Report

February 19, 2013

Prepared for:

Resolution Copper Mining

Results of Queen Creek Corridor Survey

Superior Basin, Pinal County, Arizona

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RESULTS OF QUEEN CREEK CORRIDOR SURVEY
SUPERIOR BASIN, PINAL COUNTY, ARIZONA

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RESULTS OF QUEEN CREEK CORRIDOR SURVEY SUPERIOR BASIN, PINAL COUNTY, ARIZONA

EXECUTIVE SUMMARY

An investigation of hydrogeologic conditions for the Superior Basin has been completed by Montgomery & Associates. The chief objective of the study was to evaluate the cause of recent water level declines reported for some wells located within and adjacent to the Queen Creek corridor (QCC) through the Superior Basin, as well as observed declines in discharge from Whitlow Ranch Dam. Specific questions addressed by this study include:

- What is the cause of recent water level declines at some wells in the Superior Basin and declines in discharge from Whitlow Ranch Dam?
- Has historical pumping from deep mine workings of the Magma Mine, and/or has current pumping from the workings by Resolution Copper Mining LLC (RCM), resulted in impacts to groundwater levels in wells in the Superior basin and beyond?
- Did the discontinuation of occasional discharges of treated water to Queen Creek by BHP Magma Superior Mining Operations result in a reduction in total surface water or groundwater discharge from the Superior Basin at Whitlow Ranch Dam?

CONCLUSIONS

The following conclusions are based on compilation, review, and analysis of available data conducted during this investigation:

1. The primary cause of recent groundwater level declines and reduced discharge from Whitlow Ranch Dam is the protracted period of below average rainfall in the region that commenced in 1995, combined with the lack of substantial rainfall during the winters of 2010-2011 and 2011-2012. Specific observations from this survey include:

- In the 17 years since 1995, total annual rainfall has been below average for all but 3 years, and included the driest year on record (2002). In addition, average temperatures increase during the period, which likely increased water demand for plants and irrigation.

- The importance of winter rains in providing sustained surface water runoff, and therefore periodic recharge to shallow groundwater systems such as the floodplain alluvium in Queen Creek, is apparent when reviewing groundwater level data for wells in the study area, and discharge data for Whitlow Ranch Dam. Due to the lack of substantial winter rains in 2010-2011 and 2011-2012, recharge to the floodplain alluvium aquifer did not occur. During a similar period of limited runoff in 2002-2004, similar declines in groundwater levels and discharge from Whitlow Ranch Dam were observed.

2. Current or historical dewatering operations have not resulted in observed declines in groundwater levels or drying up of wells in the Superior Basin, or resulted in observed decreases in discharge from Whitlow Ranch Dam. Specific observations from this survey include:

    - Although mine dewatering in the district east of the Concentrator Fault began in 1910 and continues to present with several small hiatuses in pumping, long-term water level records for wells in areas immediately west of the fault in the Superior area and West Plant Site do not show any apparent response to the substantial water level change that has occurred through time in the mine workings.

    - The direction of groundwater movement in the Superior Basin, as interpreted from water level contours plotted for data obtained in the summer of 2012, clearly shows that groundwater is moving generally west toward the outlet of the basin along Queen Creek at Whitlow Ranch Dam. There is no apparent reversal of hydraulic gradient towards the mine workings, even though water levels in the mine workings are currently more than 2,900 feet deeper than water levels in the Superior area.

3. Historical discharges to Queen Creek on the part of Magma Copper Company/BHP Superior Operations were not important components of recharge to the lower floodplain alluvium aquifer below Boyce Thompson Southwestern Arboretum. The direct delivery of mine discharge water to ranchers in the Superior area would have helped reduce demand on the floodplain alluvium aquifer for irrigation use. However, discharge of excess water to Queen Creek occurred mainly during periods of above normal precipitation, when there was already sufficient water from runoff available for recharge of the aquifer. Specific observations from this survey include:

    - The magnitude of discharge of treated water from Superior Operations in the 1980s and 1990s was greatest when runoff from precipitation was also greatest. During

periods of high rainfall, Superior Operations were required to discharge treated water in order to safely manage water at the facility.

- Discharge of treated water from Superior Operations during periods of below normal precipitation rarely occurred. When they did occur, magnitude of discharge was small relative to the principal inflow and outflow components of the Superior Basin water balance (i.e. precipitation and discharge from Whitlow Ranch Dam).

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RESULTS OF QUEEN CREEK CORRIDOR SURVEY SUPERIOR BASIN, PINAL COUNTY, ARIZONA

INTRODUCTION

In accordance with a request from Mr. Greg Ghidotti, Resolution Copper Mining LLC (RCM), Montgomery & Associates (M&A) has completed this survey of hydrogeologic conditions and water use by stakeholders for the Queen Creek corridor in the Superior Basin and Queen Valley areas, Pinal County, Arizona. The Superior Basin encompasses the uppermost part of the Queen Creek watershed, including the headwaters of Queen Creek and Town of Superior. The outlet of the Superior Basin is located at Whitlow Ranch Dam, just upstream from the community of Queen Valley.

CONTEXT

RCM is conducting a Pre-Feasibility Study (PFS) for a proposed block-cave copper mining operation in the Oak Flat area east from Superior, Arizona. As part of the PFS, dewatering of the existing Magma Mine underground workings was re-initiated by RCM in March 2009. Dewatering of the Magma Mine workings was first initiated in 1910. The dewatering system was operated nearly continuously until shutdown in 1998, commencing a 10-year period of water level recovery in the mine workings. Prior to start-up of RCM dewatering operations

in March 2009, the water level in the mine workings was still 1,000 feet below the original 1910 groundwater level.

Water currently pumped from the mine workings by RCM is treated and transported by pipeline to the New Magma Irrigation District (NMID) 17 miles west from Superior to be blended with Central Arizona Project water for irrigation use. Prior to 1998, water pumped from the mine workings was utilized for on-site operations by Magma Copper Company (MCC). During periods of high precipitation, excess water that collected on the MCC West Plant Site north of the Town of Superior was treated and discharged to Queen Creek. In addition, excess water was occasionally piped to the Herron Ranch, located 3 miles west from the West Plant site, for agricultural purposes.

Water use by others in the Superior basin currently includes small amounts of groundwater or surface water for stock, domestic, and irrigation uses via wells, galleries, or springs. In addition, groundwater is periodically pumped for pit dewatering by local quarry operations. Groundwater use west of the Superior Basin in Queen Valley includes municipal supply for residents and irrigation supply for a golf course via wells. Additional irrigation water supply is obtained from combined surface water and groundwater discharge from the outflow of Whitlow Ranch Dam.

Some stock and domestic water wells in the Superior Basin have recently experienced groundwater level declines, and in some cases are now dry. In addition, groundwater levels at public supply wells in the community of Queen Valley have declined nearly continuously since early 2010, and discharge for groundwater that flows from the outlet of Whitlow Ranch Dam have declined to flow rates last observed in 2004.

In the past 9 months, RCM has been approached by local stakeholders who have expressed concerns regarding the potential relationship between current RCM dewatering activities and past MCC discharges to Queen Creek and observed declines in water levels at wells and

decline in discharge from Whitlow Ranch Dam. RCM has engaged with local stakeholders to compile available hydrogeologic data and to cooperatively monitor hydrogeologic conditions.

SURVEY OBJECTIVE

The principal objective of the QCC survey is to review and analyze available data to address the concerns of local stakeholders, including: (1) the cause of recent declines in water level and discharge from Whitlow Ranch Dam; and (2) the potential relationship between observed declines in water levels at wells in the Superior Basin and outflow from Whitlow Ranch Dam, and current/past dewatering practices at the Magma Mine.

STUDY AREA LOCATION

The location for the Queen Creek Corridor (QCC) survey study area is shown on **Figure 1.** The study area encompasses the entire upper Queen Creek watershed above Whitlow Ranch Dam (the Superior Basin) and extends about 3 miles west from Whitlow Ranch Dam to encompass the community of Queen Valley. Queen Creek extends from east to west across the study area, and US Highway 60 (US60) follows the QCC through much of the study area. Principal population centers in the study area include the Town of Superior, and the unincorporated community of Queen Valley. The Boyce Thompson Southwestern Arboretum (BTSWA) is located along Queen Creek near the center of the study area. Principal geographic features include the Apache Leap escarpment located east from Superior, and Picket Post Mountain located south from BTSWA. The study area is shown on **Figure 2.**

PRINCIPAL STAKEHOLDERS

Principal stakeholders with respect to water use in the QCC survey study area have included companies, utilities, and individuals requiring water supply for use in mining, ranching, potable water supply, and irrigation for agriculture, including an arboretum and a golf course.

Mining

Historical mining in the Superior area began in the 1870s (Short, et.al., 1943). The principal mining areas of Superior, officially designated the Pioneer Mining District, are located along the base of the Apache Leap escarpment in an approximately 6-mile long, north-south belt centered on Queen Creek canyon. Principal mining operations for the past 130 years include the Silver King, Silver Queen (Magma), Lake Superior, Arizona, and Belmont mines. The mine with the longest operating history in the district is the Magma Mine, which operated nearly continuously from 1875 (as the Silver Queen Mine) through 1998. Magma Mining Company was founded in 1910 by a business partnership that included William Boyce Thompson.

Magma Mining Company/Resolution Copper Mining LLC

The Magma Mine property presently controlled by RCM comprises former processing facilities north of Superior (West Plant Site), and a shaft complex east of Superior and the crest of the Apache Leap escarpment (East Plant Site – Shaft No. 9) **(Figure 2)**. Although active mining and processing of mineralized ore is not currently occurring in the Superior area, substantial study work and data collection is being conducted by RCM to support PFS investigations for a proposed block-cave mining operation southeast of the Magma Mine. As part of the PFS investigations, dewatering of existing mine workings at the Magma Mine was reinitiated in March 2009 from Shaft No. 9 (**Figure 2)**, and a new shaft (No. 10) is under construction east of Superior. Groundwater pumped from the deep mine workings is treated

at a treatment plant in Superior, and then piped to New Magma Irrigation District (NMID) 17 miles to the west and blended (at ratios of 10:1 to 7:1 depending on make-up water quality) with Central Arizona Project water for use in crop irrigation. The mine pumping rate ranges between 450 and 1,000 gallons per minute (gpm).

Water supply for past mineral processing was initially developed from dewatering at the Magma Mine and other mines in the area, and some seasonal collection of water from upper Queen Creek canyon east of Superior. As mining operations grew after World War II, additional supply was developed from the Desert Wellfield, located in the western part of the study area **(Figure 1)**. A pipeline brought water from the Desert Wellfield to the Superior area via the MARRCO railroad right-of-way. The first well in the Desert Wellfield was completed in 1950. Arizona Water Company (AWC) currently operates several wells in the Desert Wellfield to supply water to the Town of Superior and to the mine for potable uses.

Other Mining Operations

Several other mines and quarries are located in the Superior Basin, including the Harborlite Perlite Mine southwest from Superior **(Figure 2)**, the Omya marble quarry near the head of Queen Creek east of Superior and the Apache Leap escarpment, and an aggregate quarry in the far southeast part of the study area. Each of these facilities requires a limited amount of water for dust control. Specialty minerals miner, IMERYS, operates the Harborlite Open-Pit Perlite Mine, located southwest from Superior (**Figure 2)**. Periodic dewatering is required for mining operations. IMERYS has a water right to pump up to 200 acre-feet per year (AF/yr) for dewatering purposes. Most of the pumped water is discharged to Queen Creek directly north of the mining operation; the remainder is used for dust control.

Ranching

Ranching has also had a long history in the Superior Basin, going back to the 1870s (Granger, 1960). Much of the land in the Superior Basin is controlled by the U.S Forest Service Tonto National Forest, with some land controlled by the State of Arizona. Ranches operating in the area have grazing allotments on federal and state lands. Three of the principal ranches operating in the Superior basin are Herron Ranches, Martin Ranches, and JI Ranch. The ranches depend on springs, stock wells, and tanks to support watering of cattle on their allotments.

Herron Ranch

The Herron Ranch currently pumps groundwater for irrigation of several small fields on ranch property located along Queen Creek at US60 **(Figure 2)**. Water is currently supplied by two wells on the property and use is generally less than 10 AF/yr, based on review of pumping records on file with Arizona Department of Water Resources (ADWR) Phoenix Active Management Area (AMA). Excess water occasionally available from mining operations at the Magma Mine may have been provided to the Herron Ranch by Magma Copper in the 1970s and 1980s via a 3.5-mile long pipeline from the Magma Mine property. Data on timing and magnitude of these deliveries are not available.

Town of Superior

The Town of Superior was established in the early 1900s; the Superior post office was established in 1902 (Short, et.al. 1943). The current boundaries for the Town of Superior are shown on **Figures 1 and 2**.

Water rights records on file with ADWR (Arizona Water Company Statement of Claim file #36-32187) indicate that water for potable use was gathered from Queen Creek starting as

early as the mid 1870s, with water hauled by mule train and "delivered door-to-door for five cents a gallon". The first formal gathering system for public water supply for Superior appears to have been developed in Queen Creek canyon east of the town site prior to 1927. The water system consisted of three dams on the channel of Queen Creek with pipelines conveying water by gravity to a large storage tank on the canyon bottom below the present-day Queen Creek Tunnel on US60. Remains of these dams and piping are still visible in Queen Creek canyon and are no longer in use.

Arizona Water Company

Arizona Water Company (AWC) took possession of the Queen Creek water collection facilities from Arizona Edison Company, Inc. in 1955. In 1975, AWC filed for a water right for the Queen Creek system totaling 61.6 AF/yr (~38 gallons per minute). At this point, some water supply was already provided by production wells at the Desert Wellfield near Florence Junction (**Figure 1)**. In 1980, one of the dams was destroyed and buried by rock and debris as a result of road work on US60 above the dam. AWC petitioned ADWR for permission to reconstruct the dam at a different location. At some point after 1980, a collection gallery was installed by AWC beneath the channel of Queen Creek near the present-day storage tank. Current status of this system is not known, although field inspection indicates that it is currently inoperative.

Water supply for the town is currently provided by AWC via the Desert Wellfield, located about 16 miles west-southwest from Superior **(Figure 1)**. No water is currently provided by AWC from sources in the Superior Basin. A number of private wells are located in the town site. Wells in the Superior area generally produce relatively small quantities of groundwater.

Boyce Thompson Southwestern Arboretum

The Boyce Thompson Southwestern Arboretum (BTSWA) was established in the early 1920s by mining magnate William Boyce Thompson. Location of BTSWA is shown on **Figure 2**.

History

During the 1920s and 1930s, the arboretum gathered a collection of plants from arid lands around the globe (Young and Sejkora, 2011) for the purpose of evaluating economic utility and aesthetic appeal of plant species adapted to arid lands. Throughout subsequent years, activities at the arboretum were characterized by a series of partnerships that included the U.S. Forest Service, University of Arizona, and Arizona State Parks. A large nursery of native and non-native plants was established at the arboretum in the 1930s to provide plants for use in erosion control, re-vegetation of disturbed areas, and landscaping. The current partnership includes the University of Arizona and Arizona State Parks, both of which provide important financial and administrative support to BTSWA.

Water Use

BTSWA is open to the public and requires water for irrigation of plants and for potable water supply. Water is supplied by two wells. One well, the "gallery well", was installed in the 1920s along Queen Creek and is connected to a collection gallery beneath the alluvium of Queen Creek. A second well, the West well, located near the west edge of the BTSWA property was drilled in 1996. Annual pumping by BTSWA for the 10-year period from 2000 to 2010 has ranged from 47 to 88 AF/yr (ADWR Phoenix AMA database). Although a portion of the water supply is derived from naturally occurring groundwater in the alluvium along Queen Creek that is periodically replenished by surface water runoff, the water supply is sustained by consistent discharge of water to Queen Creek from the Town of Superior wastewater treatment plant, located several miles upstream from BTSWA **(Figure 2)**.

Additional water is occasionally discharged from dewatering activities at the Harborlite Quarry, also several miles upstream.

In 1992, Arizona State Parks applied for an instream flow (ISF) appropriation on behalf of BTSWA for a reach of perennial flow in Queen Creek that passes through the arboretum. Results of a hydrologic assessment that supports the ISF appropriation application indicate that about 525 AF/yr are needed for "water dependent resources" including recreation, fish and wildlife habitat (Young and Sejkora, 2011).

Queen Valley

Queen Valley is an unincorporated community located along Queen Creek west from the Whitlow Ranch Dam **(Figures 1 and 2).** Development of Queen Valley Estates subdivision likely began in the early 1960s with development of an 18-hole golf course in 1963 (Demand Media, Inc., 2012). The U.S. Army Corps of Engineers (USACE) completed the Whitlow Ranch Dam in 1960. A surface water diversion was apparently maintained at the site of Whitlow Ranch Dam prior to completion of the dam in 1960 (USACE, 1958). The diversion was reported to be a temporary earth dike located several hundred feet downstream from the proposed dam site that diverted flow into a ditch and conveyed water 1.5 miles to the west. Use of water at that time is not described. When the USACE completed Whitlow Ranch Dam, a diversion outlet was installed in the outlet works which allowed uninterrupted flow to serve the existing users.

Queen Valley Domestic Water Improvement District

Water supply for Queen Valley residents is provided by production from 3 water wells (Wells No. 1, No. 2, and No. 3), which are operated by the Queen Valley Domestic Water Improvement District (QVDWID). Over the past 10 years, combined annual production from these wells has averaged about 140 AF/yr. Water is provided to approximately

575 connections in Queen Valley. Additional domestic water supply is provided by a number of private wells located in the Queen Valley area. Current population based on the 2010 census is 788 persons.

Queen Valley Golf Course

Water from the outflow culvert at Whitlow Ranch Dam is currently used for irrigation of the golf course and to maintain water levels in recreational lakes in Queen Valley. Current use by the golf course is not available, but records available from golf course personnel for years 2002 to 2005 indicated that surface water use ranged from 34 to 57 AF/yr. Additional water supply for irrigation is provided by pumping a production well (Well No. 4).

