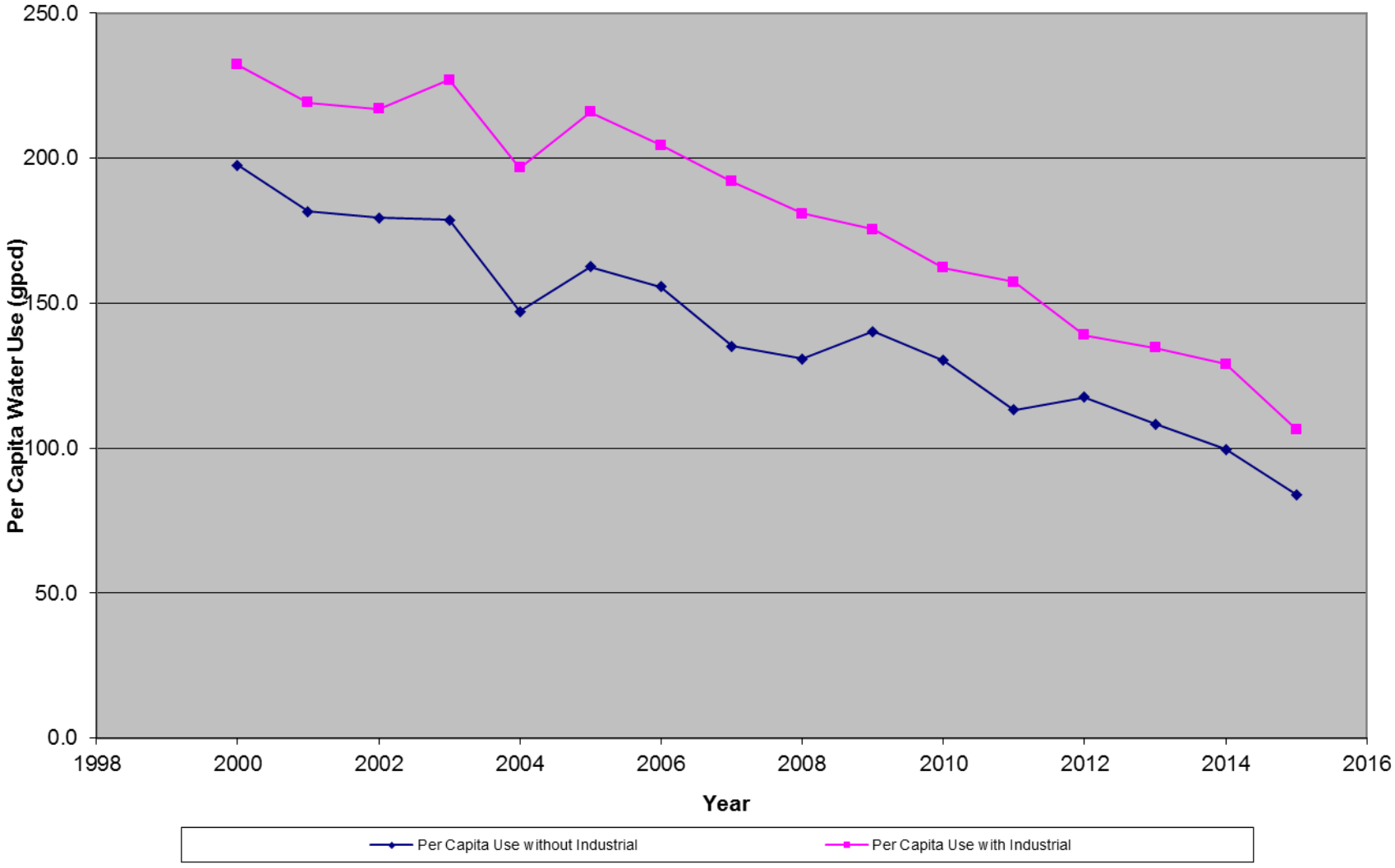
Date	City of Portales Water Department Service Area	Roosevelt County Water Coop Service Area	Eastern New Mexico University Students[3]	Total Benefitting Population
1950	8,112	- -	- -	- -
1960	9,695	- -	- -	- -
1970	10,554	- -	- -	- -
1980	10,750	- -	3,701	- -
1990	10,690	- -	3,683	- -
1995	11,438[1]	2,710[4]	3,632	17,780
2000	11,131	2,588[4]	3,224	16,943
2001	11,160[2]	2,581[4]	3,251	16,992
2002	11,220[2]	2,654[4]	3,638	17,512
2003	11,280[2]	2,716[4]	3,725	17,721
2004	11,320[2]	2,790[4]	3,959	18,069
2005	11,358[2]	2,886[4]	4,052	18,296
2006	11,404[2]	2,944[4]	4,135	18,483
2007	11,450[2]	2,999[4]	4,180	18,629
2008	11,497[2]	3,077[4]	4,300	18,874
2009	11,590[2]	3,121[4]	4,685	19,349
2010	12,280	3,740[4]	5,080	21,100
2011	12,401[5]	3,761[4]	5,574	21,736
2012	12,524[5]	3,842[4]	5,814	22,180
2013	12,648[5]	3,888[4]	5,855	22,391
2014	14,529[6]	4,024[4]	5,338	23,891
2015	14,679	4,072[4]	5,946	24,697

1. Population is July 1 estimate from U.S. Census Bureau, June 30, 1999.
2. Estimates based on 1990-2000 rate of population increase.
3. Fall semester student populations from planning staff, Eastern New Mexico University.
4. Estimates based on number of active Roosevelt County Water Coop hookups in December of the subject year, an average of 2.7 persons per household in 1995, an average of 2.3 persons per household from 2000 to 2009 (based on 2000 U.S. Census Bureau data), and an average of 2.8 persons per household in 2010 and subsequent years (based on 2010 U.S. Census Bureau data).
5. Estimates based on 2000-2010 rate of population increase.
6. Beginning in 2014, the City of Portales Water Department Service Area population (excluding ENMU students) is based on OSE GPCD Calculator estimating methodology. It is noted that Census data population is within the City limits while the Water Department service area extends beyond the City limits.

Table 6. Per Capita Water Use of Benefitting Population

Year	Estimated Service Area Benefitting Population	Consumption without Industrial Use		Consumption with all Uses	
		Total Water Use (1000 gallons)	Per Capita Water Use (gpcd)	Total Water Use (1000 gallons)	Per Captia Water Use (gpcd)
1995	17,780	1,279,542	197	1,462,238	225
1996	18,300	1,147,976	172	1,262,727	189
1997	18,700	1,070,372	157	1,211,569	178
1998	19,300	1,215,914	173	1,411,930	200
1999	19,700	1,013,163	141	1,209,456	168
2000	16,943	1,221,528	198	1,436,471	232
2001	16,992	1,125,890	182	1,359,522	219
2002	17,512	1,146,527	179	1,386,600	217
2003	17,721	1,156,371	179	1,468,275	227
2004	18,069	970,332	147	1,297,600	197
2005	18,296	1,085,389	163	1,441,960	216
2006	18,483	1,050,398	156	1,379,406	204
2007	18,629	918,826	135	1,305,415	192
2008	18,874	900,738	131	1,246,192	181
2009	19,349	990,895	140	1,238,909	175
2010	21,100	1,003,794	130	1,249,633	162
2011	21,736	897,960	113	1,248,046	157
2012	22,180	951,013	118	1,124,908	139
2013	22,391	885,522	108	1,099,563	134
2014	23,891	868,001	99	1,124,866	129
2015	24,697	756,805	84	959,713	106
Five-Year Average	- -	- -	104	- -	133

Figure 5. Per Capita Water Use of Benefitting Population



water use that offer more opportunities for landscape conservation. Portales' group quarters residents are ENMU students living in University residence halls and apartment buildings.

The resident population of the Water Utility Department's service area varies throughout the year primarily because of the significant decrease in resident student population in the summer semester. The estimated average annual resident population for Portales' Water Utility Department service area is shown on Table 7 for the period from 2009 to 2015. ENMU resident students occupy four residence halls and two apartment buildings. These are nominally multi-family housing units but are separately treated as Group Quarters because of the atypically large landscaping water demands of the university campus. The estimated average annual ENMU resident population has not changed since 2009 because the number of university housing units and their occupancy rates have remained relatively constant. The methods used to estimate these resident populations are consistent with the methods used in the NMOSE GPCD Calculator and are described in the footnotes to Table 7.

The average annual per capita water demands for the City's Water Utility Department service area resident population are presented in Table 8 and on Figure 6 for the period from 2009 to 2015. As can be seen from the figure, slight downward trends are evident for all categories except multi-family use, which has remained relatively constant at 40 to 50 GPCD. Single family use has dropped from a high of 96.6 GPCD in 2011 to the current low of 65.9 GPCD in 2015. Total service area water use of the resident population, including industrial use, dropped from a high of 186.9 GPCD in 2009 to the current low of 134.8 GPCD in 2015. These values are below the standard American benchmark of 200 GPCD; however, as noted above, increasing water shortages in the American West are changing this outlook to one of how much individual communities with limited supplies can afford to use.

2.4.3 NMOSE GPCD Calculator Results

Annual updates of GPCD Calculator results are recommended and expected by NMOSE if the water purveyor is to continue to qualify for New Mexico Water Trust Board grant funding. The GPCD Calculator provides month-to-month data for Single Family Residential (SFR) water use; Multi-Family Residential (MFR) water use; Industrial, Commercial, and Institutional (ICI) water use; and for Total System water use within the water department service area. The Calculator also allows for imported water (which is zero for Portales), exported water (to the County Coop), and for reclaimed water (which is also currently zero for Portales). The results can be used to evaluate indoor and outdoor uses and help to estimate the reductions in water use that could be expected from alternative conservation measures.

NMOSE GPCD Calculator results for 2009 through 2013 were included in the City's 2014 Water Conservation Plan. Those results were recalculated for the 2015 Water Conservation and Use Report consistent with a revised treatment of ENMU water use. As indicated in a footnote on Table 8, multi-family residential use no longer includes residents of ENMU student housing. The University is unusual in that it has relatively few residents, low summer occupancy, and extensive landscaping with high summer water use. Following NMOSE guidance and as noted above, ENMU is now treated as an institution. The University's

Table 7. Estimated Water Utility Department Resident Population

Date	Single Family Residents[1]	Multi-Family Residents[2]	ENMU Resident Students[3]	Total Resident Population
2009	12,208	2,071	1,111	15,390
2010	12,422	2,106	1,111	15,638
2011	12,560	2,127	1,111	15,799
2012	12,665	2,143	1,111	15,918
2013	12,651	2,140	1,111	15,900
2014	12,549	2,140	1,111	15,801
2015	12,540	2,140	1,111	15,791

1. SFR population based on average number of active SFR water accounts in given year multiplied by the average number of persons per household from the 2010 U.S. Census.
2. MFR population based on the total number of MFR housing units multiplied by the average occupancy rate and by the average number of persons per household from the 2010 U.S. Census.
3. ENMU resident student population based on the total number of university housing units multiplied by the average occupancy rate and by the average number of persons per housing unit from the 2010 U.S. Census. The resident student population is an annual average that takes into account the significant differences in occupancy rates for the spring, summer, and fall semesters.

Table 8. Per Capita Water Use of Resident Population

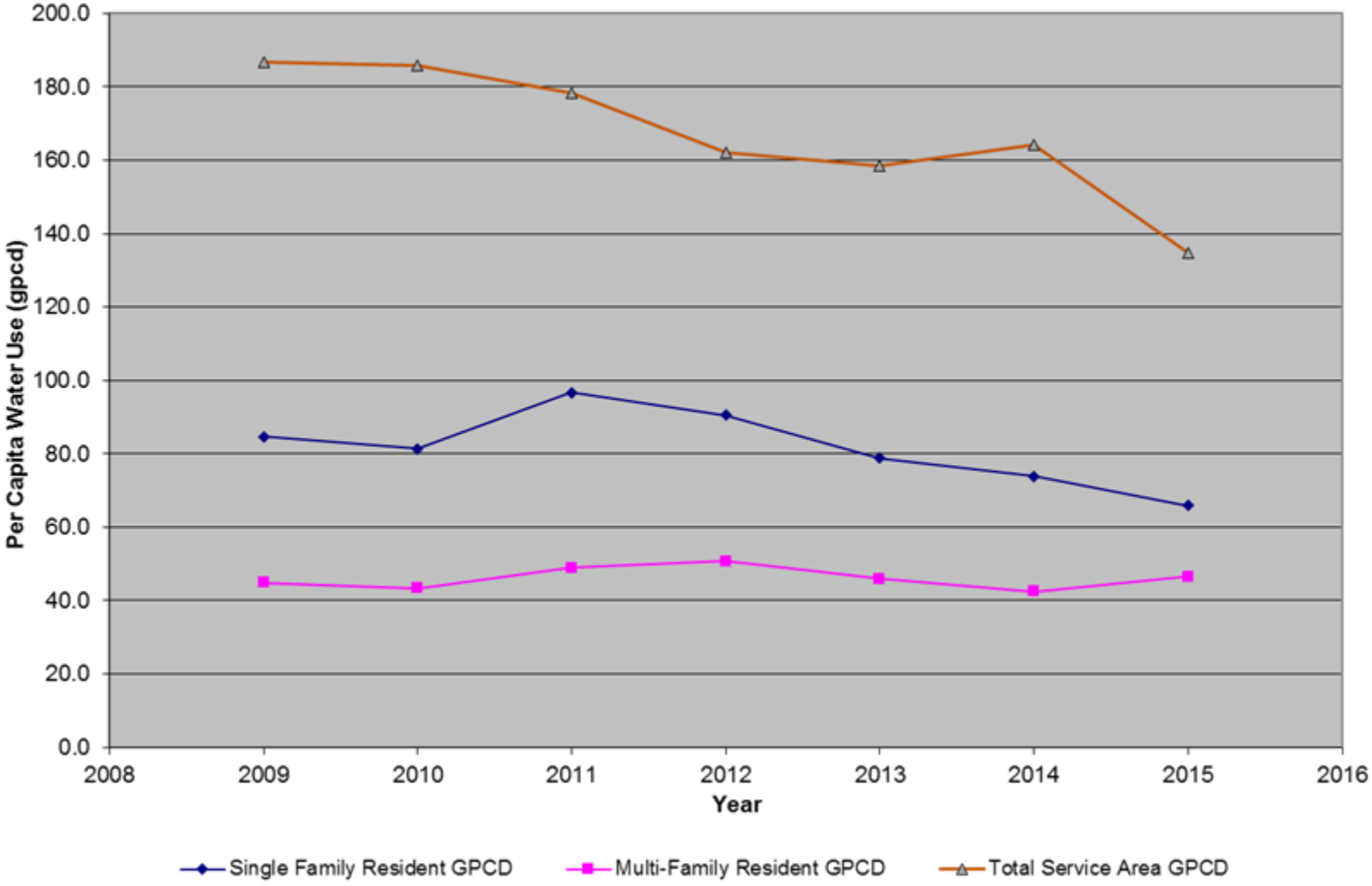
Date	Single Family Resident (GPCD)	Multi-Family Resident (GPCD)	Total Service Area (GPCD)
2009	84.7	44.9	186.9
2010	81.4	43.4	186.0
2011	96.7	49.0	178.4
2012	90.5	50.7	162.0
2013	78.9	46.0	158.6
2014	73.8	42.5	164.2
2015	65.9	46.5	134.8

Note: ENMU resident students and ENMU water use are included in the Total Service Area GPCD rather than in the Multi-Family Resident category.

resident students constitute Portales' group quarters population and the University's water use is included in the ICI category. The data inputs and results of the updated GPCD Calculator analysis for calendar year 2015 are presented in Appendix B and in Figures 7 through 10 for the SFR, MFR, ICI, and Total System categories. Updated GPCD Calculator results for calendar years 2009 through 2014 are presented in the City's 2015 Water Conservation and Use Report. These results were prepared using the NMOSE GPCD Calculator V2.04 Beta.

NMOSE GPCD Calculator results for monthly Single Family Residential (SFR) water use in 2015 are shown in Figure 7. The clearly defined summer increase resulting primarily from increased outdoor water use is typical of single family residences. The lowest average monthly use of about 50 GPCD occurred during the winter months and represents primarily indoor water use. Outdoor use constituted the balance and decreased from 32% of all SFR use in 2014 to 27% in 2015. Outdoor use is normally less essential than indoor use and reducing this outdoor use is a principal and apparently successful target of the City's water

Figure 6. Per Capita Water Use of Resident Population



conservation measures. As illustrated in Figure 6, Portales' SFR per-capita water use has been progressively decreasing since 2011.

NMOSE GPCD Calculator results for monthly Multi-Family Residential (MFR) water use in 2015 are shown in Figure 8. Overall water use was lower than for single family residences and, except for a spike in August, the summer increase was less pronounced. The average MFR indoor water use was about 32 GPCD and the outdoor use constituted 32% or about one-third of all MFR water use in 2015. This fraction represents an increase from 17% 2014 and is due in part to the August spike which coincides with an abrupt decrease in rainfall as compared with earlier months. As shown in Figure 6, the annual average MFR per capita water demand has remained relatively constant at between 40 and 50 GPCD since 2009.

NMOSE GPCD Calculator results for monthly Industrial, Commercial, and Institutional (ICI) water use in 2015 are shown in Figure 9. GPCD results for the ICI category are based on the annual average population of the entire service area. Monthly as well as annual water use for this category have been quite variable from year-to-year, depending primarily on whether the principal water-using industries in Portales were operational. The 2015 water use shown in the figure shows a clear summer peaking. Water use for this category doubled from about 40 GPCD in the winter months to over 80 GPCD in the summer months. ICI outdoor use constituted about 27% of total ICI use in 2015 and was the same fraction as SFR outdoor use.

Monthly GPCD results for Total System water use are not automatically plotted by the NMOSE GPCD Calculator but for purposes of this report the 2015 Total System results are shown in Figure 10. Consistent with NMOSE's approach, these results are based on the annual average population of the entire service area. Total system use includes the metered water uses described above as well as unmetered use and system losses but does not include water exports to the County Coop. Unlike results for previous years, the summer increases in water use seen in the SFR, MFR, and ICI categories are not evident in the total system results because of the additional influence of unmetered water use and associated pipeline breaks. The 2015 total system water use ranged from a low of about 82 GPCD in August to a high of 187 GPCD in October. The 2015 annual average of 135 GPCD was favorably lower than the 2014 average of 164 GPCD.

3.0 WATER SUPPLY

The City of Portales currently relies exclusively on pumping groundwater for its water supply. The principal source is the Blackwater Wellfield, located about 10 miles northeast of the City. A secondary source, used primarily during the higher demand summer months, is the older and smaller Sandhill Wellfield, located about 3 miles north of the City. Water is conveyed to the City in underground pipelines. The City has 9.26 million gallons of water storage capacity in five underground and surface tanks. To supplement the supply from its current wellfields, in 2001 the City purchased the Blackwater Farm and Las Lomas properties along with their appurtenant water rights to create a groundwater reserve adjacent to the City's Blackwater Wellfield. The Las Lomas property has also been called the Ruther Farm. Together these two

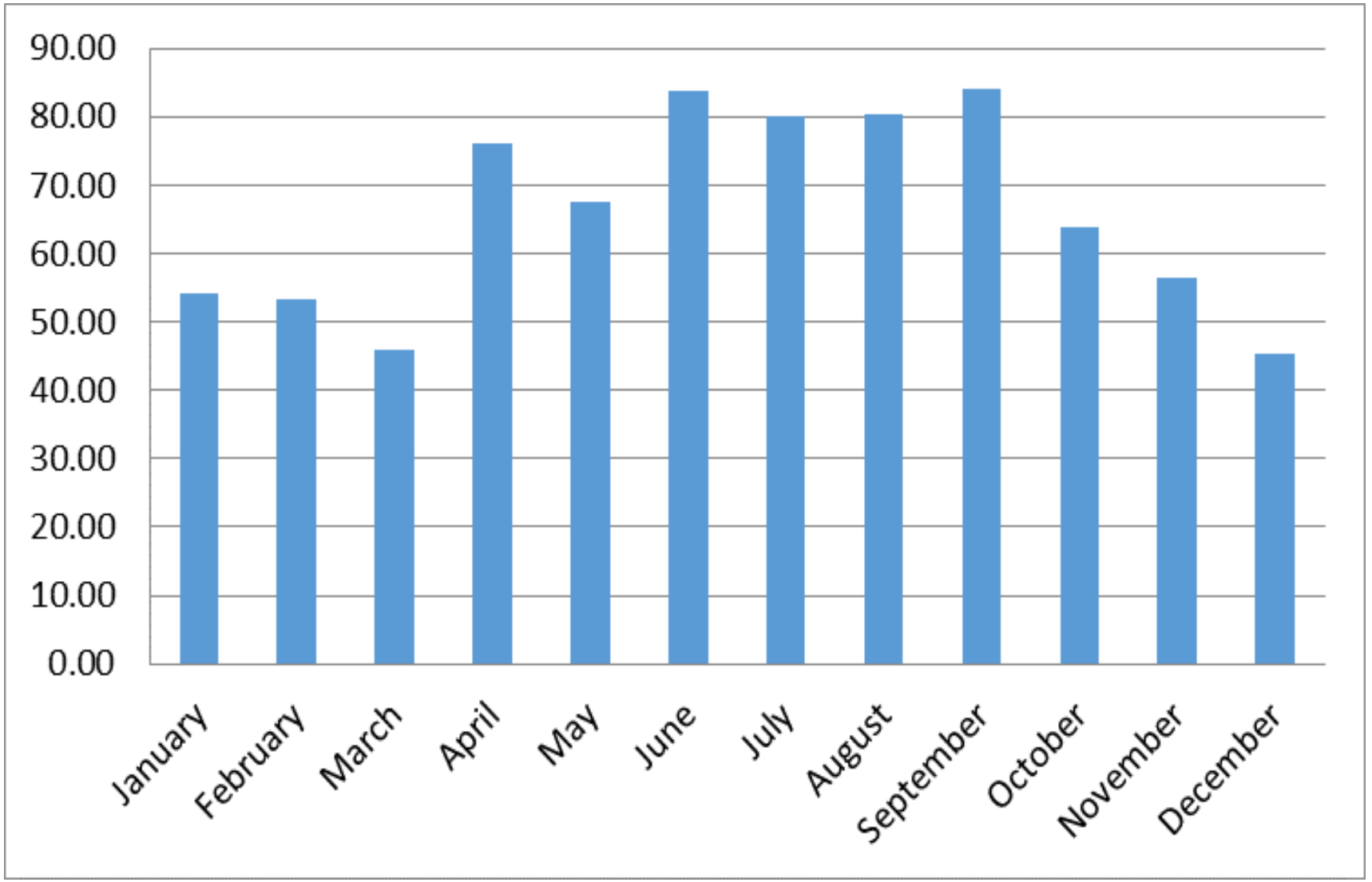


Figure 7. 2015 single family residential GPCD from NMOSE GPCD Calculator.

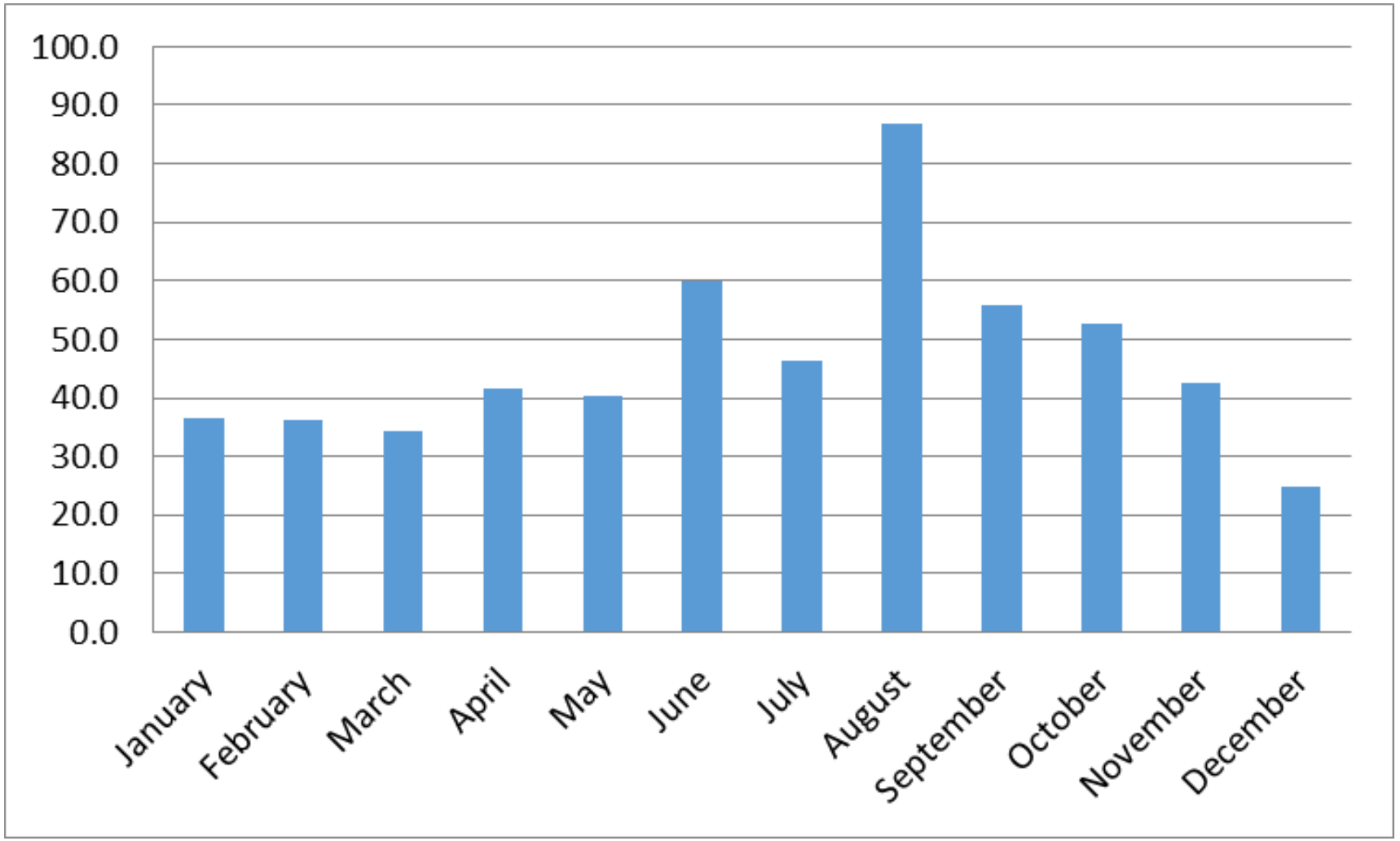


Figure 8. 2015 multi-family residential GPCD from NMOSE GPCD Calculator.

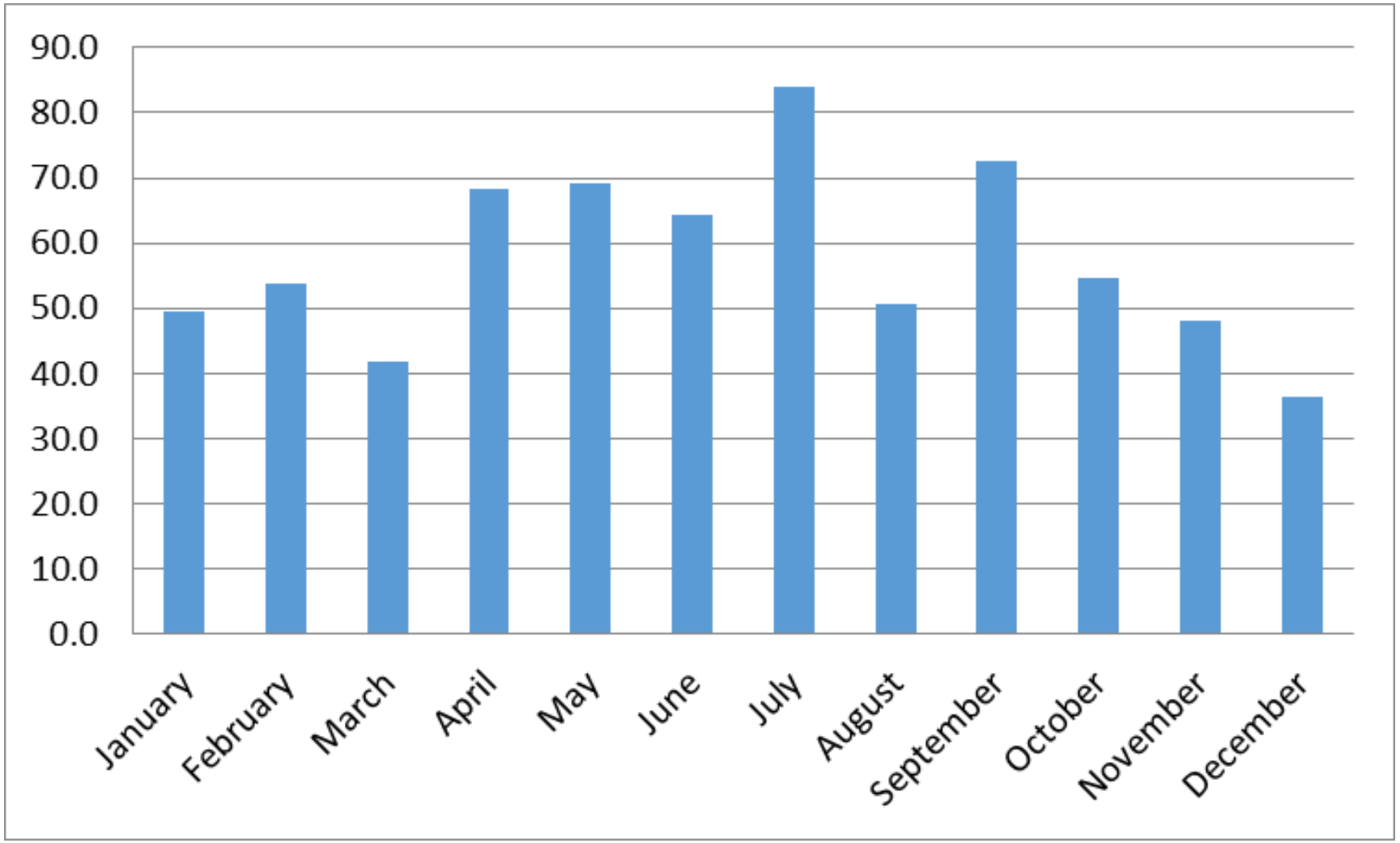


Figure 9. 2015 industrial, commercial, and institutional GPCD from NMOSE GPCD Calculator.