EXISTING WELLS IN QCC STUDY AREA

As part of this study, an inventory of existing wells was compiled for the QCC study area. Locations for wells registered with ADWR under the 55-series well registry are shown on **Figure 2**. A description of the well numbering system is provided in **Appendix A**. Summary tables for wells registered in the 55-series database, the Groundwater Site Inventory (GWSI) database, and the 35-series database are given in **Appendix B; Tables B-1 through B-3**. The 55-series well registry is the current ADWR registry for existing wells. The GWSI database represents wells that have been visited by the United States Geological Survey (USGS) or ADWR and locations have been verified. The 35-series well registry represents wells that were registered prior to 1980, many of which have been reregistered under the 55-series registry.

As of July 2012, a total of 457 wells are registered under the ADWR 55-series well registry in **Appendix B; Table B-1**. A summary of the water use/well type and number of wells currently registered in the QCC study area are listed on **Table B-1** and provided below:

PRIMARY WATER USE LISTED FOR

diabase. A more extensive outcrop belt of highly deformed pЄy rocks occurs east from the Concentrator Fault along the base of the Apache Leap escarpment, and are exposed in Queen Creek canyon east of Superior. In most locations, these rock units are steeply tilted and highly fractured. Historic mine workings in the Superior Mining District are located along mineralized veins within pЄy rocks east of the Concentrator Fault.

Hydrogeologic Significance: Rocks of the pЄy/pЄgu series are generally poorly permeable, although zones of higher permeability may locally occur in highly fractured quartzite or limestone. Because these units are extensively faulted and intruded with poorly permeable diabase, the groundwater system is compartmentalized. For example, Trough Spring in Telegraph Canyon **(Figure 10)** occurs where groundwater that is collected and stored in a local block of fractured pЄy quartzite is forced to the surface at a contact with diabase.

Near mine workings that are present beneath the bed of Queen Creek in Queen Creek Canyon, the pЄy rocks have been locally dewatered. Dewatering of these units began in 1910 and has continued to present with only occasional hiatuses in pumping.

Paleozoic Sedimentary Rocks (Pz)

There are several small occurrences of Paleozoic sedimentary rocks that overlie pЄy rocks in some areas of the Superior Basin, although they do not crop out along the QCC between the Elephant Butte and Concentrator Faults **(Figures 10 and 11)**. Limited outcrops of the Pz rocks occur in Roblas Canyon and the upper reaches of Arnette Creek. Pz rocks include limestones, quartzites, and shales. A more extensive outcrop belt of highly deformed Pz rocks occurs east from the Concentrator Fault along the base of the Apache Leap escarpment, and is exposed in Queen Creek canyon east of Superior. In most locations, these rock units are steeply tilted and highly fractured. Historic mine workings in the Superior Mining District are located along mineralized veins within Pz rocks east of the Concentrator Fault.

Hydrogeologic Significance: Rocks of the Pz sedimentary sequence are generally poorly permeable, although zones of higher permeability may locally occur in highly fractured limestone and quartzite units. Because these units are highly faulted and are often offset adjacent to poorly permeable pЄy rock units **(Figure 10)**, the groundwater system in the Pz rocks is compartmentalized. Where extensively fractured, these rocks may provide local collection and storage of groundwater to support spring flow, or small quantities of groundwater to wells. For example, Hidden Spring and Kane Spring, which are located south of Superior and east of AZ 177 **(Figure 10),** occur where groundwater that is collected and stored in a local block of fractured limestone is forced to the surface near a contact with pЄy rocks.

Near mine workings that are present beneath the bed of Queen Creek in Queen Creek Canyon, the Pz rocks have been locally dewatered. Dewatering of these units began in 1910 and has continued to present with only occasional hiatuses in pumping.

Cretaceous Volcaniclastic Rocks (Kvs)

Cretaceous volcaniclastic rocks (Kvs) do not crop out in the study area, but occur at large depths beneath Oak Flat **(Figures 10 and 11)**. Rocks of the Kvs were preserved due to the presence of a deep-seated graben structure (Resolution Graben) beneath Oak Flat. These highly altered rocks represent the host rocks for the Resolution copper deposit, and are the target of current and future dewatering activities by RCM. Shaft No. 9 is partly completed in the Kvs, and parts of the Kvs are intersected by numerous mine workings.

Hydrogeologic Significance: Hydrologic characterization of the Kvs by RCM is ongoing; however, results of investigations conducted to date indicate that rocks of the Kvs are generally poorly permeable. The presence of deep-seated faults bounding the Resolution Graben, combined with the presence of the Concentrator Fault have effectively limited impacts from mine dewatering to the deep groundwater system within the graben beneath

Oak Flat. Groundwater levels are extremely deep, more than 4,000 feet below land surface at Shaft No. 9. Based on the large differences in groundwater elevations across the fault (greater than 2,900 feet) combined with the absence of impacts to water levels west of the fault, there is no apparent hydraulic connection between the deep groundwater system in the Kvs and the groundwater system west from the Concentrator Fault and in the Superior area.

Cretaceous to Tertiary Intrusive Rocks (TKg)

Cretaceous to Tertiary granitoid rocks crop out over small areas of the Superior basin, although they do not crop out along the QCC **(Figure 10)**. Outcrops of these granitoid rocks (diorites and quartz diorites) occur in upper Whitford Canyon and Silver King wash, as well as in isolated occurrences in upper Arnett Creek. In most locations, these rocks are moderately fractured.

Hydrogeologic Significance: Granitoid rocks of the TKg are likely to be poorly permeable; where extensively fractured, these rocks may provide local collection and storage of groundwater to support spring flow, or small quantities of groundwater to wells. Bitter Spring and I-Berry Spring in Silver King Wash both discharge from fracture zones in the TKg **(Figure 10)**.

Tertiary Volcanic Rocks (Tal/Tvu)

Tertiary volcanic rocks of the Apache Leap Tuff (Tal) and younger Picket Post Volcanics (Tvu) overlie pЄpi, pЄy, and Pz rocks in the study area. Both rock units crop out over large parts of the study area **(Figure 10)**.

Apache Leap Tuff (Tal)

The principal outcrop belt of the dacite tuff of the Tal occurs in the east part of the QCC study area, with generally isolated outcrops occurring west of the Concentrator Fault **(Figure 10)**. East of the fault, Tal forms the cliffs of the Apache Leap escarpment, and covers an extensive plateau that extends into the Devils Canyon watershed to the east. The Tal is exposed at the surface across the Oak Flat area **(Figure 10)**. The Tal is found at large depths west of the Concentrator Fault **(Figure 11)** demonstrating the substantial displacement of rock units along this important fault. Isolated Tal outcrops occur at the outlet of the Superior Basin at Whitlow Ranch Dam, and near the headwaters of Arnett Creek. West of the Elephant Butte Fault, the Tal forms low hills west from Queen Valley and north from US60.

Hydrogeologic Significance: East of the Apache Leap escarpment, the Tal comprises an extensive fractured-rock aquifer of small to moderate permeability. In the Superior Basin, the Tal aquifer discharges to Shaft No. 9, where inflows are estimated by RCM to range from 40 to 80 gpm. Prior to 1972, groundwater from the Tal discharged from two springs in upper Queen Creek canyon east of Superior (Bassett, et.al., 1994). Following construction of Shaft No. 9 and the Never Sweat Tunnel in the early 1970s, flow from these springs ceased. Although discharge from these springs may have contributed to the total amount of water available to the former municipal water gathering system in Queen Creek (described above), the current or historical connection between the Tal aquifer and the groundwater system west of the Concentrator Fault is small or non-existent.

In the Superior Basin west of the Concentrator Fault, the Tal is not considered an important hydrogeologic unit. Testing of a deep well completed in the Tal near Superior indicated poor permeability (Montgomery & Associates, 2011). Testing of the Tal at the foundation of Whitlow Ranch Dam also indicated poor permeability (Lippincott, 1900). In the upper part

of Arnett Creek, Blue Spring **(Figure 10)** discharges a small amount of groundwater from an isolated block of Tal.

West of the Elephant Butte Fault, a well serving the Queen Valley area (QVDWID No. 3) is completed in volcanic rocks equivalent to the Apache Leap Tuff, and produces small to moderate amounts of groundwater.

Picket Post Volcanics (Tvu)

The Picket Post Volcanics (Tvu) comprise a series of tuffs, felsic lava flows, and basalts. The Tvu forms an extensive outcrop belt along a 2-3 mile reach of Queen Creek near the BTSWA, including Picket Post Mountain, much of the lower part of Arnett Creek, and the east wall of Telegraph Canyon **(Figure 10)**. The Tvu rocks generally dip to the east, and are interbedded with the Tertiary basin-fill deposits in the Superior area **(Figure 11)**.

Hydrogeologic Significance: Available data for existing wells completed in the Tvu indicate that volcanic rocks of the Tvu are generally poorly permeable. Where extensively fractured, these rocks provide local collection and storage of groundwater to support spring flow, or small quantities of groundwater to wells. In addition, groundwater discharge from the Tvu appears to support perennial flow along short reaches of Arnett Creek and Telegraph Canyon east from Picket Post Mountain **(Figure 10)**. Some groundwater discharges from the Tvu to the Harborlite Perlite Mine which requires periodic dewatering of the open pit.

Tertiary Basin-fill Deposits (QTg)

Tertiary basin-fill deposits crop out over a large area that straddles the QCC and the Town of Superior **(Figure 10)**. The basin-fill deposits consist predominantly of poorly-sorted conglomerates, with some sandstones and fine-grained lacustrine deposits. Along the QCC,

the basin-fill deposits form an east-dipping wedge that thickens from west to east; volcanic rocks of the Tvu are interbedded with the QTg basin-fill deposits.

West from the Elephant Butte Fault, a small wedge of QTg rocks occurs in the Queen Valley area **(Figures 10 and 11)**. As with the larger QTg outcrop belt in the Superior Basin, this localized outcrop belt is part of a larger east-dipping tilt-block bounded by the Elephant Butte Fault to the east and other basin-bounding faults west of the study area.

Hydrogeologic Significance: Conglomerates of the Tertiary basin-fill deposits are well consolidated and poorly sorted, and generally poorly permeable. Numerous hydraulic tests have been conducted for monitoring wells constructed at the RCM West Plant Site north of Superior (Golder, 2008). Results of these tests confirm the permeability of the basin-fill deposits is very low. Numerous private wells are completed in the basin-fill deposits in the Superior area. These wells generally produce small amounts of groundwater, and water level recovery after pumping is reported to be slow at some locations, confirming the reported low permeabilities for these deposits.

Rocks of the QTg in the area of Queen Valley appear to have some permeability, as several water supply wells operated by QVDWID appear to be completed in this unit. It is unclear whether this is due to the presence of fracture zones or to the primary characteristics of the QTg rocks in this particular area.

Quaternary Alluvium (Qal)

Quaternary alluvium includes unconsolidated floodplain alluvial deposits along Queen Creek and its tributaries and other poorly consolidated surficial deposits that crop out adjacent to the floodplains **(Figure 10)**. These deposits typically comprise sand, gravel, cobbles, and boulders, with some fine-grained deposits, especially in the flood control basin upstream from Whitlow Ranch Dam. From BTSWA upstream, the width of the alluvial deposits in the

Queen Creek channel is generally less than 100 feet, and in places, the alluvium is nearly absent with bedrock exposed at land surface. For the reach of Queen Creek from BTSWA to Whitlow Ranch Dam (more than 6 miles), the width of the floodplain increases substantially, ranging from 500 to nearly 1,500 feet. Thickness of the Qal is likely to be generally less than 30 feet, but has been documented to reach a thickness of 42 feet at Whitlow Ranch Dam (Lippincott, 1900).

Hydrogeologic Significance: The Qal is moderately to highly permeable, and comprises the principal source of groundwater to shallow wells along the QCC in the Superior Basin. As would be expected given its hydrogeologic setting, the deposits are readily recharged by rainfall and surface water runoff, and serve an important role for storage of groundwater. The floodplain alluvium also represents the principal source of sustained groundwater discharge at Whitlow Ranch Dam during dry periods. Groundwater is forced to the surface at the dam due to installation of impervious materials through the core of the dam and dam footing.

Downstream from Whitlow Ranch Dam, the floodplain alluvial deposits continue to serve an important role in receiving and storing recharge from surface water runoff that passes through the dam outlet works or enters the valley from Whitlow Canyon and other tributary drainages. Infiltration of surface water runoff via the floodplain alluvial deposits is likely the principal source of recharge to the aquifer(s) tapped by the QVDWID wells.

GROUNDWATER CONDITIONS

With the exception of floodplain alluvium that occurs along Queen Creek and its tributaries, rock units within the Superior Basin are generally poorly permeable, and large-scale, productive aquifers such as the basin-fill aquifers of the East Salt River Valley are not present. Where hard-rock units are extensively fractured, rocks of the Superior Basin

provide local collection and storage of groundwater to support spring flow, or small quantities of groundwater to wells. Faulting has resulted in the groundwater system being highly compartmentalized in some areas, further limiting integration of a basin-wide groundwater system.

Principal Aquifers

The principal aquifers in the QCC study area occur in the floodplain alluvium along Queen Creek, the Apache Leap Tuff east of the concentrator fault, and basin-fill deposits/volcanic rocks in the Queen Valley area. West of the QCC study area, Queen Creek enters the desert plains of the East Salt River Valley where a thick sequence of basin-fill deposits hosts aquifers that provide abundant water for irrigation and municipal use.

Floodplain Alluvium Aquifer

Unconsolidated sediments of the floodplain alluvial deposits along Queen Creek and its tributaries represent the principal aquifer in Superior Basin. The floodplain alluvium (FA) aquifer provides water to BTSWA as well as a number of stock and irrigation wells downstream from BTSWA. Historically, infiltration galleries installed beneath the floodplain alluvium in the Superior area provided water, at least seasonally, from the FA aquifer of Queen Creek as it was recharged by infiltration of runoff. At the outlet of Superior Basin, groundwater underflow from the FA aquifer sustains discharge from the outlet of Whitlow Ranch Dam.

As described above, the lateral and vertical extent of the floodplain alluvial deposits is limited. Aquifers hosted in this type of geologic setting are sometimes referred to as “shoestring” aquifers, and are characterized by shallow groundwater levels, and diurnal and seasonal water level fluctuations resulting from groundwater uptake by phreatophytes during daytime hours in the spring, summer and fall. As is typical of these types or aquifers, the FA

aquifer is highly dependent on seasonal recharge from surface water runoff. In the absence of periodic runoff events of sufficient magnitude, water levels in the FA aquifer will decline, resulting in reduced production from wells and reduced discharge from Whitlow Ranch Dam.

Figure 12 shows a series of conceptual block diagrams that depict how the FA aquifer responds to various climatic regimes. During dry periods, in the absence of groundwater recharge, groundwater moves through the aquifer as underflow, and water levels decline as groundwater drains or is extracted from the system. Once rains begin, recharge of surface water runoff causes the water levels to rise in the aquifer. During more extensive winter rains, the FA aquifer will "top off", and potential additional recharge will be rejected (i.e., sustained surface water flow occurs). As the system returns to dry conditions, streamflow will decrease, and groundwater stored in the stream banks will discharge to streambeds until drying occurs, at which point water continues to move downstream as groundwater underflow only.

Apache Leap Tuff Aquifer East from Concentrator Fault

The Apache Leap Tuff (ALT) aquifer in the Oak Flat area east of the Apache Leap escarpment extends east and southeast from the Oak Flat area across the Devils Canyon drainage basin. A small portion of this fractured-rock aquifer occurs in the Superior Basin, and discharges to Shaft No. 9 and associated tunnels. Other than groundwater discharge that is collected at Shaft No. 9, and occasional pumping related to hydraulic testing on behalf of RCM, no other groundwater use is reported for the ALT aquifer in the Superior Basin. Because the Tal aquifer is not directly connected to any part of the groundwater system west of the Concentrator Fault, this aquifer is not discussed further.

Queen Valley Aquifer

West from Whitlow Ranch Dam, groundwater occurs in a wedge of Tertiary basin-fill deposits and Apache Leap Tuff with overlying floodplain alluvium deposits, locally forming an aquifer that supplies water to four production wells that provide domestic and irrigation water supply for the Queen Valley area. The direct contribution of the floodplain alluvium in supporting groundwater production from these wells is likely to be minimal, as review of drillers' logs and current groundwater levels suggest that the alluvium is locally dewatered near the production wells. However, as previously described, the floodplain alluvium serves an important role of capture and storage of recharge from surface water runoff in the Queen Creek channel when it occurs, which in turn recharges the underlying rock formations.

Figure 14 shows two conceptual block diagrams that describe how the Queen Valley aquifer in the Queen Valley area responds to dry and wet climatic regimes. During dry periods, groundwater from the FA aquifer upstream of Whitlow Ranch Dam is forced to the surface, where it passes through the inlet structure above the dam. This water then discharges to the outlet works, where it is diverted to a canal which delivers water to a series of ponds and lakes, and is used for irrigation of the golf course. During dry periods, groundwater levels in the Queen Valley aquifer decline, and the FA aquifer is generally dry. Some limited seepage of water from canals and ponds probably occurs resulting in some degree of continuous recharge to the Queen Valley aquifer via the floodplain alluvium. During wet periods, surface water runoff from the Superior Basin and Whitlow Canyon will recharge the Queen Valley aquifer via the floodplain alluvium. Groundwater levels will rise at the production wells as a result of both increased recharge and decreased groundwater pumping for irrigation.

Groundwater Recharge

Recharge to the groundwater system primarily occurs as infiltration of surface water runoff along principal drainages in the study area. Locally, groundwater recharge is augmented by discharge of effluent from the Superior WWTP and the Harborlite Quarry to the channel of Queen Creek **(Figure 2)**. Because water from the Superior WWTP is derived from water imported from the Desert Wellfield, this source of recharge represents a net input to the water budget in the Superior Basin. Groundwater discharged to Queen Creek from the Harborlite Quarry represents a local transfer of groundwater within the basin, and as such is not a net input to the water budget in Superior Basin.