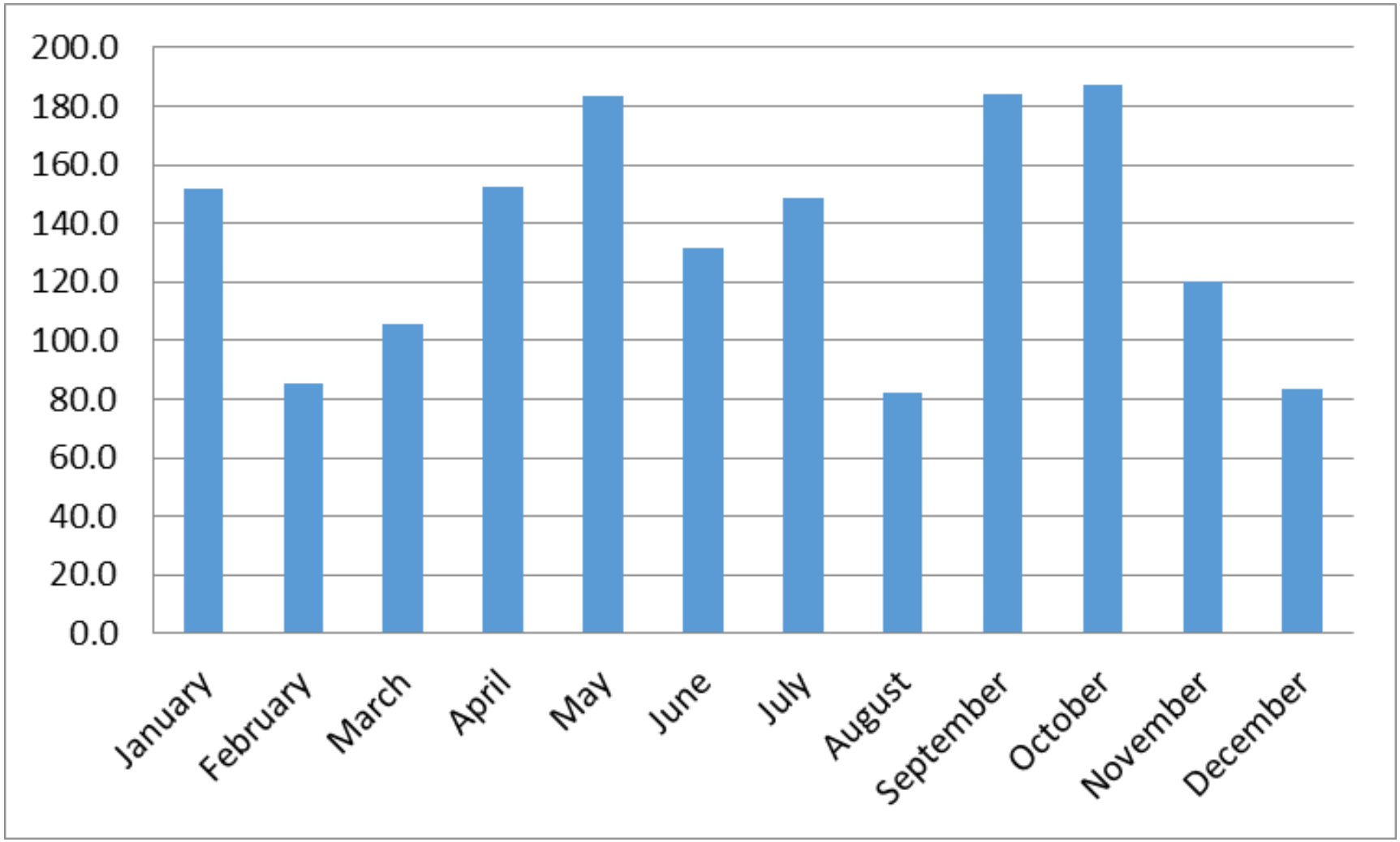


Figure 10. 2015 total system GPCD from NMOSE GPCD Calculator.

properties are herein called the Baker Farm, named after their former owner. The City has retired the farm's irrigation wells from agricultural use and is progressively converting the irrigation wells to municipal use and tying them into the City's Blackwater Wellfield conveyance system.

Available data on the City's wells are presented in the appendices to this report and include drilling dates, pumping capacities, static water levels, and depletion rates. Data on the Blackwater wells are presented in Appendix C, on the Sandhill wells in Appendix D, and on the remaining unconverted Baker Farm wells in Appendix E.

3.1 Groundwater Supply in City Wellfields

Portales' 2015 water supply was derived from 35 active Blackwater wells. Seven Blackwater wells (BW-1, BW-10, BW-14, BW-21, BW-23, BW-24, and BW-25) were out of service in 2015 and were not pumped. In addition, none of the seven Sandhill wells were pumped in 2015. Conversion to municipal use has been completed for 24 Baker Farm wells, which have been renumbered as Blackwater Wells BW-19 through BW-42. Of these, five were identified for conversion in 2003 and two more in 2008. An ambitious program to convert the remaining 17 wells began in 2011. Seven more wells were added to the Blackwater Wellfield system in 2011, two more in 2012, six more in 2013, and the remaining two in 2014. No additional wells were added to the system in 2015. A summary list of converted wells by OSE permit number is presented in Appendix F. Historic production of the Sandhill Wellfield averaged about 5% of total pumping but has been essentially negligible since 2012. Because the contribution of the Sandhill Wellfield to the City's water supply is small, emphasis in the following discussion is on the Blackwater Wellfield.

3.1.1 Blackwater Wellfield

The locations of the City's Blackwater and Baker Farm wells are shown on the wellfield map in Figure 11. Baker Farm wells that have not yet been converted to municipal use are identified by their NMOSE permit numbers on the figure. All City wells are withdrawing water from the Ogallala/High Plains Aquifer, which due to high regional demand and low natural recharge, is being depleted at a relatively rapid rate. Because the groundwater in the aquifer is being regionally pumped at a rate that far exceeds the rate of recharge, it is effectively being mined and cannot be considered a renewable resource.

Table 9 presents a summary of how several diagnostic indicators of the health of the Blackwater Wellfield have changed over time. This table was first included in the 2013 annual report to more closely monitor the wellfield because the remaining aquifer saturated thickness is becoming critically low and average depletion rates need to be reduced. Aquifer depletion is measured as the rate of decline of the water table. Increasing depletion rates and decreasing aquifer thickness are indicators of deteriorating wellfield conditions. Since January of 2000, when the average saturated thickness at the City's Blackwater Wells was 80 feet, the average saturated thickness has dropped 45 feet at an average rate of 2.8 feet/year.

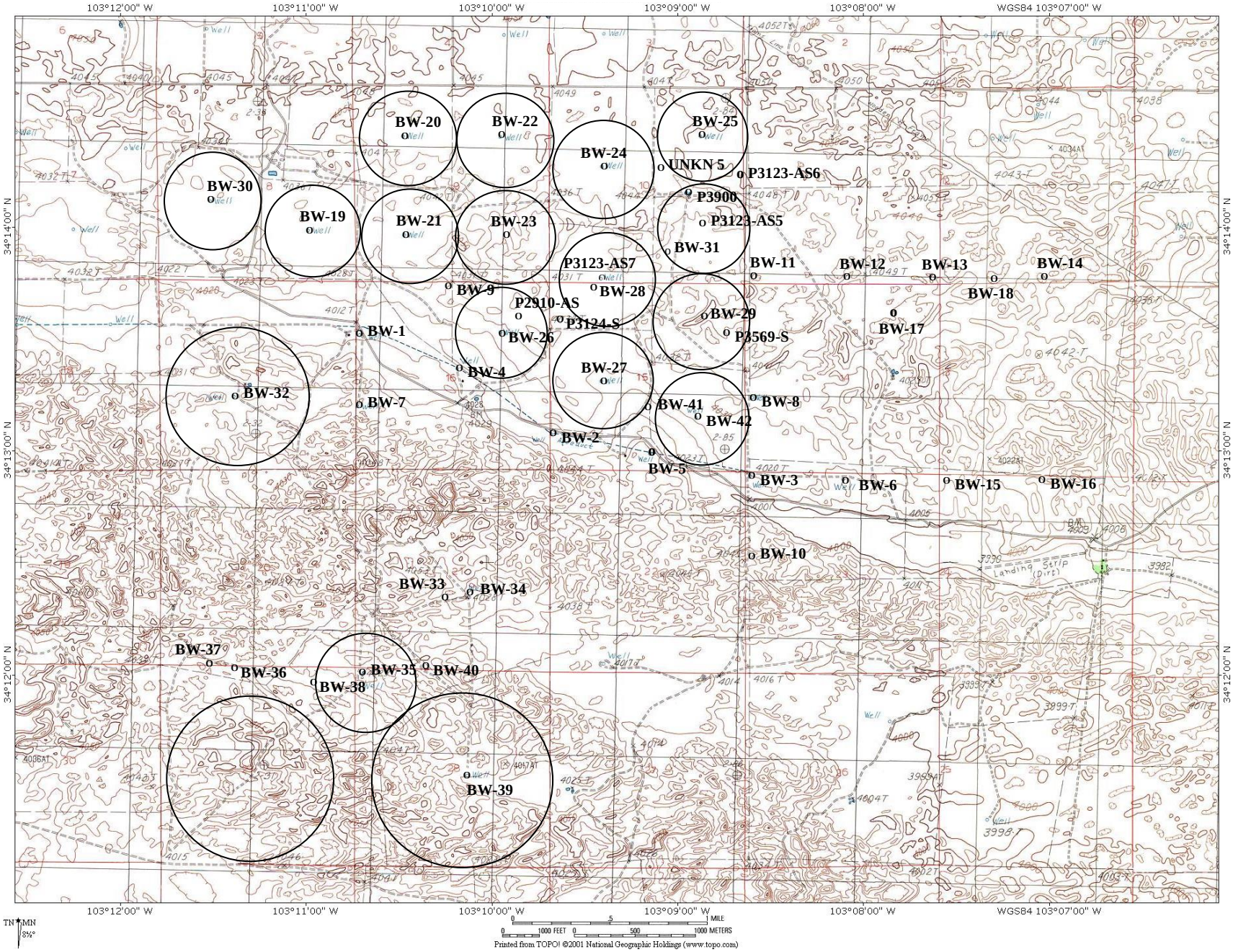


Figure 11. Map of the Blackwater Wellfield

Specific capacity is the production rate of a well divided by the pumping drawdown. Decreasing specific capacity provides a third indicator when production rates and associated water table drawdowns are high but becomes less useful when production rates and drawdowns are small because the aquifer can't be sufficiently stressed. As shown in Table 9, the average specific capacity of the City's Blackwater wells followed a trend of progressively declining followed by increases as new wells are added to the system. The average specific capacity of 8.6 gpm/foot in January 2014 represented a small increase over the January 2013 average of 7.9 gpm/foot and returned the average to essentially the January 2012 level. However, since 2014 the average specific capacity has increased to over 20 gpm/ft while the saturated thickness continues to decrease and is no longer an adequate indicator.

The column showing one-year depletion rates on Table 9 provides a more immediate indication of depletion rate trends. As can be seen in the table, the one-year depletion rates have been decreasing over the past four years and have dropped from 2.7 feet/year to the current 1.1 foot/year. This welcome reduction is due to lower wellfield demands and to the addition of new wells which better spread pumping across the wellfield. It will be important to keep future average depletion rates below 2 feet/year to help meet the targeted reductions in water demand described below.

The City's strategy for dealing with the depleting aquifer is to encourage water conservation, to progressively add more wells to its system that draw upon the stored water in its groundwater reserve, and to eventually acquire a renewable water supply from Ute Reservoir. Although the components of this strategy have been successful and construction of the Ute Pipeline has begun, as the aquifer approaches the end of its useful life as a high yield source of municipal water supply, increasingly significant reductions in water demand will be required pending actual receipt of supplemental supplies from Ute Reservoir or from another, more temporary source. As long as the Blackwater Wellfield remains the City's primary source of water, the wellfield depletion rate will increase as the aquifer thickness decreases unless more wells are regularly added to the system and/or the volume pumped is reduced.

Long-term increases in the depth to water at the City's Blackwater Wellfield are shown graphically in Figures 12 through 16. As shown in the figures, the water table has been declining at a more or less regular rate for decades. The brief water table stabilization observed for several years following the unusually wet year in 2004 is expected to be repeated following the unusually high precipitation in 2015 but this is not likely to alter the long-term trend unless pumping rates continue to decline.

Performance data for individual wells in the Blackwater Wellfield as of the winter of 2016 are shown in Table 10 and additional historic data are presented in Appendix C. The remaining aquifer saturated thickness ranged from 15.5 feet at BW-21 to 71.2 feet at BW-16. The average remaining aquifer thickness at wells where data was available was 34.6 feet, one foot less than the 35.6 feet measured in winter 2015. These data are little changed from the previous year. The production pumping rate ranged from 25 gpm at BW-34 to 221 gpm at BW-32. The overall average production pumping rate in the active Blackwater wells was 104 gpm in winter 2016 as compared with 108 gpm in winter 2015. The total pumping capacity in winter 2016 was 3,432 gpm as compared with 3,680 gpm in winter 2015.

Table 9. Diagnostic Data for City of Portales Blackwater Wellfield

Year of Measurement	Average Depletion Rate (feet/year)			Average Aquifer Saturated Thickness (feet)	Average Well Specific Capacity (gpm/foot)
	Long Term	Short Term	One Year		
2000	-3.1	-6.0	-2.1	80	8.4
2001	- -	- -	-2.2	- -	- -
2002	-3.0	-4.7	-6.1	75	4.5
2003	-2.4	-2.5	-0.2	74	15.0
2004	-2.6	-2.7	-2.9	64	11.1
2005	-2.7	-2.9	-2.1	61	16.9
2006	-2.6	-2.3	-0.6	60	15.1
2007	-2.4	-0.3	+0.6	68	15.5
2008	-2.7	-2.3	-6.6	55	15.3
2009	-2.7	-3.0	-5.0	56	- -
2010	-2.8	-3.4	-3.5	42	- -
2011	-2.8	-3.5	-1.6	43	10.9
2012	-2.8	-3.5	-2.5	38	8.7
2013	-2.7	-2.8	-2.7	38	7.9
2014	-2.6	-2.2	-1.8	37	8.6
2015	-2.8	-1.7	-1.5	36	- -
2016	-2.7	-1.9	-1.1	35	- -

Notes:
-Values measured in January/February of the given year. Depletion rates are for years prior to the measurement date.
-Long-term is since the well was drilled; short term is the previous three to five years. One year is for the previous year.
-Average specific capacity values after 2014 are no longer indicative of wellfield health. See text discussion.

The unutilized saturated thickness shown in Table 10 takes pumping drawdown into account and includes a 5 foot minimum saturated zone buffer to provide a margin of safety when the well is nearing the end of its useful life. The unutilized saturated thickness ranged from zero feet at BW-13 (indicating the pumping drawdown is 5 feet from the bottom of the aquifer) to 49.9 feet at the new well BW-38. As further discussed below, a small unutilized saturated thickness is an indication that the well is either going dry or is being pumped too hard. The average unutilized saturated thickness increased from 17.5 feet in the winter of 2015 to 21.7 feet in the winter of 2016 and reflects the decrease in average pumping rates.

A decreasing aquifer thickness is accompanied by a decrease in well yields. The long-term declines in yield of the City's Blackwater wells are illustrated through the winter of 2016 in Figures 17 through 21. The declines in well yields are consistent with the declining saturated thickness of the aquifer and illustrate the importance of the City's program to routinely add additional wells to the system and reduce wellfield demands. Several of the older Blackwater wells were acidized and swabbed in 2011 to remove well screen rust and improve performance. The most notable improvement was in the yield of well BW-8, which increased from 50 to 210 gpm. This increase is quite evident in Figure 17.

Table 10. Estimated Winter 2016 Aquifer Characteristics in the City of Portales Blackwater Wells

Well Number	(1) Depth to Static Water in Winter 2016[1] (ft)	(2) Depth to Top of Redbeds[4] (ft)	(3) = (2) – (1) Total Saturated Thickness in Winter 2016 (ft)	(4) Pumping Drawdown in Winter 2016[1] (ft)	(5) = (4) / (3) Ratio of Pumping Drawdown to Saturated Thickness	(6) Production Pumping Rate in Winter 2016[1] (gpm)	(7) = (6) / (4) Specific Capacity of Well in Winter 2016 (gpm/ft)	(8) = (3) – (4) – 5 ft Unutilized Saturated Thickness Remaining in Winter 2016[2] (ft)
BW-1	No Data	170	No Data	Out of Service	Out of Service	Out of Service	Out of Service	Out of Service
BW-2	137.9	172	34.1	5.2	0.15	155	29.9	23.9
BW-3	141.7	190	48.3	12.2	0.25	55	4.5	31.1
BW-4	144.9	180	35.1	2.0	0.06	80	39.2	28.0
BW-5	164.4	198	33.6	2.6	0.08	105	40.2	26.0
BW-6	143.6	198	54.4	21.8	0.40	70	3.2	27.5
BW-7	No Data	205	No Data	No Data	No Data	115	No Data	No Data
BW-8	168.2	205	36.8	11.9	0.32	85	7.2	19.9
BW-9	155.1	179	23.9	3.8	0.16	No Data	No Data	15.1
BW-10	155.4	202	46.6	12.2	0.26	30	2.5	29.4
BW-11	167.9	196	28.1	3.2	0.11	108	34.0	19.9
BW-12	168.0	195	27.0	13.9	0.51	101	7.3	8.1
BW-13	186.9	223	36.1	31.1	0.86	145	4.7	0.0
BW-14	174.2	212	37.8	No Data	No Data	No Data	No Data	No Data
BW-15	141.8	200	58.2	No Data	No Data	57	No Data	No Data
BW-16	128.9	200	71.2	27.8	0.39	125	4.5	38.3
BW-17	174.3	211	36.7	12.0	0.33	170	No Data	19.7
BW-18	168.3	210	41.7	No Data	No Data	No Data	No Data	No Data
BW-19	153.4	172	18.6	3.1	0.17	68	22.1	10.5
BW-20	No Data	180	No Data	No Data	No Data	No Data	No Data	No Data
BW-21	154.5	170	15.5	6.3	0.41	30	4.8	4.2
BW-22	168.1	190	21.9	4.5	0.20	97	21.7	12.5
BW-23	157.0	182	25.0	No Data	No Data	No Data	No Data	No Data
BW-24	168.6	185	16.4	No Data	No Data	No Data	No Data	No Data
BW-25	178.2	200	21.8	No Data	No Data	No Data	No Data	No Data
BW-26	160.7	180	19.3	7.0	0.36	180	25.7	7.3
BW-27	151.0	185	34.0	4.4	0.13	120	27.1	24.6
BW-28	171.7	199	27.3	No Data	No Data	No Data	No Data	No Data
BW-29	175.0	206	31.0	3.9	0.13	85	21.7	22.1
BW-30	147.4	179	31.6	2.4	0.07	70	29.7	24.2
BW-31	173.4	190	16.7	1.8	0.11	35	19.6	9.9

Table 10. Estimated Winter 2016 Aquifer Characteristics in the City of Portales Blackwater Wells (Continued)

Well Number	(1) Depth to Static Water in Winter 2016[1] (ft)	(2) Depth to Top of Redbeds[4] (ft)	(3) = (2) – (1) Total Saturated Thickness in Winter 2016 (ft)	(4) Pumping Drawdown in Winter 2016[1] (ft)	(5) = (4) / (3) Ratio of Pumping Drawdown to Saturated Thickness	(6) Production Pumping Rate in Winter 2016[1] (gpm)	(7) = (6) / (4) Specific Capacity of Well in Winter 2016 (gpm/ft)	(8) = (3) – (4) – 5 ft Unutilized Saturated Thickness Remaining in Winter 2016[2] (ft)
BW-32	132.0	170	38.0	18.0	0.47	221	12.3	15.0
BW-33	145.2	No Data	No Data	2.5	No Data	55	22.4	No Data
BW-34	140.2	168	27.9	5.5	0.20	25	4.5	17.4
BW-35	133.2	170	36.8	9.1	0.25	105	11.5	22.7
BW-36	129.1	168	38.9	0.5	0.01	90	200.0	33.5
BW-37	129.4	165	35.6	2.0	0.06	120	60.9	28.6
BW-38	138.9	197	58.1	3.2	0.05	170	53.6	49.9
BW-39	131.4	178	46.6	12.1	0.26	150	12.4	29.5
BW-40	139.8	No Data	No Data	7.4	No Data	100	13.5	No Data
BW-41	141.6	175	33.4	4.0	0.12	120	30.1	24.4
BW-42	161.7	200	38.3	4.4	0.12	190	42.9	28.8
BW-43								
BW-44								
BW-45								
2016 Total						3432		
2016 Average	153.9	189	34.6	8.2	0.23	104.0	27.1	21.7

Note: Blank cells indicate no data.

1. Information from City of Portales well logs and monitoring data. Water levels and production pumping rates were measured in January 2014.
2. Residual saturated zone thickness during pumping taken as 5 feet.
3. Depth to top of redbeds estimated based on total well depth for BW-31 (193 ft), BW-34 (170 ft), BW-38 (200 ft), and BW-39 (180 ft). No driller's logs are available for these wells.

Figure 12. Historic Water Levels in Wells BW-1 through BW-9

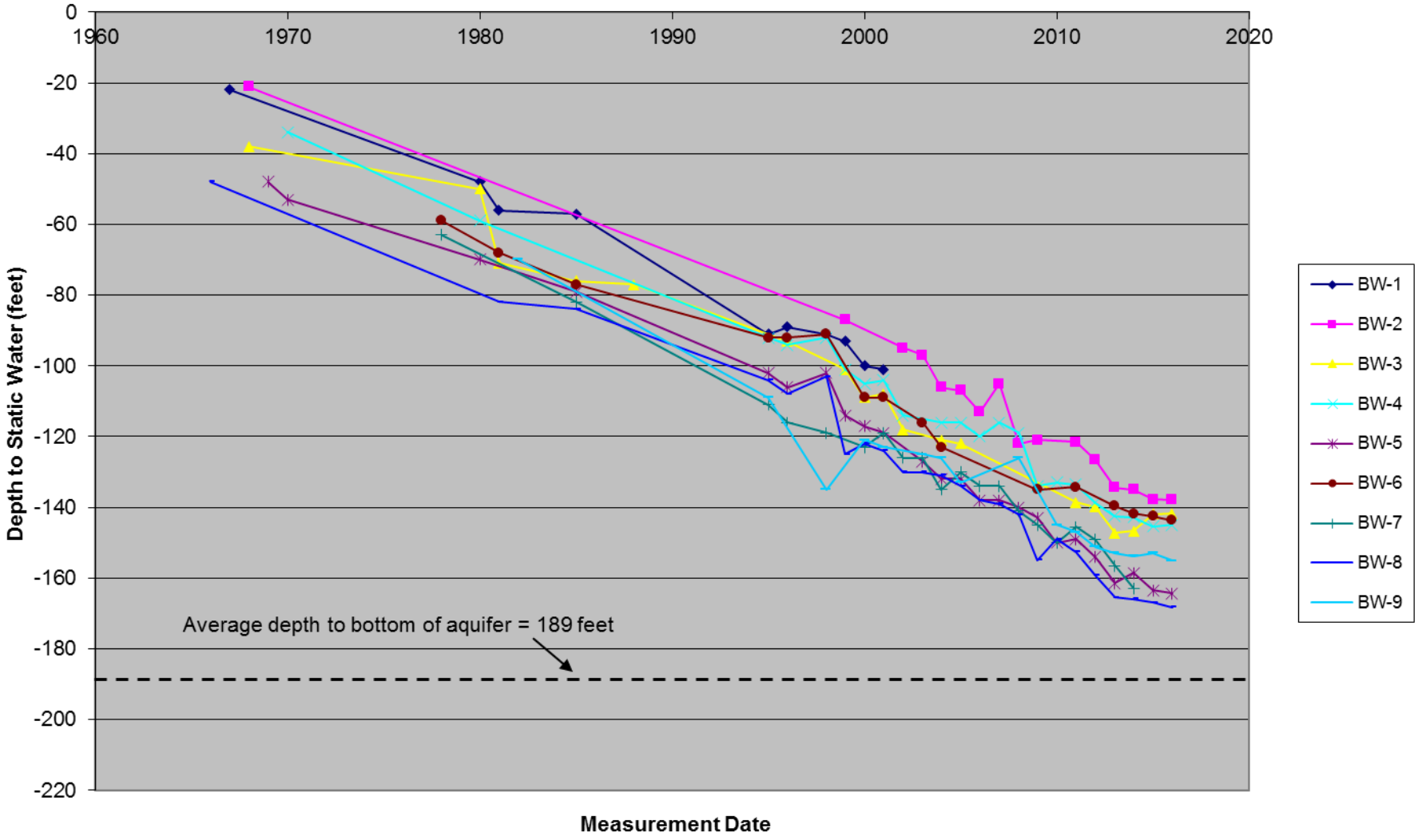


Figure 13. Historic Water Levels in Wells BW-10 through BW-18

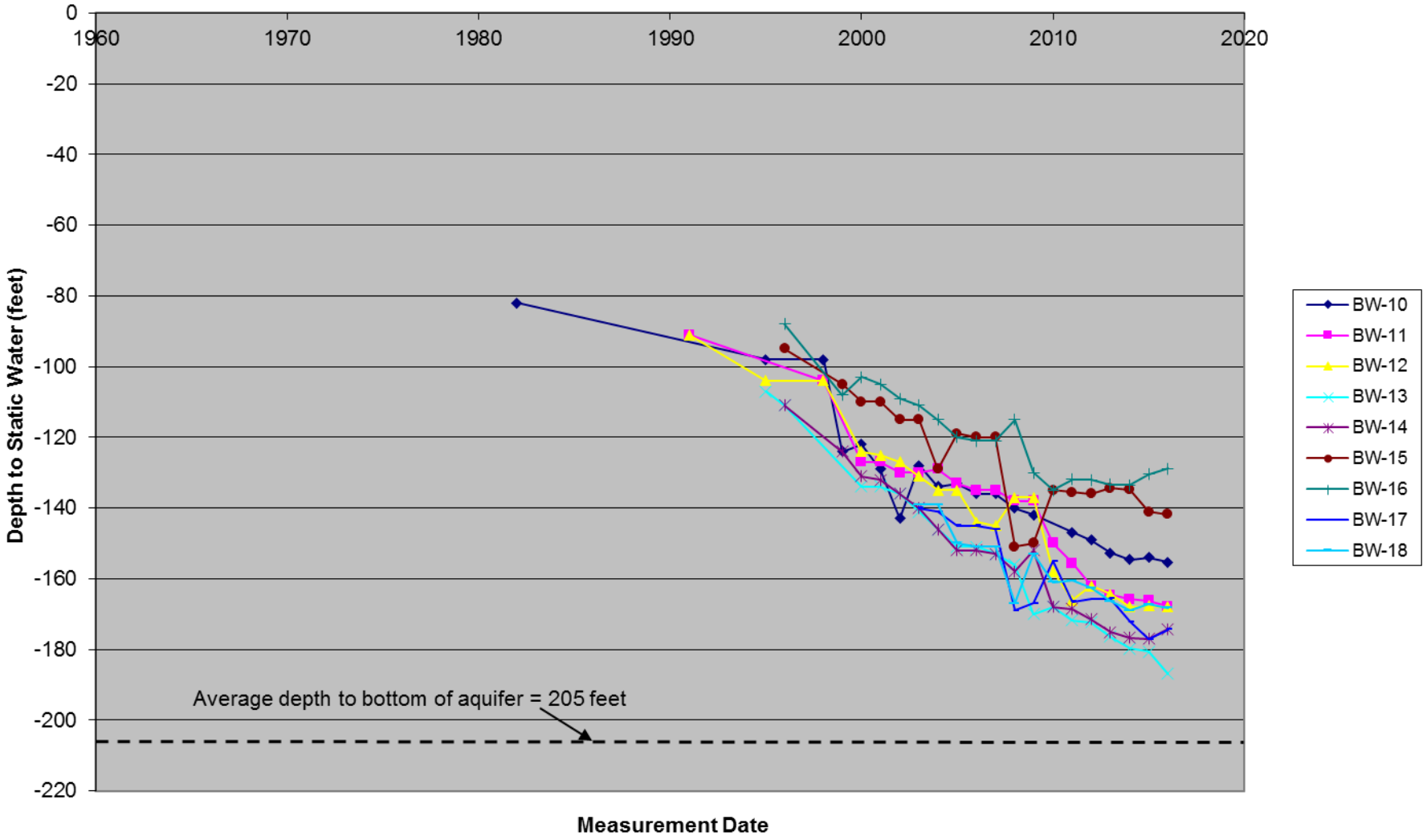


Figure 14. Historic Water Levels in Wells BW-19 through BW-27

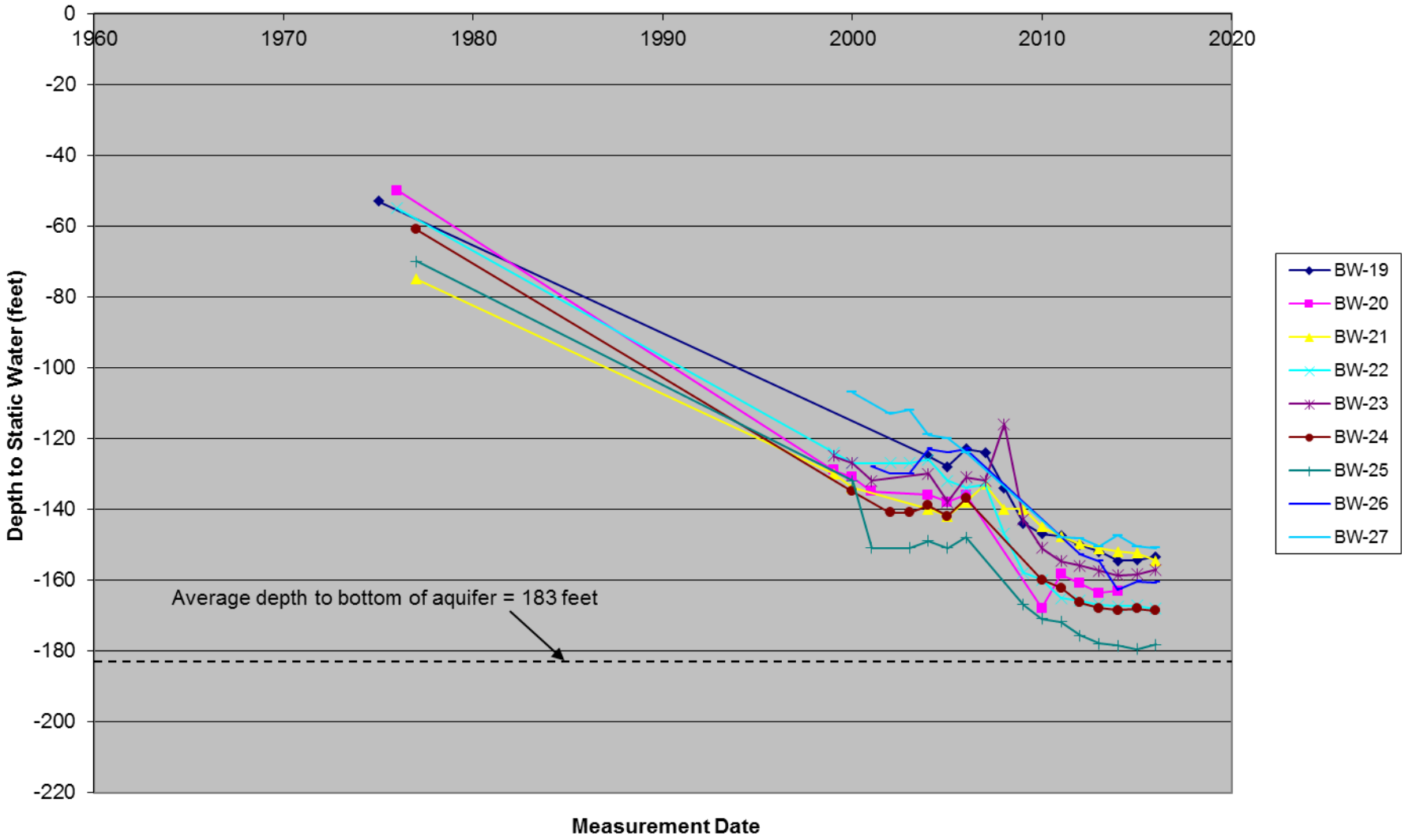


Figure 15. Historic Water Levels in Wells BW-28 through BW-36

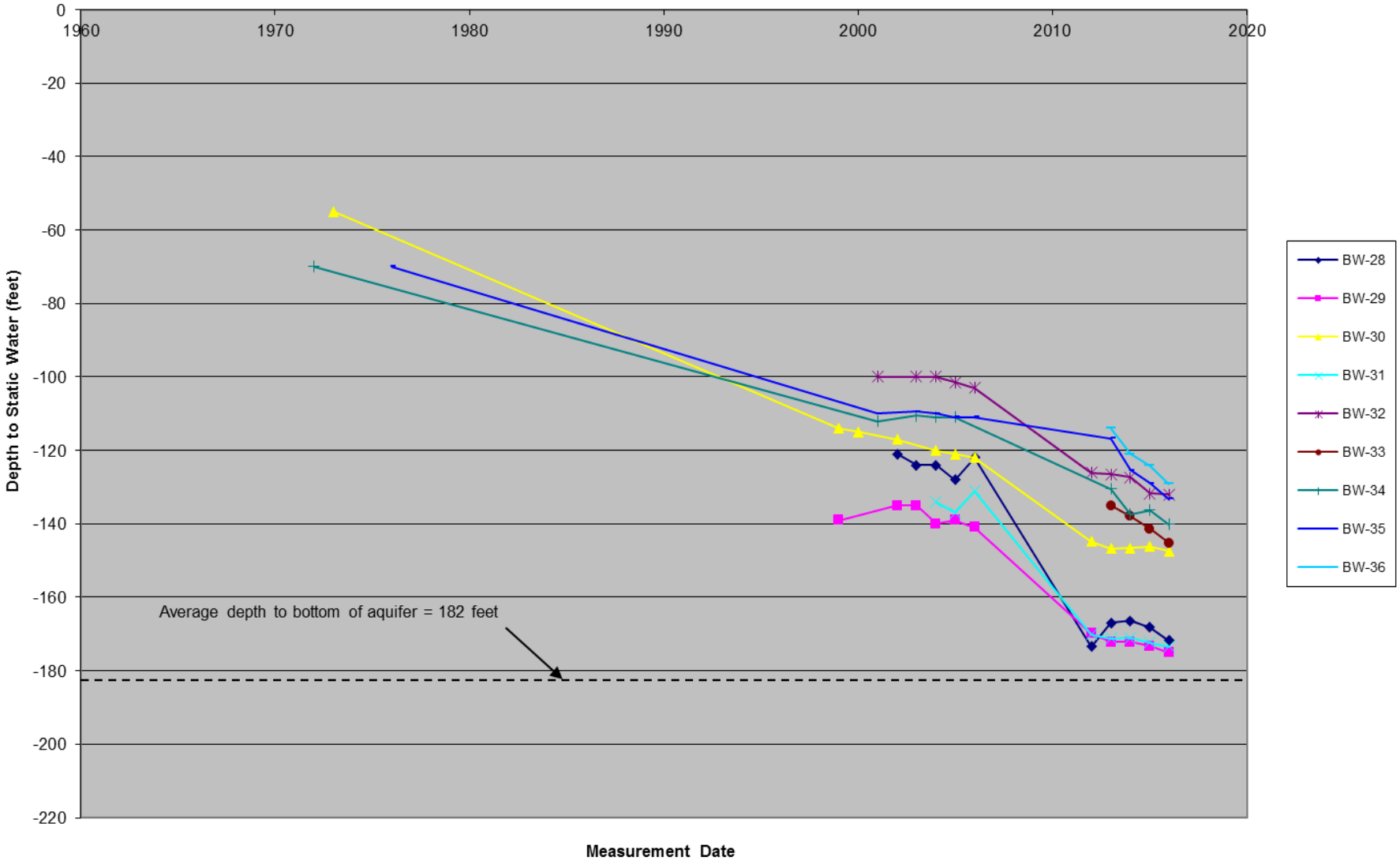
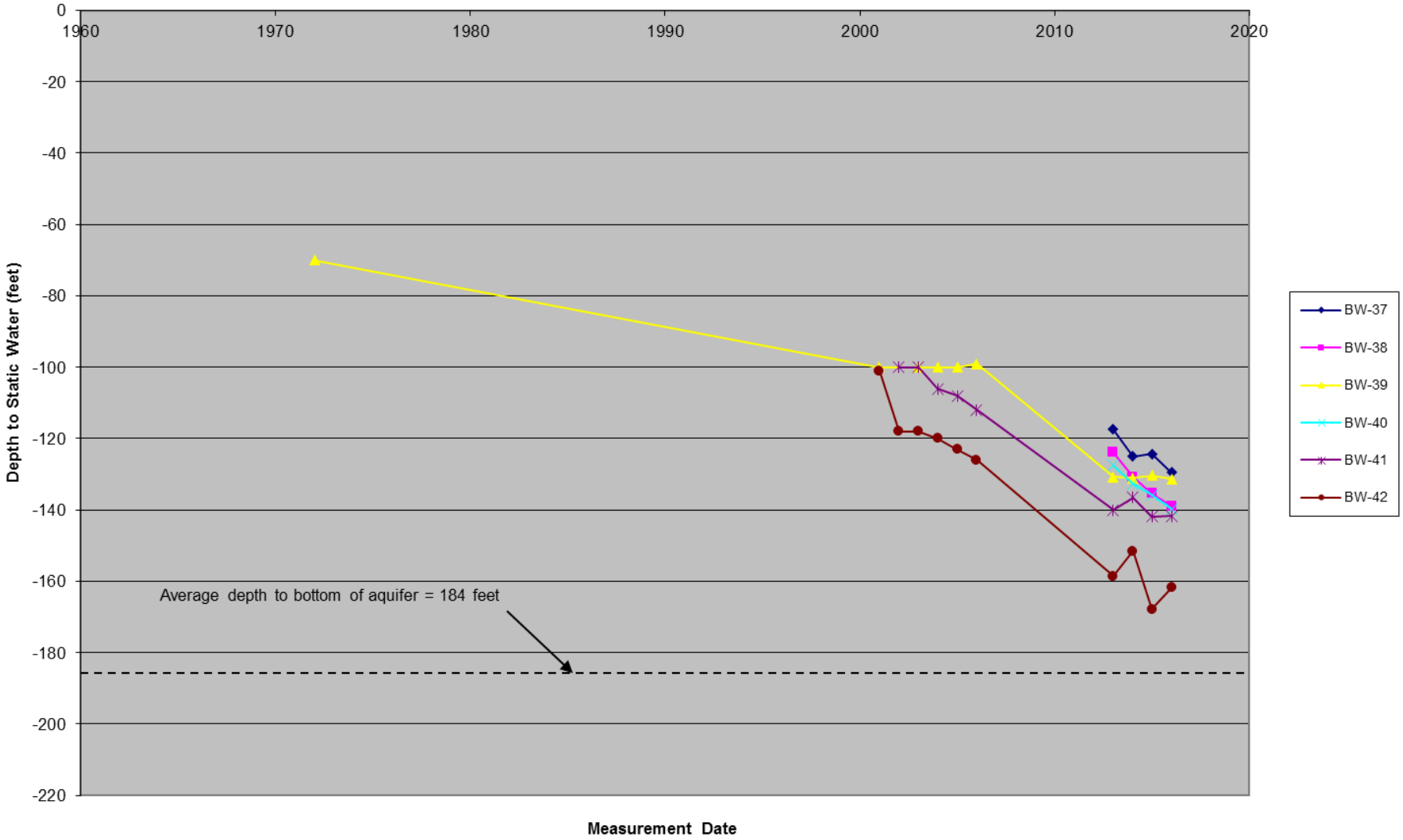


Figure 16. Historic Water Levels in Wells BW-37 through BW-42



Overpumping a well can damage the aquifer by clogging it and thus reducing its permeability. Overpumping is indicated when the pumping drawdown becomes a large percentage of the remaining saturated thickness. Although high pumping rates may occasionally be needed to obtain the necessary well yields to satisfy demands, the aquifer clogging resulting from overpumping can reduce water flow to the well. Except in emergency conditions, pumping drawdowns should be limited to 25 percent and not more than 50 percent of the saturated thickness. In the winter of 2015 the drawdowns in most wells were less than 50 percent of the remaining saturated thickness and only one well, BW-13 with a ratio of 86%, substantially exceeded 50 percent. Balancing production by reducing pumping rates in high ratio wells and increasing pumping rates in low ratio wells would increase the average unutilized saturated thickness and prolong the life of the wellfield. Drawdown to saturated thickness ratios for all Blackwater wells are shown in Table 10.

3.1.2 Sandhill Wellfield

Historic water levels in the City's seven Sandhill Wellfield are shown in Figure 22. Even though this wellfield was not pumped in 2015, measurements were made by the City of the depth to static water in six of the seven wells. Although these data depict a long term decline similar to that observed for the Blackwater wells, water levels have been stabilizing in recent years due to decreased pumping. Although the remaining average saturated thickness at Sandhill is now only 10.2 feet, concern for overpumping at Sandhill is less than at Blackwater because of the high permeability of the aquifer and Sandhill's role as a supplemental water source. In addition, aquifer damage is likely to be less severe at Sandhill because of the greater uniformity of the sandy aquifer material. Historic yields of the Sandhill wells are shown in Figure 23. Although the data are scattered, the recent pattern shows that yields in some of the wells may be stabilizing.

Performance data for individual wells in the Sandhill Wellfield as of winter 2016 are shown in Table 11 and additional historic data are presented in Appendix D. The aquifer saturated thickness ranged from 3.1 feet at SH-4 to 32.8 feet at SH-2 and averaged 16.0 feet. This average is essentially the same as in winter 2015. The specific capacities of the wells remain relatively high with an average of 18.3 gpm/ft, reflecting the relatively high permeability of the aquifer in this wellfield. Production pumping rates ranged from 45 to 75 gpm and averaged 60 gpm. Unutilized saturated thickness ranged from -4.7 feet at SH-5 (the pumping drawdown extended nearly to the bottom of the aquifer) to 24.1 feet at SH-2 and averaged 10.2 feet.

The total measured production pumping rate at Sandhill was 240 gpm in January 2016. Although this is only about 7 percent of the total production pumping capacity at Blackwater, the high aquifer permeability at Sandhill and its resistance to damage from high pumping rates are expected to maintain Sandhill as a viable but low yield source of water for many years.

Figure 17. Historic Yields in Wells BW-1 through BW-9

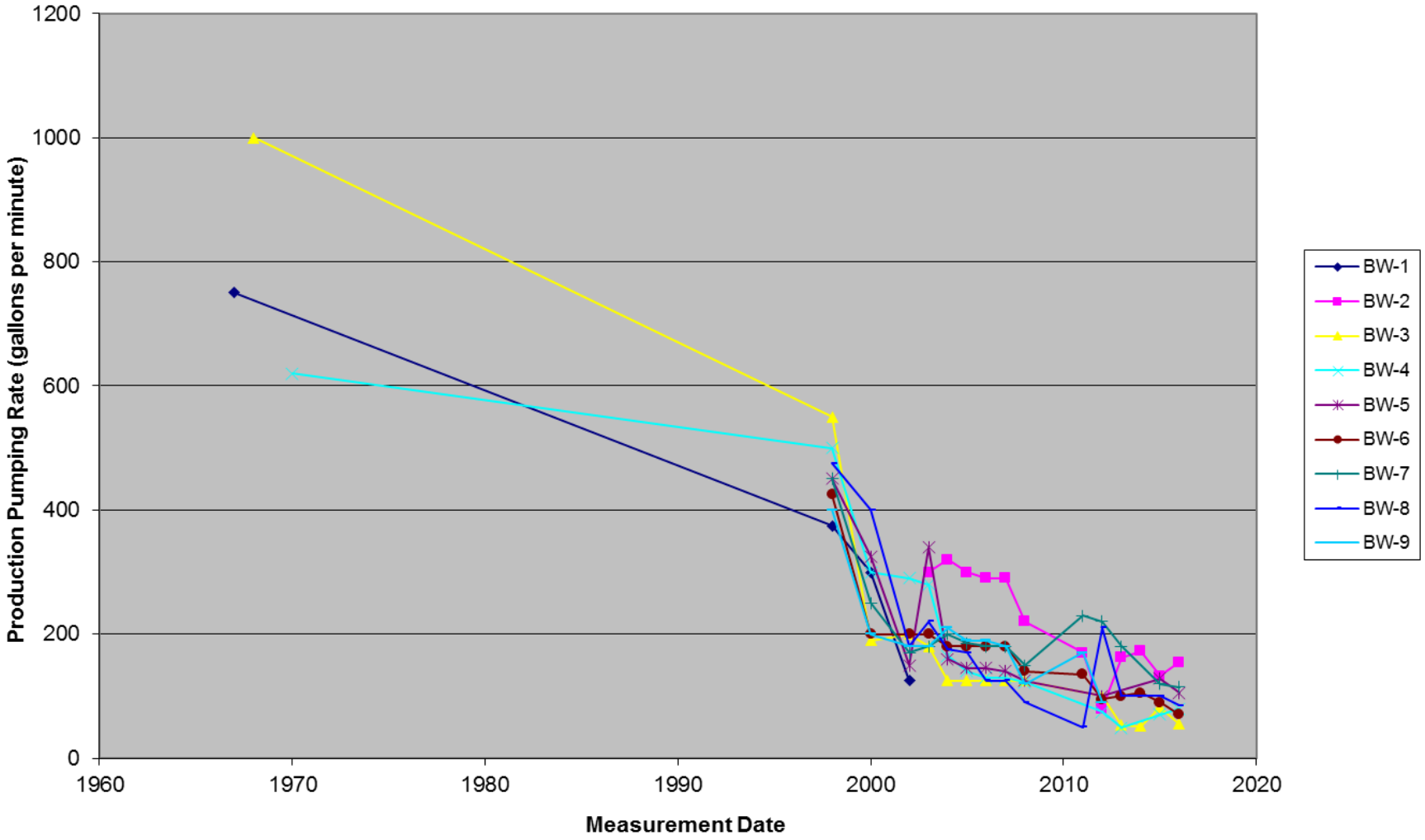


Figure 18. Historic Yields in Wells BW-10 through BW-18

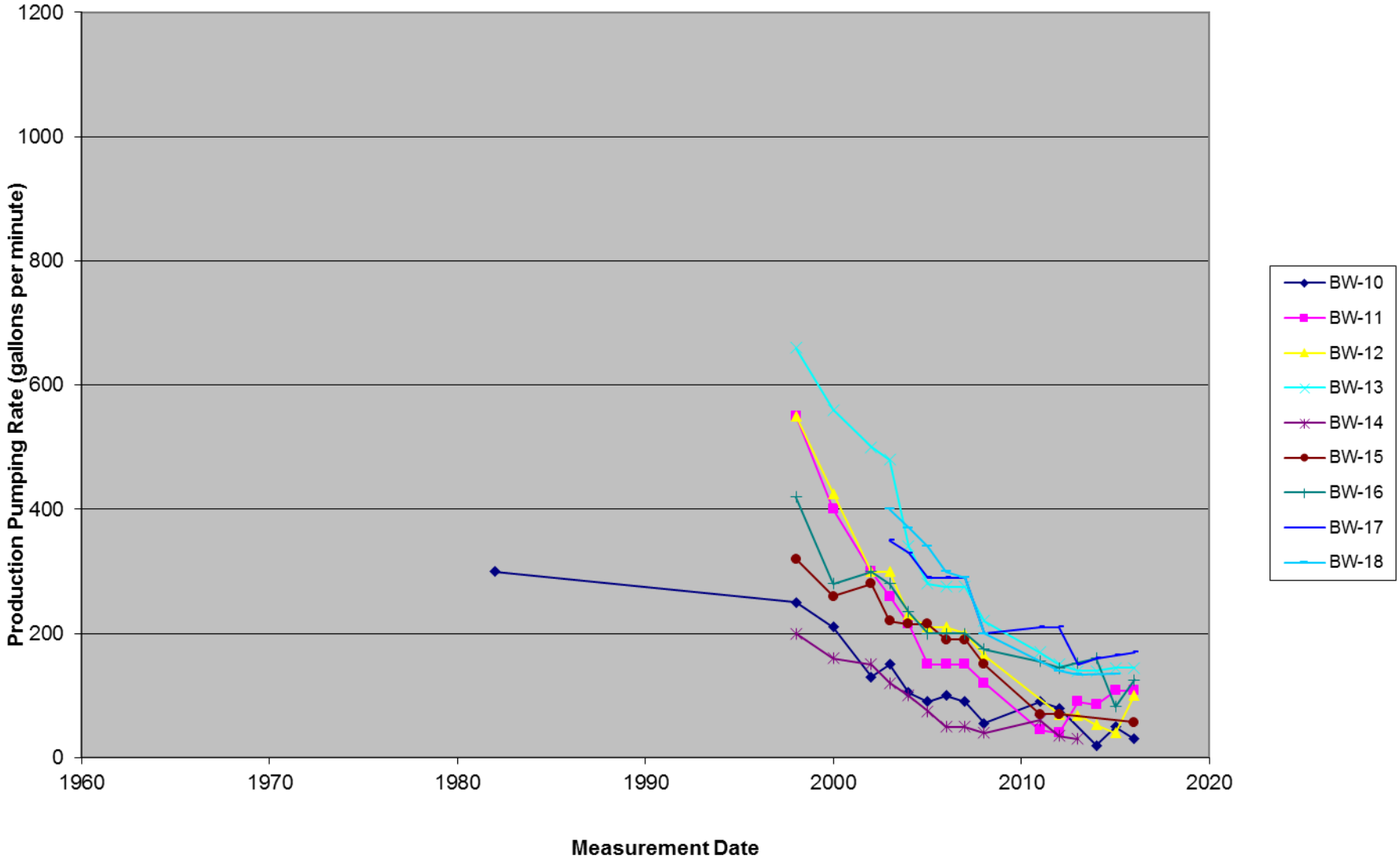


Figure 19. Historic Yields in Wells BW-19 through BW-27

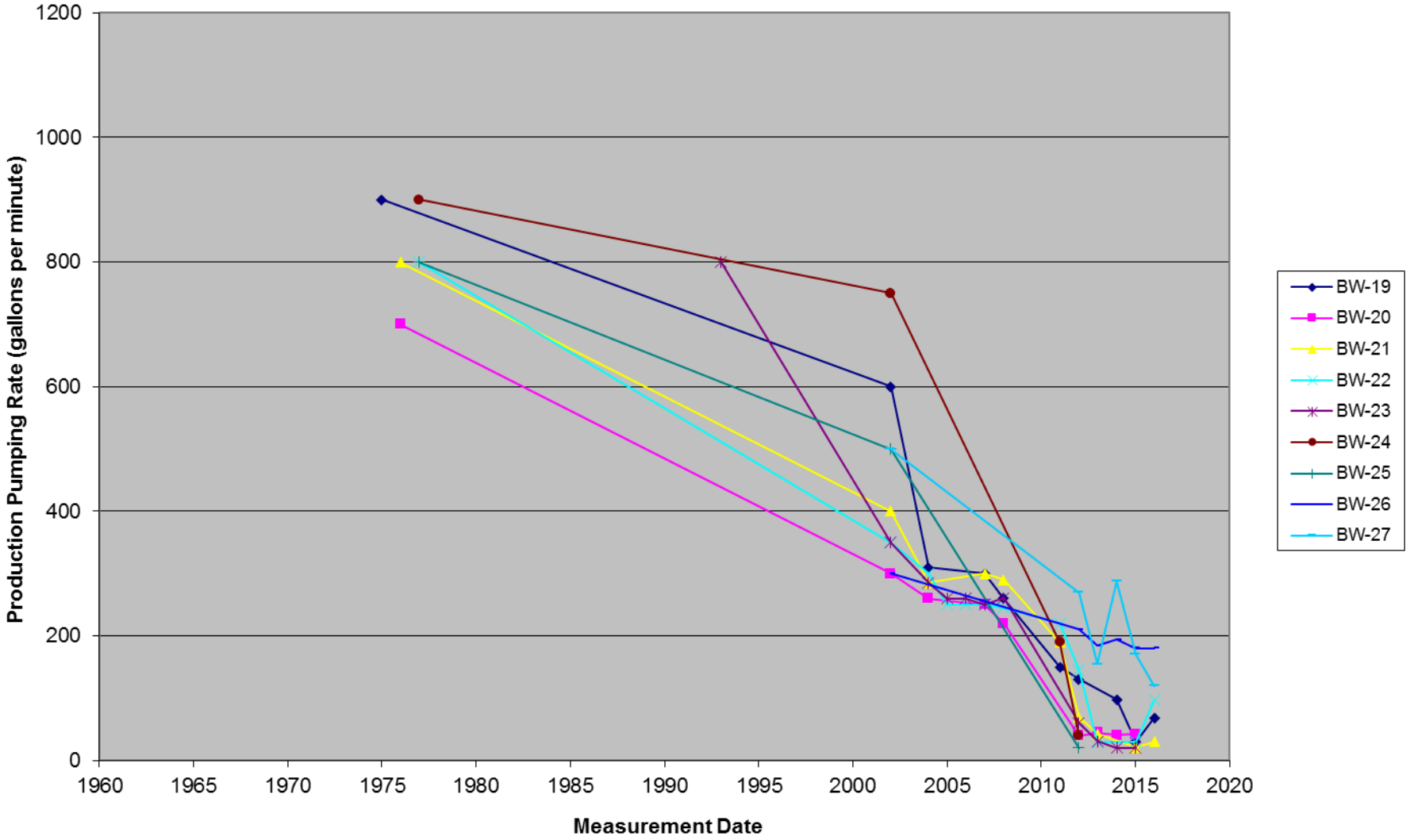


Figure 20. Historic Yields in Wells BW-28 through BW-36

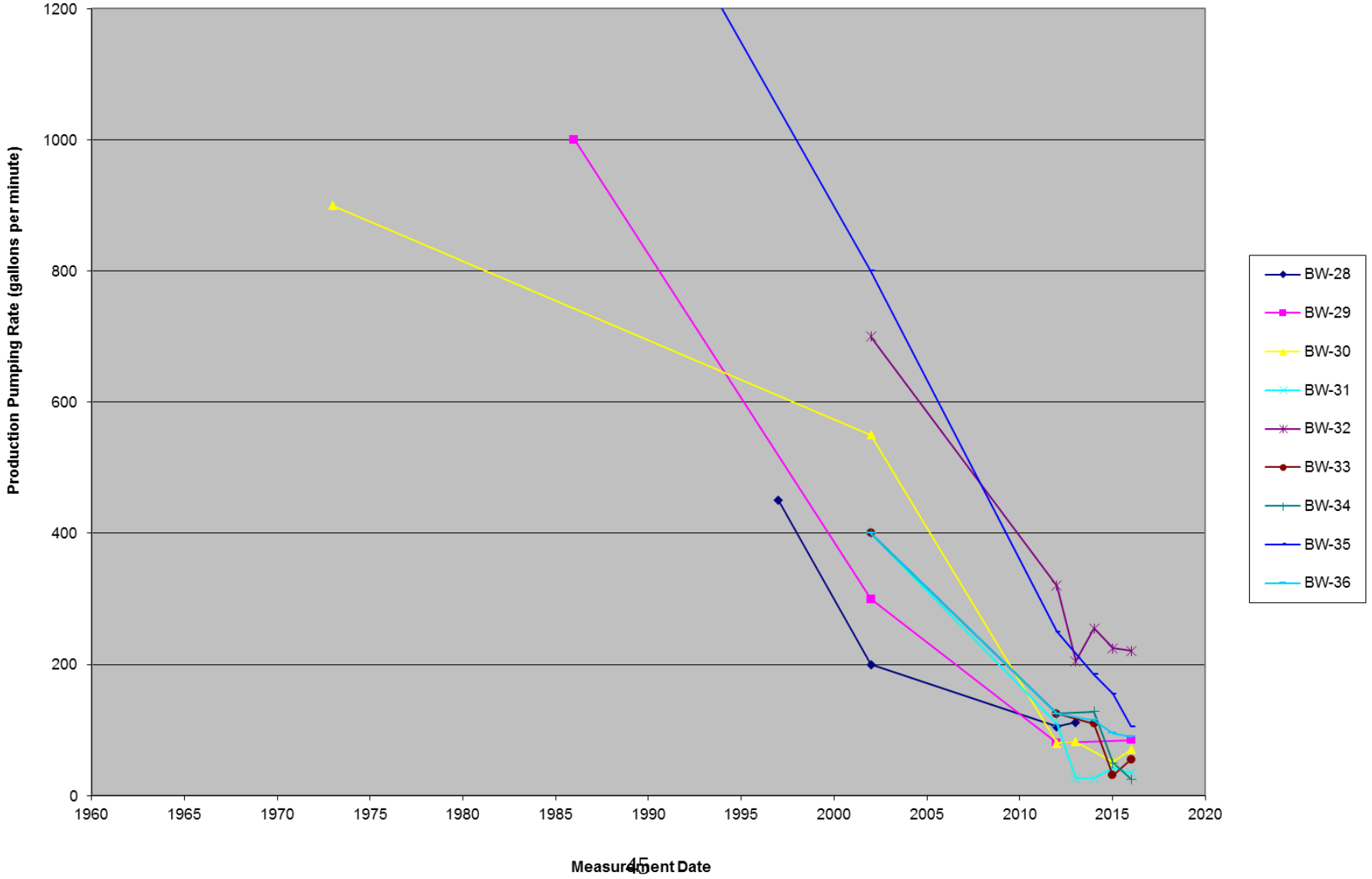


Figure 21. Historic Yields in Wells BW-37 through BW-42

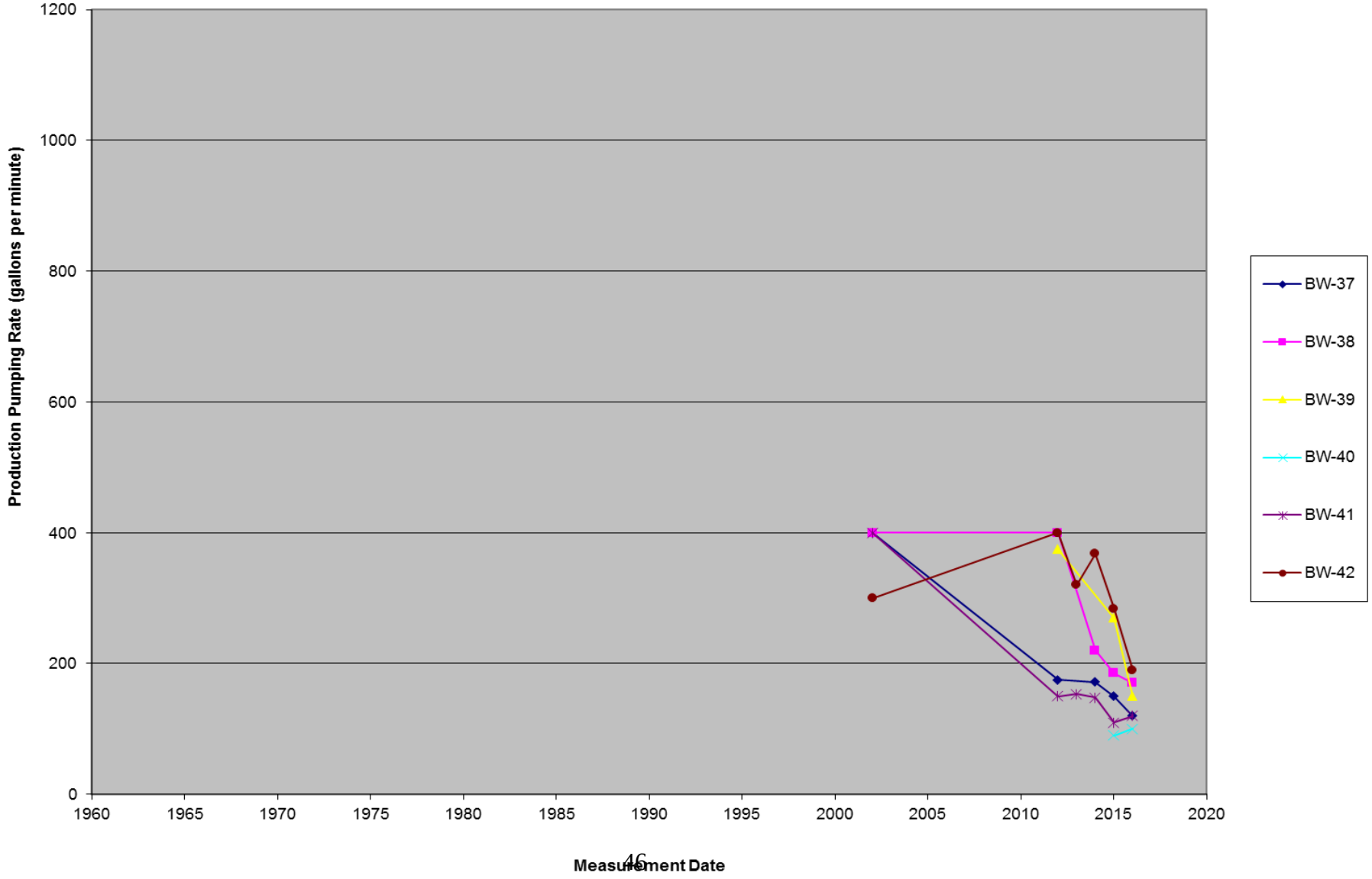
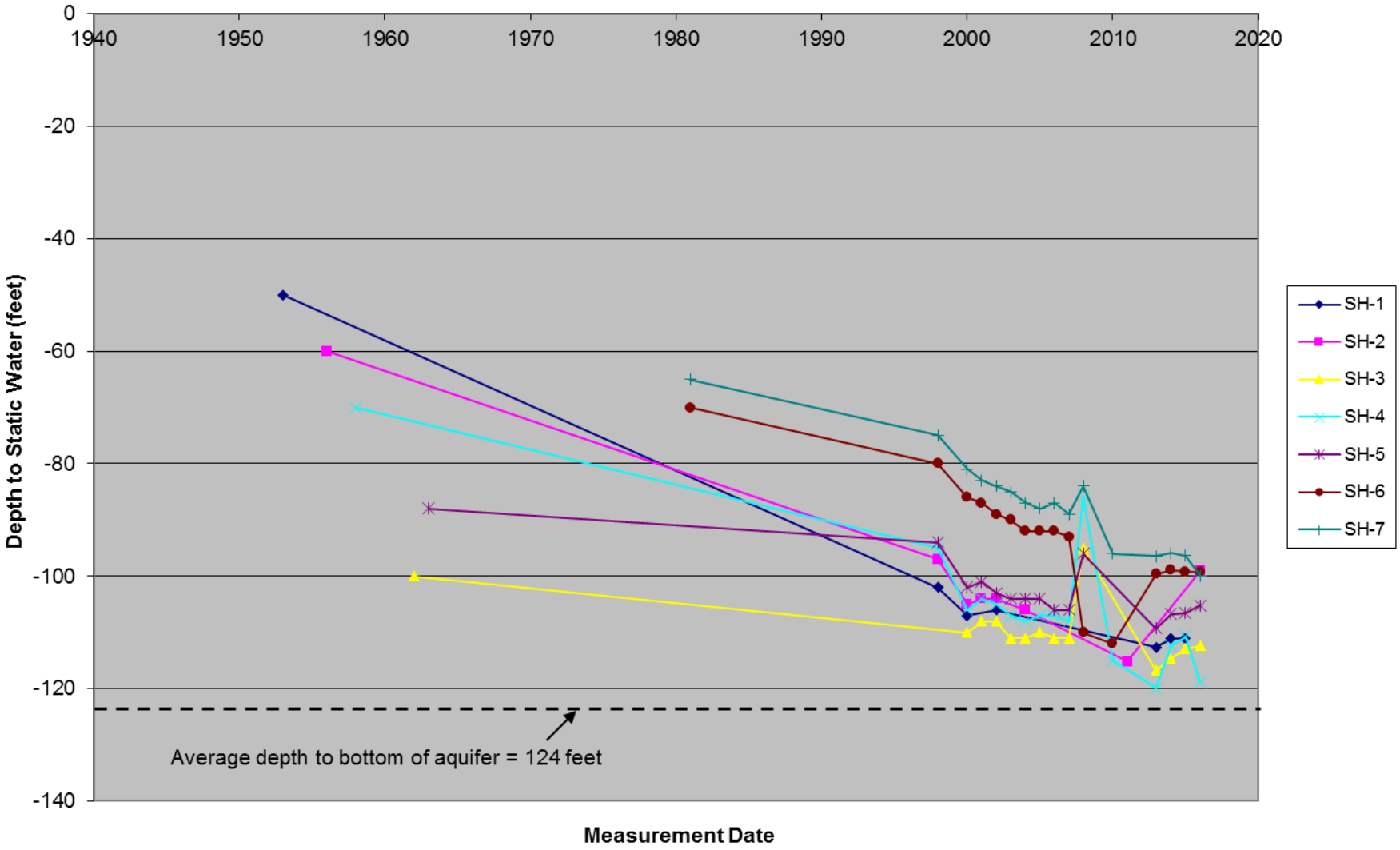


Figure 22. Historic Water Levels in Wells SH-1 through SH-7



3.1.3 Combined Wellfield Performance

The combined performance of the City's Blackwater and Sandhill Wellfields is important when determining total pumping capacity. Total pumping capacity increased from 4250 gpm in January 2006 to 5025 gpm in January 2007 as new wells were added to the system. The capacity subsequently decreased and then increased as more wells were added. The most recent peak capacity of 5715 gpm occurred in January 2012 and but has subsequently dropped despite the new wells that were added to the system. The winter 2016 combined pumping capacity is an estimated 3672 gpm when the Sandhill data is included.