East of Concentrator Fault

Where Queen Creek flows across the Apache Leap Tuff and Paleozoic rocks east of the Concentrator Fault, recharge to the ALT aquifer and the deep groundwater system occurs through the channel of Queen Creek. Increased inflow to mine workings during periods of high runoff in Queen Creek has long been documented during the history of mining at the Magma Mine (Bassett, et.al., 1994). Short-term increases in dewatering pumping on the order of several hundred gallons per minute observed during periods following runoff events.

Concentrator Fault to Whitlow Ranch Dam

In the Superior Basin west from the Concentrator Fault, little deep groundwater recharge occurs as most of the hydrogeologic units in the basin are poorly permeable. However, recharge of surface water runoff is the principal source of water to the FA aquifer along Queen Creek and its tributaries, as well as localized groundwater systems that support springs and wells throughout the basin. Changes in precipitation patterns result in changes to recharge patterns that can have substantial impacts on local water users and, ultimately, on total groundwater discharge from the basin at Whitlow Ranch Dam.

Groundwater recharge to the FA aquifer near Superior is augmented by discharge of effluent from the Town of Superior WWTP. This water is imported to the Superior Basin from the Desert Wellfield, and provides a stable source of recharge to the FA aquifer above BTSWA. Much of the water pumped from the BTSWA Gallery Well is derived from the discharge of effluent.

Some groundwater recharge may occur in the RCM West Plant Site, near Superior. Current and past storage of water in storage ponds and tailings facilities has resulted in limited recharge to the underlying basin-fill deposits of the QTg in these areas. However, because permeability of these deposits is very small, impacts to groundwater are very localized (Golder, 2008).

West from Whitlow Ranch Dam

West of the Superior Basin, groundwater recharge from surface water runoff and groundwater discharge at Whitlow Ranch Dam are an important factor in replenishing the local aquifer at Queen Valley, and a major mechanism for mountain front recharge to the East Salt River Valley (Babcock and Cushing, 1941).

Groundwater Discharge

Discharge from the groundwater system in the Superior Basin primarily occurs by evapotranspiration, groundwater pumping, and ultimately groundwater underflow out of the basin to the west.

Evapotranspiration

Groundwater discharge occurs along the alluvial channels of Queen Creek and its tributaries via evapotranspiration (ET) from vegetation, where groundwater levels are sufficiently shallow to be tapped by plant roots.

Groundwater Pumping

Groundwater pumping in the QCC study area includes pumping for dewatering of mine workings/open pits, irrigation, domestic, and stock uses. Total groundwater pumping by water users with non-exempt wells (and some exempt wells) has been reported to ADWR on an annual basis since 1984. Reported annual pumping for wells within the QCC study area for the period 1984-2010 is shown on **Figure 14** and summarized in **Table 2**.

RCM Dewatering Pumping

RCM reinitiated dewatering of the existing Magma Mine workings in March 2009 after a 10-year hiatus; total annual pumping was about 1,800 AF in 2009 and nearly 2,100 AF in 2010 **(Figure 14)**. These initial withdrawal rates reflect an accelerated dewatering schedule to bring water levels in the mine workings back down to pre-1998 levels. Once water levels are restored to pre-1998 levels, dewatering rates will likely be similar to pre-1998 rates, which were typically on the order of 650 to 1,000 AF/yr. As previously described, the deep groundwater system adjacent to the mine workings is not connected to the groundwater system west from the Concentrator Fault. Prior to mining in the district, some groundwater discharge may have occurred from the deep groundwater system to the bed of Queen Creek east of Superior, but this discharge likely ceased in 1910 when active dewatering of the Magma Mine workings first began.

Harborlite Quarry

Harborlite pumps groundwater for dewatering of open pit mines it operates southwest from Superior. Dewatering pumping is sporadic, and rates are typically less than 100 AF/yr **(Figure 14)**. Most of this water is returned to the basin via discharge to Queen Creek. Harborlite estimates that about 10 percent of the water pumped from the pits is used for dust control.

BTSWA

BTSWA uses groundwater for irrigation and potable supply. Groundwater usage rates were generally below 50 AF/yr through 1998 **(Figure 14)**. Rates have increased since 1998 as the West Well was added to the system, with combined usage approaching 70-80 AF/yr.

Queen Valley Domestic Water Improvement District

QVDWID pumps groundwater for public supply and for irrigation uses. Water usage from QVDWID Wells No. 1, No. 2, and No. 3 have averaged about 140 AF/yr from 1984 to 2010 **(Figure 14)**. Groundwater use from Well No. 4 by Queen Valley Golf Association (QVGA) has typically been less than 60 AF/yr. Although use of Well No. 4 has reportedly increased in 2011 and 2012 compared to prior years (personal communication from QVWID and QVGC in 2012), available data from ADWR do not reflect this increase. QVGA obtains a portion of its irrigation water supply from the canal from Whitlow Ranch Dam.

Other Users

Other water users with reported groundwater usage include Herron Ranch with intermittent usage rates of generally less the 10 AF/yr, and F.S. Smith with usage rates of generally less than 20 AF/yr. It is important to note that the above users comprise a small subset of the more than 450 wells in the QCC area **(Appendix B; Table B-1)**. Small amounts of groundwater use may occur from wells registered as domestic, stock, and irrigation wells, but likely at production rates much smaller than 35 gpm.

Groundwater Underflow

Groundwater underflow from the Superior Basin occurs through the FA aquifer at the outflow of Whitlow Ranch Dam. Inspection of the discharge data from Whitlow Ranch Dam on **Figure 9** for extended low-flow periods suggests that groundwater underflow is probably less than 1 cfs (~720 AF/yr), and underflow may decrease to around 0.3 cfs (~220 AF/yr) during extended periods of drought. More detailed analysis of the discharge hydrograph combined with field observation of flow conditions upstream from Whitlow Ranch Dam would be required to better quantify this discharge.

LONG-TERM GROUNDWATER LEVEL TRENDS

Groundwater level hydrographs were prepared for selected wells in the QCC study area where long-term water level data have been obtained. Sources of water level data include the ADWR Groundwater Site Inventory (GWSI) database, and the files of RCM and QVDWID. Hydrographs for the period 1984 through 2012 are shown on **Figure 14**. Periods of record are variable and measurements are in some cases sparse. The most complete records of water levels in the study area include records for the Gallery well at Boyce Thomson Arboretum, for monitoring wells at the RCM West Plant Site, for RCM Shaft No. 9, and for production wells in Queen Valley.

RCM Shafts No. 3 and No. 9

Shafts No. 3 and No. 9 are completed in a deep groundwater system east from the Concentrator Fault **(Figure 14)**. Continuous water level records are available for Shaft No. 9 starting in 1998 when dewatering pumping was discontinued. Water levels began recovery from a depth of more than 4,000 feet. Recovery continued through March 2009 when RCM commenced dewatering operations as part of PFS studies for proposed block-cave mining.

Depth to water had reach 2,000 feet below the shaft collar by March 2009. Depth to groundwater is currently more than 4,500 feet below land surface.

RCM West Plant Site Wells

Water level hydrographs are shown for four selected monitor wells that are completed in Tertiary basin-fill deposits on the RCM West Plant Site **(Figure 14)**. Water level data are available from RCM for the period 1995 to present. Water levels show a generally decreasing trend through 2005, at which point water levels remains relatively constant for the rest of the period of record. The decreasing trend for the early period of record was likely due to shutdown of mineral processing activities and associated water storage in ponds on the West Plant Site that occurred in the mid-1990s, thus reducing the amount of local groundwater recharge.

BTSWA Gallery Well

The BTSWA Gallery Well is a collection gallery completed beneath the streambed of Queen Creek. Water level data are available from the ADWR GWSI for the period 1985 to present **(Figure 14)**. Water levels show generally little change through the period, which is likely due to relatively consistent discharge of water from the Town of Superior WWTP and Harborlite Quarry located several miles upstream. Several deeper water levels shown on the hydrograph are likely due to incomplete recovery of the gallery at the time of water level measurement.

Bakers Well

The Bakers Well is a shallow stock well completed in the Queen Creek floodplain alluvial aquifer. Water level data are available from the ADWR GWSI for the period 1985 to present **(Figure 14)**. Water levels are variable, with the most recent measurement showing the well

is dry. The well appears to be responsive to periodic recharge of alluvial aquifer from runoff events.

Scales Well

The Scales Well is a shallow stock well completed in the Queen Creek floodplain alluvial aquifer. Five water level measurements are available from the ADWR GWSI for the period 1991 to present **(Figure 14)**. The well was dry in late 2002, and was dry for the latest measurement in August 2012. The well appears to be responsive to periodic recharge of the alluvial aquifer from runoff events.

QVDWID Wells

Groundwater level records for QVDWID wells are available for the period 1991 to present and are shown on **Figure 14**. Groundwater level records for QVGA Well No. 4 are available from ADWR and QVGA for the period 1985 to present. **Figure 15** shows water levels for the QVDWID and QVGA wells for the period 1991 through 2012, along with discharge from the outlet culvert at Whitlow Ranch Dam. Inspection of **Figure 15** shows that water level trends are characterized by periods of water level decline followed by rapid water level recovery from recharge associated with large-scale surface water runoff events. Water levels at QVDWID Wells No. 1 and No. 2 demonstrate this pattern most clearly. Water levels at QVGA Well No. 4 generally show a similar pattern, although response to the winter 2004-2005 recharge event is anomalous. Water levels at QVDWID Well No. 3 declined rapidly by more than 75 feet after 1995 and although response to runoff events are observed, water levels did not fully recover. This may be the result of dewatering of uppermost portion of the aquifer from local groundwater pumping combined with the absence of substantial recharge to the aquifer due to the long-term drought conditions previously discussed. Water levels have not been measured at well No. 3 since 2006 due to an obstruction in the wellbore.

DIRECTION OF GROUNDWATER MOVEMENT

Groundwater level contours for the overall groundwater system in the Superior Basin are shown on **Figure 2.** The groundwater level contours were developed based on water levels measured by RCM personnel at selected wells and springs in the Superior Basin during the summer of 2012. Wells selected for development of the water level contours are generally less than 500 feet deep, and represent the uppermost part of the groundwater system where water use in the basin is focused. The summer water level measurement round was a cooperative effort between Superior Basin stakeholders and RCM. A total of 34 wells and 11 springs were visited and measured throughout the basin; results are given in **Table 3.**

Inspection of **Figure 2** indicates that direction of groundwater movement in the Superior Basin generally follows surface water drainage patterns, and indicates that groundwater moves toward the ultimate discharge point at Whitlow Ranch Dam. As is also clear from **Figure 2**, groundwater is not being diverted from the Superior Basin west of the Concentrator Fault to the cone of depression around the existing mine workings of the Magma Mine.

PRELIMINARY WATER BUDGET – SUPERIOR BASIN (1984 TO 2010)

A preliminary water budget has been developed for the Superior Basin in order to identify the main inflows and outflows of water to and from the basin and provide a basis for assessment of the potential impacts to the system from anthropogenic water withdrawals and discharges in the Superior area.

A water balance equation for the Superior Basin may be written as follows:

WATER IN		**WATER OUT**
P + D	=	ET + O + W + DIFF

Where:

P = Precipitation
D = Discharge of imported water to Queen Creek
ET = Evapotranspiration
O = Outflow from Whitlow Canyon Dam
W = Groundwater withdrawals by pumping
DIFF = Difference between measured and/or calculated inflow and outflows

Figure 16 shows a schematic representation of the Superior Basin water budget together with estimates of the volume of water associated with each element. **Table 4** provides water budget values for each component on an annual basis, and for the period 1984-2010. Each component of the water budget is discussed below:

WATER IN

Precipitation (P)

The principal source of water to the Superior Basin is precipitation. Total precipitation of 532 inches was computed for the Superior PRISM dataset for the period 1984 to 2010.

When distributed over the entire Superior Basin watershed (area of approximately 143 square miles) this provides a total of approximately 4,055,000 AF of water to the Superior Basin. The majority of the precipitation (roughly 90 percent) that falls in the Superior Basin is lost to ET (Woodhouse, 1997). The remaining 10 percent is available for runoff, and for groundwater recharge by infiltration to either the shallow groundwater system associated with the Queen Creek alluvial channel, local groundwater systems associated with fracture zones, or the deeper regional groundwater system.

Based on the precipitation record for Superior for the 27-year period 1984 through 2010, the total volume of water available for redistribution within the Superior Basin as runoff and infiltration is estimated to be approximately 406,000 AF (average of 15,037AF per year).

Discharge of Imported Water (I)

Groundwater from the Desert Wellfield is imported to the Superior Basin via pipeline for public water supply at Superior and, prior to 1998, for water use at the Magma Mine. Some of this water is subsequently discharged to Queen Creek at the Town of Superior wastewater treatment plant. In addition, excess water was occasionally treated and released to Queen Creek by the Magma Mine prior to closure of the mine in 1998. A summary of discharges to Queen Creek, including water imported to the Superior Basin, is shown on **Figure 17.** Total discharge of imported water to Queen Creek for the period 1984-2010 is estimated to be approximately 7,700 AF (average of 285 AF per year).

Town of Superior

Limited discharge data are available for TOS WWTP with no data available for the period 1987 to 2002. In order to provide a reasonable estimate of the volume of water discharged to Queen Creek we have estimated discharges for this period using a linear interpolation

between 1986 and 2001. Using this approach we estimate that the TOS WWTP discharged approximately 4,470 AF to Queen Creek in the period 1984 to 2010.

Magma Mine

Magma Mine discharged a total of approximately 3,200 AF to Queen Creek in the period 1984 to 1998. These discharges are documented as part of Magma's authorization to discharge under the NPDES general permit (authorization number AZ0020389). Magma's water management process consisted mainly of evaporation of unwanted water from a series of ponds. Only when above normal precipitation required increased dewatering operations and overloaded Magma's storage capacity did it discharge to Queen Creek.

WATER OUT

Evapotranspiration (ET)

Evapotranspiration (ET) in the Queen Creek watershed is estimated by RCM to be on the order of 90% of precipitation. This is supported by work done in the University of Arizona Apache Leap Research Site that also concluded that ET was approximately 90 percent of precipitation (Woodhouse, 1997). For the period 1984 through 2010 10 percent of precipitation amounted to approximately 406,000 AF. This volume represents water lost to the system due to evaporation from open water and shallow geologic materials (including surface fractures in rock and alluvial sediments) and transpiration by area vegetation.

Outflow from Whitlow Ranch Dam (O)

Surface water and shallow groundwater that flows westerly through the Superior Basin in the Queen Creek stream channel and associated shallow groundwater system leaves the basin

through Whitlow Ranch Dam. The total volume discharged from the dam in the period 1984 to 2010 is estimated to be 180,000 AF.

Withdrawals (W)

Groundwater and surface water withdrawals span a range of magnitudes and hydrogeologic sources in the Superior Basin. East of the Concentrator Fault, Magma/RCM withdrawals groundwater for dewatering purposes. Other groundwater withdrawals east of the fault for stock and mining use are likely, but at quantities that are exempt from reporting. West from the Concentrator Fault, water users include: Harborlite Mine, BTSWA, and ranchers and Town of Superior residents who use water from domestic and agricultural purposes. Each of these withdrawals are discussed below.

Magma/RCM

Groundwater withdrawals by Magma/RCM have occurred for dewatering of the Magma Mine underground workings, both by Magma up until 1998 and, recently, by RCM since 2009. Magma withdrew 9,000 AF in the period 1984 to 1998; however, this withdrawal is not directly included in the Superior Basin water budget (except as occasional discharge to Queen Creek discussed above) because the water was pumped from a deep groundwater system east of the Concentrator Fault that is not hydraulically connected to the larger Superior Basin surface water/groundwater system. Groundwater withdrawn as part of recent dewatering operations (4,000 AF in 2009 and 2010) is piped across the Superior Basin and utilized by the NMID; therefore it is not included in the Superior Basin water budget.

Harborlite Mine

Harborlite dewaters its pit only when mining operations are active resulting in sporadic withdrawals in the period 1984 to 2010 (pumping reported in 2001, 2003, and 2007 to 2010).

Total groundwater pumped in this period was 760 AF. Approximately 6,000 gallons/day are used for dust control which amounted to approximately 40 AF in the period 1984 to 2010. Thus, although Harborlite does discharge to Queen Creek, it pumps slightly more than it discharges and is therefore a small net water user in the overall Superior Basin water budget.

Boyce Thompson Arboretum

BTSWA withdraws both groundwater and appropriable surface water via two wells for irrigation purposes. The total reported volume pumped by BTSWA in the period 1984 to 2010 is 1,389 AF. Of this, 1,002 AF was pumped from a shallow well known as the Gallery Well (55-624605) under a surface water right (36-063662) held by BTSWA. The remainder of the reported pumping is considered to be groundwater. The entire volume (1,389 AF) is considered lost to the system due to ET.

Superior Area Domestic and Agricultural Users

Ranchers and residents of the Town of Superior reported pumping a total of 1,235 AF in the period 1984 to 2010 from non-exempt wells. This groundwater was used for domestic use, irrigation, and livestock watering and is thus lost to the system through consumption and ET. We assume that some exempt wells are also pumped for domestic and agricultural uses in this period. Approximately 100 exempt wells are registered in the Superior Basin for domestic, irrigation, and livestock watering uses; if we assume that half of these wells are equipped for pumping and that each one pumps roughly a third of an acre-foot a year (assumption based on per-capita water consumption in the Phoenix area) on the order of 400 AF was likely withdrawn from exempt wells in the period 1984 to 2010.

Difference (DIFF)

The difference term (DIFF) is a catch-all term for the difference between measured and/or calculated inflows and outflows. Over the entire period of interest (1984 to 2010), inflow to the basin (10 percent of precipitation plus anthropogenic discharges) exceeded outflow from the basin (outflow at Whitlow Dam plus anthropogenic withdrawals) by 235,000 AF. However, consideration of DIFF values in **Table 4** shows that outflow does not always exceed inflow and that the magnitude of the difference term is variable. It should be noted that the relationship between inflow to the basin and outflow from the basin is a complex and non-linear one that is controlled by antecedent moisture conditions, vegetation, runoff characteristics, climatic variables (temperature, humidity, wind-speed etc.), and rainfall intensity and distribution. The difference term therefore includes actual differences that one would expect to occur between inflow and outflow depending on the way available water is distributed within the basin at any given point in time and under different climatic conditions.

DISCUSSION

Development of a preliminary water budget for the Superior Basin is useful for evaluating relative magnitudes of inflow and outflow to/from the basin. Assumptions inherent in the preliminary water balance have resulted in an imbalance between inflows and outflows, but serve to highlight important components of the hydrologic system that influence the ultimate pathways of water as it moves through the system, especially when viewed on an annual basis **(Table 4)**. **Figure 18** shows the annual volume of runoff from precipitation and annual discharge from Whitlow Ranch Dam for each year from 1984 through 2011 that were computed based on the assumptions discussed above. Inspection of **Figure 18** indicates that computed annual runoff exceeds computed annual discharge from Whitlow dam for all years except 1993 and 2005. For these 2 years, the magnitude of outflow was clearly impacted by

magnitude and timing of precipitation events that ultimately lead to large-scale runoff events during these years.

Several key assumptions that limit the accuracy of the preliminary water balance include:

1. Precipitation was distributed evenly across the entire basin whereas natural distribution is often highly variable due to land surface elevation and orographic effects of topography. Precipitation for the Superior townsite was used to represent a conservatively low value for total annual precipitation.

2. The timing of precipitation is important to consider, as a series of precipitation events of the same magnitude but occurring in rapid succession will be more effective in generating runoff than a similar series of events occurring over an extended period.

3. The percentage of precipitation that leaves the hydrologic system immediately as ET was fixed at 90 percent which leaves 10 percent of the total inflow to the basin available for deep groundwater recharge, shallow groundwater interflow in the upslope areas, and ultimately surface water runoff. In reality, these percentages will vary from year to year based on a number of factors such as frequency and timing of storm events, rainfall intensity, vegetation cover, all of which relate to antecedent moisture conditions.

4. Estimates of total discharge from Whitlow Ranch Dam were made using an incomplete record of discharge from the dam outlet. A more rigorous analysis and interpolation would be required to improve computed total surface water and groundwater discharge from dam, and therefore improve estimates of this important component of discharge from the Superior Basin.

SUMMARY OF KEY FINDINGS

The QCC survey was undertaken to evaluate the cause of recent declines in groundwater levels at some wells in the Superior Basin and Queen Valley areas, and recent declines in discharge from the outlet culvert at Whitlow Ranch Dam. The following key findings are based on results of the QCC survey:

1. The Superior Basin is formed by a large tilted block of generally poorly permeable rock units and bounded to the west and east by two large regional faults - the Elephant Butte Fault and the Concentrator Fault. Along the Queen Creek corridor, unconsolidated floodplain alluvium forms a shoestring aquifer that supports local water production from wells, and sustains discharge from Whitlow Ranch Dam during dry periods.

2. As a result of the limited volume of groundwater storage available in the shallow floodplain alluvium, and the small contribution of groundwater from adjacent rock units, this aquifer is highly dependent on periodic replenishment from recharge of surface water runoff, and therefore highly susceptible to water level declines during extended dry periods.

3. In the 17 years since 1995, total annual rainfall has been below average for all but 3 years, and included the driest year on record (2002). The potential for impacts to water users during this extended dry period was likely exacerbated by the above-normal temperatures observed from 1995 through 2005. The current pattern of drought conditions follows a period of substantially wetter than average conditions that occurred during the period 1978 through 1994.

4. Periodic replenishment of the floodplain alluvium aquifer occurs when magnitude and duration of winter rains is sufficient to produce sustained surface water runoff. After similar declines in groundwater levels in wells and discharge from Whitlow Ranch Dam were observed during an extended dry period from 2002 through 2004, the winter rains of 2004-2005 effectively “topped off” the aquifer and resulted in sustained discharge of more the 1 cfs from Whitlow Ranch dam for more than 18 months.

5. Dewatering of historical mine workings by RCM east from the Concentrator Fault has not resulted in impacts to groundwater levels in the Superior Basin west of the fault or impacts to discharge from Whitlow Ranch Dam.

6. Historical discharges to Queen Creek by Magma Copper Company/BHP Superior Operations did not represent important components of recharge to the lower floodplain alluvium aquifer. Discharges of excess water to Queen Creek occurred mainly during periods of above normal precipitation, when there was already sufficient water from runoff available for recharge of the aquifer.

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TABLE 1. SUMMARY OF CURRENT AND HISTORICAL PRECIPITATION STATIONS IN THE SUPERIOR REGION, PINAL AND GILA COUNTIES, ARIZONA

Station Name	Station Number	Period of Record	Latitude	Longitude	Elevation (feet amsl)
NOAA					
Ashurst Hayden Dam	NWS 020498	Jan 1956 to present	33° 05' 58"	111° 14' 49"	1,580
Florence	NWS 023027	Jan 1892 to Feb 2009	33° 02'	111° 23'	1,500
Globe	NWS 023498	Jan 1894 to Jul 1975	33° 23'	110° 48'	3,550
Globe 2	NWS 023500	Aug 1975 to Dec 2008	33° 24'	110° 46'	3,710
Globe	NWS 023505	Mar 1981 to Jun 2006	33° 23'	110° 46'	3,650
Globe USFS	NWS 020601	Mar 1990 to Oct 1995, Dec 2001 to present	33° 21' 01"	110° 39' 07"	3,650
Kearny	NWS 024590	Jun 1984 to present	33° 03'	110° 54'	1,830
Kelvin	NWS 024594	Dec 1922 to Nov 1983	33° 06'	110° 58'	1,850
Miami	NWS 025512	Feb 1914 to present	33° 24'	110° 53'	3,560
Pinal Ranch	NWS 026561	Mar 1895 to May 1973	33° 21'	110° 59'	4,520
Superior	NWS 028348	Jul 1920 to Aug 2006	33° 18'	111° 06'	3,000
Superior 2 ENE	NWS 028349	Jan 1974 to Jul 1996	33° 18'	111° 04'	4,160
ALERT Network					
Florence Dam South	730	Jun 2004 to present	33° 01' 50"	111° 21' 20"	1,500
Florence Dam North	740	Jun 2004 to present	33° 03' 36"	111° 19' 27"	1,500
Florence Junction	6730	Aug 1982 to present	33° 19' 28"	111° 25' 37"	1,805
Gila River at Kelvin	709	May 2008 to present	33° 06' 08"	110° 58' 30"	1,760
Kings Ranch	6745	Sep 1981 to present	33° 23' 06"	111° 26' 05"	2,140
Magma FRS	6715	Oct 1988 to present	33° 07' 11"	111° 24' 12"	1,625
Magma Ranch	711	Oct 2010 to present	33° 12' 04"	111° 14' 46"	2,280
SR79 at Unnamed Wash	1300	Oct 2010 to present	33° 12' 30"	111° 20' 52"	1,800
Whitlow Ranch Dam	6740	Jan 1998 to present	33° 17' 57"	111° 16' 33"	2,200

NOTE: Stations are shown on **Figure 1** of this report
feet amsl = feet above mean sea level
NOAA = National Oceanographic and Atmospheric Administration
NWS = National Weather Service
ALERT Network = Precipitation stations established by ADWR, or by county flood control districts

Precipitation and temperature data discussed in this report

TABLE 2. AVAILABLE PUMPING DATA FOR SUPERIOR BASIN AND QUEEN VALLEY AREAS, 1984 - 201(
ARIZONA DEPARTMENT OF WATER RESOURCES, PHOENIX ACTIVE MANAGEMENT AREA DATABASE

Cadastral	ADWR Registration Number	Owner	Total Water Quantity Pumped 1984-2010 (acre-feet)	Volume Pumped Per Year (acre-feet)																											
				1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
(D-01-10) 34CDA	55-628139	QUEEN VALLEY DOMESTIC WATER IMP DIST	929	36.00	57.90	25.80	36.57	41.71	74.08	21.70	65.84	66.84	22.15	36.90	64.30	80.80	61.12	59.43	48.95	18.54	0.77	37.97	0.34	0.00	0.00	21.62	21.48	13.04	2.90	11.85
(D-01-10) 35DBA	55-628140	QUEEN VALLEY GOLF ASSOCIATION	434	40.00	63.20	44.96	22.11	44.85	23.65	67.90	42.92	0.05	20.76	6.77	0.00	0.00	16.41	8.27	11.22	10.97	0.33	2.49	0.00	1.16	0.27	1.51	0.00	0.00	3.80	0.87
(D-01-10) 35DBB	55-628138	QUEEN VALLEY DOMESTIC WATER IMP DIST	2115	47.00	83.40	22.58	46.93	41.94	53.78	64.80	42.97	70.99	98.78	127.20	85.20	62.80	73.09	73.48	62.61	108.75	115.83	89.09	110.00	97.93	88.34	97.27	90.53	96.07	85.57	78.38
(D-01-10) 35DBC	55-628137	QUEEN VALLEY DOMESTIC WATER IMP DIST	757	62.00	41.80	25.37	34.25	26.76	21.15	36.80	2.10	14.74	29.35	5.14	0.00	0.00	5.89	40.06	32.95	16.27	23.14	14.69	43.12	44.32	51.86	26.74	32.34	40.01	48.92	37.00
(D-01-12) 35	55-621501	B.G. VAUGHAN	7	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(D-01-12) 36BBC	55-525311	RESOLUTION COPPER MINING LLC	5581	0.00	0.00	0.00	0.00	0.00	836.10	807.30	299.80	340.20	374.00	228.50	116.20	213.00	4.10	435.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	878.77	1046.83
(D-01-13) 32BBD	55-525312	RESOLUTION COPPER MINING LLC	7554	0.00	0.00	0.00	0.00	0.00	0.00	645.40	539.10	570.40	781.00	569.70	863.30	590.80	713.40	0.00	29.72	50.73	20.46	41.22	16.92	25.90	0.00	50.15	58.58	64.13	883.15	1039.60
(D-02-11) 01CD	55-627523	J.C. HERRON	5	0.00	1.00	1.00	0.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(D-02-11) 01CDC	55-627522	FRANK HERRON	118	2.20	2.60	4.60	9.40	11.40	5.62	4.96	6.70	2.10	3.00	6.50	1.30	3.90	6.96	6.22	1.90	2.50	11.00	0.00	0.00	0.00	0.00	0.00	0.00	6.04	9.71	8.92
(D-02-11) 01DCD	55-560518	BOYCE THOMPSON SW ARBORETUM	386	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	31.00	17.60	40.20	21.70	41.00	31.30	28.30	30.00	12.80	16.90	30.80	53.00	31.80
(D-02-12) 03CD	55-602822	F.S. SMITH	13	0.00	0.00	4.00	1.00	2.00	0.00	1.50	1.75	1.50	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(D-02-12) 06D	55-635629	ARIZONA STATE PARKS	4	3.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
(D-02-12) 07ABA	55-624605	BOYCE THOMPSON SW ARBORETUM	1002	45.07	36.62	37.40	32.00	40.90	36.00	46.20	37.20	39.60	0.00	43.10	44.50	47.00	56.50	37.19	48.70	34.77	37.00	24.30	37.30	30.50	40.00	46.40	29.70	36.60	34.80	23.00
(D-02-12) 08DAA	55-588114	HARBORLITE CORPORATION	757	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	103.40	0.00	76.10	0.00	0.00	0.00	91.40	116.16	95.70	273.80
(D-02-12) 10BA	55-602821	H.E. SMITH AND H.E. SMITH, TRUSTEES	336	9.00	10.00	21.00	7.00	9.00	13.00	10.00	11.00	7.50	12.00	11.00	10.00	11.00	12.00	14.00	15.00	17.00	19.00	18.00	12.00	14.00	13.00	14.00	24.00	7.00	6.00	9.90

TABLE 3. GROUNDWATER LEVELS FROM SELECTED WELLS AND SPRINGS SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA

Cadastral	ADWR Registration Number	Owner or Site	Date Measured	Depth to Water (feet, bls[a])	Water Level Elevation (feet, msl[b])
(A-01-11) 21dd	55-600823	TONTO NATIONAL FOREST	Sep-12	13.8	3111
(A-01-11) 22ac	55-600824	TONTO NATIONAL FOREST	Sep-12	50.1	3475
(D-01-10) 36d	---	Whitlow Dam Outlet	---	---	2056
(D-01-11) 01ba	55-600800	TONTO NATIONAL FOREST	Sep-12	29.2	2751
(D-01-11) 21dd	55-600861	TONTO NATIONAL FOREST	Sep-12	36.5	2219
(D-01-11) 22ad	55-600825	TONTO NATIONAL FOREST	Sep-12	10.5	2305
(D-01-12) 13	55-801491	PETTIJOHN, C E	Sep-12	15.8	3049
(D-01-12) 16d	---	Cottonwood Well	---	---	2778
(D-01-12) 26cac	55-912289	RESOLUTION COPPER MINING, LLC	15-Sep-12	143.8	2970
(D-01-12) 27aa	---	Silver King #1	Sep-12	29.3	2728
(D-01-12) 28c	---	Happy Camp Spring	---	---	2649
(D-01-12) 31dd	55-600883	TONTO NATIONAL FOREST	Sep-12	54.7	2426
(D-01-12) 32c	---	Walker Springs	---	---	2565
(D-01-12) 34adb	55-548184	RESOLUTION COPPER MINING, LLC	1-Jun-12	157.5	2806
(D-01-12) 34add	55-591860	RESOLUTION COPPER MINING, LLC	1-Jun-12	174.8	2833
(D-01-12) 34dbc	55-550406	RESOLUTION COPPER MINING, LLC	1-Jun-12	48.5	2763
(D-01-12) 35	55-633593	URQUIJO, JOE M	Sep-12	199.8	2660
(D-01-12) 35cdc	55-548186	RESOLUTION COPPER MINING, LLC	1-Jun-12	35.3	2765
(D-01-12) 35dab	55-907035	RESOLUTION COPPER MINING, LLC	30-May-12	131.2	2867
(D-02-11) 01cd	55-627523	Irrigation Well	Sep-12	40.1	2315
(D-02-11) 01cda	55-908053	HERRON, FRANK	Sep-12	55.5	2310
(D-02-11) 01cdc	55-627524	HERRON, FRANK	Sep-12	44.8	2320
(D-02-11) 11da	55-600808	TONTO NATIONAL FOREST	Sep-12	5.4	2394
(D-02-11) 15ac	55-600807	TONTO NATIONAL FOREST	1-Sep-12	21.3	2719
(D-02-12) 02dba	55-912770	RESOLUTION COPPER MINING, LLC	15-Sep-12	492.3	2949
(D-02-12) 03	55-634259	LIRA JR, H B	Sep-12	7.5	2723
(D-02-12) 03aad	55-635958	LUCKE, J/EVELAND, JOY	Sep-12	97.1	2740
(D-02-12) 03bcd	55-559434	RUIZ, MANUEL	Sep-12	178.2	2497
(D-02-12) 03bdc	55-529316	TAMERON, JOHN	Sep-12	111.7	2638
(D-02-12) 03cd	55-602822	SMITH, F S	Sep-12	98.2	2612
(D-02-12) 03cdc	55-528516	GOMEZ, ANGEL	Sep-12	126.2	2599
(D-02-12) 08d	---	Arnett Creek Lower	---	---	2565
(D-02-12) 09bad	55-558551	MARTINEZ, GEORGE	Sep-12	17.3	2583
(D-02-12) 11c	---	Bored Spring	---	---	2880
(D-02-12) 14b	---	Hidden Spring	---	---	3040
(D-02-12) 17b	---	Telegraph Canyon Upper	---	---	2675
(D-02-12) 22bdc	55-582476	HERRON, FRANK	Sep-12	5.9	2749
(D-02-12) 22bdc	---	T. U. Ranch Well #2	Sep-12	3.9	2754
(D-02-12) 24b	---	Kane Spring	---	---	3160
(D-02-12) 26d	---	Blue Spring	---	---	2950
(D-02-12) 31a	---	Trough Spring	---	---	3115
(D-02-12) 35ada	55-548185	BHP COPPER INC.	1-Jun-12	63.8	2787
(D-02-12) 04adb	55-548187	BHP COPPER INC.	1-Jun-12	76.2	2598

[a] bls = below land surface

[b] msl = mean sea level

TABLE 4. SUMMARY OF WATER BUDGET CALCULATIONS FOR THE SUPERIOR BASIN, 1984 THROUGH 2010

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	TOTAL
WATER IN (AF)[a]																												
Precipitation (inches)[b]	24.81	21.98	25.04	20.57	21.53	12	31.52	27.28	37.31	35.33	19.72	15.39	13.45	15.08	20.83	13.8	17.44	18.94	5.68	14.66	16.28	19.13	14.47	15.97	20.82	10.79	21.98	531.80
Precipitation (P)	189,218	167,634	190,972	156,881	164,202	91,520	240,393	208,055	284,551	269,450	150,398	117,374	102,579	115,010	158,863	105,248	133,009	144,449	43,319	111,807	124,162	145,898	110,358	121,798	158,787	82,292	167,634	4,055,861
Discharges (D)																												
Magma	0	115	0	0	0	373	789	425	409	917	17	49	25	33	49	0	0	0	0	0	0	0	0	0	0	0	0	3,200
TOS WWTP[c]	118	119	112	118	123	128	133	138	144	149	154	159	164	169	175	180	185	190	195	199	193	215	181	205	217	201	207	4,472
TOTAL WATER IN	189,336	167,868	191,083	156,998	164,325	92,021	241,315	208,619	285,104	270,516	150,569	117,583	102,768	115,212	159,087	105,428	133,194	144,639	43,515	112,006	124,355	146,113	110,538	122,003	159,005	82,493	167,841	4,063,533
WATER OUT																												
Evapotranspiration (ET)	170,296	150,871	171,875	141,192	147,782	82,368	216,353	187,250	256,096	242,505	135,358	105,637	92,321	103,509	142,977	94,723	119,708	130,004	38,988	100,626	111,746	131,308	99,322	109,618	142,908	74,063	150,871	3,650,275
Withdrawals (W)																												
Herron	2	4	6	9	11	7	6	7	3	3	7	1	4	7	6	2	3	11	0	0	0	0	0	0	6	10	9	123
Smith	9	10	25	8	11	13	12	13	9	14	11	10	11	12	14	15	17	19	18	12	14	13	14	24	7	6	10	350
Boyce-Thompson	45	37	37	32	41	36	46	37	40	0	43	45	47	57	68	66	75	59	65	69	59	70	59	47	67	88	55	1,389
Harborlite[d]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	8	0	0	0	9	12	10	27	76
Exempt Wells	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	450
Whitlow Dam Outflow (O)	5,170	8,712	3,464	1,815	2,280	1,291	5,455	3,667	11,137	54,235	1,927	7,387	1,936	732	9,435	1,410	3,363	4,467	883	323	1,405	16,259	2,701	3,916	9,154	1,548	13,579	177,651
TOTAL WATER OUT	175,539	159,650	175,423	143,074	150,142	83,731	221,888	190,990	267,301	296,774	137,363	113,096	94,335	104,333	152,517	96,233	123,182	134,586	39,970	101,054	113,241	147,667	102,113	113,631	152,171	75,740	164,567	3,830,313
DIFFERENCE (DIFF)	13,797	8,218	15,660	13,924	14,183	8,290	19,427	17,629	17,803	-26,258	13,206	4,486	8,432	10,879	6,570	9,195	10,012	10,053	3,545	10,952	11,114	-1,555	8,425	8,372	6,833	6,753	3,274	233,220

[a] AF = Acre-feet

[b] Data from Superior PRISM precipitation data set

[c] Data for 1987 through 2002 are calculated using a linear interpolation between 1986 and 2003

[d] Assumes 10% of total pumping reported to ADWR is used for dust control; remaining 90% of pumping is not a net outflow from system as it is immediately discharged to Queen Creek.