Portales' combined winter 2016 pumping capacity is relatively low and compares to 3885 gpm a year earlier, which was also low. The foregoing evidence of continuing decreases means that new wells will need to be routinely added to the system to maintain pumping capacity at even these levels. Maintaining an adequate pumping capacity is expected to remain difficult, requiring a continuing effort to add new wells and simultaneously decrease wellfield demands through water conservation. A significant reduction in wellfield demand is expected to occur when reclaimed wastewater from the City's treatment plant becomes available in 2016 for irrigating City parks. Additional discussion of this project is provided in Section 4.0 below.

3.2 Groundwater Supply in Baker Farm Wells

In recognition of the declining yields at the City's wellfields, the City of Portales purchased the Baker Farm and its water rights in September 2001 to provide a groundwater reserve. The locations of the Baker Farm wells not yet converted to municipal use and the original irrigation circles are shown in Figure 11. As previously mentioned, the farm property was purchased with the intent of retiring agriculture and using the associated groundwater supplies for municipal purposes. This required transferring water rights to the City and changing the location and type of water use from agricultural to municipal and industrial. Recovery of this water for City use required new pipeline laterals from the existing system, reconfiguring the existing irrigation wells to be suitable for supplying drinking water, and eventually drilling new wells. Most of the agricultural wells have now been converted and renamed as Blackwater Wells BW-19 through BW-42. Current depletion rate data for farm wells that are being placed in municipal service are presented in Appendix C.

Historic data on the eight remaining Baker Farm wells that are not currently being converted to municipal use are presented in Appendix E. The Baker Farm wells were intended for agricultural and stock use and were not equipped for simplified water level monitoring. No water level data have been collected from those wells since January 2006. Two of the eight remaining wells are low capacity stock wells and the rest are higher capacity irrigation wells. The stock wells and some of the irrigation wells are located near former irrigation wells that have been converted to municipal use and are not good candidates for future conversion.

Figure 23. Historic Yields in Wells SH-1 through SH-7

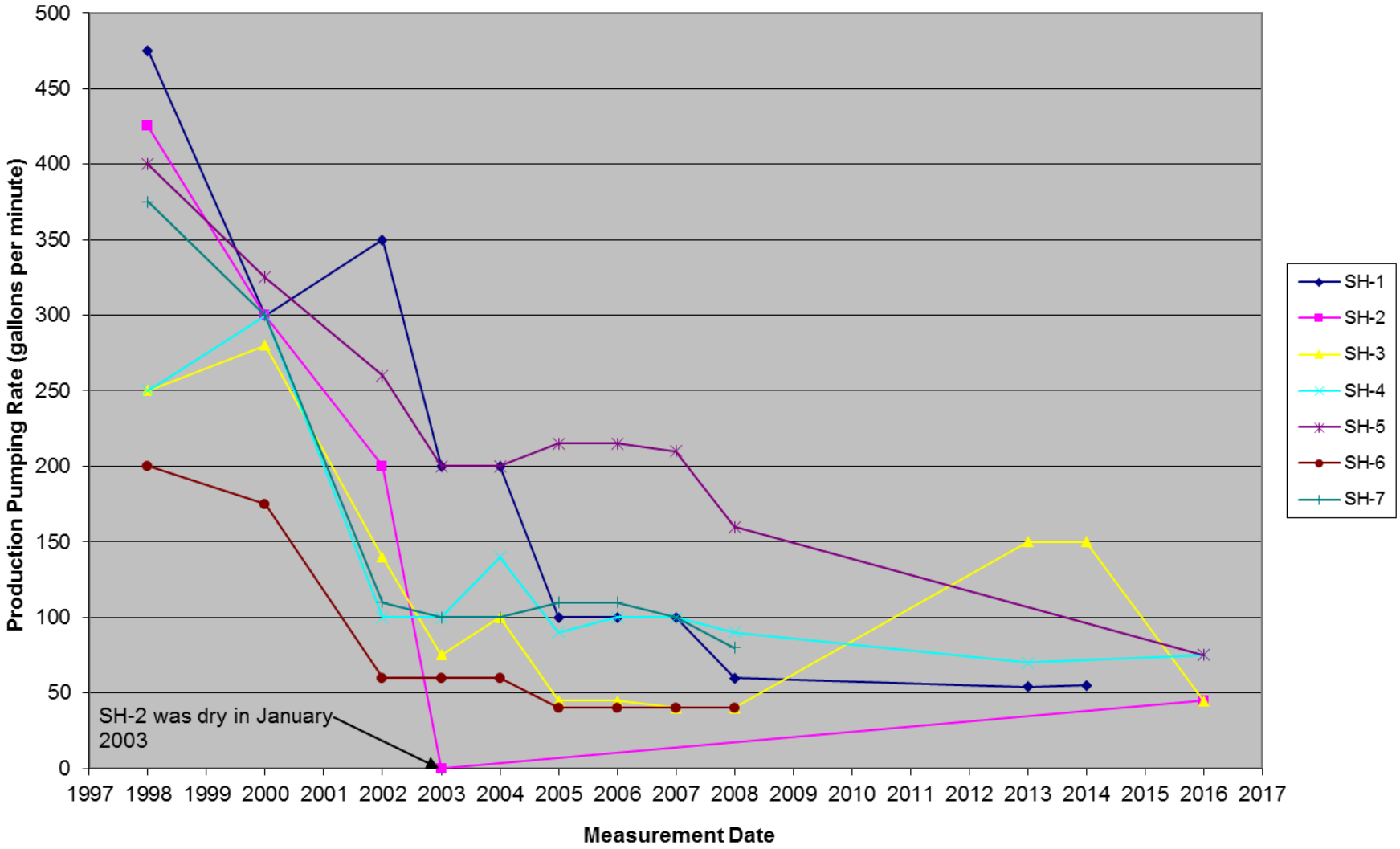


Table 11. Estimated Winter 2016 Aquifer Characteristics in the City of Portales Sandhill Wells

Well Number	(1) Depth to Static Water in Winter 2016[1] (ft)	(2) Depth to Top of Redbeds[1] (ft)	(3) = (2) – (1) Total Saturated Thickness in Winter 2016 (ft)	(4) Pumping Drawdown in Winter 2016[1] (ft)	(6) Production Pumping Rate in Winter 2016[1] (gpm)	(7) = (6) / (4) Specific Capacity of Well in Winter 2016 (gpm/ft)	(8) = (3) – (4) – 5 ft Unutilized Saturated Thickness Remaining in Winter 2016[2] (ft)
SH-1	In Repair	135	In Repair	In Repair	In Repair	In Repair	In Repair
SH-2	99.1	132	32.9	3.8	45	11.8	24.1
SH-3	112.4	130	17.6	2.9	45	15.5	9.7
SH-4	118.9	122	3.1	2.8	75	27.0	-4.7
SH-5	105.2	126	20.8	4.0	75	18.9	11.8
SH-6	99.2	113	13.8	In Repair	In Repair	In Repair	In Repair
SH-7	99.9	108	8.1	In Repair	In Repair	In Repair	In Repair
2016 Total					240		
2016 Average	105.8	124	16.0	3.4	60	18.3	10.2

3.3 Standpipe Heights for Depth-to-Water Measurements

The depth to water in the City's wells is measured from the top of the well's standpipe and then corrected to a ground surface reference by subtracting the height of the standpipe above ground surface from the depth measurement. These reference heights are presented in Appendix G.

3.4 OSE Point of Diversion Well Numbering System

The OSE has changed well permit numbers to a new Point of Diversion (POD) system. A correlation of the old numbering system with the new POD system is presented in Appendix H.

4.0 CONSERVATION GOALS AND MEASURES EMPLOYED

This section describes the process used by the City of Portales to set water conservation goals, identify alternative Best Management Practices (BMPs) in water conservation, and select those BMPs that are most amenable to achieve the established goals. Pursuant to NMOSE review comments, the format of this section was revised in 2015 to be consistent with NMOSE guidance in Section 3 of NMOSE's Technical Report 53 (NMOSE 2013).

4.1 Objective and Reasons for Developing a Water Conservation Plan

The City's sole source of water supply is groundwater from the Ogallala/High Plains Aquifer. Because this aquifer is being pumped throughout eastern New Mexico at a rate that far exceeds natural recharge, it is a non-renewable resource. Meeting the City's water demands has been increasingly challenging because of continuing aquifer depletion. Graphic evidence of the ongoing decline in saturated thickness and yield at the City's primary Blackwater Wellfield is presented in Section 3 of this report. The City government and residents are aware that their wellfields cannot be relied upon indefinitely to provide the needed water supply and have contracted with the Eastern New Mexico Rural Water Authority to provide a supplemental supply from Ute Reservoir in northeastern New Mexico. Due to continuing aquifer depletion, Portales' Ute allotment will become its primary source of potable water. However, the quantity of that allotment is less than the City's historic annual use, the quantity of Ute water available in any year may be restricted due to drought conditions, and the receipt of that water depends on construction of a conveyance pipeline whose timing is uncertain. Because of these considerations, the City has adopted an updated Water Conservation Plan (Wilson 2014) for the twofold objective of reducing its water use and extending the life of its existing groundwater supplies until such time as Ute water becomes available.

4.2 Wellfield Demand Reduction Goal

The City of Portales adopted a comprehensive Water Conservation Plan in June 2001 (Wilson 2001a) that presented a summary of the City's water conservation measures and goals to the

year 2040. The goal of that plan was to decrease the City's average annual water use to 167 gallons per person per day (GPCD) of the benefitting population by the end of the planning period. The benefitting population was defined as the number of people using and therefore benefitting from the City's groundwater supply. The benefitting population was larger than the resident Water Utility Department service area population because, as previously noted, it included water exported to Roosevelt County Water Coop customers as well as all students at ENMU. Achieving the goal of 167 GPCD required a 13 percent reduction in the City's 2000 water use as projected without additional conservation. This goal was considered achievable in view of the reductions in use that had already been made by the City. The City's water use has been declining since 2000 and passed the aforementioned goal of 167 gallons per person per day in 2010. As shown in Table 8, even when considering only the smaller service area resident population rather than the total benefitting population, the City's water use goal of 167 GPCD has also been achieved. However, as described in the City's 2013 *Review of Water Supply Options* (Wilson 2013), it has become evident that additional and more aggressive water conservation measures are now needed to reduce consumption even more given the observed rate of depletion of the City's groundwater supply and the uncertainty in the timing of supplemental surface water supplies from Ute Reservoir.

Construction of the Ute conveyance system began in 2013 and the intake structure at Ute Reservoir has been completed. The conveyance pipeline remains to be constructed and is currently scheduled to be completed by 2023 to 2025. Shortages of water from the City's wellfields are projected to become increasingly problematic over the next decade unless the demand on the wellfields is reduced. Because delays in water deliveries from Ute Reservoir could occur, the City needs to reduce demands on its wellfields and increase their useful lives. In addition, shortages in the Ute water supply are expected during times of drought, and these shortages may be increasingly severe due to climate change. The potential impacts of climate change provide an additional reason for the City to reduce demands on its wellfields so that a reserve water supply would be available in times of drought.

To provide a buffer that would accommodate a delay in Ute water delivery, the City has developed a new water demand reduction goal to help accommodate a 5-year delay in Ute Project completion to 2030. This goal is described in the City's updated 2014 Water Conservation Plan. This goal is to reduce the total 2012 wellfield demand of 1,125 million gallons by about 40% or 425 million gallons to 700 million gallons/year by 2016 to help bridge the gap caused by such a delay. This reduction includes water used within the City's Water Utility Department service area and water exported to the Roosevelt County Water Coop. However, a 40% reduction in wellfield demand would not result in a 40% reduction in water availability to City residents. Most of this reduction in wellfield demand (about 325 million gallons/year) is expected to be taken up by the City's program to irrigate City parks entirely with reclaimed wastewater instead of the currently used wellfield water. The reduction in water availability to be addressed by reductions in consumer demand will therefore be on the order of 100 million gallons or 9% of the 2012 wellfield demand.

In summary, the goal of Portales' 2001 Water Conservation Plan, to reduce per capita consumption to 167 GPCD by 2040, has been met. The current goal of the City's 2014 Water Conservation Plan (Wilson 2014), is to reduce total annual wellfield demand to 700 million

gallons by 2016. A schedule of anticipated, progressive system-wide water demand reductions that would meet this goal was provided in the aforementioned Water Conservation Plan and is reproduced in Table 12 of this report. This table shows actual 2013 demands by several major use sectors and stepwise reductions in those demands that would lead to meeting the 2016 goal. The target value in meeting that goal is the 2016 total groundwater pumping volume of 700 million gallons. The remaining values are not targets but serve as indicators of the types of demand reductions and wastewater reuse supply increases that would allow the target groundwater pumping volume to be met. The City recognizes that other combinations of demand reduction and supply increases would also meet this goal.

The actual water supply and demand data for 2015 presented in Sections 2 and 3 of this report show that while the anticipated water savings for 2015 were exceeded in overall use as well as in all listed categories except exports to the County Coop. The details are illustrated in Table 13 and indicate that Portales is well on its way to meeting the 2016 water use objective.

The anticipated water uses for 2015 presented in Table 13 were based upon a sharing of water use cutbacks across several major categories of water users in order to achieve the ultimate 2016 target wellfield pumping of 700 million gallons per year. Although uniform cutbacks in all categories are not actually expected to occur, the comparison does provide an indication of which water use sectors are performing well in reducing demands and which are not. Of the categories presented in the table, the most successful were again Portales' single family residents who registered a 2015 water use that was nearly 52 million gallons or 14.7% less than anticipated. A close followup was Portales Water Utility Department's reduction in unmetered water use which was over 15 million gallons or 12.7% less than anticipated. Except for the County Coop, all major water demand categories including commercial, industrial, ENMU, and City use registered decreases in 2015.

4.3 Water Conservation Goals

Portales has identified both short-term and mid-range goals for selected water consumption and supply categories that can meet and sustain the overall wellfield pumping volume goal of 700 million gallons in 2016. These goals are described in the City's 2014 Water Conservation Plan (Wilson 2014, Section 6) and are summarized below.

Short-Term Goals

- Reduce annual outdoor SFR and MFR use from the 2009-2013 average of 189 million gallons to 119 million gallons in 2016 for a target reduction of 70 million gallons.
- Reduce annual indoor SFR and MFR use from the 2009-2013 average 300 million gallons to 290 million gallons in 2016 for a target reduction of 10 million gallons.
- Initiate wastewater reuse in 2016 for irrigating City parks for a target wellfield demand reduction of 325 million gallons.
- Reduce apparent and real distribution system losses from 129 million gallons in 2013 to 109 million gallons in 2016 for a target demand reduction of 20 million gallons.

Table 12. Anticipated Reductions in Water Demands

Water Use Metric	Anticipated Volumes in Thousands of Gallons			
	2013	2014	2015	2016
Total Groundwater Pumping	1,099,563	1,074,709	1,049,854	700,000
Wastewater Reuse				325,000
Total Water Available	1,099,563	1,074,709	1,049,854	1,025,000
Exports to County Coop	177,831	173,811	169,792	165,772
Total Water Use in Service Area	921,732	900,897	880,063	859,228
Projected Total Service Area Population	15,807	15,938	16,071	16,204
System Total GPCD	159.8	154.9	150.0	118.4
Single Family Residential Water Use	370,331	361,960	353,589	345,218
Single Family Residential Population	12,659	12,773	12,887	13,002
Single Family Residential GPCD	80.2	77.6	75.2	72.7
Unmetered Non-Revenue Water Use	127,581	124,697	121,813	118,930

Table 13. Comparison of Anticipated and Actual Water Use in 2015

Water Use Metric	Volumes in Thousands of Gallons			Percent Difference
	Anticipated 2015 Use	Actual 2015 Use	Difference	
Total Groundwater Pumping	1,049,854	959,713	-90,141	8.6% low
Wastewater Reuse	0	0	0	0
Total Water Available	1,049,854	959,713	-90,141	8.6% low
Exports to County Coop	169,792	182,545	+12,753	7.5% high
Total Water Use in Service Area	880,063	777,168	102,895	11.7% low
Projected Total Service Area Population	16,071	15,791	-280	1.7% low
System Total GPCD	150.0	134.8	-15.2	10.1% low
Single Family Residential Water Use	353,589	301,744	-51,848	14.7% low
Single Family Residential Population	12,887	12,540	-347	2.7% low
Single Family Residential GPCD	75.2	65.9	-9.3	12.4% low
Unmetered Non-Revenue Water Use	121,813	106,317	-15,496	12.7% low

Mid-Range Best Management Practice Goals

- Reduce the apparent distribution system losses of 14 million gallons in 2013 to 7 million gallons in 2018 for a net loss reduction of 7 million gallons.
- Reduce the real distribution system losses of 115 million gallons in 2013 to 83 million gallons in 2018 for a net loss reduction of 32 million gallons.
- Improve distribution system management such that the AWWA Water Loss Audit data validity score is increased from 77 in 2013 to 85 in 2018.
- Achieve a sustained wellfield demand after 2016 not to exceed 700 million gallons per year until deliveries of supplemental water from Ute Reservoir begin.

4.4 Prioritizing Goals

The short-term and mid-range goals described above have been adopted by the City and most are currently implemented and account for the reductions in water use that have already been achieved. Priority is being given to the goals that will yield the greatest short-term benefits in order to achieve the City's overall goal of reducing total annual wellfield demand to 700 million gallons by 2016. The following priorities have therefore been identified.

1. Implement wastewater reuse
2. Reduce outdoor water use
3. Reduce distribution system losses
4. Sustain wellfield demand goal after 2016
5. Improve distribution system management
6. Reduce indoor water use

4.5 Evaluating Goals

The foregoing goals are each amenable to the following methods of quantitative evaluation.

Implement wastewater reuse: Conversion of Portales' wastewater treatment plant to supply irrigation water for City parks is on schedule for completion by 2016. The measured output of the treatment plant will be used to evaluate the success of this goal.

Reduce outdoor water use: Indoor water use will be subtracted from total water use using annual NMOSE GPCD Calculator results to evaluate the success of this goal.

Reduce distribution system losses: Apparent and real distribution system losses are measured annually through the AWWA Water Loss Audit process. Calculated losses will be compared on a year-to-year basis to determine the success of this goal.

Sustain wellfield demand goal after 2016: The total measured supply from the City's wellfields will be used to evaluate the success of this goal.

Improve distribution system management: The AWWA Water Loss Audit data validity score will be used to evaluate the success of this goal.

Reduce indoor water use: Indoor water use will be determined from annual NMOSE GPCD Calculator results to evaluate the success of this goal.

4.6 Best Management Practices

Best management practices that are currently considered and implemented by Portales are described in Section 5 of the City's 2014 Water Conservation Plan and implementation details are presented in Section 6 of that Plan (Wilson 2014). These practices are being used to achieve the water conservation goals described above. In summary, these practices include the following.

Indoor Water Conservation. These incentives are being used primarily to achieve the City's indoor water conservation goal but are expected to also help achieve the outdoor water conservation goal. All categories of water users (residential, commercial, industrial, institutional, and municipal) have indoor water uses and the following water conservation incentives apply to them all.

- *Water Use Conservation Surveys.* Free, voluntary conservation surveys that address both indoor and outdoor water uses have been offered by the City's Water Utility Department for all customers since 2002.
- *Water Conservation Packets.* Free water savings packets are being distributed to service area customers to provide an incentive to conserve water. These packets include a low-flow showerhead, a low flow faucet aerator, a toilet leak displacement bag, and a toilet leak detection die packet. To stimulate children in water conservation practices, a separate kit has been prepared that includes a toilet leak detection die packet and a shower/faucet flow measurement tool.
- *Sewer Rate Schedules.* Sewer rate schedules are tied to water use and are therefore also structured to encourage water conservation.
- *Low Water Pressure.* Low water pressures (40 to 60 psi) are maintained in the distribution system to reduce waste from leaks and running faucets.
- *Water-Conserving Fixture Rebates.* Indoor water conservation can be stimulated by providing rebate incentives for residential, commercial, and institutional facilities for the replacement of the two greatest water using fixtures, toilets and washing machines, with new water-efficient models. A rebate program has been developed by the City. It has been approved by the City's Finance Committee and is undergoing legal review. It will then be presented to the City Council for adoption.

Outdoor Water Conservation. These practices are being used to achieve the City's outdoor water conservation goal. Outdoor water use in Portales consists primarily of landscape irrigation. All categories of water users (residential, commercial, industrial, institutional, and municipal) have outdoor water uses and the following water conservation measures apply to them all.

- *Xeric Demonstration Gardens.* Three xeric demonstration gardens were developed in 2005, located along highway NM 206 connecting Portales with Lovington and at the north and south entrances to town along US 70. In addition, a mile-long xeric garden was established in 2009 in the median along US 70 north of town and another garden is at the City Hall. These gardens provide ongoing examples of xeric landscaping.
- *Rainwater Harvesting and Cisterns.* Portales has installed a rainwater catchment and cistern system to accompany the xeric landscaping demonstration project at City Hall. Rainwater from the City Hall roof is collected in two 1,500-gallon tanks and pumped to a xeric demonstration garden in front of the Portales City Hall. The irrigation demand is expected to be about 5,000 gallons per year. The system became operational in September 2005 and is designed to harvest an average of 7,500 gallons per year.
- *Hardscaping of Residential Gardens.* An increasing number of residences are converting their gardens to xeric hardscaping by replacing grass and shrubs with decorative gravel and highly drought-resistant plants. These conversions are believed

to be encouraged by increasing water rates and the availability of educational information on xeric landscaping.

- *Alternating Day Watering.* In 2012 the City initiated a voluntary program of watering every other day with no watering on Mondays or between 10 am and 6 pm daily. Flyers announcing the program were prepared in English and Spanish and distributed with water quality testing results in the City's Consumer Confidence Report. The alternate day watering program is expected to further increase awareness of water conservation and reduce residential water demands.

Conservation Water Rates. These practices are being used to achieve the City's indoor and outdoor water conservation goals and are applicable to commercial as well as residential water uses. Structuring water rates to discourage excessive water use has been found to be one of the most effective methods for increasing conservation awareness and reducing water demands.

- *Minimum Monthly Base Rate.* The minimum monthly base rate includes the first 2,000 gallons of water use and was set at less than the expected minimum usage to encourage water use awareness.
- *Conservation Water Rates.* Conservation water rates are rates that increase as water use increases. This is called an inverted block rate structure. Increasing block rates have been a part of Portales' water billing structure since 1995 and are designed to encourage water conservation and reuse. Raising water rates has been found to provide a significant incentive to reduce consumption.

Reducing System Losses. These practices are being used to achieve the City's goal of reducing distribution system losses. A detailed evaluation of the City's 2015 system losses is presented in Section 2 and Appendix A. Two types of losses are apparent losses and real losses. Apparent losses are traceable to known and potentially avoidable causes such as meter inaccuracies and data handling errors. Real losses are not readily anticipated or avoided, such as pipeline leaks and storage tank overflows. Both types of losses are amenable to reduction through the following measures.

- *Leak Detection and Repair.* Leak detection and pipe repair/replacement programs have been implemented by the City's Water Utility Department since its inception to reduce real losses. Information on the type and age of water mains in the distribution system is maintained by the Department and the replacement program is both proactive and responsive. Aging water mains that are approaching the ends of their useful lives are replaced proactively before significant breaks or leaks occur, and the upgraded water metering described below allows the Department to quickly identify and respond to unexpected leaks.
- *Replacement Water Meters.* Replacement water meters were installed at 140 residential, commercial, and institutional locations in Portales in 2015 as part of an ongoing replacement program. The old meters often measured less than the actual flow and the improved accuracy and reliability of the replacement meters is expected to result in additional water savings. This replacement program applies to all customer categories.
- *Expanded Water Metering.* Portales reduced its unmetered water use in 2011 by installing meters at the City's swimming pool and in City parks. In addition, portable

meters have been provided for fire hydrant and street department use. The City's goal of 100% metering will continue to be actively pursued. Accurate measurement of water use is key to identifying and correcting major real system losses as well as other forms of wasteful use.

- *Automatic Water Metering.* Portales is installing a fixed base Automatic Meter Reading (AMR) system that allows water meters to be read at City Hall through a wireless network. The City is progressively replacing existing water meters with automatic meters that are more accurate and the increased accessibility to consumption data is expected to reduce water losses. The AMR system became operational in 2010 and applies to all customer categories.
- *Water Use Monitoring.* Water meter readings are monitored for excessively high and low values and checked for accuracy. High readings trigger onsite leak checks and informal water use surveys. This conservation measure applies to all customer categories.
- *Water Utility Internal Audits.* Portales' Water Utility Department conducts annual internal water use audits that provide much of the information used in the City's annual Water Conservation and Use Reports. This program is essential to identifying areas of excessive water use and to evaluating the effectiveness of the City's conservation programs.

Wastewater Recovery and Reuse. These practices are being used primarily to achieve the City's wastewater reuse goal from its treatment plant upgrade and will benefit all water users by reducing wellfield demands. The household grey water reuse component is applicable to the City's outdoor water use reduction goal. The term *wastewater* refers to water collected in a municipal sewer system and treated in a treatment plant. *Gray water* refers to untreated household water that has not come in contact with toilet waste. Both types of water can be recovered for reuse.

- *City Park Irrigation with Wastewater.* The City is upgrading its treatment plant to improve the quality of the discharged water so it can be used to irrigate the City's public parks. Treated wastewater used for irrigation will reduce demand on the City's primary groundwater supply and can therefore be considered a water conservation measure. The upgraded system is expected to be fully operational in 2016.
- *Water Conservation in City Parks.* Water conservation in the City's public parks has been an important part of the City's conservation effort even before the planned introduction of reclaimed wastewater. Automatic, timed sprinkler systems have been installed in City parks allowing for controlled use of water and nighttime watering. In addition, sprinkler systems in the parks are designed with controlled nozzle sizes and equal overlap to minimize overwatering. The City also cooperated in conversion to drought-resistant landscaping at ENMU.
- *Potable Uses of Treated Wastewater.* The option to extend wastewater treatment to include directly supplementing Portales' drinking water supply has been considered by the City Council. The advantages and disadvantages of such an action are described in the City's *Review of Water Supply Options* (Wilson 2013). In weighing these considerations, the City Council has concluded that potable uses of treated wastewater are not appropriate for implementation at this time.

- *Household Irrigation with Gray Water.* Gray water is defined by the NMOSE as untreated household wastewater that has not come in contact with toilet waste. Gray water can be captured and successfully used to irrigate household landscaping and fruit trees, and reduces the amount of potable water that would otherwise have been used. Increasing water rates and an increased emphasis on public education are expected to provide residential customers with incentives for gray water reuse.

Water Conservation Ordinances. These ordinances are variously applicable to all water users including residential, commercial, industrial, institutional, and municipal, and will assist in achieving all of Portales' water conservation goals. Portales' City Council has adopted ordinances for emergency drought management and to encourage all customers to reduce water use. Ordinances will also be developed to address waste of water. Such ordinances include the following.

- *Water Rate Ordinance.* This ordinance defines the City's conservation block rate structure where higher rates apply to higher volumes of water consumed. Such an ordinance is in place in Portales and is renewed every five years.
- *Xeriscaping Ordinance*. This ordinance requires landscaping with drought-tolerant plants over most yard areas for new developments and when substantial improvements are made to existing developments. The ordinance provides for runoff controls and encourages rainwater harvesting. Landscape design reviews by the City are required prior to issuing landscape permits.
- *Emergency Drought Management Ordinance.* The City Council has given the City Manager emergency water management authority including initiating water conservation and drought management practices.
- *Waste of Water Ordinance.* This ordinance is being considered and will outline water use standards for outdoor irrigation. It will be developed with public inputs and adopted in open meetings of the City Council.

5.0 PUBLIC INVOLVEMENT, EDUCATION, AND OUTREACH

This section summarizes the importance of public interaction in developing, implementing, and enhancing Portales' water conservation measures. The City's interaction with the public includes City residents as well as commercial, industrial, and institutional enterprises within the Water Utility Department's service area. Portales' public involvement, education, and outreach program is more fully described in Section 5 of the City's 2014 Water Conservation Plan and implementation details are presented in Section 6 of that Plan (Wilson 2014). The public involvement, education, and outreach component of Portales' best management practices is expected to assist in achieving all of the City's water conservation goals, and particularly in achieving the goal of sustaining wellfield demand at a reduced level after the current goal is achieved in 2016.

5.1 Public Involvement during the Planning Process

In preparing the 2001 Water Conservation Plan, Best Management Practices in water conservation that were found to be effective in other, similar communities were reviewed by

the City of Portales Public Works Committee. The Public Works Committee consisted of the City Manager, the City's Public Works Director, several members of the City Council, representatives of the City's Water Utility Department and the Roosevelt County Water Coop, members of the City's Finance Committee and other key City committees, and members of the public. That review considered many avenues for enhanced water conservation and provided general direction for establishing the type and scope of water conservation practices that would be appropriate for the City of Portales and consistent with the City's socioeconomic conditions. Those conditions have not substantially changed since 2001 and the considerations established by the Committee in selecting Best Management Practices for the 2001 Plan remain relevant and have been applied to the 2014 Plan.

The new water demand reduction goal in the updated 2014 Plan, the water supply conditions upon which that goal was based, and the water conservation measures selected to meet that goal were presented in the City's open report *Review of Water Supply Options* (Wilson 2013). In addition, the findings and conclusions of annual reports on the City's water supply and demand conditions have been presented to the City Council and the general public in open meetings and have been described for the general public in the Portales News-Tribune. The entire *Review of Water Supply Options* report is available for public review and comment on the City's website.

5.2 Education and Outreach during Plan Implementation

Much of the success of Portales' water conservation measures is attributed to an increased public awareness of a limited resource and an increased social responsibility for conserving that resource. As one example, education can explain the reasons why the increasing water costs and inverted block rates adopted by the City Council are needed and can also provide customers with ideas on how to respond to those increases.

The City's education and outreach program has four elements: distribution of written materials; presentations and other outreach; support for school education efforts; and demonstration facilities. Descriptions of each of these elements are presented in the City's 2014 Water Conservation Plan (Wilson 2014) and are summarized in the following paragraphs.

- *Distribution of Written Materials.* Written materials describing the need for water conservation and providing information on ways to conserve water are being obtained and distributed by the City. Written materials are available in Portales's City Hall and are also distributed as articles in the Portales News-Tribune, with local water bills, in standalone mailings, as handouts at local businesses, and as handouts during educational presentations. These materials address the following subjects.
    - The source of Portales' present and future water supply
    - How to design and plant water-efficient landscapes
    - How to efficiently irrigate home gardens
    - How to detect and fix leaks
    - Types, benefits and costs of water-conserving household fixtures
    - Good indoor water-conserving practices

- *Presentations and other Outreach***.** Individuals such as Water Utility Department and other City employees, representatives of other government agencies such as agricultural extension agents, and other outside individuals are made available to speak to community groups and the media on water supply and conservation issues, and to respond to customer questions. Elements of the program include:
  - The use of paid and public service advertising
  - Periodic news releases and "water awareness" articles in the Portales News-Tribune and Clovis News Journal
  - Development of a water conservation library of books, videos and other information that can be used in conjunction with presentations
  - Support for printing and distributing water conservation messages for motels, restaurants and other commercial and institutional customers

- *Support for School Education Efforts.* This program includes such measures as distributing water conservation curricula developed by the NMOSE; encouraging water conservation on school property; making presentations to school groups and organizations; providing teachers with information and teaching materials on Portales' water supply issues and conservation needs; and sponsoring water conservation poster and other water awareness contests. Outreach to schools also includes ENMU groups and the University's newspaper and public television services.

- *Support for Industrial, Commercial, and Institutional Education Efforts*. This program includes presentations on the need for enhanced water conservation before local business and community organizations and providing informative and educational water conservation materials to businesses for customer use. High water using businesses and businesses with significant landscape irrigation needs are identified and specifically targeted for outreach. As a major water user itself, this program has also been made available to City employees.

- *Demonstration Gardens and Homes.* The programs described below feature conversion to drought-resistant residential landscaping. The aforementioned xeric demonstration gardens prepared by the City and ENMU provide ongoing models of water-wise landscaping and are part of the City's education and outreach program. If xeric landscaping is associated with homes featuring water conserving fixtures and materials, such homes will also be included in the annual *Parade of Homes*, to be on display for citizens to tour.
  - *Xeriscaping Rebate Program*. Although many residents are voluntarily converting their gardens, an incentive program may be implemented that offers rebates to residential, commercial, and institutional customers who convert traditional grass lawns to hardscape or drought resistant plants. Xeriscaping rebates are included as goals of this Plan to be implemented pending completion of legal and budgetary reviews.
  - *Home & Garden Shows.* The City is working with *Pride in Portales* and *New Mexico Clean and Beautiful* organizations to promote water-conserving landscaping on road medians and adjacent areas. As part of this effort, the City is

promoting and/or participating in annual Home and Garden Shows where Water Utility Department representatives can be present to provide information, answer questions, make presentations, and support a community-wide water conservation effort through home and landscape design.