R. 9 E. R. 10 E. R. 11 E. R. 12 E. R. 13 E. R. 14 E. R. 15 E. R. 15.5 E. R. 16 E. R. 17 E.

T. 2 N. T. 1 N. T. 1 S. T. 2 S. T. 3 S. T. 4 S. T. 5 S.

Kings Ranch
Florence Junction
Queen Valley
USGS 09478500
Whitlow Ranch Dam
Florence Junction
SR79 at Unnamed Wash
Magma Ranch
Desert Wellfield
Magma FRS
Florence [NWS 023027]
Florence Dam South
FLORENCE
Florence Dam North
Ashurst Hayden Dam [NWS 020498]
USGS 09475500
Gila River
Queen Creek
Queen Creek
Arnett Creek
Pinto Creek
Superior [NWS 028348]
Superior 2 ENE [NWS 028349]
SUPERIOR
USGS 094985005
Miami [NWS 025512]
MIAMI
Globe 2 [NWS 023500]
Globe [NWS 023498]
Globe [NWS 023505]
GLOBE
Globe USFS [NWS 020601]
Pinal Ranch [NWS 026561]
USGS 09474000
Gila River at Kelvin
Kelvin [NWS 024594]
KEARNY
Kearny [NWS 0245900]
Dripping Spring Wash
Study Area Boundary
TONTO NATIONAL FOREST
60
77
79
177
287

EXPLANATION

Watershed Boundary - Queen Creek above Whitlow Ranch Dam (Superior Basin)

Precipitation Gage (Table 1)

ALERT Station and Identifier
Magma Ranch

NOAA Station and Identifier
Kearny [NWS 0245900]

Surface Water Gage

Surface Water Gaging Station and Identifier
USGS 0947400

0 5
Miles

Resolution Copper Mining

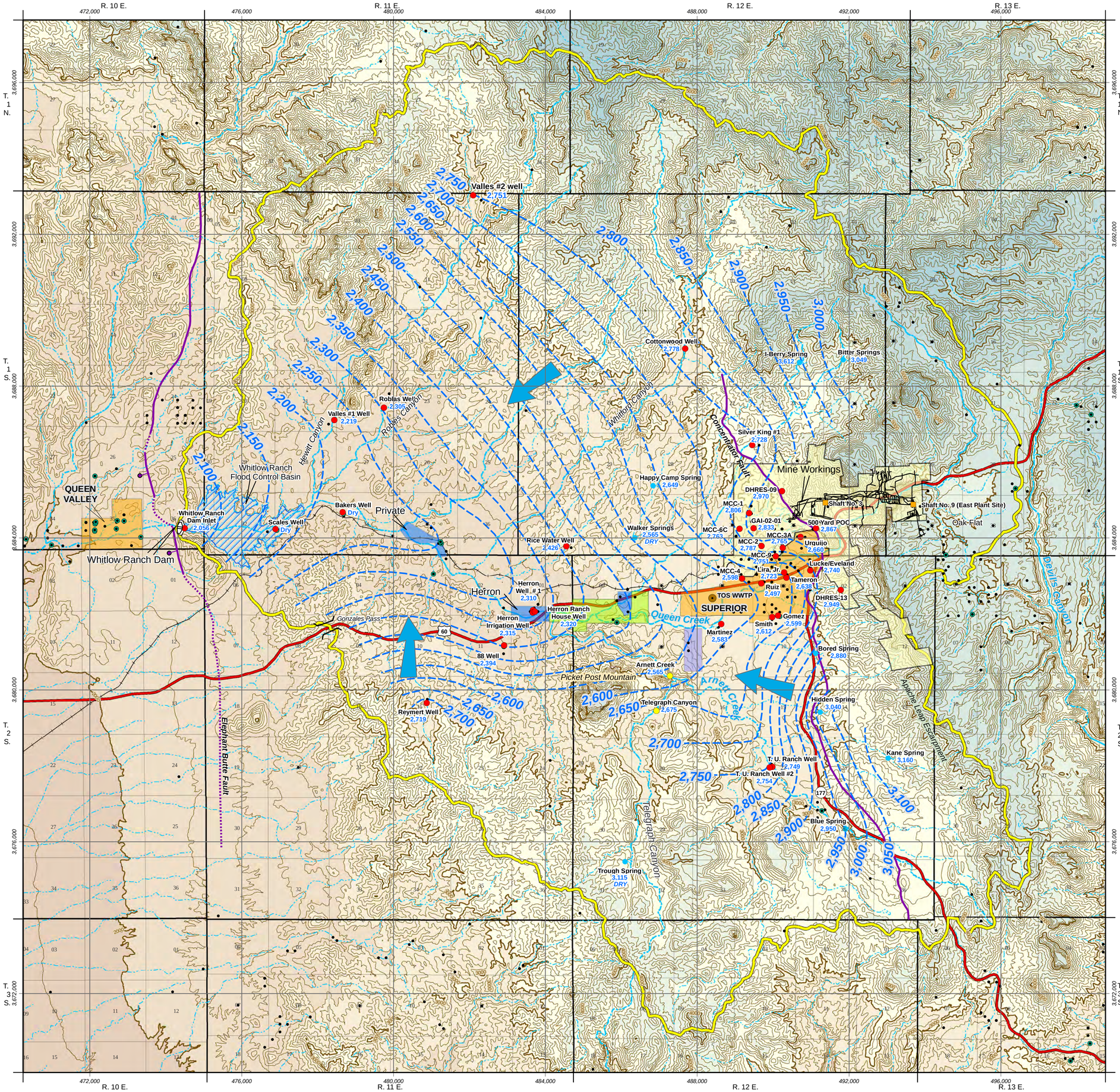
REGIONAL LOCATION MAP

2013

MONTGOMERY & ASSOCIATES
Water Resource Consultants

FIGURE 1

GIS-Tuc\605.1212\SUPERIOR-BASIN_REPORT\FINALReport_Feb19_2013\StationMap\18Feb2013



EXPLANATION

- ADWR GWSI Well Registry
- ADWR 55 Well Registry, July 2012
- Shaft
- Town of Superior Waste Water Treatment Plant (TOS WWTP)
- Fault; dotted where inferred; bar and ball on downthrown side
- Railroad
- Watershed Boundary, Superior Basin

Water Level Elevation - Summer 2012

- Rice Water Well 2,426 — Well Location and Identifier; Water Level Elevation, in feet above mean sea level
- Telegraph Canyon 2,675 — Location of Beginning of Flowing Reach; Water Level Elevation, in feet above mean sea level
- Trough Spring 3,115 — Spring Location and Identifier; Water Level Elevation, in feet above mean sea level
- Water Level Elevation Contour
- Direction of Groundwater Movement

Land Use (Selected Areas)

- Townsite or Subdivision
- BoyceThompson Arboretum
- Resolution Copper Property
- Harborlite Quarry
- Other Private Lands

Elevation Range

- 0 - 2,000
- 2,000 - 2,500
- 2,500 - 3,000
- 3,000 - 3,500
- 3,500 - 4,000
- 4,000 - 4,500
- 4,500 - 5,000
- 5,000 - 5,500
- 5,500 - 6,000

REGISTERED GEOLOGIST CERTIFICATE NO. 25063 TODD KEAY Date Signed 19 Feb 2013 ARIZONA U.S.A. Expires 06 30 2014

0 2,000 4,000 6,000 8,000 Feet

0 500 1,000 1,500 2,000 Meters

Resolution Copper Mining

QUEEN CREEK CORRIDOR SURVEY
Pinal County, Arizona

LOCATION MAP
SUPERIOR BASIN

2013

MONTGOMERY & ASSOCIATES
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FIGURE 2

GIS-TUC\605.1212\SUPERIOR-BASIN_Report\FinalReport_Feb19_2013\SiteMap_WLContours\19Feb2013

S:/605.1216/MetData/Graphs for Report/Temp_SupNWS_AvgMonthlyYearly1955-2011.grf

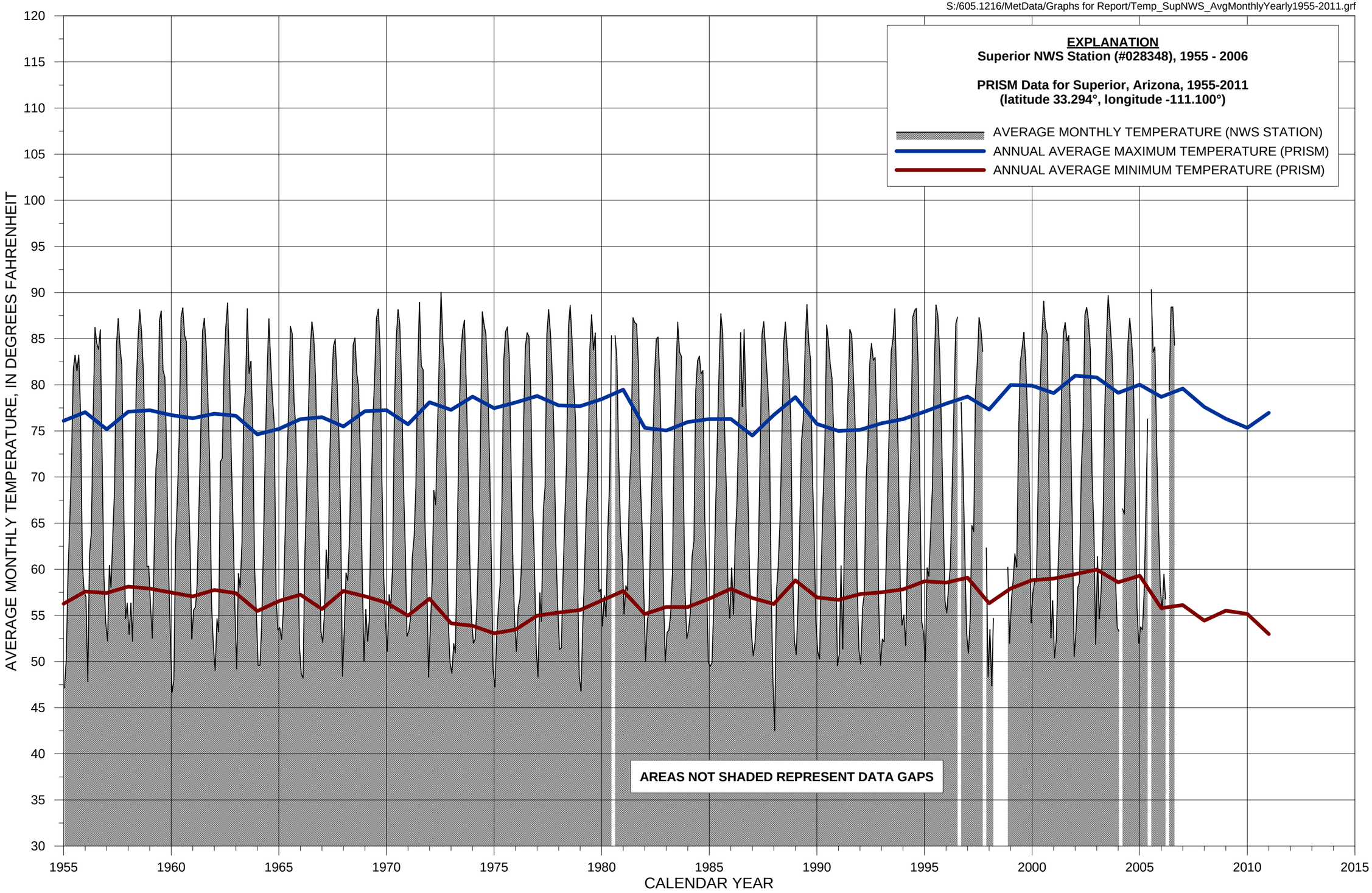


FIGURE 3. AVERAGE MONTHLY AND YEARLY TEMPERATURE, AND AVERAGE YEARLY MINIMUM AND MAXIMUM TEMPERATURES SUPERIOR, ARIZONA - 1955 THROUGH 2011

MONTGOMERY & ASSOCIATES

S:/605.1216_QueenCreekCorridorSurvey/MetData/Graphs for Report/Temp_MonthlyDepartureFromAvgMax_Sup_PRISM_Miami_1984-2012.grf

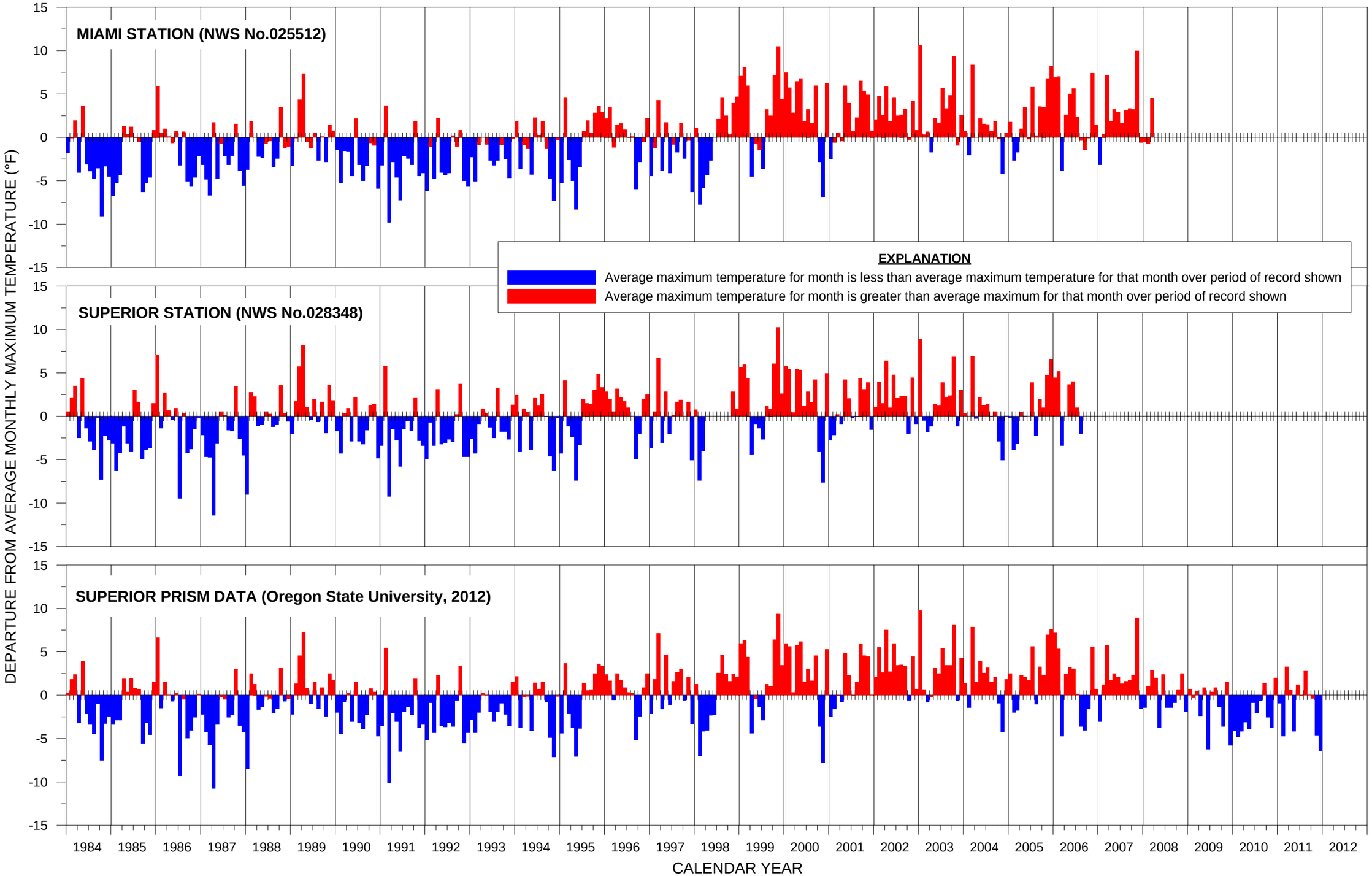


FIGURE 4. DEPARTURE OF AVERAGE MONTHLY MAXIMUM TEMPERATURE FROM AVERAGE MONTHLY MAXIMUM TEMPERATURE FOR MIAMI AND SUPERIOR, ARIZONA