- *Landscape Irrigation and Xeric Garden Consultation.* When requested, Water Utility Department personnel will provide free one-on-one consultation to residents and businesses on landscape irrigation and xeric garden conversions.

6.0 WATER CONSERVATION GOAL PERFORMANCE

The 2015 performance of Portales' short-term and mid-range water conservation goals is summarized in Table 14. Performance data on two of the goals, implementation of wastewater reuse in 2016 and sustaining the annual wellfield demand at 700 million gallons after 2016, will not be available until 2016. The short-term performance goals were not expected to be met until 2016 but three of the four short-term goals were met and exceeded in 2015. The remaining short- and long-term goals are related to reducing water losses and the City showed improvements in every category in 2015. Continuing to reduce distribution system losses is a priority if the City's water conservation efforts are to be achieved.

Table 14. Water Conservation Goal Performance in 2015

Performance Goal	Performance Metric	2015 Metric Value	Discussion
Short-Term Goals to be Achieved by 2016			
Achieve reduced annual outdoor SFR and MFR water use	119 million gallons	93 million gallons	2016 Goal exceeded
Achieve reduced annual indoor SFR and MFR water use	290 million gallons	245 million gallons	2016 Goal exceeded
Initiate wastewater reuse	325 million gallons	Not applicable	To be achieved in 2016
Achieve reduced apparent and real distribution system losses	109 million gallons	95 million gallons	2016 Goal exceeded
Mid-Range Goals to be Achieved by 2018			
Achieve reduced apparent distribution system losses	7 million gallons	8 million gallons	Achievement in progress
Achieve reduced real distribution system losses	83 million gallons	87 million gallons	Achievement in progress
Achieve higher AWWA data validity score	85	82	Achievement in progress
Achieve sustained wellfield demand after 2016	700 million gallons	Not applicable	To be achieved in 2016

Portales' total groundwater pumping in 2015 was the lowest of record over the last 20 years and serves as a positive indicator that the City's 2016 goal will be met. The 2015 water demand and supply data are the most accurate of recent years due to the Water Utility Department's ongoing program of improving the extent and accuracy of metering. The City's 2015 unmetered and unaccounted-for water loss of 87.5 million gallons represented about 9%

of total pumping. The 2015 loss also represents a 37% decrease over the losses incurred in 2014.

In looking forward, it is hoped that Portales' reduced water demand in 2015 was achieved in spite of rather than because of the near-record rainfall and that the demand will be further reduced in 2016, enabling the City to meet and possibly exceed its water conservation goal.

7.0 RECOMMENDED ACTIONS AND IMPROVEMENTS

Portales' water conservation measures were highly successful in 2015. The City's single- and multi-family residents, the commercial and industrial users, and ENMU and the City itself demonstrated continuing, long-term reductions in water use. Of all the major use categories, only the Roosevelt County Coop recorded an increased water use. While residential use has been progressively decreasing and commercial, ENMU, and metered City use have been consistently low, industrial and unmetered uses have fluctuated significantly over the past decade, making it difficult to project water demands. It is understood that industrial water use is important to the City's economy and that unanticipated water losses from the pipeline breaks that constitute much of the unmetered, non-revenue sector are difficult and expensive to avoid, but unless an additional source of water is found, water use reductions in both of these sectors will be necessary if the City is to achieve its overall wellfield water demand goal of 700 million gallons by 2016.

An additional concern is that water use by the County Water Coop has been relatively flat over the last decade while residential demands from within the City have been progressively decreasing. As previously noted, the Coop constitutes a significant water use sector and should be actively and successfully pursuing its own water conservation measures. The remaining water use sectors of commercial, ENMU, and other metered users constitute a small portion of the City's current wellfield demand and are adequately served by the City's existing conservation measures.

The following recommendations are intended to help Portales to continue to conserve water and prolong the life of its wellfields pending receipt of supplemental water from Ute Reservoir.

- Reduce unaccounted-for system losses through a vigorous program of replacing and upgrading aging water mains.
- Continue implementation of the Best Management Practices in water conservation described in this report, many of which are directed toward residential water users who have performed well in contributing to reducing the City's wellfield water demands.
- Continue to convert existing agricultural wells to municipal use and install new wells as needed to maintain an adequate pumping capacity.
- Actively encourage the Roosevelt County Water Coop to develop an accelerated water conservation program and provide support as needed.
- Actively encourage the City's high water using industries to enhance their water conservation and reuse measures.

- Expand the City's inverted block rate structure to include industrial water users and the Roosevelt County Water Coop to provide a financial incentive for enhancing their water conservation measures.
- Seek an additional, interim source of groundwater supply if it appears that the target reductions in water demand cannot be met or if delays in the Ute project appear to be longer than expected.

In summary, strengthening of the City's overall management program for both its water demand and supply sides is needed to keep up with the declining aquifer and to maintain a strategic reserve for drought years. The fact remains, however, that the aquifer supplying the City is a finite resource and the current management plan of satisfying the City's water needs by regularly increasing the number of wells cannot continue indefinitely even if the City drastically decreases its water demand. In the long term, Portales needs to find another source of supply.

The author would like to thank John DeSha, Karen Chandler, Susan Baysinger, Chris Searl and Randy Poe of the City of Portales for their continuing support and initiative in assembling the water demand, water supply, and conservation data needed for these reports.

REFERENCES

NMOSE (New Mexico Office of the State Engineer) 2001. *A Water Conservation Guide for Public Utilities.* Santa Fe, New Mexico, March.

NMOSE (New Mexico Office of the State Engineer) 2013. *New Mexico Water Conservation Planning Guide for Public Water Suppliers.* Technical Report 53, Version 1. Santa Fe, New Mexico, September.

Wilson, B.C., A.A. Lucero, J.T. Romero, and P.J. Romero 2003. *Water Use by Categories in New Mexico Counties and River Basins, and Irrigated Acreage in 2000.* Technical Report 51. New Mexico Office of the State Engineer, Santa Fe, New Mexico, February 2003.

Wilson, C.R. 2001a. *City of Portales Water Conservation Plan.* Prepared for the City of Portales by Charles R. Wilson, Consultant LLC, Santa Fe, New Mexico. June.

Wilson, C.R. 2001b. *City of Portales 40-Year Water Development Plan.* Prepared for the City of Portales by Charles R. Wilson, Consultant LLC, Santa Fe, New Mexico. February.

Wilson, C.R. 2013. *City of Portales Review of Water Supply Options.* Prepared for the City of Portales by Charles R. Wilson, Consultant LLC, Santa Fe, New Mexico. November.

Wilson, C.R. 2014. *City of Portales Water Conservation Plan.* Prepared for the City of Portales by Charles R. Wilson, Consultant LLC, Santa Fe, New Mexico. December.

Wilson, C.R. 2015. *City of Portales 2015 Water Conservation and Use Report.* Prepared for the City of Portales by Charles R. Wilson, Consultant LLC, Santa Fe, New Mexico. December.

Appendix A.

AWWA Water Loss Audit Input and Result Spreadsheets

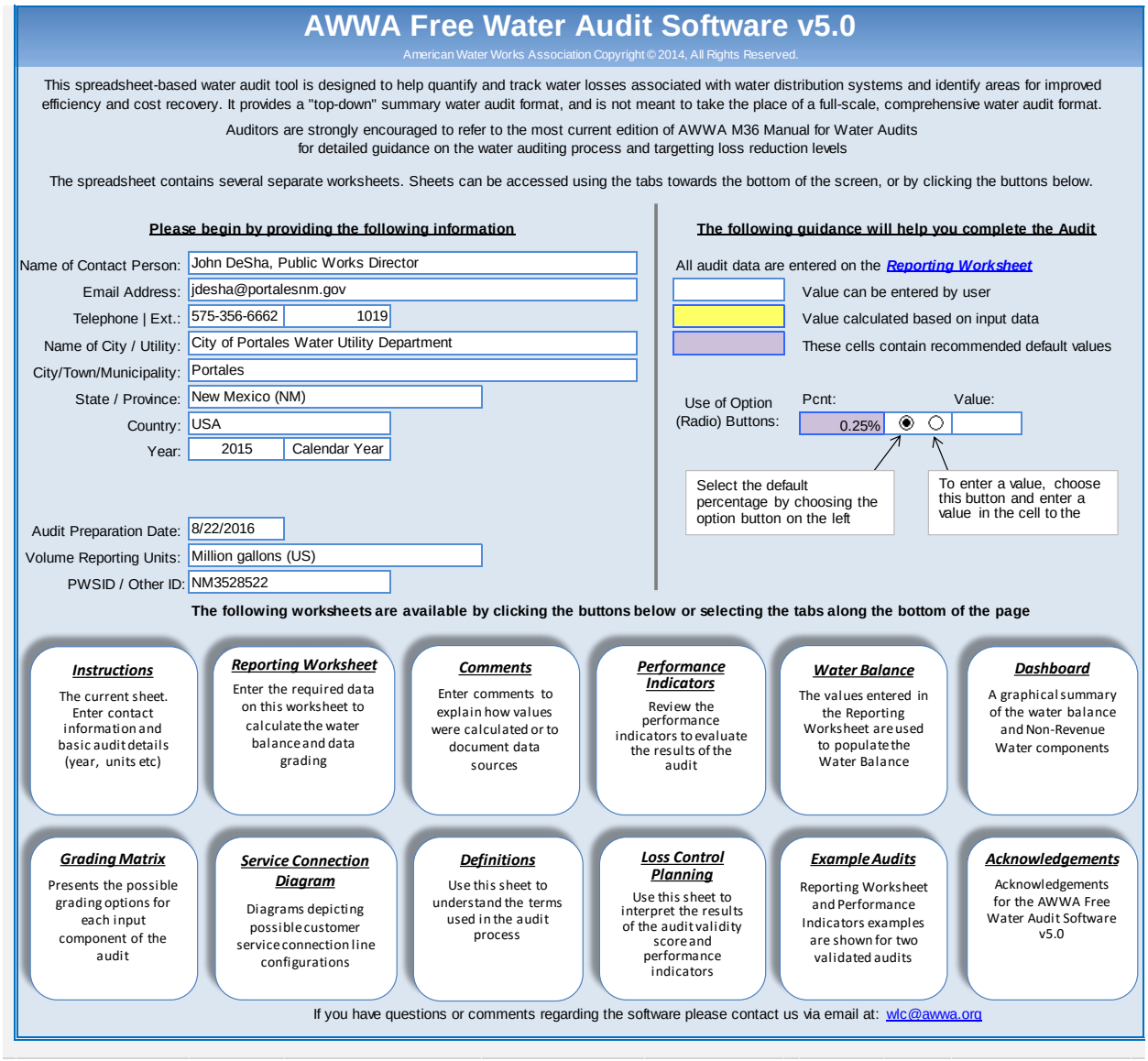


Figure A-1. Audit instructions.

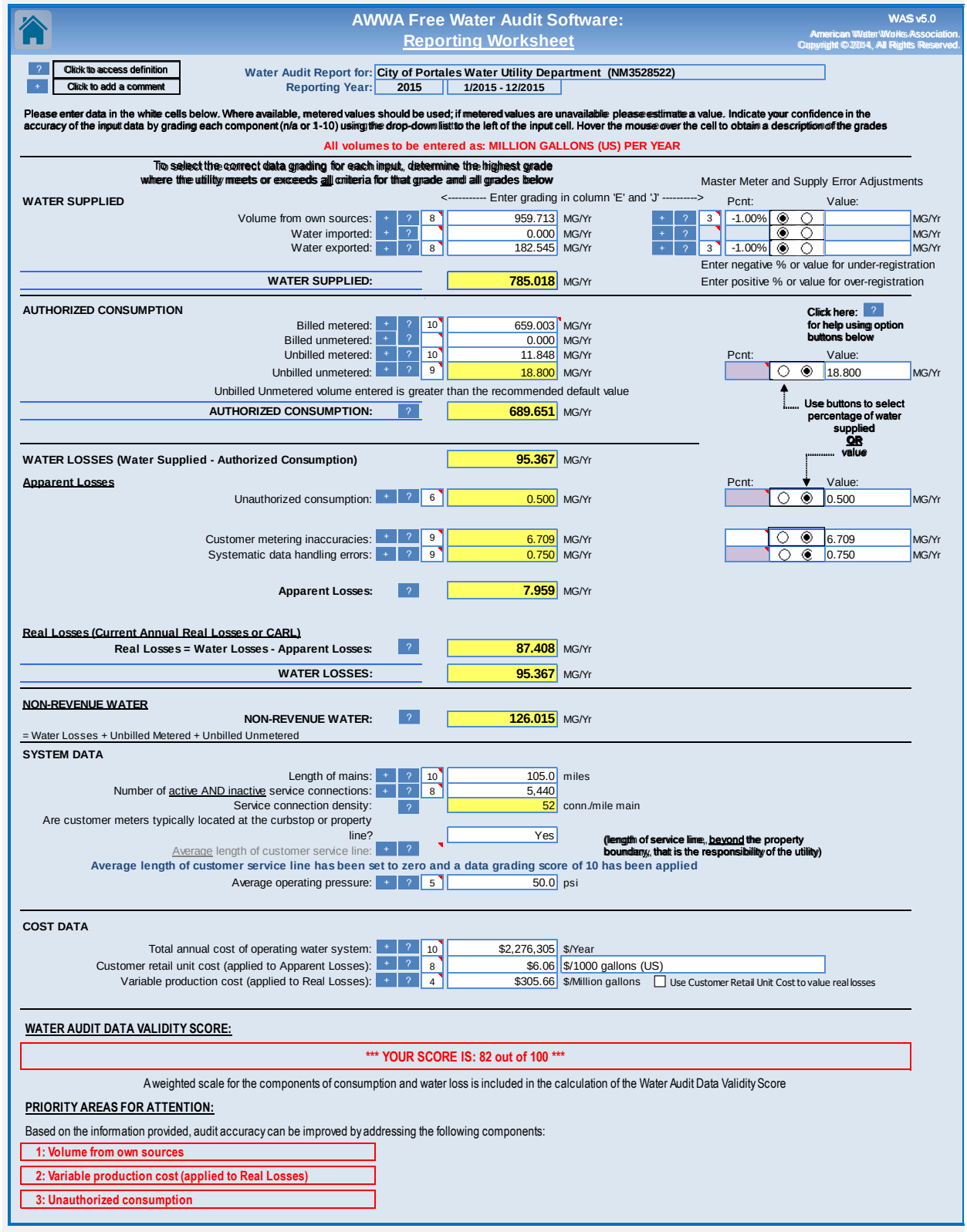
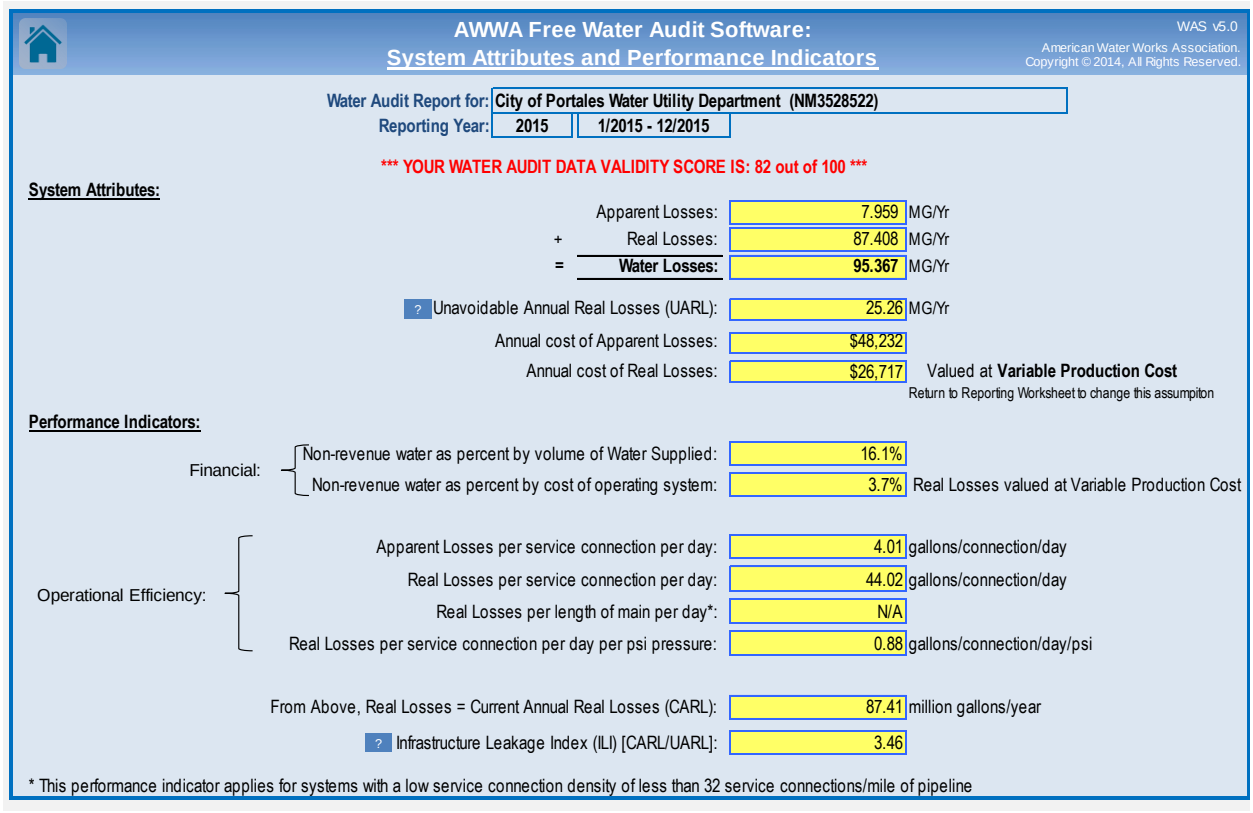


Figure A-2. Reporting worksheet.



AWWA Free Water Audit Software:
System Attributes and Performance Indicators

WAS v5.0
American Water Works Association.
Copyright © 2014, All Rights Reserved.

Water Audit Report for: City of Portales Water Utility Department (NM3528522)
Reporting Year: 2015 1/2015 - 12/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 82 out of 100 ***

System Attributes:

	Apparent Losses:	7.959	MG/Yr
+	Real Losses:	87.408	MG/Yr
=	**Water Losses:**	95.367	MG/Yr
?	Unavoidable Annual Real Losses (UARL):	25.26	MG/Yr
	Annual cost of Apparent Losses:	$48,232	
	Annual cost of Real Losses:	$26,717	Valued at **Variable Production Cost**

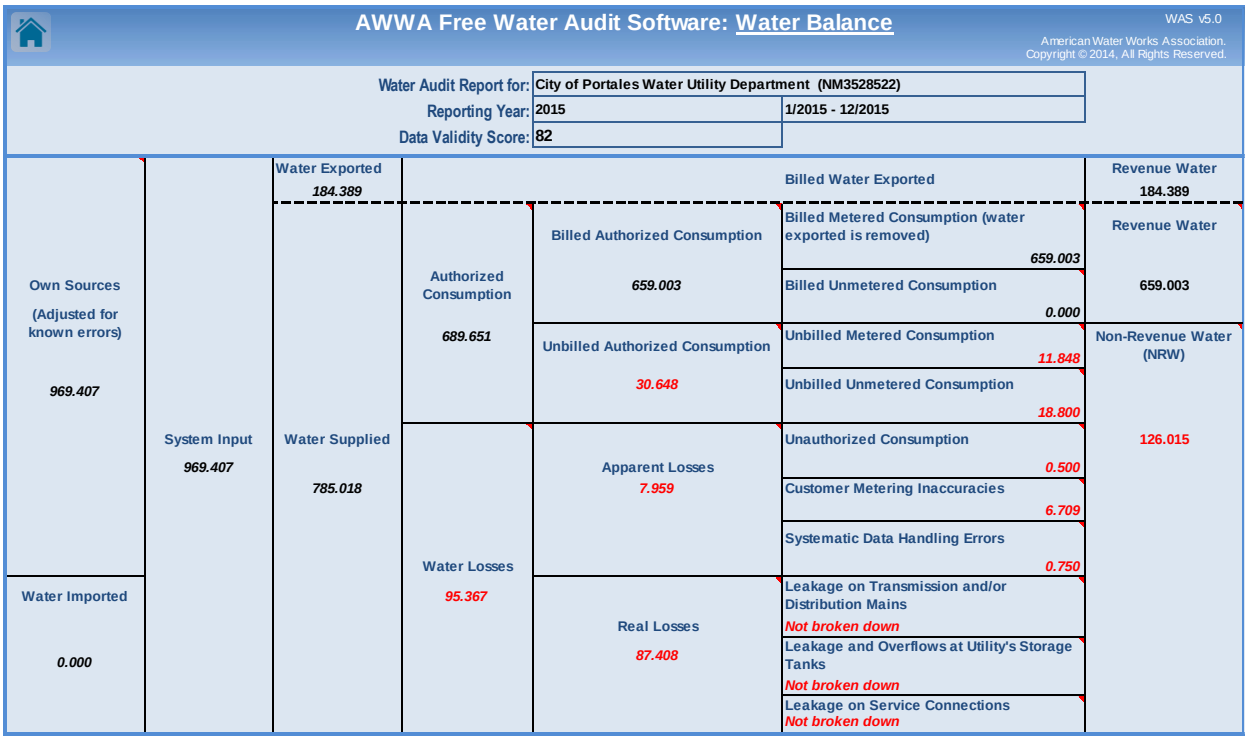
Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	16.1%	
	Non-revenue water as percent by cost of operating system:	3.7%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	4.01	gallons/connection/day
	Real Losses per service connection per day:	44.02	gallons/connection/day
	Real Losses per length of main per day*:	N/A	
	Real Losses per service connection per day per psi pressure:	0.88	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	87.41	million gallons/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	3.46	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

Figure A-3. System attributes and performance indicators.



AWWA Free Water Audit Software: Water Balance

WAS v5.0
American Water Works Association.
Copyright © 2014, All Rights Reserved.

Water Audit Report for: City of Portales Water Utility Department (NM3528522)
Reporting Year: 2015 1/2015 - 12/2015
Data Validity Score: 82

		Water Exported 184.389	Billed Water Exported			Revenue Water 184.389
Own Sources (Adjusted for known errors) 969.407	System Input 969.407	Water Supplied 785.018	Authorized Consumption 689.651	Billed Authorized Consumption 659.003	Billed Metered Consumption (water exported is removed) 659.003	Revenue Water 659.003
					Billed Unmetered Consumption 0.000	
				Unbilled Authorized Consumption 30.648	Unbilled Metered Consumption 11.848	Non-Revenue Water (NRW) 126.015
					Unbilled Unmetered Consumption 18.800	
			Water Losses 95.367	Apparent Losses 7.959	Unauthorized Consumption 0.500	
					Customer Metering Inaccuracies 6.709	
					Systematic Data Handling Errors 0.750	
Water Imported 0.000				Real Losses 87.408	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	

Figure A-4. System water balance.

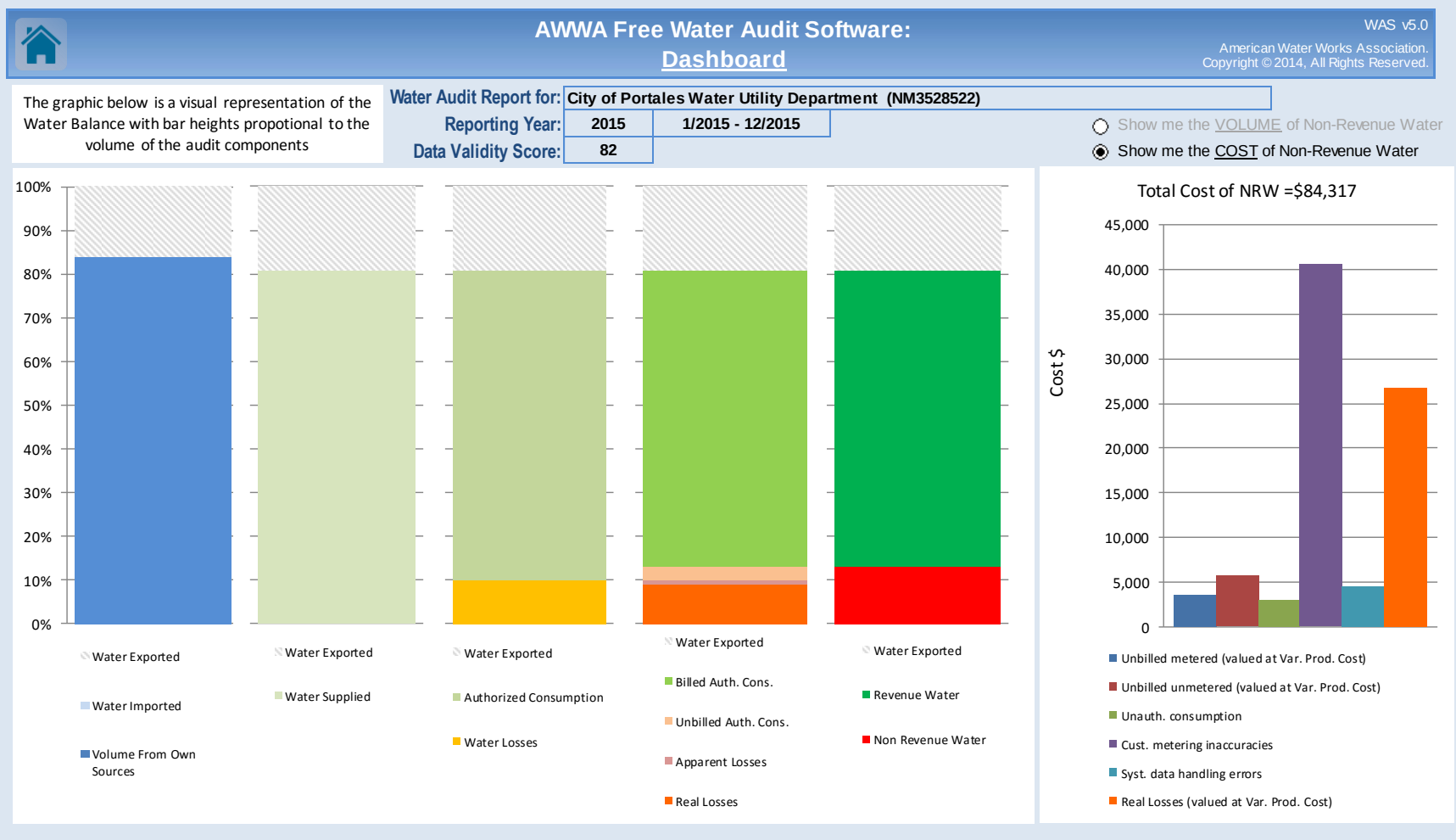
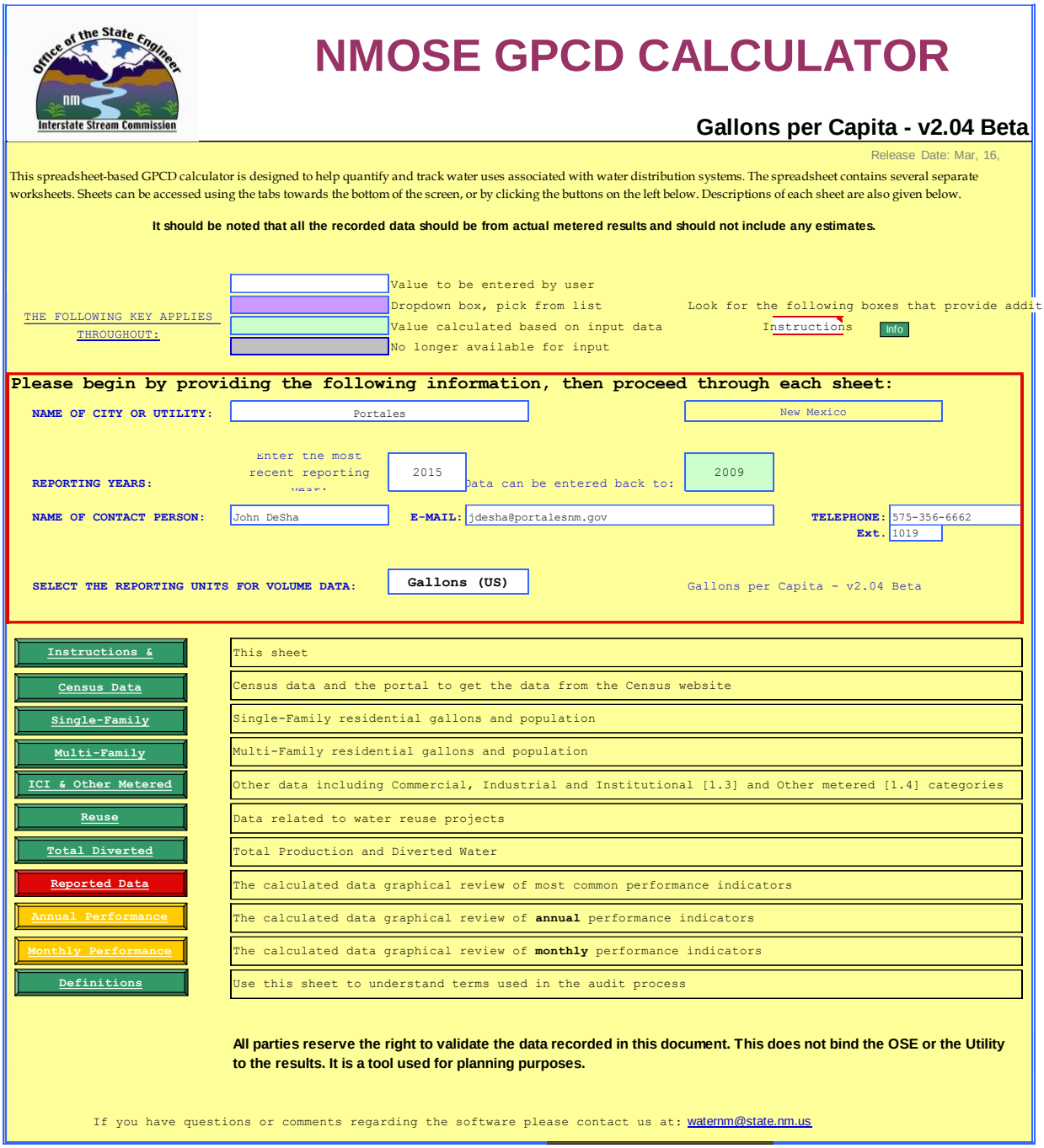


Figure A-5. Water balance summary and non-revenue water costs.

Appendix B.

GPCD Calculator Data Inputs and Results

Figure B-1. NMOSE Calculator general information sheet.



NMOSE GPCD CALCULATOR

Gallons per Capita - v2.04 Beta

Release Date: Mar, 16,

This spreadsheet-based GPCD calculator is designed to help quantify and track water uses associated with water distribution systems. The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons on the left below. Descriptions of each sheet are also given below.

It should be noted that all the recorded data should be from actual metered results and should not include any estimates.