MONTGOMERY & ASSOCIATES

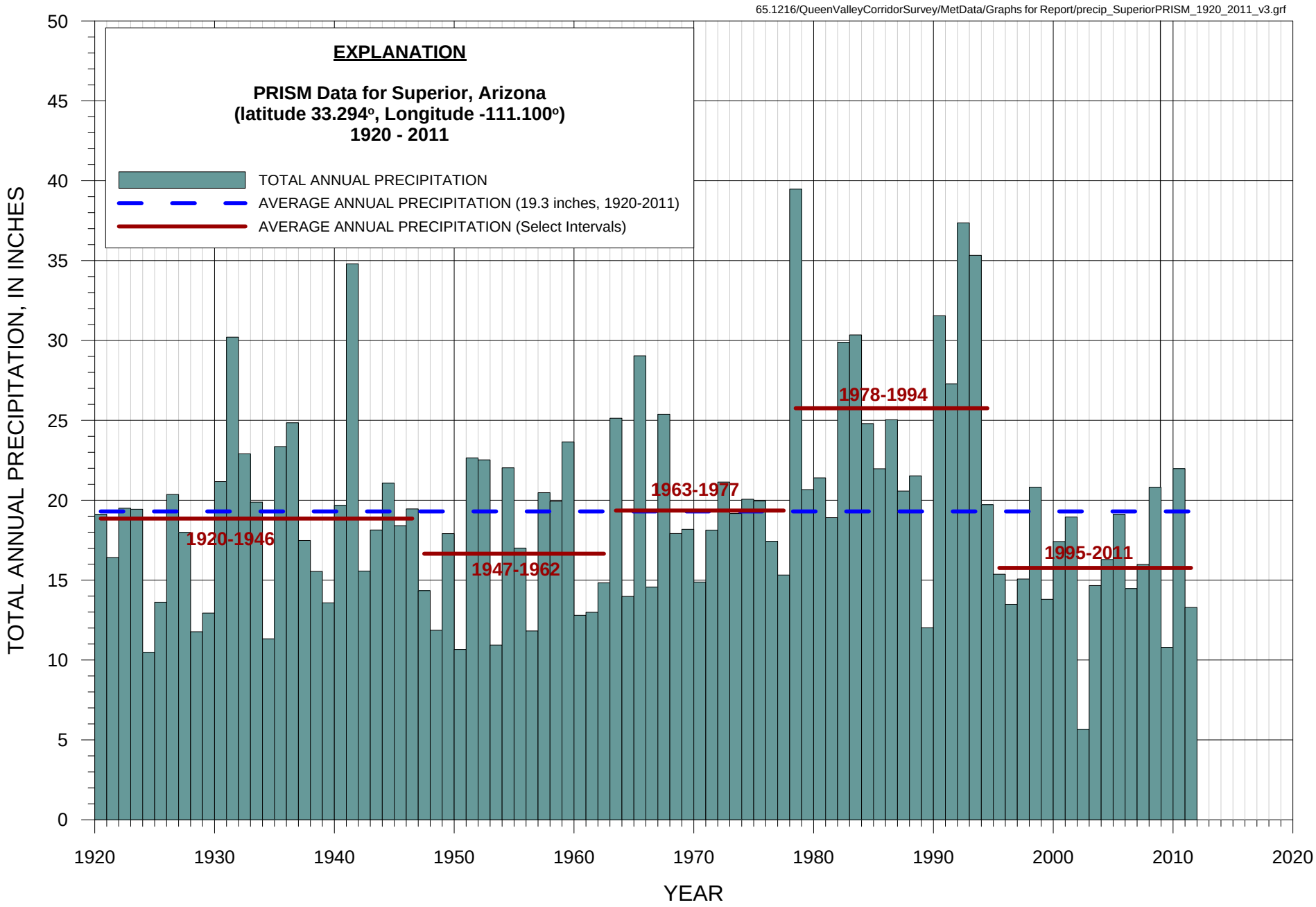


FIGURE 5. TOTAL ANNUAL PRECIPITATION, SUPERIOR, ARIZONA

MONTGOMERY & ASSOCIATES

S:/605.1216/MetData/Graphs for Report/Precip_SuperiorPRISM_TotalMonthly 1984-2012.grf

EXPLANATION

PRISM Data for Superior, Arizona
(latitude 33.294°, Longitude -111.100°)
JANUARY 1984 - JUNE 2012

TOTAL MONTHLY PRECIPITATION - October through March
TOTAL MONTHLY PRECIPITATION - April through September

TOTAL MONTHLY PRECIPITATION, IN INCHES

0
2
4
6
8
10
12
14

1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012

CALENDAR YEAR

FIGURE 6. TOTAL MONTHLY PRECIPITATION, SUPERIOR, ARIZONA - JANUARY 1984 THROUGH JUNE 2012

MONTGOMERY & ASSOCIATES

S:/605.1216_QueenCreekCorridorSurvey/MetData/Precip_MonthlyDepartureFromAvg_Sup_PRISM_Miami_&CummDepart.grf

MIAMI STATION (NWS No.025512)

SUPERIOR STATION (NWS No.028348)

SUPERIOR PRISM DATA (Oregon State University, 2012)

EXPLANATION

- Observed total precipitation for month is less than average precipitation for that month over period of record shown
- Observed total precipitation for month is greater than average precipitation for that month over period of record shown
- Cumulative departure from average monthly precipitation for period of record shown

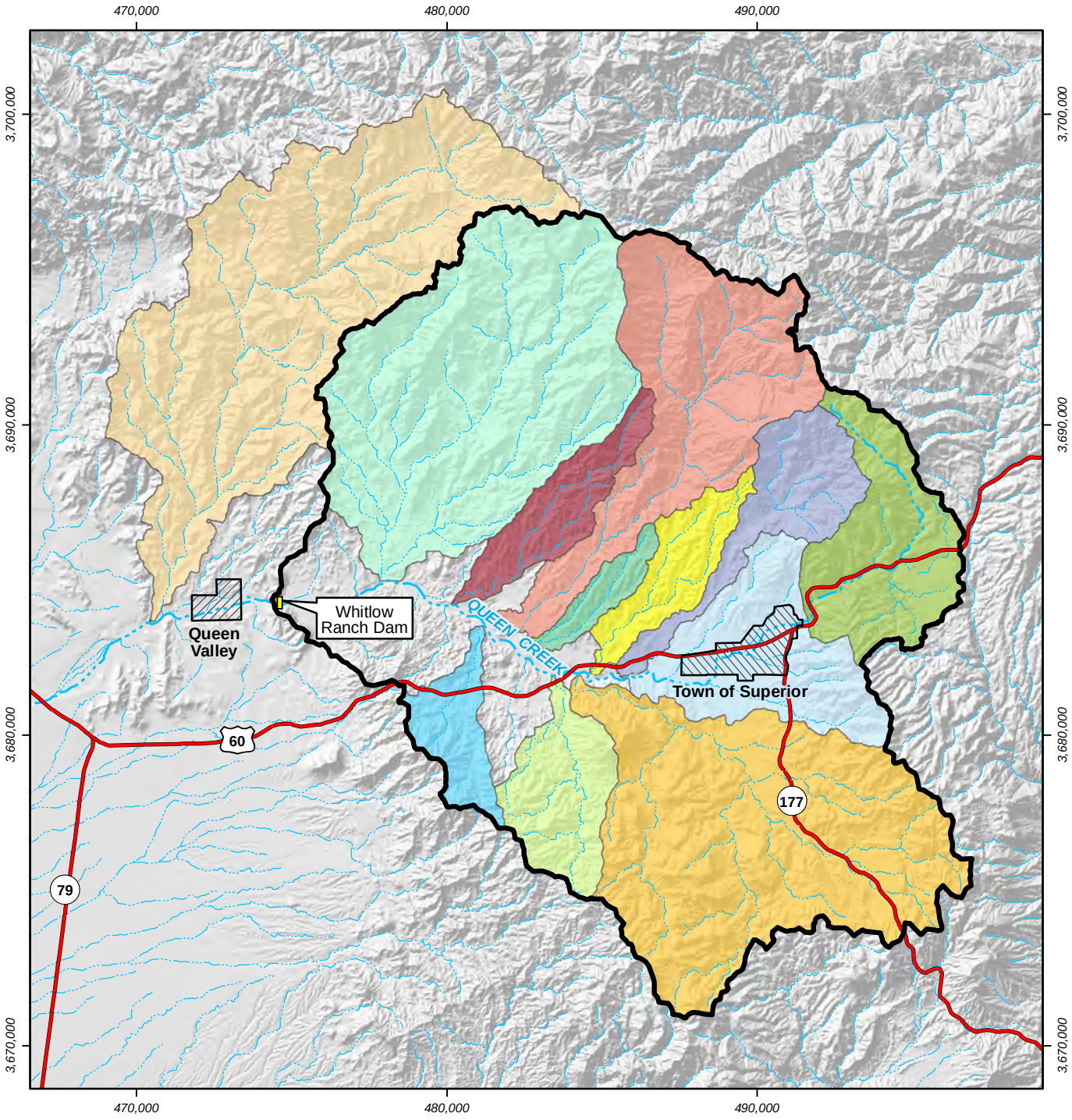
DEPARTURE FROM AVERAGE MONTHLY PRECIPITATION (INCHES)

CUMULATIVE DEPARTURE FROM AVERAGE MONTHLY PRECIPITATION (INCHES)

CALENDAR YEAR

FIGURE 7. DEPARTURE OF OBSERVED TOTAL MONTHLY PRECIPITATION FROM AVERAGE MONTHLY PRECIPITATION FOR MIAMI AND SUPERIOR, ARIZONA

MONTGOMERY & ASSOCIATES



EXPLANATION

- Queen Creek-Superior Basin Boundary
- Whitlow Canyon
- Hewitt-Roblas Canyon
- Bear Tank Canyon
- Potts-Whitford Canyon
- Rice Water Canyon
- Happy Camp Canyon
- Silver King Wash
- Queen Creek Canyon
- Queen Creek-Town of Superior
- Arnett Creek
- Alamo Canyon
- Raymert Wash

0 1 2 3
Miles

FIGURE 8. UPPER QUEEN CREEK SUB-BASINS, SUPERIOR BASIN, ARIZONA

GIS\605.1216\1216_CatchmentDelineation\CatchmentDelineations.mxd\19Dec2012

MONTGOMERY & ASSOCIATES

S:/605.1216/WhitlowDamDischarge/Fig9_hyd_WhitlowDam_Precip_USGS_ACE_1984To2012.grf

TOTAL MONTHLY PRECIPITATION (INCHES)

EXPLANATION

PRISM Data for Superior, Arizona
(latitude 33.294º, Longitude -111.100º)
JANUARY 1984 - JUNE 2012

TOTAL MONTHLY PRECIPITATION - October through March
TOTAL MONTHLY PRECIPITATION - April through September

WHITLOW DAM DISCHARGE (CFS)

EXPLANATION

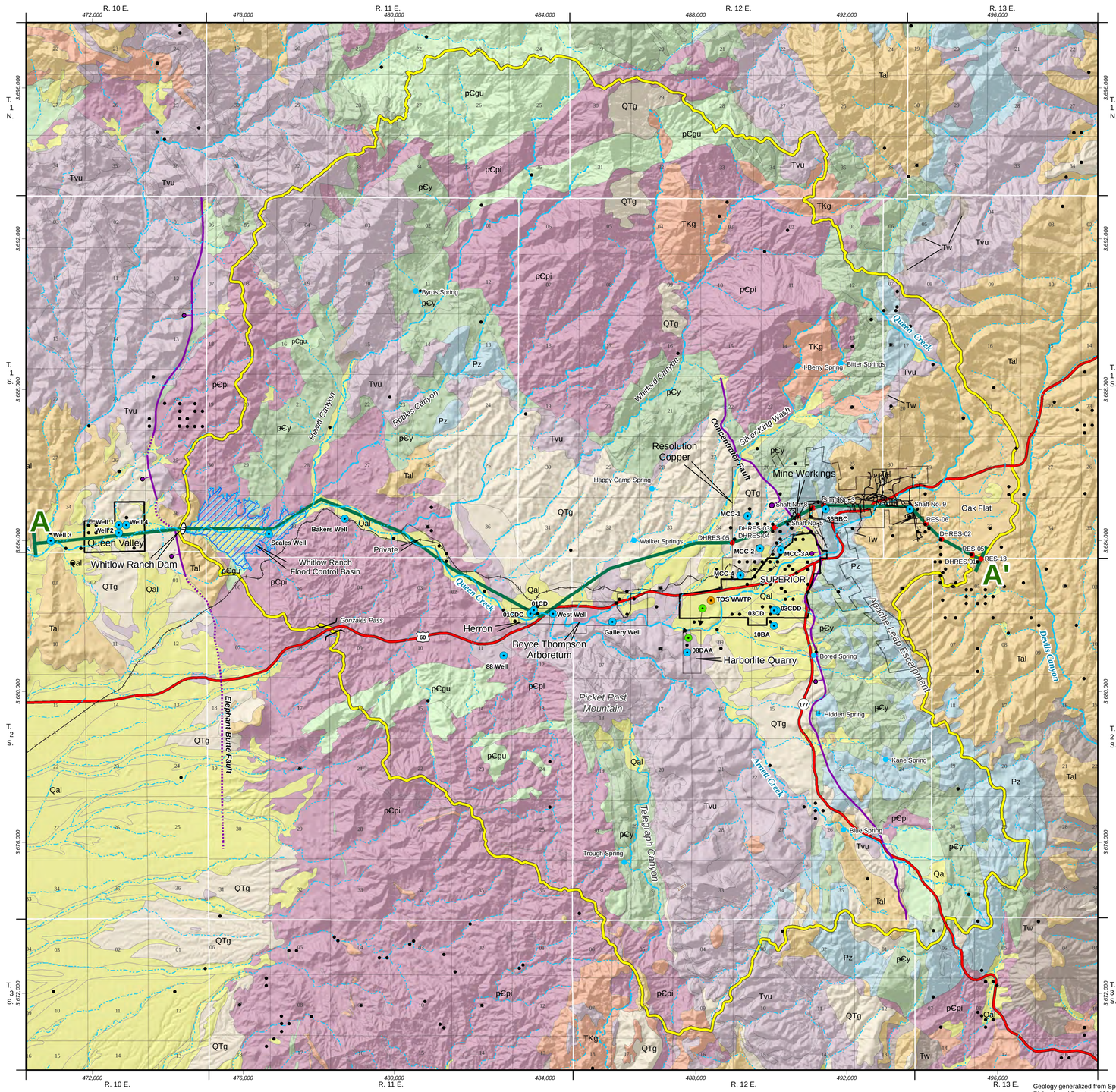
USACE Instantaneous Discharge
USGS Daily Average Discharge
USGS Field Measurements

DATA FOR FLOWS OF LESS THAN 1-2 CFS NOT AVAILABLE FROM USACE FOR PERIOD 1984 THROUGH 2001

CALENDAR YEAR

FIGURE 9. DISCHARGE FROM OUTLET CULVERT AT WHITLOW RANCH DAM, AND TOTAL MONTHLY PRECIPITATION AT SUPERIOR

MONTGOMERY & ASSOCIATES



EXPLANATION

- ADWR 55 Well Registry, July 2012
- Wells/Shafts on Hydrogeologic Cross-Section
- Location of Pumping and/or Groundwater Level Data
- Town of Superior Waste Water Treatment Plant (TOS WWTP)
- Point of Discharge
- A A' Hydrogeologic Section
- Fault; dotted where inferred; bar and ball on downthrown side
- Railroad
- Watershed Boundary, Superioir Basin

Geologic Units

d	Disturbed Surficial Deposits
Qal	Quaternary Alluvial Deposits and Surficial Deposits
QTg	Quaternary and Tertiary Basin-Fill Deposits
Tal	Tertiary Apache Leap Tuff
Tvu	Tertiary Volcanic Rocks, Undifferentiated
Tw	Tertiary Whitetail Conglomerate
TKg	Cretaceous and Tertiary Intrusive Rocks
Pz	Paleozoic Sedimentary Rocks, Undifferentiated
pCy	Younger Precambrian Sedimentary and Intrusive Rocks, Undifferentiated
pCgu	Undifferentiated Precambrian Intrusive Rocks
pCpi	Older Precambrian Pinal Schist

REGISTERED GEOLOGIST
CERTIFICATE NO.
25063
TODD
KEAY
Date Signed 11/30/2014
ARIZONA U.S.A.
Expires 06/30/2015