THE FOLLOWING KEY APPLIES THROUGHOUT:

- Value to be entered by user
- Dropdown box, pick from list
- Value calculated based on input data
- No longer available for input

Look for the following boxes that provide addit
Instructions Info

Please begin by providing the following information, then proceed through each sheet:

NAME OF CITY OR UTILITY: Portales — New Mexico

REPORTING YEARS: Enter the most recent reporting year: 2015 — Data can be entered back to: 2009

NAME OF CONTACT PERSON: John DeSha **E-MAIL:** jdesha@portalesnm.gov **TELEPHONE:** 575-356-6662 **Ext.** 1019

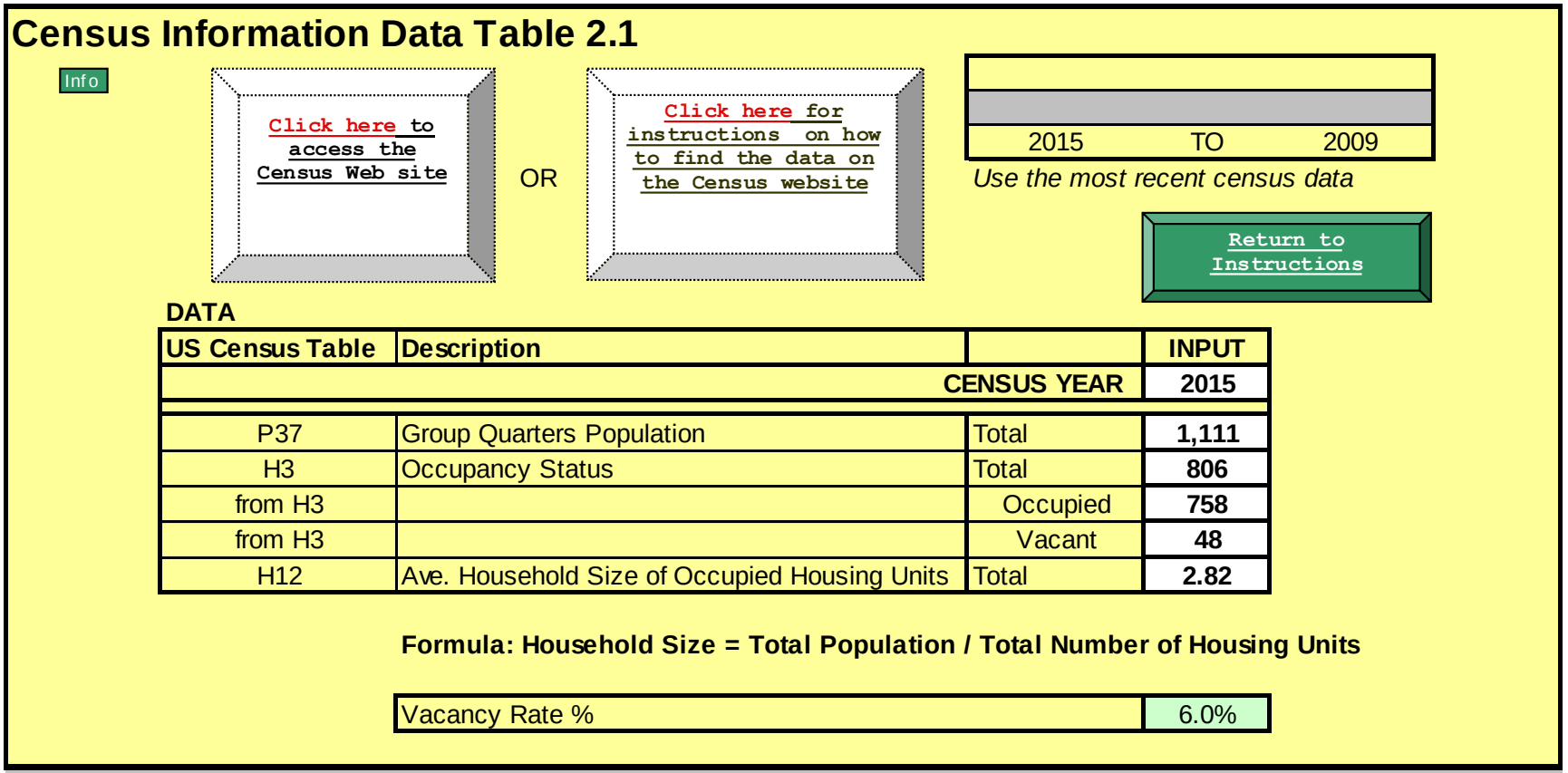
SELECT THE REPORTING UNITS FOR VOLUME DATA: Gallons (US) — Gallons per Capita - v2.04 Beta

Instructions &	This sheet
Census Data	Census data and the portal to get the data from the Census website
Single-Family	Single-Family residential gallons and population
Multi-Family	Multi-Family residential gallons and population
ICI & Other Metered	Other data including Commercial, Industrial and Institutional [1.3] and Other metered [1.4] categories
Reuse	Data related to water reuse projects
Total Diverted	Total Production and Diverted Water
Reported Data	The calculated data graphical review of most common performance indicators
Annual Performance	The calculated data graphical review of **annual** performance indicators
Monthly Performance	The calculated data graphical review of **monthly** performance indicators
Definitions	Use this sheet to understand terms used in the audit process

All parties reserve the right to validate the data recorded in this document. This does not bind the OSE or the Utility to the results. It is a tool used for planning purposes.

If you have questions or comments regarding the software please contact us at: waternm@state.nm.us

Figure B-2. NMOSE Calculator Group Quarters and Multi-Family Residence input data.



Census Information Data Table 2.1

Info

Click here to access the Census Web site

OR

Click here for instructions on how to find the data on the Census website

2015 TO 2009

Use the most recent census data

Return to Instructions

DATA

US Census Table	Description		INPUT
		CENSUS YEAR	**2015**
P37	Group Quarters Population	Total	**1,111**
H3	Occupancy Status	Total	**806**
from H3		Occupied	**758**
from H3		Vacant	**48**
H12	Ave. Household Size of Occupied Housing Units	Total	**2.82**

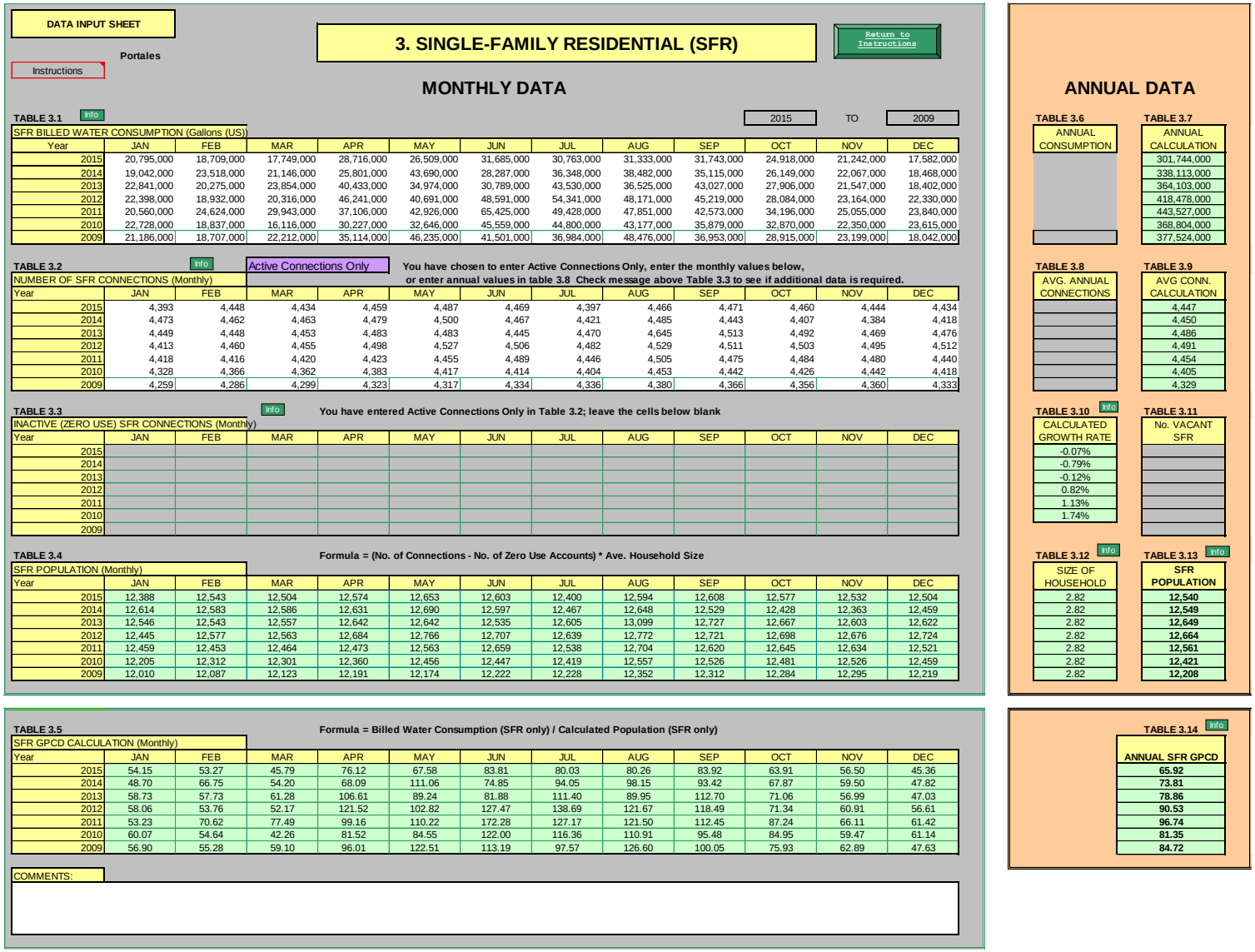
Formula: Household Size = Total Population / Total Number of Housing Units

Vacancy Rate %	6.0%

COMMENTS:

The Group Quarters Population consists of ENMU students occupying four University residence halls and two University apartment buildings, and is the average population over the spring, summer, and fall semesters. Occupancy status data apply to multi-family residences within Portales' Water Utility Department service area excluding ENMU residence halls and apartments. Average vacancy rate data for 2015 were obtained from local realtors. The average household size was obtained from the 2010 US Census.

Figure B-3. NMOSE Calculator Single Family Residential input and output data.



DATA INPUT SHEET

Portales

Instructions

3. SINGLE-FAMILY RESIDENTIAL (SFR)

Return to Instructions

MONTHLY DATA

TABLE 3.1 Info — 2015 TO 2009

SFR BILLED WATER CONSUMPTION (Gallons (US))

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	20,795,000	18,709,000	17,749,000	28,716,000	26,509,000	31,685,000	30,763,000	31,333,000	31,743,000	24,918,000	21,242,000	17,582,000
2014	19,042,000	23,518,000	21,146,000	25,801,000	43,690,000	28,287,000	36,348,000	38,482,000	35,115,000	26,149,000	22,067,000	18,468,000
2013	22,841,000	20,275,000	23,854,000	40,433,000	34,974,000	30,789,000	43,530,000	36,525,000	43,027,000	27,906,000	21,547,000	18,402,000
2012	22,398,000	18,932,000	20,316,000	46,241,000	40,691,000	48,591,000	54,341,000	48,171,000	45,219,000	28,084,000	23,164,000	22,330,000
2011	20,560,000	24,624,000	29,943,000	37,106,000	42,926,000	65,425,000	49,428,000	47,851,000	42,573,000	34,196,000	25,055,000	23,840,000
2010	22,728,000	18,837,000	16,116,000	30,227,000	32,646,000	45,559,000	44,800,000	43,177,000	35,879,000	32,870,000	22,350,000	23,615,000
2009	21,186,000	18,707,000	22,212,000	35,114,000	46,235,000	41,501,000	36,984,000	48,476,000	36,953,000	28,915,000	23,199,000	18,042,000

TABLE 3.2 Info — Active Connections Only — You have chosen to enter Active Connections Only, enter the monthly values below, or enter annual values in table 3.8 Check message above Table 3.3 to see if additional data is required.

NUMBER OF SFR CONNECTIONS (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	4,393	4,448	4,434	4,459	4,487	4,469	4,397	4,466	4,471	4,460	4,444	4,434
2014	4,473	4,462	4,463	4,479	4,500	4,467	4,421	4,485	4,443	4,407	4,384	4,418
2013	4,449	4,448	4,453	4,483	4,483	4,445	4,470	4,645	4,513	4,492	4,469	4,476
2012	4,413	4,460	4,455	4,498	4,527	4,506	4,482	4,529	4,511	4,503	4,495	4,512
2011	4,418	4,416	4,420	4,423	4,455	4,489	4,446	4,505	4,475	4,484	4,480	4,440
2010	4,328	4,366	4,362	4,383	4,417	4,414	4,404	4,453	4,442	4,426	4,442	4,418
2009	4,259	4,286	4,299	4,323	4,317	4,334	4,336	4,380	4,366	4,356	4,360	4,333

TABLE 3.3 Info — You have entered Active Connections Only in Table 3.2; leave the cells below blank

INACTIVE (ZERO USE) SFR CONNECTIONS (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015												
2014												
2013												
2012												
2011												
2010												
2009												

TABLE 3.4 — Formula = (No. of Connections - No. of Zero Use Accounts) * Ave. Household Size

SFR POPULATION (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	12,388	12,543	12,504	12,574	12,653	12,603	12,400	12,594	12,608	12,577	12,532	12,504
2014	12,614	12,583	12,586	12,631	12,690	12,597	12,467	12,648	12,529	12,428	12,363	12,459
2013	12,546	12,543	12,557	12,642	12,642	12,535	12,605	13,099	12,727	12,667	12,603	12,622
2012	12,445	12,577	12,563	12,684	12,766	12,707	12,639	12,772	12,721	12,698	12,676	12,724
2011	12,459	12,453	12,464	12,473	12,563	12,659	12,538	12,704	12,620	12,645	12,634	12,521
2010	12,205	12,312	12,301	12,360	12,456	12,447	12,419	12,557	12,526	12,481	12,526	12,459
2009	12,010	12,087	12,123	12,191	12,174	12,222	12,228	12,352	12,312	12,284	12,295	12,219

TABLE 3.5 — Formula = Billed Water Consumption (SFR only) / Calculated Population (SFR only)

SFR GPCD CALCULATION (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	54.15	53.27	45.79	76.12	67.58	83.81	80.03	80.26	83.92	63.91	56.50	45.36
2014	48.70	66.75	54.20	68.09	111.06	74.85	94.05	98.15	93.42	67.87	59.50	47.82
2013	58.73	57.73	61.28	106.61	89.24	81.88	111.40	89.95	112.70	71.06	56.99	47.03
2012	58.06	53.76	52.17	121.52	102.82	127.47	138.69	121.67	118.49	71.34	60.91	56.61
2011	53.23	70.62	77.49	99.16	110.22	172.28	127.17	121.50	112.45	87.24	66.11	61.42
2010	60.07	54.64	42.26	81.52	84.55	122.00	116.36	110.91	95.48	84.95	59.47	61.14
2009	56.90	55.28	59.10	96.01	122.51	113.19	97.57	126.60	100.05	75.93	62.89	47.63

COMMENTS:

ANNUAL DATA

TABLE 3.6 ANNUAL CONSUMPTION

TABLE 3.7 ANNUAL CALCULATION

301,744,000
338,113,000
364,103,000
418,478,000
443,527,000
368,804,000
377,524,000

TABLE 3.8 AVG. ANNUAL CONNECTIONS

TABLE 3.9 AVG CONN. CALCULATION

4,447
4,450
4,486
4,491
4,454
4,405
4,329

TABLE 3.10 Info CALCULATED GROWTH RATE

TABLE 3.11 No. VACANT SFR

-0.07%
-0.79%
-0.12%
0.82%
1.13%
1.74%

TABLE 3.12 Info SIZE OF HOUSEHOLD

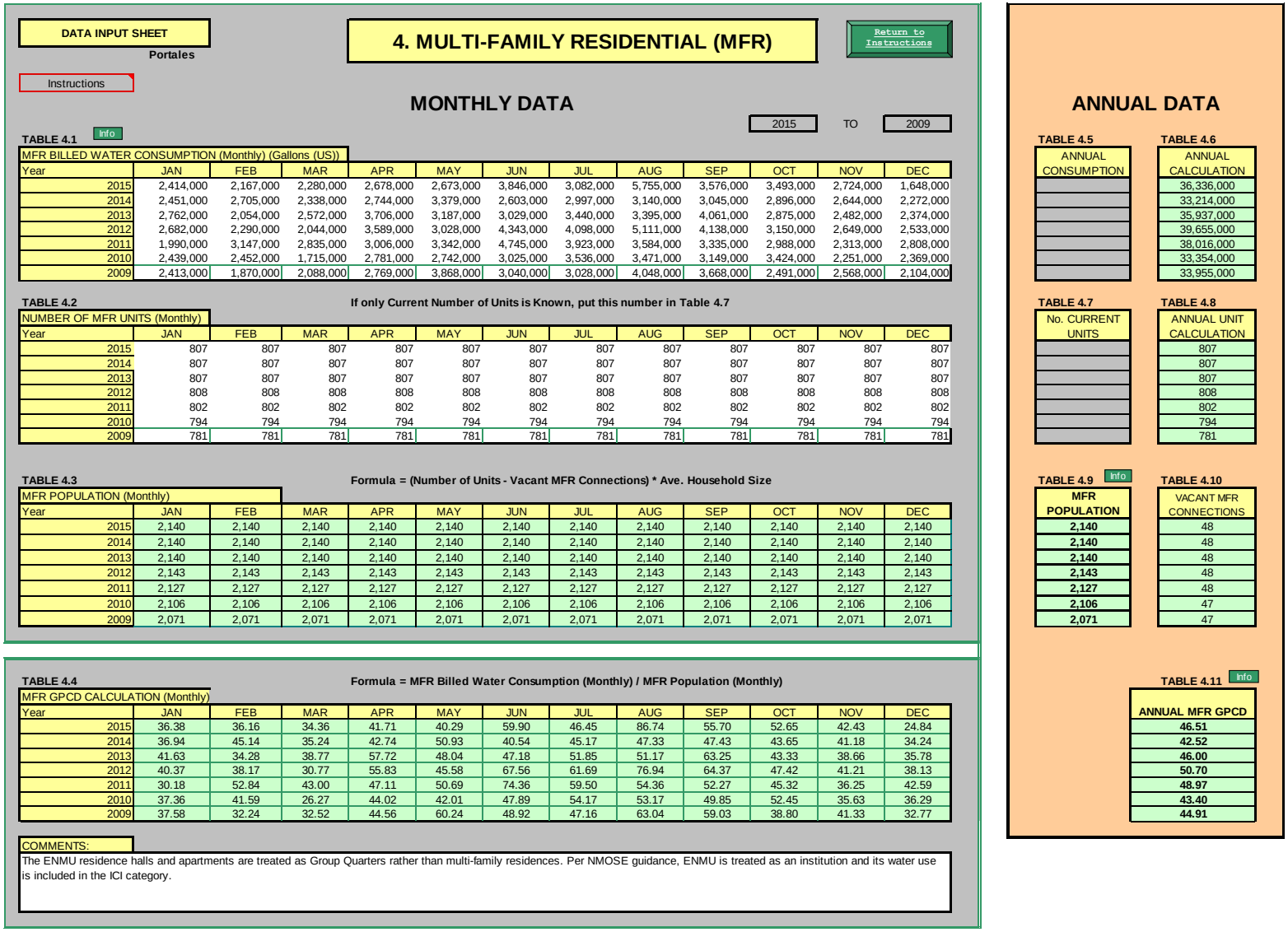
TABLE 3.13 Info SFR POPULATION

2.82	**12,540**
2.82	**12,549**
2.82	**12,649**
2.82	**12,664**
2.82	**12,561**
2.82	**12,421**
2.82	**12,208**

TABLE 3.14 Info

ANNUAL SFR GPCD
65.92
73.81
78.86
90.53
96.74
81.35
84.72

Figure B-4. NMOSE Calculator Multi-Family Residential input and output data.



DATA INPUT SHEET

Portales

4. MULTI-FAMILY RESIDENTIAL (MFR)

Return to Instructions

Instructions

MONTHLY DATA

2015 TO 2009

TABLE 4.1 Info

MFR BILLED WATER CONSUMPTION (Monthly) (Gallons (US))

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	2,414,000	2,167,000	2,280,000	2,678,000	2,673,000	3,846,000	3,082,000	5,755,000	3,576,000	3,493,000	2,724,000	1,648,000
2014	2,451,000	2,705,000	2,338,000	2,744,000	3,379,000	2,603,000	2,997,000	3,140,000	3,045,000	2,896,000	2,644,000	2,272,000
2013	2,762,000	2,054,000	2,572,000	3,706,000	3,187,000	3,029,000	3,440,000	3,395,000	4,061,000	2,875,000	2,482,000	2,374,000
2012	2,682,000	2,290,000	2,044,000	3,589,000	3,028,000	4,343,000	4,098,000	5,111,000	4,138,000	3,150,000	2,649,000	2,533,000
2011	1,990,000	3,147,000	2,835,000	3,006,000	3,342,000	4,745,000	3,923,000	3,584,000	3,335,000	2,988,000	2,313,000	2,808,000
2010	2,439,000	2,452,000	1,715,000	2,781,000	2,742,000	3,025,000	3,536,000	3,471,000	3,149,000	3,424,000	2,251,000	2,369,000
2009	2,413,000	1,870,000	2,088,000	2,769,000	3,868,000	3,040,000	3,028,000	4,048,000	3,668,000	2,491,000	2,568,000	2,104,000

TABLE 4.2 If only Current Number of Units is Known, put this number in Table 4.7

NUMBER OF MFR UNITS (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	807	807	807	807	807	807	807	807	807	807	807	807
2014	807	807	807	807	807	807	807	807	807	807	807	807
2013	807	807	807	807	807	807	807	807	807	807	807	807
2012	808	808	808	808	808	808	808	808	808	808	808	808
2011	802	802	802	802	802	802	802	802	802	802	802	802
2010	794	794	794	794	794	794	794	794	794	794	794	794
2009	781	781	781	781	781	781	781	781	781	781	781	781

TABLE 4.3 Formula = (Number of Units - Vacant MFR Connections) * Ave. Household Size

MFR POPULATION (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140
2014	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140
2013	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140	2,140
2012	2,143	2,143	2,143	2,143	2,143	2,143	2,143	2,143	2,143	2,143	2,143	2,143
2011	2,127	2,127	2,127	2,127	2,127	2,127	2,127	2,127	2,127	2,127	2,127	2,127
2010	2,106	2,106	2,106	2,106	2,106	2,106	2,106	2,106	2,106	2,106	2,106	2,106
2009	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071	2,071

TABLE 4.4 Formula = MFR Billed Water Consumption (Monthly) / MFR Population (Monthly)

MFR GPCD CALCULATION (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	36.38	36.16	34.36	41.71	40.29	59.90	46.45	86.74	55.70	52.65	42.43	24.84
2014	36.94	45.14	35.24	42.74	50.93	40.54	45.17	47.33	47.43	43.65	41.18	34.24
2013	41.63	34.28	38.77	57.72	48.04	47.18	51.85	51.17	63.25	43.33	38.66	35.78
2012	40.37	38.17	30.77	55.83	45.58	67.56	61.69	76.94	64.37	47.42	41.21	38.13
2011	30.18	52.84	43.00	47.11	50.69	74.36	59.50	54.36	52.27	45.32	36.25	42.59
2010	37.36	41.59	26.27	44.02	42.01	47.89	54.17	53.17	49.85	52.45	35.63	36.29
2009	37.58	32.24	32.52	44.56	60.24	48.92	47.16	63.04	59.03	38.80	41.33	32.77

COMMENTS:

The ENMU residence halls and apartments are treated as Group Quarters rather than multi-family residences. Per NMOSE guidance, ENMU is treated as an institution and its water use is included in the ICI category.

ANNUAL DATA

TABLE 4.5

ANNUAL CONSUMPTION

TABLE 4.6

ANNUAL CALCULATION
36,336,000
33,214,000
35,937,000
39,655,000
38,016,000
33,354,000
33,955,000

TABLE 4.7

No. CURRENT UNITS

TABLE 4.8

ANNUAL UNIT CALCULATION
807
807
807
808
802
794
781

TABLE 4.9 Info

MFR POPULATION
2,140
2,140
2,140
2,143
2,127
2,106
2,071

TABLE 4.10

VACANT MFR CONNECTIONS
48
48
48
48
48
47
47

TABLE 4.11 Info

ANNUAL MFR GPCD
46.51
42.52
46.00
50.70
48.97
43.40
44.91

Figure B-5. NMOSE Calculator Industrial, Commercial, and Institutional input and output data.

DATA INPUT SHEET

5. INDUSTRIAL, COMMERCIAL & INSTITUTIONAL (ICI) AND OTHER METERED

Return to Instructions

Info

Portales

Instructions

MONTHLY DATA

2015 TO 2009

TABLE 5.1

ICI WATER CONSUMPTION (Gallons (US))

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	24,211,000	23,802,000	20,536,000	32,380,000	33,844,000	30,466,000	41,051,000	24,761,000	34,344,000	26,795,000	22,738,000	17,843,000
2014	32,029,000	27,527,000	32,884,000	32,726,000	50,780,000	39,226,000	55,476,000	36,663,000	35,708,000	29,142,000	21,299,000	29,332,000
2013	26,451,000	21,609,000	30,725,000	44,207,000	40,028,000	27,587,000	45,313,000	35,845,000	38,430,000	29,479,000	23,793,000	24,689,000
2012	21,124,000	23,929,000	18,982,000	33,671,000	34,040,000	47,378,000	44,988,000	37,531,000	37,181,000	26,066,000	20,511,000	21,937,000
2011	27,103,000	40,996,000	40,392,000	43,855,000	41,009,000	50,229,000	36,103,000	47,154,000	54,656,000	51,750,000	43,367,000	50,880,000
2010	27,320,000	24,655,000	24,249,000	39,191,000	36,239,000	42,355,000	44,776,000	40,747,000	32,731,000	31,649,000	20,292,000	27,084,000
2009	33,461,000	28,997,000	34,630,000	50,948,000	43,631,000	46,919,000	38,811,000	52,083,000	37,591,000	30,641,000	22,704,000	23,167,000

TABLE 5.2

OTHER METERED (Gallons (US))

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0

COMMENTS:

All metered water is included in the SFR, MFR, and ICI categories.

ANNUAL DATA

TABLE 5.3 ICI ANNUAL CONSUMPTION	TABLE 5.4 ICI GPCD	TABLE 5.5 ICI ANNUAL CALCULATED
	57.73	332,771,000
	73.31	422,792,000
	66.88	388,156,000
	63.22	367,338,000
	91.47	527,494,000
	68.55	391,288,000
	78.97	443,583,000

TABLE 5.6 OTHER ANNUAL CONSUMPTION	TABLE 5.7 OTHER METERED GPCD	TABLE 5.8 OTHER ANNUAL CALCULATED
	N/A	N/A
	N/A	N/A
	N/A	N/A
	N/A	N/A
	N/A	N/A
	N/A	N/A
	N/A	N/A

Figure B-6. NMOSE Calculator Total System input and output data.

DATA INPUT SHEET

Portales

7. TOTAL WATER DIVERTED AND SUPPLIED

Return to Instructions

MONTHLY DATA

TABLE 7.1 — 2015 TO 2009

TOTAL WATER DIVERTED (Monthly) (Gallons (US))

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	91,988,000	51,377,000	62,348,000	89,622,000	103,452,000	75,932,000	88,942,000	64,461,000	103,459,000	105,199,000	70,084,000	52,849,000
2014	50,774,000	84,711,000	76,883,000	87,366,000	119,853,000	117,204,000	123,671,000	108,246,000	100,094,000	99,851,000	94,077,000	62,136,000
2013	44,470,000	73,981,000	50,021,000	93,585,000	105,502,000	84,252,000	112,989,000	143,618,000	149,841,000	81,678,000	81,276,000	78,350,000
2012	84,435,000	61,730,000	88,367,000	89,833,000	88,410,000	104,612,000	121,956,000	118,282,000	105,816,000	93,733,000	82,239,000	85,495,000
2011	79,370,000	93,930,000	128,580,000	106,048,000	110,771,000	138,543,000	137,346,000	84,428,000	114,637,000	85,798,000	72,509,000	96,086,000
2010	85,566,000	48,462,000	48,457,000	141,506,000	78,597,000	159,459,000	154,554,000	63,278,000	142,435,000	126,309,000	106,046,000	94,964,000
2009	71,790,000	68,460,000	66,198,000	74,548,000	110,991,000	121,910,000	126,788,000	137,721,000	128,889,000	119,257,000	113,299,000	99,058,000

TABLE 7.2

IMPORTED WATER (Monthly)(Gallons (US)) Info

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 7.3

EXPORTED WATER (Monthly) (Gallons (US)) Info

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	17,776,000	13,742,000	10,791,000	17,500,000	13,713,000	13,572,000	16,241,000	24,107,000	16,361,000	13,579,000	13,189,000	11,974,000
2014	14,333,000	11,276,000	11,958,000	14,091,000	20,848,000	14,058,000	21,088,000	15,638,000	16,192,000	11,988,000	14,273,000	11,952,000
2013	11,426,000	12,909,000	10,511,000	14,364,000	17,564,000	15,794,000	16,810,000	20,428,000	16,558,000	14,188,000	15,177,000	12,102,000
2012	12,118,000	10,639,000	12,514,000	18,527,000	17,341,000	21,253,000	19,759,000	18,060,000	16,854,000	12,971,000	11,090,000	12,552,000
2011	13,897,000	14,804,000	14,309,000	19,792,000	20,763,000	21,865,000	25,021,000	21,618,000	21,740,000	15,906,000	14,388,000	14,896,000
2010	13,291,000	11,396,000	10,700,000	15,434,000	15,274,000	24,767,000	17,918,000	18,398,000	20,986,000	15,504,000	12,092,000	12,345,000
2009	12,964,000	11,996,000	13,507,000	14,171,000	19,537,000	19,462,000	18,744,000	21,008,000	19,748,000	14,526,000	12,510,000	11,007,000

TABLE 7.4 — Formula = Total Water Diverted + Imported water - Exported Water

TOTAL WATER SUPPLY (Monthly) (Gallons (US))

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	74,212,000	37,635,000	51,557,000	72,122,000	89,739,000	62,360,000	72,701,000	40,354,000	87,098,000	91,620,000	56,895,000	40,875,000
2014	36,441,000	73,435,000	64,925,000	73,275,000	99,005,000	103,146,000	102,583,000	92,608,000	83,902,000	87,863,000	79,804,000	50,184,000
2013	33,044,000	61,072,000	39,510,000	79,221,000	87,938,000	68,458,000	96,179,000	123,190,000	133,283,000	67,490,000	66,099,000	66,248,000
2012	72,317,000	51,091,000	75,853,000	71,306,000	71,069,000	83,359,000	102,197,000	100,222,000	88,962,000	80,762,000	71,149,000	72,943,000
2011	65,473,000	79,126,000	114,271,000	86,256,000	90,008,000	116,678,000	112,325,000	62,810,000	92,897,000	69,892,000	58,121,000	81,190,000
2010	72,275,000	37,066,000	37,757,000	126,072,000	63,323,000	134,692,000	136,636,000	44,880,000	121,449,000	110,805,000	93,954,000	82,619,000
2009	58,826,000	56,464,000	52,691,000	60,377,000	91,454,000	102,448,000	108,044,000	116,713,000	109,141,000	104,731,000	100,789,000	88,051,000

ANNUAL DATA

TABLE 7.6 — ANNUAL TOTAL DIVERTED

TABLE 7.7 — ANNUAL TOTAL DIVERTED CALC

959,713,000
1,124,866,000
1,099,563,000
1,124,908,000
1,248,046,000
1,249,633,000
1,238,909,000

TABLE 7.8 — ANNUAL TOTAL IMPORTED

TABLE 7.9 — ANNUAL TOTAL IMPORT CALC

N/A
N/A
N/A
N/A
N/A
N/A
N/A

TABLE 7.10 — ANNUAL TOTAL EXPORTED

TABLE 7.11 — ANNUAL TOTAL EXPORT CALC

182,545,000
177,695,000
177,831,000
183,678,000
218,999,000
188,105,000
189,180,000

TABLE 7.12 — ANNUAL TOTAL WATER SUPPLY Info

TABLE 7.13 — TOTAL POP. EST.

777,168,000	15,791
947,171,000	15,801
921,732,000	15,900
941,230,000	15,918
1,029,047,000	15,799
1,061,528,000	15,638
1,049,729,000	15,390

Table 7.5

SYSTEM TOTAL GPCD (Monthly)

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2015	152	85	105	152	183	132	149	82	184	187	120	83
2014	74	166	133	155	202	218	209	189	177	179	168	102
2013	67	137	80	166	178	144	195	250	279	137	139	134
2012	147	115	154	149	144	175	207	203	186	164	149	148
2011	134	179	233	182	184	246	229	128	196	143	123	166
2010	149	85	78	269	131	287	282	93	259	229	200	170
2009	123	131	110	131	192	222	226	245	236	220	218	185

COMMENTS:

The City of Portales exports water to Roosevelt County Water Coop.

TABLE 7.14

Info	Year	SYSTEM TOTAL GPCD
	2015	**134.84**
	2014	**164.23**
	2013	**158.82**
	2012	**162.00**
	2011	**178.45**
	2010	**185.98**
	2009	**186.87**

Figure B-7. NMOSE Calculator annual summary of Total System water use components.

9. Annual Reporting Performance

Return to Instructions

Overall Annual GPCD (based on Total Population)

	SFR - System Total	MFR - System Total	ICI	Other Metered	Non-Revenue Water (Info)	Total Supplied	Non-Revenue Volume Million Gallons (US)
Year							
On Graph?	Yes	Yes	Yes	Yes	Yes		
2015	52.35	6.30	57.73	N/A	18.45	134.84	106.32
2014	58.63	5.76	73.31	N/A	26.54	164.23	153.05
2013	62.74	6.19	66.88	N/A	23.01	158.82	133.54
2012	72.03	6.83	63.22	N/A	19.92	162.00	115.76
2011	76.91	6.59	91.47	N/A	3.47	178.45	20.01
2010	64.61	5.84	68.55	N/A	46.97	185.98	268.08
2009	67.21	6.04	78.97	N/A	34.65	186.87	194.67

Portales		
2015	to	2009

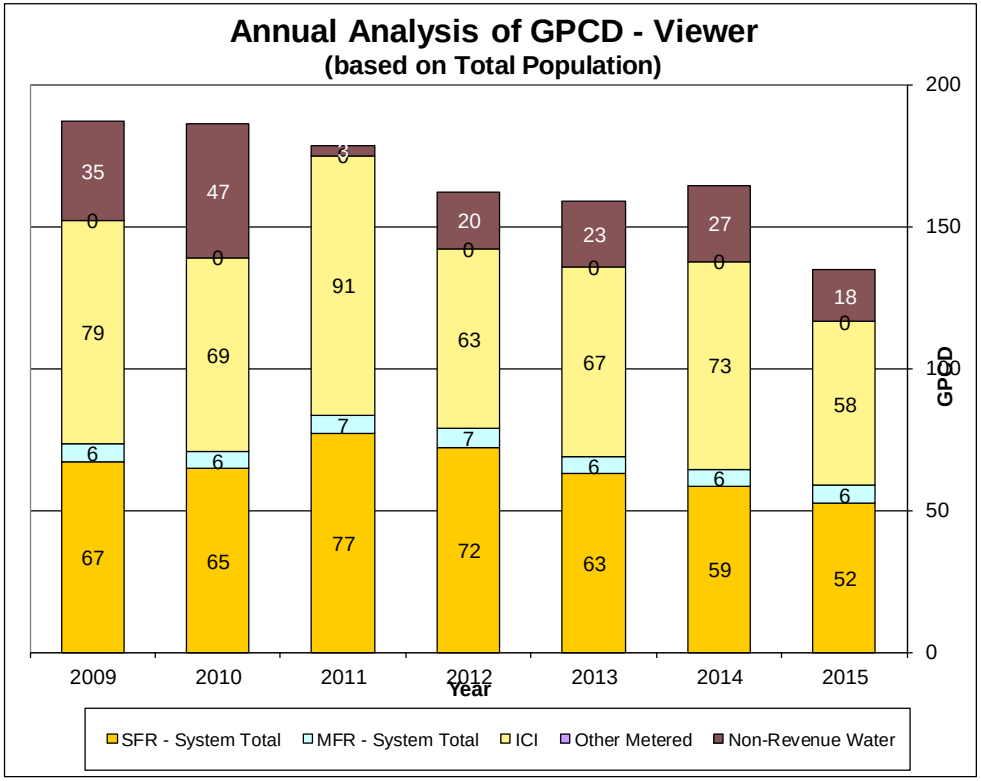


Figure B-8. NMOSE Calculator monthly SFR water use in 2015

10. Monthly Reporting Performance

Return to Instructions

Choose Year for Monthly Analysis 2015

Choose Sector Single-Family Residential

Monthly GPCD

Month	Single-Family Residential GPCD	Multi-Family Residential GPCD	ICI GPCD	Other Metered GPCD	Non-Revenue GPCD
JAN	54.15	36.38	49.46	0.00	54.73
FEB	53.27	36.16	53.83	0.00	-15.93
MAR	45.79	34.36	41.95	0.00	22.45
APR	76.12	41.71	68.35	0.00	17.62
MAY	67.58	40.29	69.14	0.00	54.57
JUN	83.81	59.90	64.31	0.00	-7.68
JUL	80.03	46.45	83.86	0.00	-4.48
AUG	80.26	86.74	50.58	0.00	-43.91
SEP	83.92	55.70	72.50	0.00	36.80
OCT	63.91	52.65	54.74	0.00	74.39
NOV	56.50	42.43	48.00	0.00	21.51
DEC	45.36	24.84	36.45	0.00	7.77

Portales		
2015	to	2009

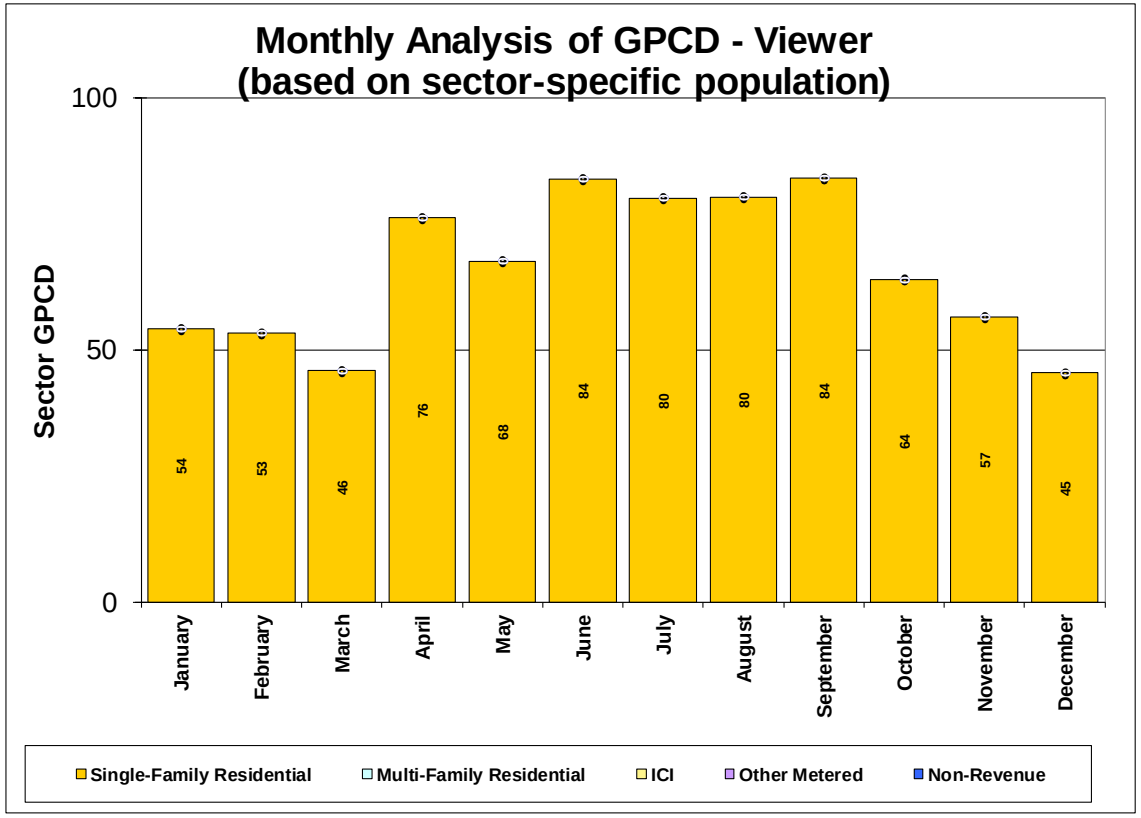


Figure B-9. NMOSE Calculator monthly MFR water use in 2015

10. Monthly Reporting Performance

Return to Instructions

Choose Year for Monthly Analysis 2015

Choose Sector Multi-Family Residential

Monthly GPCD

Month	Single-Family Residential GPCD	Multi-Family Residential GPCD	ICI GPCD	Other Metered GPCD	Non-Revenue GPCD
JAN	54.15	36.38	49.46	0.00	54.73
FEB	53.27	36.16	53.83	0.00	-15.93
MAR	45.79	34.36	41.95	0.00	22.45
APR	76.12	41.71	68.35	0.00	17.62
MAY	67.58	40.29	69.14	0.00	54.57
JUN	83.81	59.90	64.31	0.00	-7.68
JUL	80.03	46.45	83.86	0.00	-4.48
AUG	80.26	86.74	50.58	0.00	-43.91
SEP	83.92	55.70	72.50	0.00	36.80
OCT	63.91	52.65	54.74	0.00	74.39
NOV	56.50	42.43	48.00	0.00	21.51
DEC	45.36	24.84	36.45	0.00	7.77

Portales		
2015	to	2009

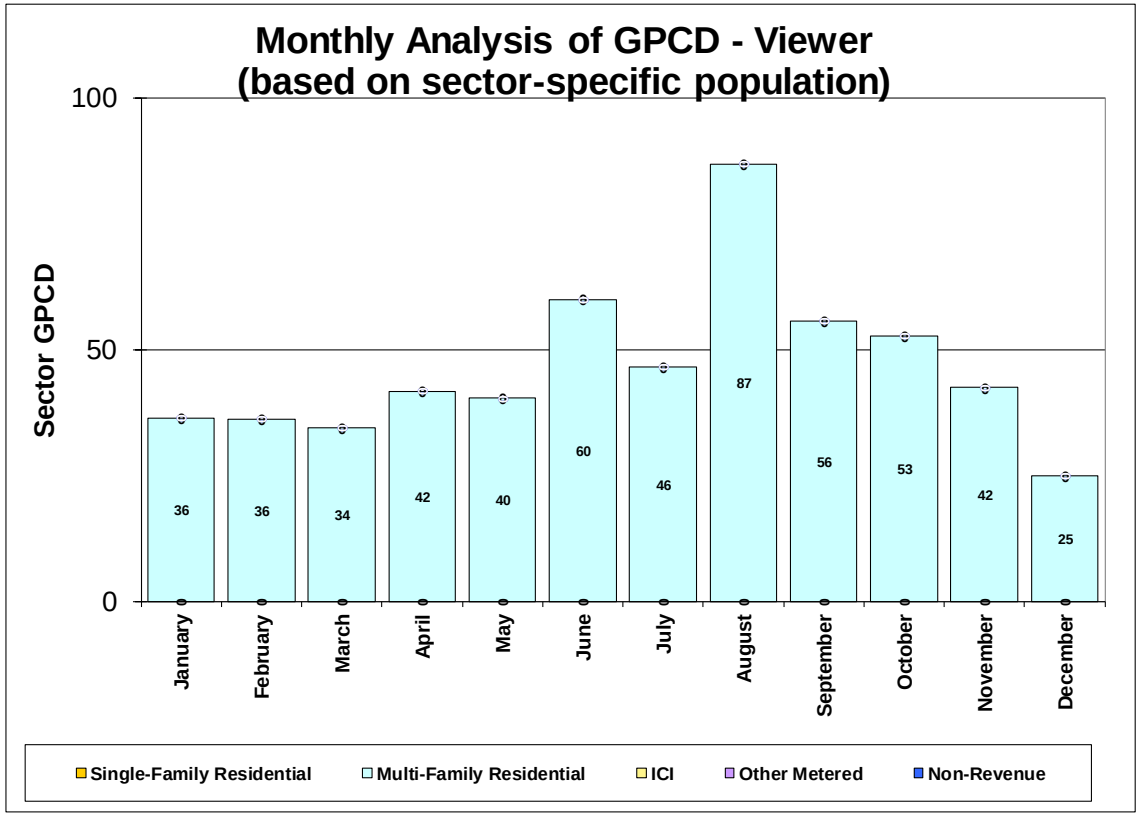


Figure B-10. NMOSE Calculator monthly ICI water use in 2015.

10. Monthly Reporting Performance

Return to Instructions

Choose Year for Monthly Analysis 2015

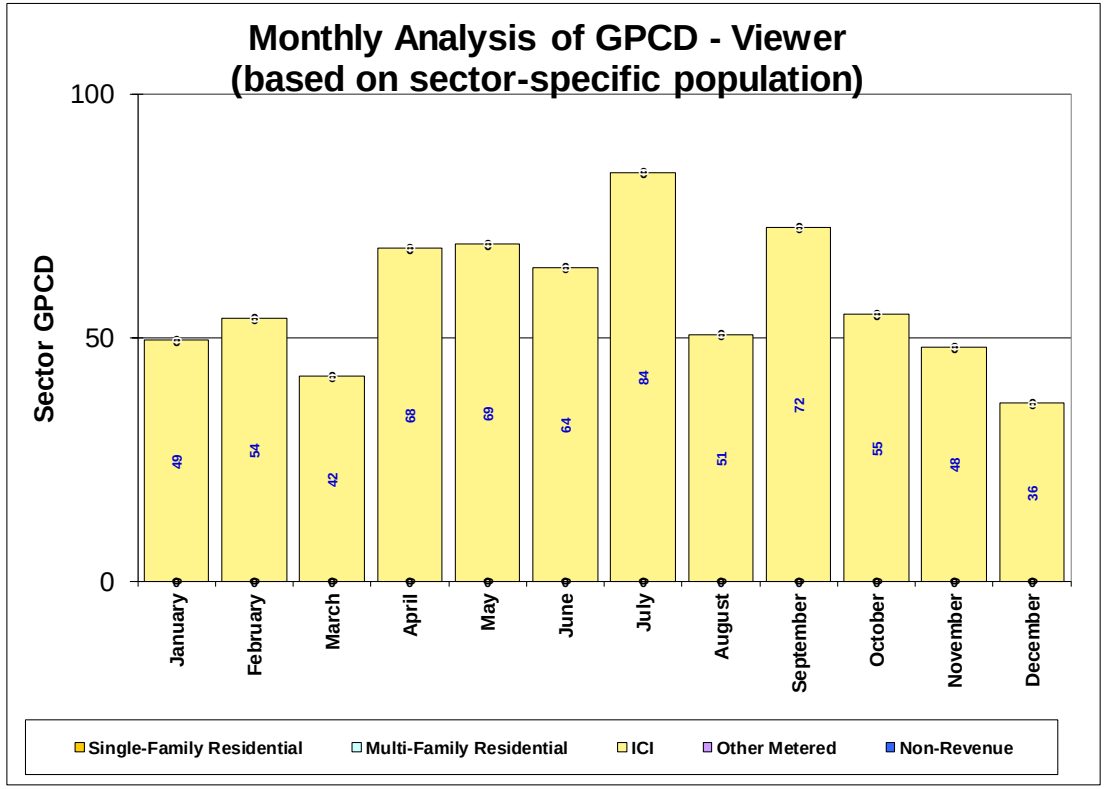
Choose Sector ICI

Monthly GPCD

Month	Single-Family Residential GPCD	Multi-Family Residential GPCD	ICI GPCD	Other Metered GPCD	Non-Revenue GPCD
JAN	54.15	36.38	49.46	0.00	54.73
FEB	53.27	36.16	53.83	0.00	-15.93
MAR	45.79	34.36	41.95	0.00	22.45
APR	76.12	41.71	68.35	0.00	17.62
MAY	67.58	40.29	69.14	0.00	54.57
JUN	83.81	59.90	64.31	0.00	-7.68
JUL	80.03	46.45	83.86	0.00	-4.48
AUG	80.26	86.74	50.58	0.00	-43.91
SEP	83.92	55.70	72.50	0.00	36.80
OCT	63.91	52.65	54.74	0.00	74.39
NOV	56.50	42.43	48.00	0.00	21.51
DEC	45.36	24.84	36.45	0.00	7.77

Portales

2015 to 2009



Appendix C

Historic Depletion Rates in the City of Portales Blackwater Wells

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2201 (BW-1)	1967	1967	750	22	- -
		1980	No Data	48	- -
		June 1981	No Data	53	- -
		December 1981	No Data	56	- -
		1985	No Data	57	- -
		1995	No Data	91	- -
		1996	No Data	89	- -
		1998	375	91	- -
		April 1999	No Data	93	- -
		January 2000	300	100	- -
		January 2001	No Data	101	- -
		January 2002	125	(4)	- -
		January 2003	No Data	No Data	- -
		January 2004	No Data	No Data	- -
		January 2005	Out of Service	Out of Service	- -
	Long Term Average				**Out of Service**
P-2201-S (BW-2)	1968	February 1968	800	21	- -
		April 1999	No Data	87	- -
	2001[5]	September 2001	No Data	No Data	- -
		January 2002	300	95	- -
		January 2003	300	97	- -
		January 2004	320	106	- -
		January 2005	300	107	- -
		January 2006	290	113	- -
		January 2007	290	105	- -
		January 2008	220	122	- -
		January 2009	No Data	121	- -
		January 2010	No Data	No Data	- -
		March 2011	170	122	- -
		January 2012	200	126.56	- -
		January 2013	162	134.47	- -
		January 2014	173	135.03	- -
		February 2015	133	137.75	- -
		January 2016	155	137.92	
	Long Term Average				**-2.4**
	Current Three to Five Year Average				**-3.3**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2202 (BW-3)	1968	1968	1,000	38	- -
		1980	No Data	50	- -
		June 1981	No Data	66	- -
		December 1981	No Data	71	- -
		1985	No Data	76	- -
		1988	No Data	77	- -
		1996	No Data	93	- -
		1998	550	70[1]	- -
		April 1999	No Data	101	- -
		January 2000	190	109	- -
		January 2001	No Data	108	- -
		January 2002	200	118	- -
		January 2003	180	(4)	- -
		January 2004	125	121	- -
		January 2005	125	122	- -
		January 2006	125	No Data	- -
		January 2007	125	No Data	- -
		January 2008	125[13]	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		March 2011	No Data	139	- -
		January 2012	No Data	139.89	- -
		January 2013	53	147.27	- -
		January 2014	52	146.75	- -
		February 2015	82	141.91	- -
		January 2016	55	141.71	
	Long Term Average				**-2.2**
	Current Three to Five Year Average				**-0.6**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2201-S-2 (BW-4)	1969	1970	620	34	- -
		1980	No Data	59	- -
		June 1981	No Data	62	- -
		1995	No Data	92	- -
		1996	No Data	94	- -
		1998	500	92	- -
		April 1999	No Data	101	- -
		January 2000	300	105	- -
		January 2001	No Data	104	- -
		January 2002	290	114	- -
		January 2003	280	(4)	- -
		January 2004	165	116	- -
		January 2005	140	116	- -
		January 2006	130	120	- -
		January 2007	130	116	- -
		January 2008	122	119	- -
		January 2009	No Data	134	- -
		January 2010	No Data	133	- -
		March 2011	No Data	133	- -
		January 2012	147	138.79	- -
		January 2013	49	142.54	- -
		January 2014	In Repair	142.77	- -
		February 2015	70	145.45	- -
		January 2016	80	144.93	
	Long Term Average				**-2.4**
	Current Three to Five Year Average				**-2.3**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2401 Renumbered P-2201-S-3 In 1977 (BW-5)	1968	1969	No Data	48	- -
		1970	No Data	53	- -
		1980	No Data	70	- -
		June 1981	No Data	89	- -
		1985	No Data	79	- -
		1995	No Data	102	- -
		1996	No Data	106	- -
		1998	450	102	- -
		April 1999	No Data	114	- -
		January 2000	325	117	- -
		January 2001	No Data	119	- -
		January 2002	150	(4)	- -
		January 2003	340	127	- -
		January 2004	160	132	- -
		January 2005	145	132	- -
		January 2006	145	138	- -
		January 2007	140	138	- -
		January 2008	125[13]	140	- -
		January 2009	No Data	143	- -
		January 2010	No Data	150	- -
		March 2011	No Data	149	- -
		January 2012	No Data	154.10	- -
		January 2013	No Data	161.50	- -
		January 2014	Bad Meter	158.59	- -
		February 2015	128	163.48	- -
		January 2016	105	164.38	
	Long Term Average				**-2.5**
	Current Three to Five Year Average				**-3.1**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2403 (BW-6)	1978	1978	No Data	59	- -
		June 1981	No Data	62	- -
		December 1981	No Data	68	- -
		1985	No Data	77	- -
		1995	No Data	92	- -
		1996	No Data	92	- -
		1998	425	91	- -
		January 2000	200	109	- -
		January 2001	No Data	109	- -
		January 2002	200	(4)	- -
		January 2003	200	116	- -
		January 2004	180	123	- -
		January 2005	180	No Data	- -
		January 2006	180	No Data	- -
		January 2007	180	No Data	- -
		January 2008	140[13]	No Data	- -
		January 2009	No Data	135	- -
		January 2010	No Data	No Data	- -
		March 2011	135	134	- -
		January 2012	No Data	No Data	- -
		January 2013	100	139.65	- -
		January 2014	105	141.72	- -
		February 2015	90	142.54	- -
		January 2016	70	143.64	
	Long Term Average				**-2.2**
	Current Three to Five Year Average				**-1.9**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3475-S (BW-7)	1978	1978	No Data	63	- -
		June 1981	No Data	81	- -
		1985	No Data	82	- -
		1995	No Data	111	- -
		1996	No Data	116	- -
		1998	450	119	- -
		January 2000	250	123	- -
		January 2001	No Data	119	- -
		January 2002	170	126	- -
		January 2003	180	126	- -
		January 2004	200	135	- -
		January 2005	185	130	- -
		January 2006	180	134	- -
		January 2007	180	134	- -
		January 2008	150[13]	141	- -
		January 2009	No Data	145	- -
		January 2010	No Data	150	- -
		March 2011	230	146	- -
		January 2012	187	149.09	- -
		January 2013	180	156.49	- -
		January 2014	In Repair	162.84	- -
		February 2015	120	No Data	- -
		January 2016	115	No Data	
	Long Term Average **Current Three to Five Year Average**				**-2.8** **Insufficient Data**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2402 (BW-8)	1966	1966	1,100	48	- -
		June 1981	No Data	75	- -
		December 1981	No Data	82	- -
		1985	No Data	84	- -
		1995	No Data	104	- -
		1996	No Data	108	- -
		1998	475	103	- -
		April 1999	No Data	125	- -
		January 2000	400	122	- -
		January 2001	No Data	124	- -
		January 2002	180	130	- -
		January 2003	220	130	- -
		January 2004	175	130.5	- -
		January 2005	170	134	- -
		January 2006	125	138	- -
		January 2007	125	139	- -
		January 2008	90[14]	142	- -
		January 2009	No Data	155	- -
		January 2010	No Data	149	- -
		March 2011	50	153	- -
		January 2012	No Data	159.22	- -
		January 2013	100	165.42	- -
		January 2014	100	165.93	- -
		February 2015	100	166.86	- -
		January 2016	85	168.23	
	Long Term Average				**-2.4**
	Current Three to Five Year Average				**-3.1**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3475 (BW-9)	1982	1982	No Data	70	- -
		1995	No Data	109	- -
		1998	400	135	- -
		January 2000	200	121	- -
		January 2001	No Data	123	- -
		January 2002	180	[4]	- -
		January 2003	180	125	- -
		January 2004	210	126	- -
		January 2005	190	133	- -
		January 2006	190	No Data	- -
		January 2007	180	No Data	- -
		January 2008	120	126	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	145	- -
		March 2011	170	147	- -
		January 2012	90	151.12	- -
		January 2013	Pumps Air	152.90	- -
		January 2014	Pumps Air	153.71	- -
		February 2015	Out of Service	152.90	- -
		January 2016	No Data	155.10	
	Long Term Average				**-2.5**
	Current Three to Five Year Average				**-1.6**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2403-S (BW-10)	1982	1982	300	82	- -
		1995	No Data	98	- -
		1998	250	98	- -
		April 1999	No Data	124	- -
		January 2000	210	122	- -
		January 2001	No Data	129	- -
		January 2002	130	143	- -
		January 2003	150	128	- -
		January 2004	105	134	- -
		January 2005	90	133	- -
		January 2006	100	136	- -
		January 2007	90	136	- -
		January 2008	55	140	- -
		January 2009	No Data	142	- -
		January 2010	No Data	No Data	- -
		March 2011	90	147	- -
		January 2012	85	149.02	- -
		January 2013	No Data	152.71	- -
		January 2014	20	154.53	- -
		February 2015	50	154.07	- -
		January 2016	30	155.38	
	Long Term Average				**-2.2**
	Current Three to Five Year Average				**-1.7**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2203-S (BW-11)	1991	1991	No Data	91	- -
		1998	550	104	- -
		January 2000	400	127	- -
		January 2001	No Data	127	- -
		January 2002	300	130	- -
		January 2003	260	130	- -
		January 2004	215	129	- -
		January 2005	150	133	- -
		January 2006	150	135	- -
		January 2007	150	135	- -
		January 2008	120	138	- -
		January 2009	No Data	138	- -
		January 2010	No Data	150	- -
		March 2011	45	156	- -
		January 2012	No Data	162.05	- -
		January 2013	90	164.60	- -
		January 2014	85	165.76	- -
		February 2015	108	166.24	- -
		January 2016	108	167.90	
	Long Term Average				**-3.1**
	Current Three to Five Year Average				**-2.5**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2203 (BW-12)	1991	1991	No Data	91	- -
		1995	No Data	104	- -
		1998	550	104	- -
		January 2000	425	124	- -
		January 2001	No Data	125	- -
		January 2002	300	127	- -
		January 2003	300	131	- -
		January 2004	230	134.5	- -
		January 2005	210	135	- -
		January 2006	210	144	- -
		January 2007	200	145	- -
		January 2008	165	137	- -
		January 2009	No Data	137	- -
		January 2010	No Data	158	- -
		March 2011	No Data	166	- -
		January 2012	63	162.07	- -
		January 2013	68	164.36	- -
		January 2014	53	167.96	- -
		February 2015	40	167.76	- -
		January 2016	101	168.03	
	Long Term Average				**-3.1**
	Current Three to Five Year Average				**-0.4**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2560 (BW-13)	1995	1995	No Data	107	- -
		1996	No Data	111	- -
		1998	660	No Data	- -
		January 2000	560	134	- -
		January 2001	No Data	134	- -
		January 2002	500	136	- -
		January 2003	480	141	- -
		January 2004	340	146	- -
		January 2005	280	151	- -
		January 2006	275	151	- -
		January 2007	275	153	- -
		January 2008	220	156	- -
		January 2009	No Data	170	- -
		January 2010	No Data	168	- -
		March 2011	170	172	- -
		January 2012	200	172.37	- -
		January 2013	140	176.41	- -
		January 2014	140	179.81	- -
		February 2015	145	180.69	- -
		January 2016	145	186.86	
	Long Term Average				**-3.8**
	Current Three to Five Year Average				**-3.0**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2560-S (BW-14)	1996	1996	No Data	111	- -
		1998	200	No Data	- -
		April 1999	No Data	124	- -
		January 2000	160	131	- -
		January 2001	No Data	132	- -
		January 2002	150	136	- -
		January 2003	120	140	- -
		January 2004	100	146	- -
		January 2005	75	152	- -
		January 2006	50	152	- -
		January 2007	50	153	- -
		January 2008	40	158	- -
		January 2009	No Data	152	- -
		January 2010	No Data	168	- -
		March 2011	60	168	- -
		January 2012	60	171.48	- -
		January 2013	30	175.08	- -
		January 2014	In Repair	176.77	- -
		February 2015	No Data	176.97	- -
		January 2016	Out of Service	174.20	
	Long Term Average				**-3.2**
	Current Three to Five Year Average				**-1.1**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2565 (BW-15)	1996	1996	No Data	95	- -
		1998	320	No Data	- -
		April 1999	No Data	105	- -
		January 2000	260	110	- -
		January 2001	No Data	110	- -
		January 2002	280	115	- -
		January 2003	220	115	- -
		January 2004	215	129	- -
		January 2005	215	119	- -
		January 2006	190	120	- -
		January 2007	190	120	- -
		January 2008	150[13]	151	- -
		January 2009	No Data	150	- -
		January 2010	No Data	135	- -
		March 2011	70	136	- -
		January 2012	68	136.05	- -
		January 2013	No Data	134.32	- -
		January 2014	In Repair	134.84	- -
		February 2015	Out of Service	141.03	- -
		January 2016	57	141.83	
	Long Term Average				**-2.3**
	Current Three to Five Year Average				**-1.3**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2565-S (BW-16)	1996	1996	No Data	88	- -
		1998	420	No Data	- -
		April 1999	No Data	108	- -
		January 2000	280	103	- -
		January 2001	No Data	105	- -
		January 2002	300	109	- -
		January 2003	280	111	- -
		January 2004	235	114.5	- -
		January 2005	200	120	- -
		January 2006	200	121	- -
		January 2007	200	121	- -
		January 2008	175	115	- -
		January 2009	No Data	130	- -
		January 2010	No Data	135	- -
		March 2011	155	132	- -
		January 2012	No Data	132.03	- -
		January 2013	153	133.36	- -
		January 2014	160	133.52	- -
		February 2015	82	130.49	- -
		January 2016	125	128.85	
	Long Term Average **Current Three to Five Year Average**				**-2.0** **+0.6**
P-2454[7] (Stock Well in T01S R36E Section 14)	1977	June 1977	Windmill	No Data	- -
		January 2001	- -	115	- -
		January 2002	- -	117	- -
		January 2004	- -	126	- -
		January 2005	- -	129	- -
		January 2010	- -	No Data	- -
		March 2011	- -	No Data	- -
		January 2012	- -	No Data	- -
		January 2013	- -	No Data	- -
		January 2014	- -	No Data	- -
		February 2015	- -	No Data	- -
		January 2016	- -	No Data	
	Long Term Average **Current Three to Five Year Average**				**Insufficient Data**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2565-S-2 (BW-17)	2001	October 2001	No Data	140[6]	- -
		January 2002	No Data	No Data	- -
		January 2003	350	140	- -
		January 2004	330	141	- -
		January 2005	290	145	- -
		January 2006	290	145	- -
		January 2007	290	146	- -
		January 2008	200[13]	169	- -
		January 2009	No Data	167	- -
		January 2010	No Data	155	- -
		March 2011	210	166	- -
		January 2012	210	164.84	- -
		January 2013	150	165.61	- -
		January 2014	160	172.26	- -
		February 2015	165	177.18	- -
		January 2016	170	174.32	
	Long Term Average				**-2.6**
	Current Three to Five Year Average				**-1.6**
P-2565-S-3 (BW-18)	2001	September 2001	No Data	140[6]	- -
		January 2002	No Data	No Data	- -
		January 2003	400	139	- -
		January 2004	370	138.5	- -
		January 2005	340	150	- -
		January 2006	300	151	- -
		January 2007	290	151	- -
		January 2008	200[13]	167	- -
		January 2009	No Data	153	- -
		January 2010	No Data	161	- -
		March 2011	No Data	161	- -
		January 2012	146	162.56	- -
		January 2013	134	166.44	- -
		January 2014	In Repair	168.98	- -
		February 2015	135	167.27	- -
		January 2016	In Repair	168.33	
	Long Term Average				**-2.3**
	Current Three to Five Year Average				**-1.6**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2713-A-A (BW-19) [9]	1972	July 1975	900	53	- -
		January 2002	600[12]	No Access	- -
		January 2003	No Data	No Data	- -
		January 2004	No Data	125	- -
		March 2004	310[10]	No Data	- -
		January 2005	No Data	128	- -
		January 2006	No Data	123	- -
		January 2007	300	124	- -
		January 2008	260	134	- -
		January 2009	No Data	144	- -
		January 2010	No Data	147	- -
		March 2011	150	148	- -
		January 2012	No Data	150.14	- -
		January 2013	No Data	151.94	- -
		January 2014	98	154.57	- -
		February 2015	30	154.38	- -
		January 2016	68	153.40	
	Long Term Average				**-2.4**
	Current Three to Five Year Average				**-1.2**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3165 (BW-20) [9]	1976	July 1976	700	50	- -
		April 1999	No Data	129	- -
		January 2000	No Data	131	- -
		February 2001	No Data	135	- -
		January 2002	500[12]	No Access	- -
		October 2002	300[11]	137	- -
		January 2003	No Data	No Data	- -
		January 2004	No Data	136	- -
		March 2004	260[10]	- -	- -
		January 2005	No Data	138	- -
		January 2006	No Data	136	- -
		January 2007	250	No Data	- -
		January 2008	220	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	168	- -
		March 2011	No Data	158	- -
		January 2012	No Data	160.95	- -
		January 2013	45	163.69	- -
		January 2014	41	163.04	- -
		February 2015	42	No Data	- -
		January 2016	In Repair	No Data	
	Long Term Average **Current Three to Five Year Average**				**-3.0** **Insufficient Data**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3165-A (BW-21) [9]	1975	March 1977	800	75	- -
		April 1999	No Data	130	- -
		January 2000	No Data	134	- -
		January 2001	No Data	No Data	- -
		January 2002	600 [12]	No Access	- -
		October 2002	400 [11]	142	- -
		January 2003	No Data	No Data	- -
		January 2004	No Data	140	- -
		March 2004	285 [10]	No Data	- -
		January 2005	No Data	142	- -
		January 2006	No Data	138	- -
		January 2007	300	133	- -
		January 2008	290	140	- -
		January 2009	No Data	140	- -
		January 2010	No Data	145	- -
		March 2011	190	148	- -
		January 2012	No Data	149.78	- -
		January 2013	42	151.09	- -
		January 2014	In Repair	152.01	- -
		February 2015	21	152.38	- -
		January 2016	30	154.50	
	Long Term Average				**-2.0**
	Current Three to Five Year Average				**-1.4**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3123-A-S (BW-22) [9]	1977	August 1976	800	55	- -
		May 1999	No Data	124	- -
		February 2000	No Data	127	- -
		January 2001	No Data	No Data	- -
		January 2002	400[12]	127	- -
		October 2002	350[11]	126	- -
		January 2003	No Data	127	- -
		January 2004	No Data	126	- -
		March 2004	300[10]	No Data	- -
		January 2005	250	132	- -
		January 2006	250	134	- -
		January 2007	250	133	- -
		January 2008	245	147	- -
		January 2009	No Data	158	- -
		January 2010	No Data	160	- -
		March 2011	220	165	- -
		January 2012	150	165.81	- -
		January 2013	29	167.01	- -
		January 2014	Bad Meter	167.33	- -
		February 2015	30	167.22	- -
		January 2016	97	168.08	
	Long Term Average				**-2.8**
	Current Three to Five Year Average				**-0.6**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3123-A-S-4 (BW-23) [9]	1993	May 1993	800	No Data	- -
		May 1999	No Data	125	- -
		January 2000	No Data	127	- -
		February 2001	No Data	132	- -
		January 2002	600[12]	No Access	- -
		October 2002	350[11]	132	- -
		January 2004	No Data	130	- -
		March 2004	285[10]	No Data	- -
		January 2005	260	138	- -
		January 2006	260	131	- -
		January 2007	250	132	- -
		January 2008	261	116[15]	- -
		January 2009	No Data	143	- -
		January 2010	No Data	151	- -
		March 2011	No Data	155	- -
		January 2012	No Data	155.93	- -
		January 2013	31	157.38	- -
		January 2014	20	158.70	- -
		February 2015	20	158.35	- -
		January 2016	In Repair	157.03	
	Long Term Average				**-1.9**
	Current Three to Five Year Average				**-0.5**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3123-A-S-3 (BW-24) [9]	1977	July 1977	900	61	- -
		May 1999	No Data	132	- -
		February 2000	No Data	135	- -
		January 2002	750[12]	141	- -
		October 2002	500[4]	140	- -
		January 2003	No Data	141	- -
		January 2004	No Data	139	- -
		January 2005	No Data	142	- -
		January 2006	No Data	137	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	160	- -
		March 2011	190	162	- -
		January 2012	No Data	166.38	- -
		January 2013	No Data	167.88	- -
		January 2014	Out of Service	168.52	- -
		February 2015	Out of Service	168.15	- -
		January 2016	Out of Service	168.61	
	Long Term Average				**-2.8**
	Current Three to Five Year Average				**-1.3**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3123-A (BW-25) [9]	1977	January 1977	800	70	- -
		May 1999	No Data	140	- -
		February 2000	No Data	132	- -
		February 2001	No Data	151	- -
		January 2002	500[2]	No Access	- -
		January 2003	No Data	151	- -
		January 2004	No Data	149	- -
		January 2005	No Data	151	- -
		January 2006	No Data	148	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	167	- -
		January 2010	No Data	170	- -
		March 2011	No Data	172	- -
		January 2012	[18]	175.72	- -
		January 2013	Out of Service	177.95	- -
		January 2014	Out of Service	178.51	- -
		February 2015	Out of Service	179.47	- -
		January 2016	Out of Service	178.23	
	Long Term Average				**-2.8**
	Current Three to Five Year Average				**-1.3**
P-2910-A-S (BW-26)	1996	December 1996	250	155[6]	- -
		January 2002	300[12]	132	- -
		January 2003	No Data	132	- -
		January 2004	No Data	129	- -
		January 2005	No Data	132	- -
		January 2006	No Data	128	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	210	152.79	- -
		January 2013	184	154.64	- -
		January 2014	194	162.67	- -
		February 2015	180	160.45	- -
		January 2016	180	160.72	
	Long Term Average				**-2.2**
	Current Three to Five Year Average				**-2.0**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3124 (BW-27)	1972	May 1972	No Data	No Data	- -
		February 2000	No Data	107	- -
		January 2002	500[12]	113	- -
		January 2003	No Data	112	- -
		January 2004	No Data	119	- -
		January 2005	No Data	120	- -
		January 2006	No Data	124	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	148	- -
		January 2012	210	148.27	- -
		January 2013	155	150.48	- -
		January 2014	288	147.42	- -
		February 2015	170	150.55	- -
		January 2016	120	150.96	
	Long Term Average				**-2.7**
	Current Three to Five Year Average				**-0.6**
P-3569 (BW-28)	1997	June 1997	450	144[6]	- -
		January 2002	200[12]	121	- -
		January 2003	No Data	124	- -
		January 2004	No Data	124	- -
		January 2005	No Data	128	- -
		January 2006	No Data	122	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	111	173.46	- -
		January 2013	112	166.93	- -
		January 2014	Out of Service	166.35	- -
		February 2015	Out of Service	168.23	- -
		January 2016	Out of Service	171.74	
	Long Term Average				**-1.5**
	Current Three to Five Year Average				**+0.4**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3569-S-3 (BW-29)	1986	November 1986	1,000	No Data	- -
		April 1999	No Data	139	- -
		January 2002	300[2]	135	- -
		January 2003	No Data	135	- -
		January 2004	No Data	140	- -
		January 2005	No Data	139	- -
		January 2006	No Data	141	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	148	169.83	- -
		January 2013	No Data	172.15	- -
		January 2014	Out of Service	172.15	- -
		February 2015	Out of Service	173.25	- -
		January 2016	85	175.00	
	Long Term Average				**-2.1**
	Current Three to Five Year Average				**-1.3**
P-2713-A-A-S (BW-30)	1972	July 1973	900	55	- -
		April 1999	No Data	114	- -
		January 2000	No Data	115	- -
		January 2002	550[12]	No Access	- -
		May 2002	No Data	117	- -
		January 2003	No Data	No Access	- -
		January 2004	No Data	120	- -
		January 2005	No Data	121	- -
		January 2006	No Data	122	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	No Data	No Data	- -
		January 2013	82	146.72	- -
		January 2014	Barely Pumps	146.62	- -
		February 2015	52	146.11	- -
		January 2016	70	147.41	
	Long Term Average				**-2.1**
	Current Three to Five Year Average				**-0.6**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3123-A-S-8 (BW-31)	No Data	No Data	No Data	No Data	- -
		January 2002	400[12]	No Access	- -
		January 2003	No Data	No Access	- -
		January 2004	No Data	134	- -
		January 2005	No Data	137	- -
		January 2006	No Data	131	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	102	No Data	- -
		January 2013	26	171.22	- -
		January 2014	26	171.06	- -
		February 2015	42	172.31	- -
		January 2016	35	173.35	
	Long Term Average				**-3.3**
	Current Three to Five Year Average				**-0.8**
P-2801 (BW-32)	1972	July 1972	No Data	No Data	- -
		February 2001	No Data	100	- -
		January 2002	700[12]	No Data	- -
		January 2003	No Data	100	- -
		January 2004	No Data	100	- -
		February 2005	No Data	101.5	- -
		January 2006	No Data	103	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	275	No Data	- -
		January 2013	205	126.50	- -
		January 2014	255	127.30	- -
		February 2015	225	131.76	- -
		January 2016	221	132.01	
	Long Term Average				**-2.1**
	Current Three to Five Year Average				**-1.5**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3136-S (BW-33)	No Data	No Data	No Data	No Data	- -
		January 2002	400[12]	No Data	- -
		January 2003	No Data	No Data	- -
		January 2004	No Data	No Data	- -
		January 2005	No Data	No Data	- -
		January 2006	No Data	No Data	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	125	No Data	- -
		January 2013	No Data	135.00	- -
		January 2014	110	137.90	- -
		February 2015	31	141.31	- -
		January 2016	55	145.16	
	Long Term Average				**-3.4**
	Current Three to Five Year Average				**-3.4**
P-3136 (BW-34)	1972	August 1972	No Data	70[6]	- -
		February 2001	No Data	112	- -
		January 2002	400[12]	No Data	- -
		January 2003	No Data	110.5	- -
		January 2004	No Data	111	- -
		January 2005	No Data	111	- -
		January 2006	No Data	No Data	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	125	No Data	- -
		January 2013	No Data	130.48	- -
		January 2014	128	137.41	- -
		February 2015	50	136.23	- -
		January 2016	25	140.15	
	Long Term Average				**-1.6**
	Current Three to Five Year Average				**-3.2**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2801-S (BW-35)	1976	April 1976	2100	70[6]	- -
		February 2001	No Data	110	- -
		January 2002	800[12]	No Data	- -
		January 2003	No Data	109.5	- -
		January 2004	No Data	110	- -
		February 2005	No Data	111	- -
		January 2006	No Data	111	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	250	No Data	- -
		January 2013	No Data	116.67	- -
		January 2014	185	125.42	- -
		February 2015	155	128.92	- -
		January 2016	105	133.24	
	Long Term Average				**-1.6**
	Current Three to Five Year Average				**-5.5**
P-2801-S-3 (BW-36)	1998	February 1998	No Data	No Data	- -
		January 2002	400[12]	No Data	- -
		January 2003	No Data	No Data	- -
		January 2004	No Data	No Data	- -
		February 2005	No Data	No Data	- -
		January 2006	No Data	No Data	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	125	No Data	- -
		January 2013	No Data	113.94	- -
		January 2014	115	121.05	- -
		February 2015	95	124.11	- -
		January 2016	90	129.07	
	Long Term Average				**-5.0**
	Current Three to Five Year Average				**-5.0**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2801-S-2 (BW-37)	1998	January 1998	No Data	No Data	- -
		January 2002	400[12]	No Data	- -
		January 2003	No Data	No Data	- -
		January 2004	No Data	No Data	- -
		February 2005	No Data	No Data	- -
		January 2006	No Data	No Data	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	175	No Data	- -
		January 2013	No Data	117.46	- -
		January 2014	172	124.99	- -
		February 2015	150	124.32	- -
		January 2016	120	129.43	
	Long Term Average				**-4.0**
	Current Three to Five Year Average				**-4.0**
P-2801-S-4 (BW-38)	No Data	No Data	No Data	No Data	- -
		January 2002	400[12]	No Data	- -
		January 2003	No Data	No Data	- -
		January 2004	No Data	No Data	- -
		February 2005	No Data	No Data	- -
		January 2006	No Data	No Data	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	400	No Data	- -
		January 2013	No Data	123.82	- -
		January 2014	220	130.78	- -
		February 2015	185	135.43	- -
		January 2016	170	138.89	
	Long Term Average				**-5.0**
	Current Three to Five Year Average				**-5.0**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3137 (BW-39)	1972	September 1972	No Data	70[6]	- -
		February 2001	No Data	100	- -
		January 2002	No Data	No Data	- -
		January 2003	No Data	100	- -
		January 2004	No Data	100	- -
		January 2005	No Data	100	- -
		January 2006	No Data	99	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	375	No Data	- -
		January 2013	No Data	130.74	- -
		January 2014	Not in Service	131.07	- -
		February 2015	270	130.36	- -
		January 2016	150	131.38	
	Long Term Average				**-1.4**
	Current Three to Five Year Average				**-0.2**
Unknown 8 (BW-40)	No Data	No Data	No Data	No Data	- -
		January 2012	No Data	No Data	- -
		January 2013	No Data	127.48	- -
		January 2014	Not in Service	132.72	- -
		February 2015	90	135.80	- -
		January 2016	100	139.78	
	Long Term Average				**-4.1**
	Current Three to Five Year Average				**-4.1**