0 2,000 4,000 6,000 8,000
Feet

0 500 1,000 1,500 2,000
Meters

Resolution Copper Mining

QUEEN CREEK CORRIDOR SURVEY
Pinal County, Arizona

GEOLOGIC MAP

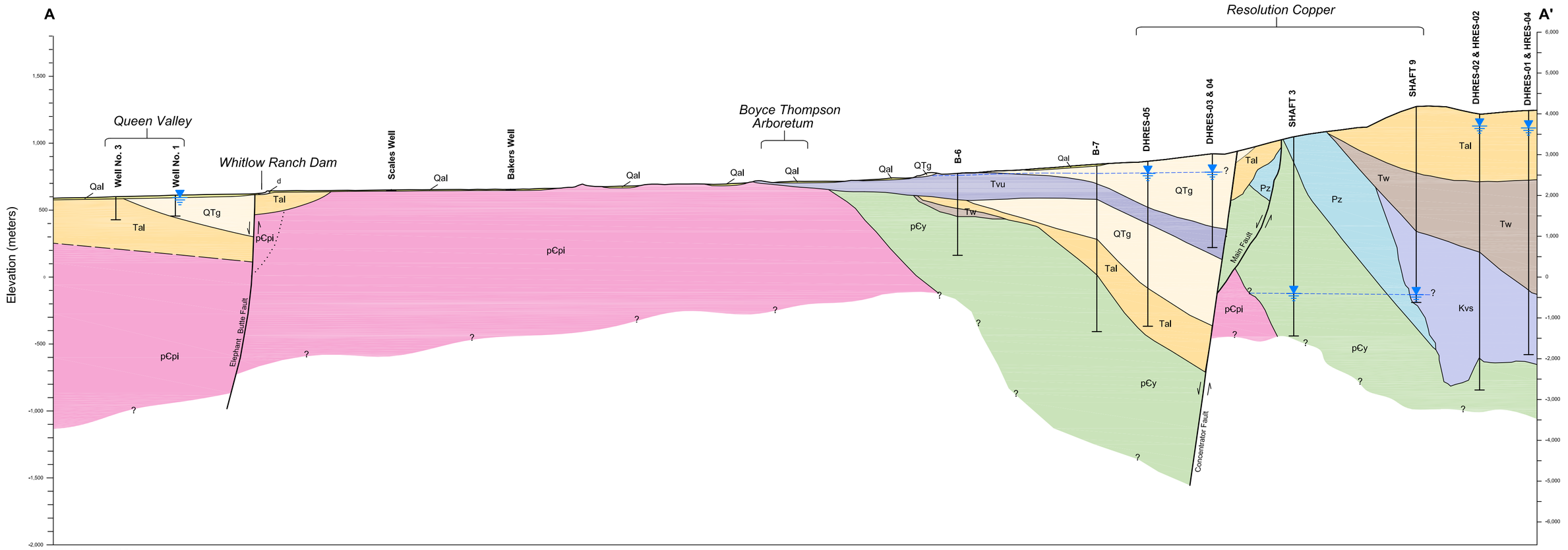
2013

MONTGOMERY & ASSOCIATES
Water Resource Consultants

FIGURE 10

Geology generalized from Spencer, Richard, and Peartree, 1996 and 1998

GIS-TUC\605.1212\SUPERIOR-BASIN_report\FINAL_reportFeb19_2013\Geology2012\18Feb2013



EXPLANATION

Geologic Units

d	Disturbed Unit
Qal	Quaternary Alluvial Deposits and Surficial Deposits
QTg	Quaternary and Tertiary Basin-Fill Deposits
Tal	Tertiary Apache Leap Tuff
Tvu	Tertiary Volcanic Rocks, Undifferentiated
Tw	Tertiary Whitetail Conglomerate
Kvs	Cretaceous Volcaniclastic Rocks
Pz	Paleozoic Sedimentary Rocks, Undifferentiated
pЄy	Younger Precambrian Sedimentary and Intrusive Rocks, Undifferentiated
pЄpi	Older Precambrian Pinal Schist

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0 2,000 4,000 6,000 8,000 10,000
Feet

0 1,000 2,000
Meters

VERTICAL EXAGGERATION 2.5:1

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QUEEN CREEK CORRIDOR SURVEY
Pinal County, Arizona

HYDROGEOLOGIC CROSS-SECTION A-A'

2013

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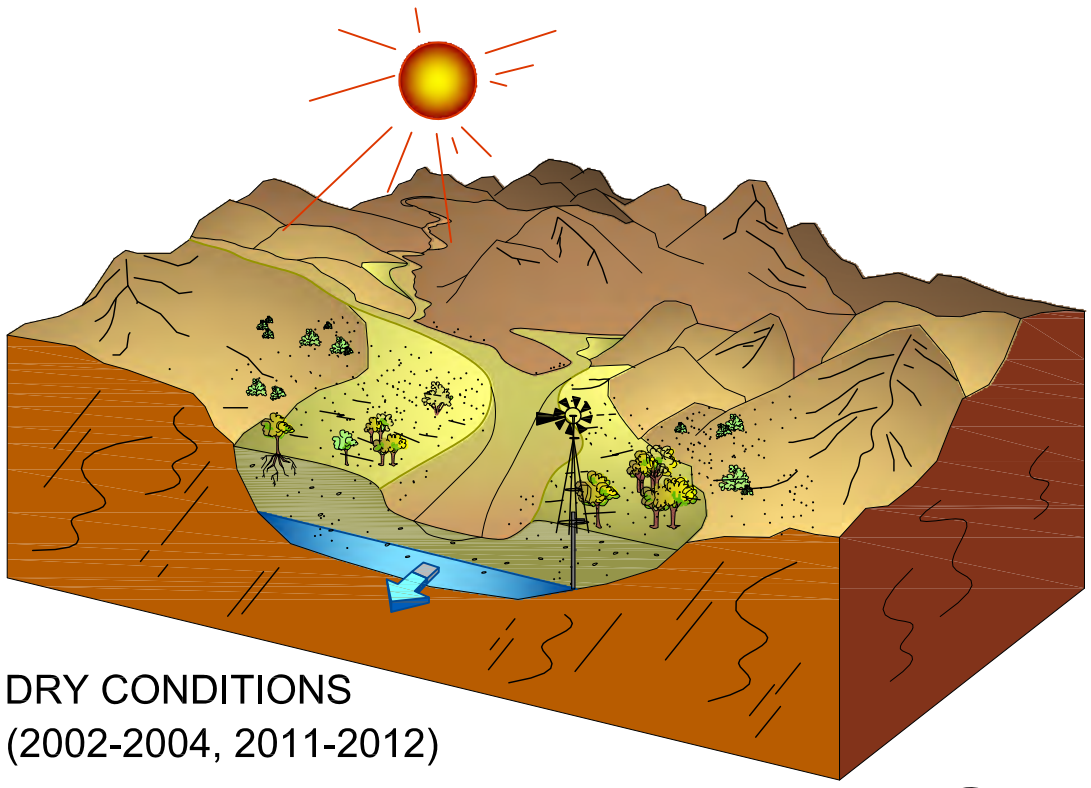
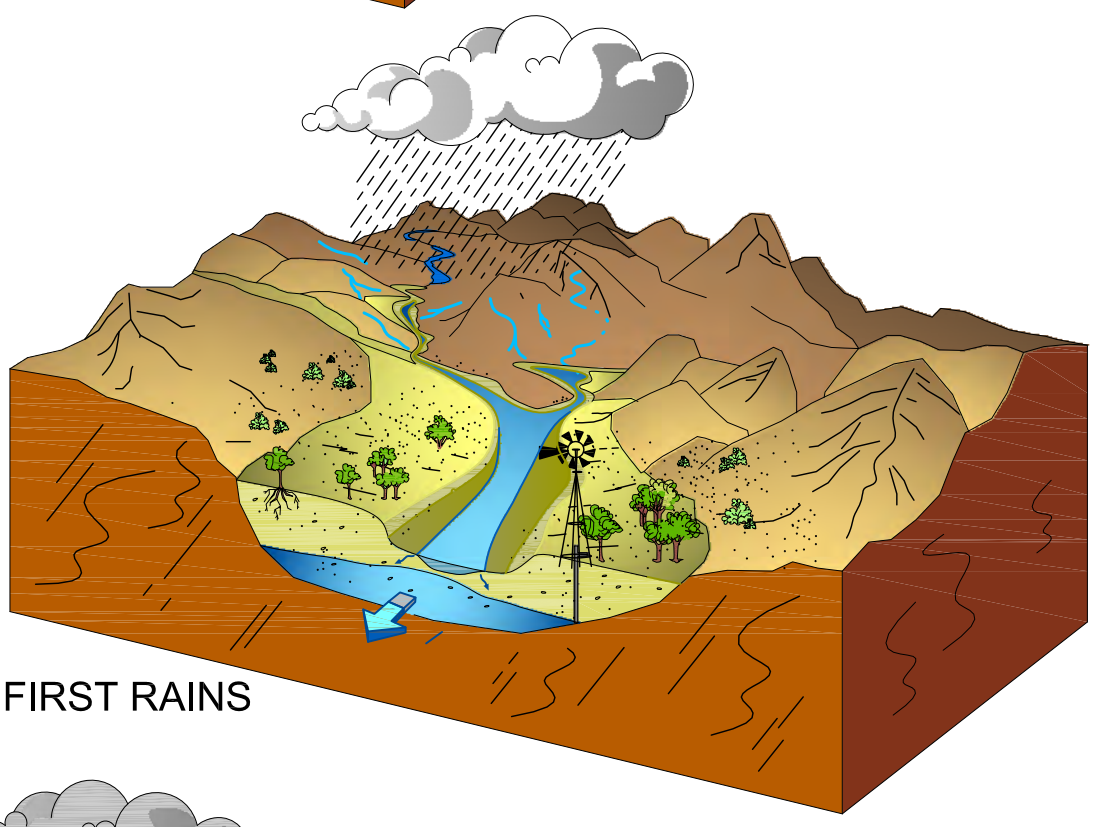
FIGURE 11

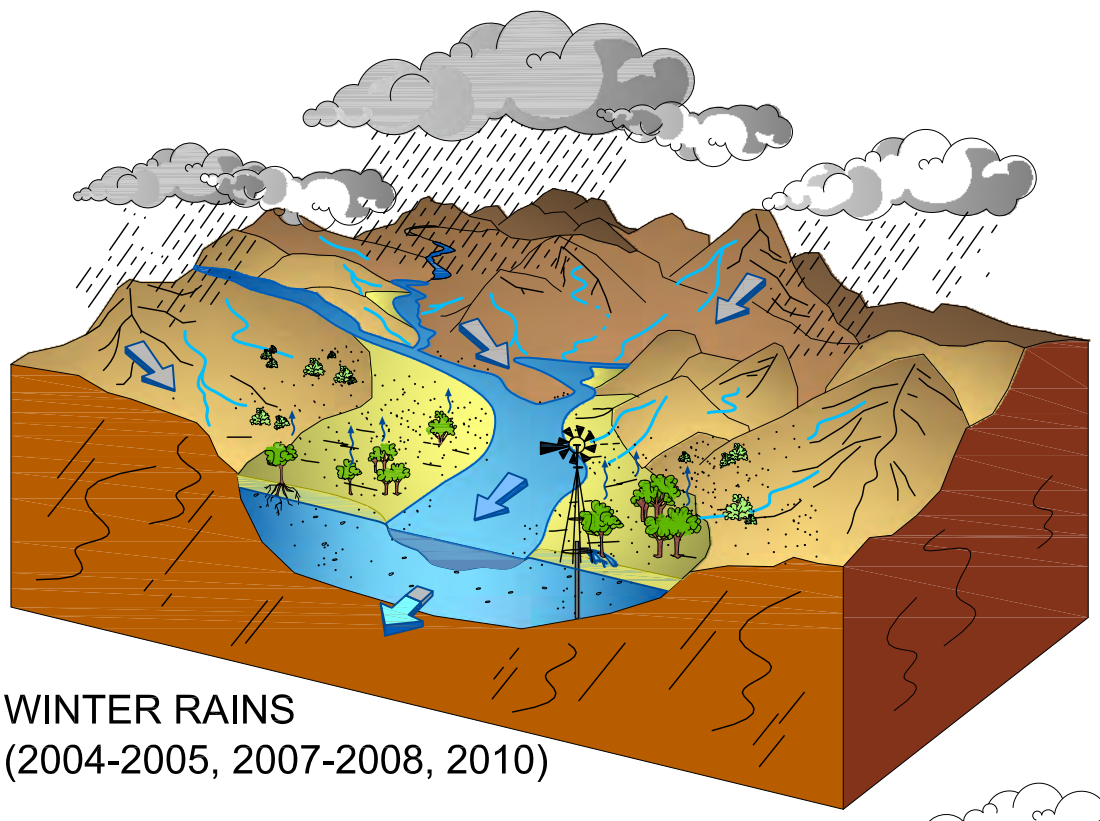
Drafting\605.1216\FINALReport_Feb18_2013\cross-section_clippedSCALEADJUST\18Feb2013



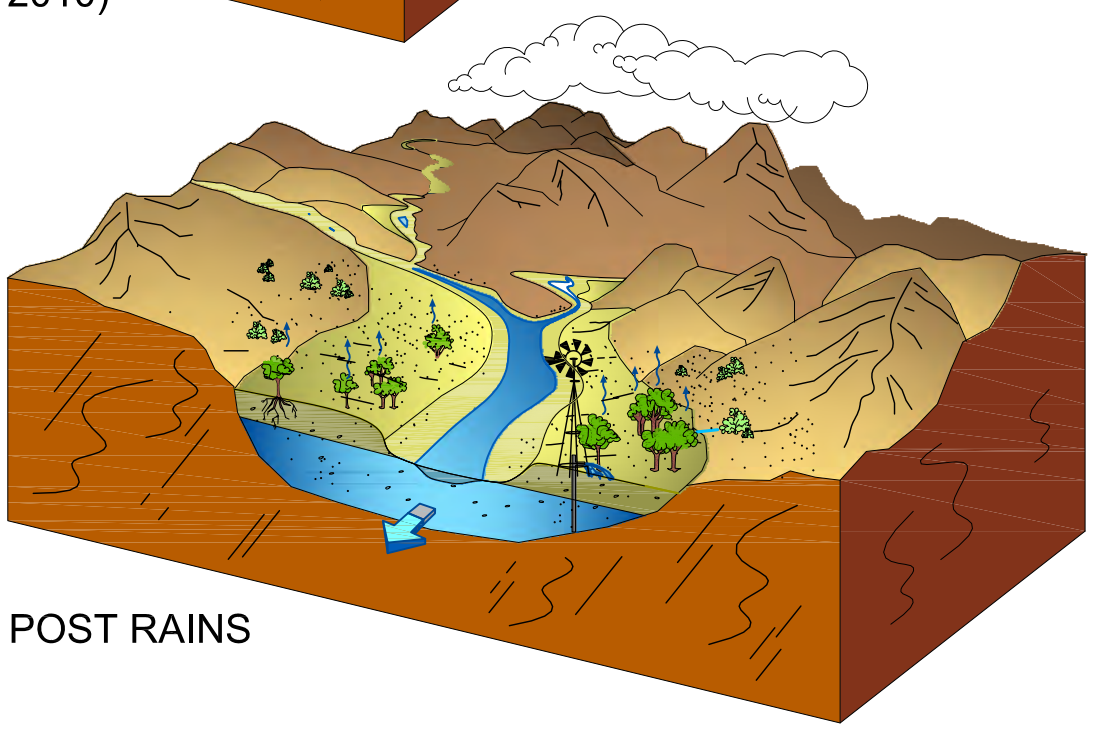
DRY CONDITIONS
(2002-2004, 2011-2012)



FIRST RAINS



WINTER RAINS
(2004-2005, 2007-2008, 2010)



POST RAINS

FIGURE 12. CONCEPTUAL BLOCK DIAGRAMS FOR TYPICAL REACH OF QUEEN CREEK FLOODPLAIN ALLUVIAL AQUIFER UNDER DIFFERENT CLIMATIC CONDITIONS

DRY CONDITIONS

WET CONDITIONS

FIGURE 13. CONCEPTRUAL BLOCK DIAGRAM FOR REACH OF QUEEN CREEK AT QUEEN VALLEY AND WHITLOW DAM - DRY AND WET CONDITIONS

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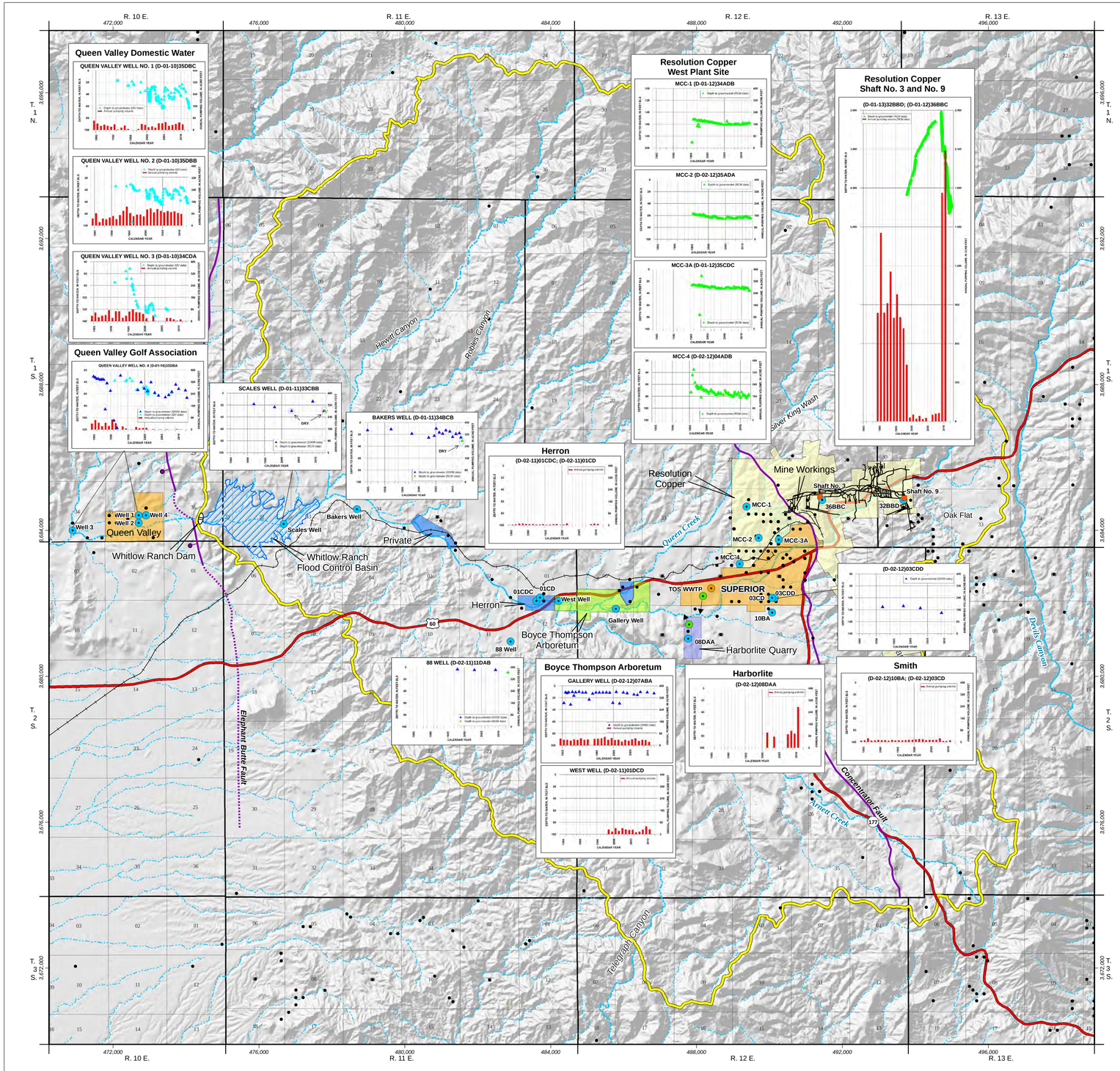