Historic Depletion Rates in the City of Portales Blackwater Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-2910-S (BW-41)	1998	April 1998	No Data	No Data	- -
		January 2002	400[12]	100	- -
		January 2003	No Data	100	- -
		January 2004	No Data	106	- -
		January 2005	No Data	108	- -
		January 2006	No Data	112	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	150	No Data	- -
		January 2013	153	139.37	- -
		January 2014	148	136.52	- -
		February 2015	110	141.83	- -
		January 2016	120	141.64	
	Long Term Average				**-3.0**
	Current Three to Five Year Average				**-0.6**
P-2910 (BW-42)	1975	February 1975	No Data	No Data	- -
		February 2001	No Data	101	- -
		January 2002	300[12]	118	- -
		January 2003	No Data	118	- -
		January 2004	No Data	120	- -
		January 2005	No Data	123	- -
		January 2006	No Data	126	- -
		January 2007	No Data	No Data	- -
		January 2008	No Data	No Data	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		January 2011	No Data	No Data	- -
		January 2012	400	No Data	- -
		January 2013	320	158.51	- -
		January 2014	368	151.48	- -
		February 2015	284	167.83	- -
		January 2016	190	161.74	
	Long Term Average				**-4.0**
	Current Three to Five Year Average				**-1.1**

Long Term Combined Average for all City Blackwater Wells with 2016 Data	**-2.7**
Short Term Combined Average for all City Blackwater Wells with 2016 Data	**-1.9**

Notes for Appendix C:

1. The 1998 depth to water in BW-3 is probably in error.
2. Wells BW-8 and BW-9 were not pumped in 1999.
3. Not used.
4. Depth to static water could not be measured in Well BW-1 because access was blocked by the submersible pump electric lines. Well BW-1 was taken out of service in February 2004 due to insufficient depth of water.
5. The casing of the original Well BW-2 partially collapsed in 1997, rendering the well unusable. In September 2001 the original well was plugged and a replacement well was drilled about 40 ft south of the original well. The replacement BW-2 was placed in service in May 2002.
6. Depth to water upon completion of drilling; may not accurately represent static water level.
7. This is a private well not owned by the City of Portales but is included for purposes of comparison.
8. Excepting BW-10 for which the January 2002 depth to static water is suspect.
9. Wells BW-19 through BW-42 are converted Baker Farm wells.
10. Well yield conservatively estimated by West Texas Water Well Service based on pump test.
11. Well yield estimated by L&J Well Service Inc. based on pump test.
12. Well yield estimated by Mr. Wayne Baker, former land owner.
13. Flow meter is improperly sized for declining yield and is not accurate; pumping rate estimated by City of Portales
14. Pump turned off; pumping rate estimated by City of Portales
15. The 16 foot rise in water level in BW-23 from the previous year is unlikely but may have resulted from a significant reduction in pumping during 2007.
16. Well BW-9 was not pumped during 2009 or 2010.
17. New Wells BW-24 and BW-25 were placed in service in 2010.
18. Well BW-25 had insufficient water to pump after January 2012.

Appendix D

Historic Depletion Rates in the City of Portales Sandhill Wells

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-1110-S-16 (SH-1)	1953	1953	No Data	50	- -
		1998	475	102	- -
		January 2000	300	107	- -
		January 2002	350	106	- -
		January 2003	200	(3)	- -
		January 2004	110	(3)	- -
		January 2005	100	(3)	- -
		January 2006	100	(3)	- -
		January 2007	100	(3)	- -
		January 2008	60[5]	(3)	- -
		January 2009	No Data	(3)	- -
		January 2010	No Data	No Data	- -
		March 2011	No Data	No Data	- -
		January 2012	No Data	No Data	- -
		January 2013	54	112.69	- -
		January 2014	55	111.07	- -
		February 2015	No Data	111.02	- -
		January 2016	Out of Service	No Data	
	Long Term Average **Current Three to Five Year Average**				**-1.0** **Insufficient Data**
P-1110-S-2 (SH-2)	1956	1956	- -	60	- -
		1998	425	97	- -
		January 2000	300	105	- -
		January 2001	- -	104	- -
		January 2002	200[2]	104	- -
		January 2003	No Data	No Data	- -
		March 2011	No Data	115	- -
		January 2012	No Data	No Data	- -
		January 2013	No Data	No Data	- -
		January 2014	Out of Service	No Data	
		February 2015	Out of Service	No Data	
		January 2016	45	99.12	
					- -
	Long Term Average				**-0.7** **Insufficient Data**

Historic Depletion Rates in the City of Portales Sandhill Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
In Licensing (SH-3)	1962	1962	No Data	100	- -
		1998	250	No Data	- -
		January 2000	280	110	- -
		February 2001	No Data	108	- -
		January 2002	140	108	- -
		January 2003	75	111	- -
		January 2004	75	111	- -
		January 2005	45[2]	110	- -
		January 2006	45[2]	111	- -
		January 2007	40[2]	111	- -
		January 2008	40[5]	95[6]	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		March 2011	No Data	No Data	- -
		January 2012	No Data	No Data	- -
		January 2013	150	116.77	- -
		January 2014	150	114.64	- -
		February 2015	No Data	112.95	- -
		January 2016	45	112.43	
	Long Term Average				**-0.2**
	Current Three to Five Year Average				**+1.4**

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
In Licensing (SH-4)	1958	1958	No Data	70	- -
		1998	250	95	- -
		January 2000	300	106	- -
		February 2001	No Data	104	- -
		January 2002	100	105	- -
		January 2003	100	107	- -
		January 2004	90	108	- -
		January 2005	90	107	- -
		January 2006	100	107	- -
		January 2007	100	108	- -
		January 2008	90[5]	86[6]	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	115	- -
		March 2011	No Data	No Data	- -
		January 2012	No Data	No Data	- -
		January 2013	70	119.91	- -
		January 2014	No Data	112.36	- -
		February 2015	No Data	110.74	- -
		January 2016	75	118.87	
	Long Term Average				**-0.8**
	Current Three to Five Year Average				**+0.3**

Historic Depletion Rates in the City of Portales Sandhill Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-1110-S-4 (SH-5)	1963	1963	No Data	88	- -
		1998	400	94	- -
		January 2000	325	102	- -
		February 2001	No Data	101	- -
		January 2002	260	103	- -
		January 2003	200	104	- -
		January 2004	210	104	- -
		January 2005	215	104	- -
		January 2006	215	106	- -
		January 2007	210	106	- -
		January 2008	160[5]	96[6]	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	No Data	- -
		March 2011	No Data	No Data	- -
		January 2012	No Data	No Data	- -
		January 2013	No Data	109.32	- -
		January 2014	Bad Meter	106.74	- -
		February 2015	No Data	106.56	- -
		January 2016	75	105.23	
	Long Term Average				**-0.3**
	Current Three to Five Year Average				**+1.4**

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-1110-S (SH-6)	1981	1981	No Data	70	- -
		1998	200	80	- -
		January 2000	175	86	- -
		January 2001	No Data	87	- -
		January 2002	60	89	- -
		January 2003	60	90	- -
		January 2004	50	92	- -
		January 2005	40	92	- -
		January 2006	40[2]	92	- -
		January 2007	40[2]	93	- -
		January 2008	40[5]	110	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	112	**- -**
		March 2011	No Data	No Data	**- -**
		January 2012	No Data	No Data	- -
		January 2013	No Data	No Data	- -
		January 2014	Out of Service	98.91	**- -**
		February 2015	Out of Service	99.18	- -
		January 2016	Out of Service	99.24	
	Long Term Average				**-0.8**
	Current Three to Five Year Average				**+0.1**

Historic Depletion Rates in the City of Portales Sandhill Wells (Continued)

Well Number	Date Completed	Date of Measurement	Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-1110-S-3 (SH-7)	1981	1981	No Data	65	- -
		1998	375	75	- -
		January 2000	300	81	- -
		January 2001	No Data	83	- -
		January 2002	110[2]	84	- -
		January 2003	100	85	- -
		January 2004	110	87	- -
		January 2005	110	88	- -
		January 2006	110	87	- -
		January 2007	100	89	- -
		January 2008	80[5]	84	- -
		January 2009	No Data	No Data	- -
		January 2010	No Data	96	- -
		March 2011	No Data	No Data	- -
		January 2012	No Data	No Data	- -
		January 2013	No Data	No Data	- -
		January 2014	Out of Service	95.93	- -
		February 2015	Out of Service	96.33	- -
		January 2016	Out of Service	99.90	
	Long Term Average				**-1.0**
	Current Three to Five Year Average				**-1.1**

Long Term Combined Average for all City Sandhill Wells with 2015 Data	**-0.6**
Short Term Combined Average for all City Sandhill Wells with 2015 Data	**+0.4**

Notes for Appendix D:
1. Wells SH-2, -3, and -6 were not pumped during 1998 or 1999.
2. The pumping rate was estimated by the City of Portales.
3. Depth to static water could not be measured because access was blocked by the submersible pump electric lines.
4. Well SH-2 was mistakenly reported dry at a depth of 106 ft. in January 2003 and was taken out of service. However, the total well depth as reported on the driller's log is 132 ft. and a depth to static water of 115 ft was measured in March 2011.
5. Pump turned off; pumping rate estimated by City of Portales
6. The reported rise in water level of 10 feet or more is unlikely and may be in error.
7. Well SH-3 was not pumped in 2009.

Appendix E

Historic Depletion Rates in the City of Portales Baker Farm Wells

Well Number	Date Completed	Date of Measurement	Reported Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
Unknown 5 Not Used	No Data	- -	- -	- -	- -
		January 2002	500[2]	No Data	- -
		January 2003	- -	No Data	- -
		January 2004	- -	No Data	- -
		January 2005	- -	No Data	- -
		January 2006	- -	No Data	- -
		January 2007	- -	No Data	- -
		January 2008	- -	No Data	- -
		January 2009	- -	No Data	- -
	Long Term Average **Current Five-Year Average**				**No data from 2003 to date**
P-3123-A-S-5 Served CSE10: #2 - at pivot	1993	May 1993	400	No Data	- -
		January 2002	200[2]	133	- -
		January 2003	- -	133	- -
		January 2004	- -	134	- -
		January 2005	- -	137	- -
		January 2006	- -	133	- -
		January 2007	- -	No Data	- -
		January 2008	- -	No Data	- -
		January 2009	- -	No Data	- -
	Long Term Average **Most Recent Three-Year Average**				**No data from 2007 to date**
P-3123-A-S-6 Served CSE10: #3 - north-east of pivot	1993	October 1993	400	No Data	- -
		January 2002	300[2]	153	- -
		January 2003	- -	153	- -
		January 2004	- -	154	- -
		January 2005	- -	157	- -
		January 2006	- -	153	- -
		January 2007	- -	No Data	- -
		January 2008	- -	No Data	- -
		January 2009	- -	No Data	- -
	Long Term Average **Most Recent Three-Year Average**				**No data from 2007 to date**

Historic Depletion Rates in the City of Portales Baker Farm Wells (Continued)

Well Number	Date Completed	Date of Measurement	Reported Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3123-A-S-7 Served C8: #1 - at pivot	1996	December 1996	200	150[1]	- -
		February 2001	- -	130	- -
		January 2002	300[2]	132	- -
		January 2003	- -	132	- -
		January 2004	- -	135	- -
		January 2005	- -	136	- -
		January 2006	- -	134	- -
		January 2007	- -	No Data	- -
		January 2008	- -	No Data	- -
		January 2009	- -	No Data	- -
	Long Term Average **Most Recent Three-Year Average**				**No data from 2007 to date**
P-3124-S Served C8: #3 - south-west of pivot	1972	May 1972	No Data	No Data	- -
		January 2002	300[2]	126	- -
		January 2003	- -	130	- -
		January 2004	- -	127	- -
		January 2005	- -	130	- -
		January 2006	- -	125	- -
		January 2007	- -	No Data	- -
		January 2008	- -	No Data	- -
		January 2009	- -	No Data	- -
	Long Term Average **Most Recent Three-Year Average**				**No data from 2007 to date**
P-3355 Stockyard Well	1975	May 1975	No Data	62	- -
		January 2002	- -	No Data	- -
		January 2003	- -	No Data	- -
		January 2004	- -	No Data	- -
		January 2005	- -	No Data	- -
		January 2006	- -	No Data	- -
		January 2007	- -	No Data	- -
		January 2008	- -	No Data	- -
		January 2009	- -	No Data	- -
	Long Term Average **Current Five-Year Average**				**No data from 1976 to date**

Historic Depletion Rates in the City of Portales Baker Farm Wells (Continued)

Well Number	Date Completed	Date of Measurement	Reported Pumping Capacity (gpm)	Depth to Static Water (ft)	Average Rate of Water Level Change (ft/year)
P-3569-S Served CNE10-2: southeast of pivot	1994	May 1994	800	120[1]	- -
		January 2002	300[2]	No Access	- -
		January 2003	- -	No Access	- -
		January 2004	- -	140	- -
		January 2005	- -	140	- -
		January 2006	- -	142	- -
		January 2007	- -	No Data	- -
		January 2008	- -	No Data	- -
		January 2009	- -	No Data	- -
	Long Term Average				**No data from 2007 to date**
P-3900 Unused Stock Well	1993	October 1993	10	85	- -
		January 2002	- -	No Data	- -
		January 2003	- -	No Data	- -
		January 2004	- -	No Data	- -
		January 2005	- -	No Data	- -
		January 2006	- -	No Data	- -
		January 2007	- -	No Data	- -
		January 2008	- -	No Data	- -
		January 2009	- -	No Data	- -
	Long Term Average **Current Five-Year Average**				**No data from 1994 to date**
Long Term Average for all Wells with Data					**Insufficient Data**
Recent Three to Four-Year Average for all Wells with Data					

Notes:
1. Depth to water was measured upon completion of drilling and may not accurately represent static water level.
2. Well yield estimated by Mr. Wayne Baker, former land owner.

Appendix F

Baker Farm Wells Converted to Municipal Wells

OSE Permit Number	Agricultural Function	City Well Number	Year Renumbered
P-2713-A-A	Served Circle C6 located at pivot	BW-19	2003
P-2713-A-A-S	Served Circle C5 located at pivot	BW-30	2011
P-2801	Served Circle R1 located at pivot	BW-32	2011
P-2801-S	Served Circles R3 and R5 located at R3 pivot	BW-35	2011
P-2801-S-2	Served Circles R3 and R5 located west of R3 pivot	BW-37	2011
P-2801-S-3	Served Circles R3 and R5 located west of R3 pivot	BW-36	2011
P-2801-S-4	Served Circles R3 and R5 located west of R3 pivot	BW-38	2011
P-2910	Served Circle C9 #1 located at pivot	BW-42	2011
P-2910-S	Served Circle C9 #2 located west of pivot	BW-41	2011
P-2910-A-S	Served Circle C27 located northeast of pivot	BW-26	2011
P-3123-A	Served Circle C25E located at pivot	BW-25	2008
P-3123-A-S	Served Circle C16E located at pivot	BW-22	2003
P-3123-A-S-3	Served Circle C25W located at pivot	BW-24	2008
P-3123-A-S-4	Served Circle CSE9 located at pivot	BW-23	2003
P-3123-A-S-8	Served Circle CSE10 #1 located southwest of pivot	BW-31	2011
P-3124	Served Circle C7 located at pivot	BW-27	2011
P-3136	Served Circle R2 located at pivot	BW-34	2011
P-3136-S	Served Circle R2 located southwest of pivot	BW-33	2011
P-3137	Served Circle R4 located at pivot	BW-39	2011
P-3165	Served Circle C16W located at pivot	BW-20	2003
P-3165-A	Served Circle C18 located at pivot	BW-21	2003
P-3569	Served Circle C8 #2 located south of pivot	BW-28	2011
P-3569-S-3	Served Circle CNE10-1 located at pivot	BW-29	2011
Unknown 8	Served Circle R2 located southwest of pivot	BW-40	2011

Appendix G

Reference Point Heights for Depth to Water Measurements

Well Number	Reference Point Height Above Ground Surface (ft)	Well Number	Reference Point Height Above Ground Surface (ft)
Blackwater Wells			
BW-1	2.17	BW-26	2.28
BW-2	2.00	BW-27	2.72
BW-3	2.41	BW-28	3.67
BW-4	2.44	BW-29	1.59
BW-5	2.32	BW-30	1.89
BW-6	1.50	BW-31	2.21
BW-7	1.77	BW-32	2.19
BW-8	1.65	BW-33	2.39
BW-9	1.33	BW-34	2.05
BW-10	1.34	BW-35	1.86
BW-11	2.32	BW-36	2.70
BW-12	2.12	BW-37	2.90
BW-13	2.45	BW-38	2.44
BW-14	3.35	BW-39	2.43
BW-15	2.13	BW-40	2.24
BW-16	3.26	BW-41	2.36
BW-17	2.83	BW-42	1.47
BW-18	2.67		
BW-19	1.63		
BW-20	1.80		
BW-21	1.12		
BW-22	1.90		
BW-23	1.75		
BW-24	2.49		
BW-25	3.00		
Sandhill Wells			
SH-1	0.91	SH-5	1.77
SH-2	0.92	SH-6	1.04
SH-3	2.27	SH-7	0.85
SH-4	1.66		

Appendix H

Correlation of Old and New OSE Permit Numbers

City Well Number	Original OSE Designation	New OSE Point-of-Diversion (POD) Number	City Well Number	Original OSE Designation	New OSE Point-of-Diversion (POD) Number
Blackwater Wells					
BW-1	P-2201	P02201 POD1	BW-26	P-2910-A	P02910A
BW-2	P-2201-S	P02201 POD2	BW-27	P-3124	P03134
BW-3	P-2202	P02202 POD1	BW-28	P-3569	P03569
BW-4	P-2201-S-2	P02201 POD3	BW-29	P-3569-S-3	P03569S3
BW-5	P-2201-S-3	P02201 POD4	BW-30	P-2713-A-A-S	P02713POD2
BW-6	P-2403	P02403 POD1	BW-31	P-3123-A-S-8	P03123AS8
BW-7	P-3475-S	P03475 POD2	BW-32	P-2801	P02801
BW-8	P-2402	P02402 POD1	BW-33	P-3136-S	P03136S
BW-9	P-3475	P03475 POD1	BW-34	P-3136	P03136
BW-10	P-2403-S	P02403 POD2	BW-35	P-2801-S	P02801S
BW-11	P-2203-S	P02203 POD2	BW-36	P-2801-S-3	P02801S3
BW-12	P-2203	P02203	BW-37	P-2801-S-2	P02801S2
BW-13	P-2560	P02560 POD1	BW-38	P-2801-S-4	P02801S4
BW-14	P-2560-S	P02560 POD2	BW-39	P-3137	Unchanged
BW-15	P-2565	P02565	BW-40	In Licensing	In Licensing
BW-16	P-2565-S	P02565 POD2	BW-41	P-2910-S	P02910S
BW-17	P-2565-S-2	P02565 POD3	BW-42	P-2910	P02910
BW-18	P-2565-S-3	P02565 POD4			
BW-19	P-2713-A-A	P02713AA			
BW-20	P-3165	P03165			
BW-21	P-3165-A	P03165 POD3			
BW-22	P-3123-A-S	P03123AS			
BW-23	P-3123-A-S-4	P03123AS4			
BW-24	P-3123-A-S-3	P03123AS3			
BW-25	P-3123-A	P03123A			
Sandhill Wells					
SH-1	P-1110-S-16	Unchanged	SH-5	P-1110-S-4	Unchanged
SH-2	P-1110-S-2	Unchanged	SH-6	P-1110-S	Unchanged
SH-3	In Licensing	Unchanged	SH-7	P-1110-S-3	Unchanged
SH-4	In Licensing	Unchanged			
Unconverted Farm Wells					
	P-3123-A-S-6	P03123AS6		P-3355	P03355
	P-3123-A-S-5	P03123AS5		P-3569-S	P03569S
	P-3123-A-S-7	P03123AS7		P-3900	P03900
	P-3124-S	P03124S			