EXPLANATION

- ADWR 55 Well Registry, July 2012
- Location of Pumping and/or Groundwater Level Data
- Town of Superior Waste Water Treatment Plant (TOS WWTP)
- Point of Discharge
- Fault; dotted where inferred; bar and ball on downthrown side
- Railroad
- Watershed Boundary, Superior Basin
- Townsite or Subdivision
- BoyceThompson Arboretum
- Resolution Copper Property
- Harborlite Quarry
- Other Private Lands

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0 2,000 4,000 6,000 8,000
Feet

0 500 1,000 1,500 2,000
Meters

Resolution Copper Mining

QUEEN CREEK CORRIDOR SURVEY
Pinal County, Arizona

PUMPING VOLUMES AND GROUNDWATER LEVEL HYDROGRAPHS

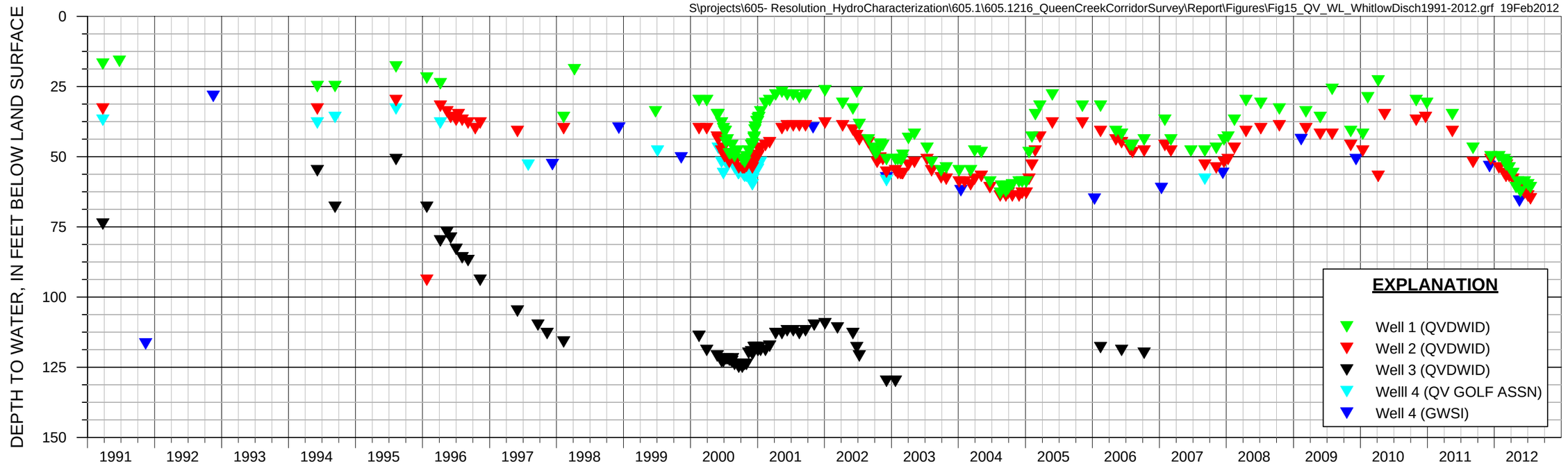
2013

MONTGOMERY & ASSOCIATES
Water Resource Consultants

FIGURE 14

GIS-TUC\605.1212\SUPERIOR-BASIN_report\FINALReport_Feb19_2013\2012HydroGRAPHS\18Feb2013

S\projects\605- Resolution_HydroCharacterization\605.1\605.1216_QueenCreekCorridorSurvey\Report\Figures\Fig15_QV_WL_WhitlowDisch1991-2012.grf 19Feb2012



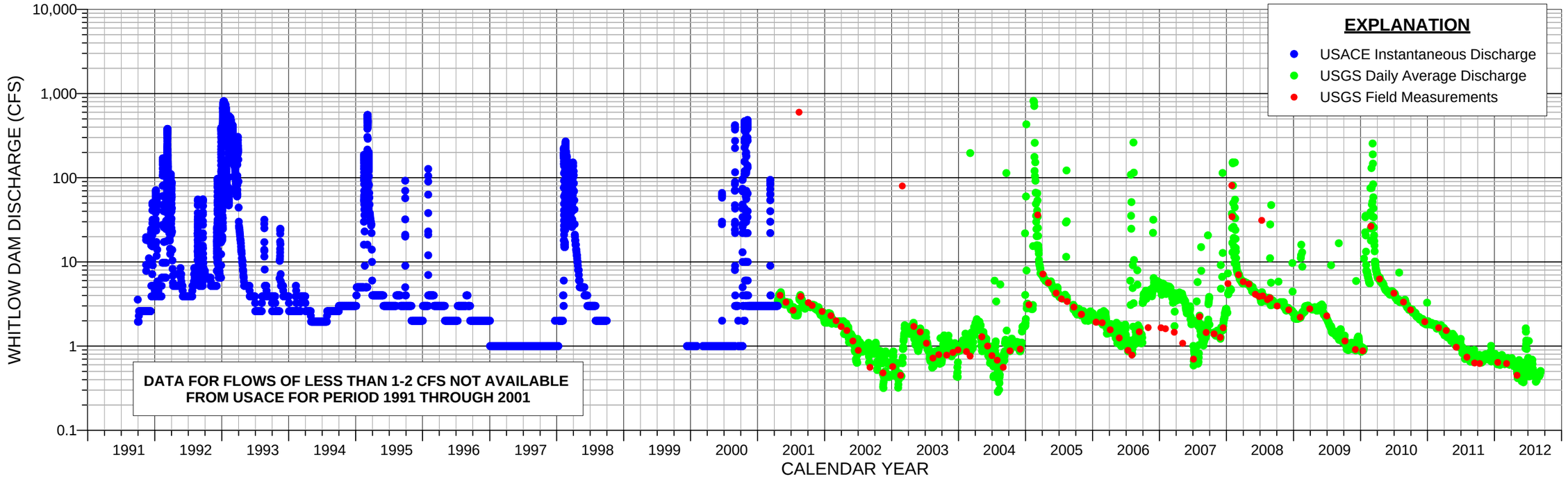


FIGURE 15. GROUNDWATER LEVELS IN WELLS OWNED BY QUEEN VALLEY DOMESTIC WATER AND QUEEN VALLEY GOLF ASSOCIATION AND DISCHARGE FROM OUTLET CULVERT AT WHITLOW RANCH DAM - 1991 THROUGH 2012

MONTGOMERY & ASSOCIATES

EXPLANATION

- Used/Evaporated
- Discharged to Queen Creek
- Transported within or across basin

ALL VOLUMES IN ACRE-FEET (AF) FOR PERIOD 1984 THROUGH 2010

SUPERIOR BASIN PRECIPITATION
(TOTAL = 4,057,000 AF)

EVAPORATION/TRANSPIRATION
(90 % OF PRECIPITATION)
3,651,300 AF

RUNOFF/INTERFLOW/INFILTRATION
(10% OF PRECIPITATION)
405,700 AF

EAST SALT RIVER BASIN | SUPERIOR BASIN

ELEPHANT BUTTE FAULT

CONCENTRATOR FAULT

IN

DESERT WELLFIELD
(TOTAL = 14,000 AF)

MAGMA DEWATERING
1984 – 1998
(TOTAL = 9,000 AF)

Town of Superior

Magma

TOS Waste Water Treatment Plant

Indian Pond Discharge Point 001

DISCHARGED TO QUEEN CREEK

720 AF | **4,470 AF** | **3,200 AF**

OUT

1,860 AF

450 AF

NON-EXEMPT PUMPING

EXEMPT PUMPING
(ESTIMATED)

40

HARBORLITE MINE

Used by New Magma Irrigation District

RCM DEWATERING
2009 – 2010
(TOTAL = 4,000 AF)

OUTFLOW FROM SUPERIOR BASIN AT WHITLOW DAM

180,000 AF

SUMMARY

IN:	4,065,390 AF
OUT:	3,834,370 AF
DIFFERENCE:	231,020 AF

FIGURE 16. WATER BUDGET FOR SUPERIOR BASIN, 1984 THROUGH 2010

MONTGOMERY & ASSOCIATES

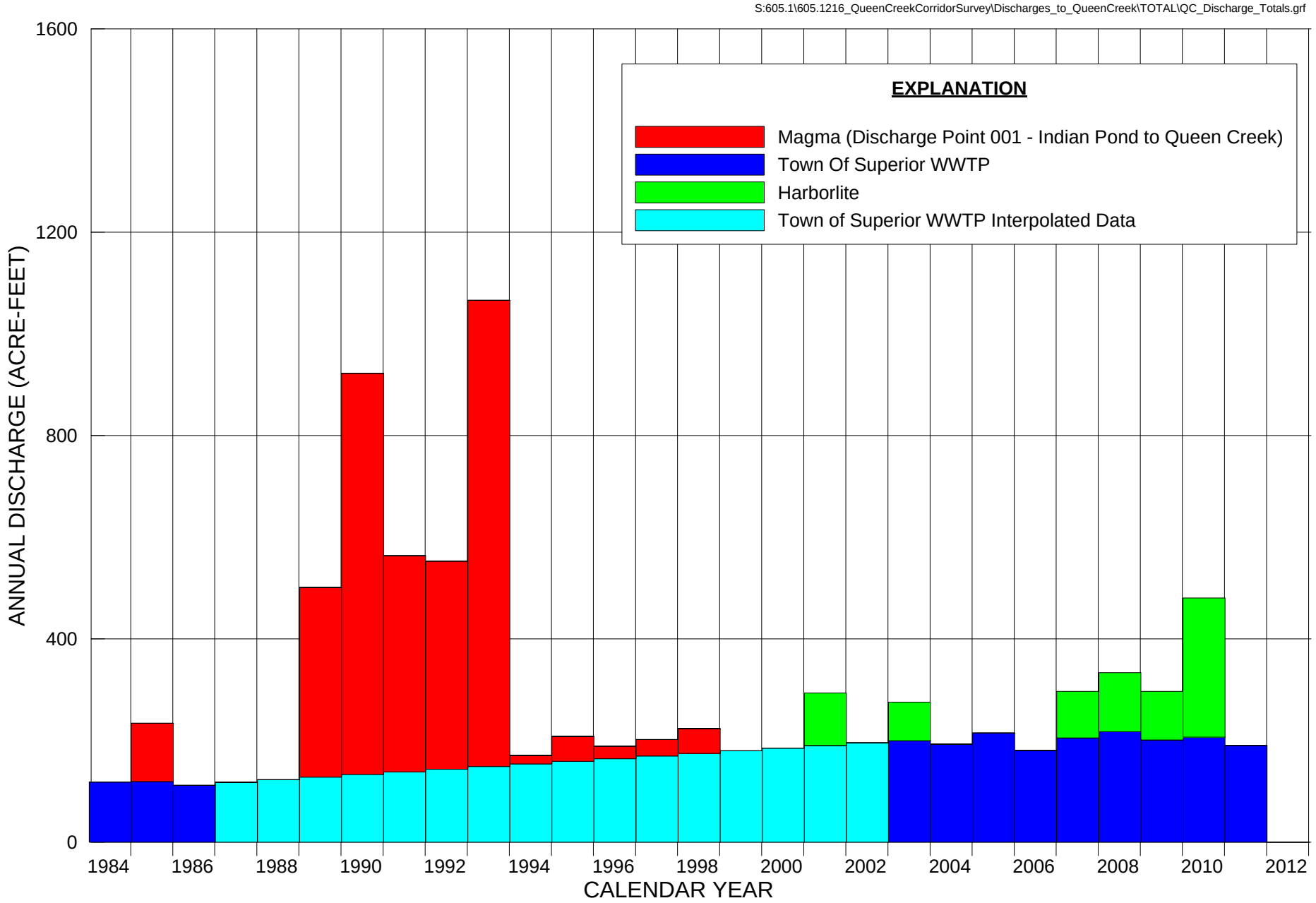


FIGURE 17. ANNUAL DISCHARGES TO QUEEN CREEK - 1984 THROUGH 2011

MONTGOMERY & ASSOCIATES

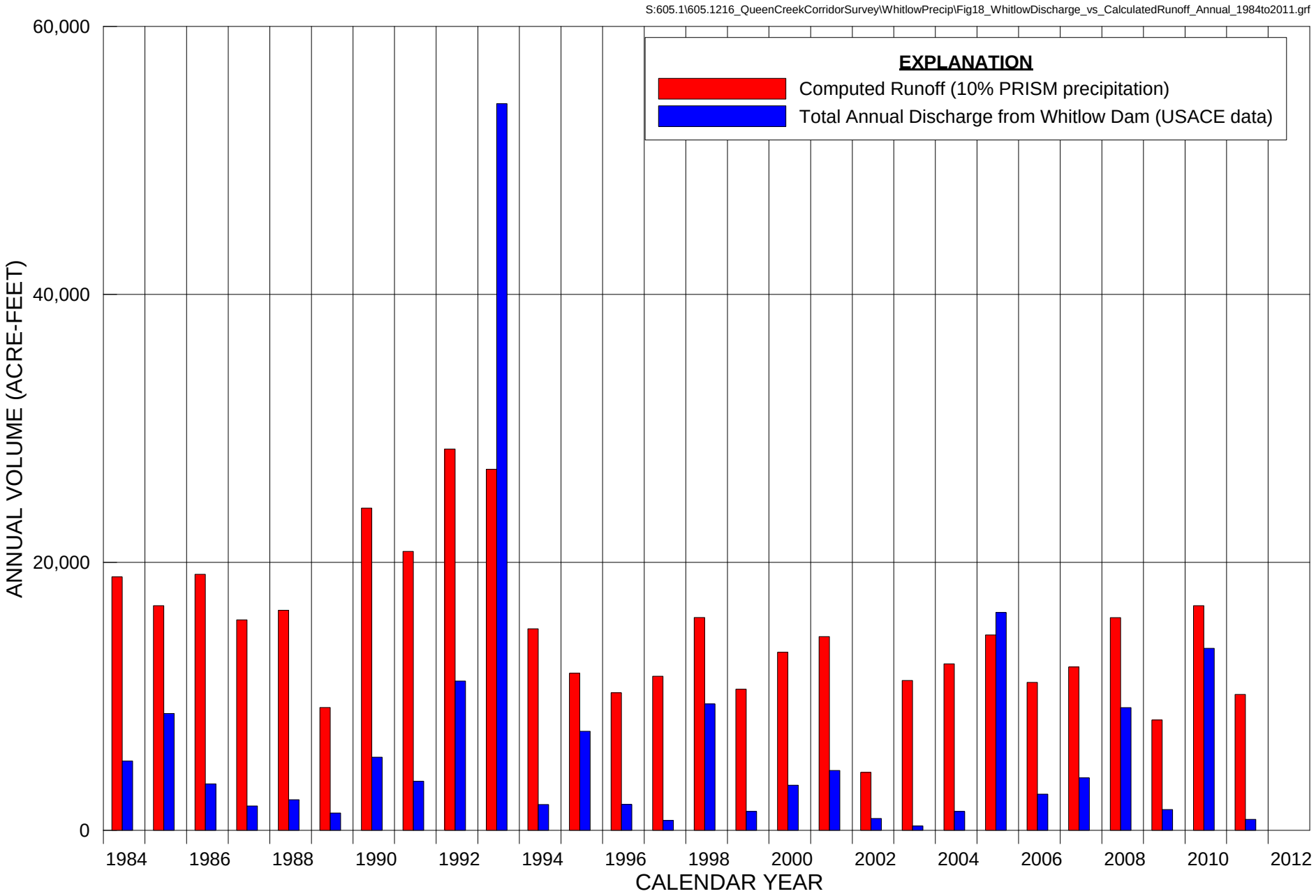


FIGURE 18. ANNUAL VOLUME OF COMPUTED RUNOFF TO SUPERIOR BASIN, AND ANNUAL VOLUME OF DISCHARGE FROM WHITLOW RANCH DAM

MONTGOMERY & ASSOCIATES

APPENDIX A

WELL NUMBERING SYSTEM

MONTGOMERY & ASSOCIATES

WELL NUMBERING SYSTEM

The well numbers used in this study are in accordance with the Bureau of Land Management's system of land subdivision. The land survey in Arizona is based on the Gila and Salt River meridian and base line, which divide the State into four quadrants. These quadrants are designated, counter-clockwise, by the capital letters A, B, C, and D. All land north and east of the point of origin is in quadrant A; all land north and west of the point of origin is in quadrant B; all land south and west is in quadrant C; and land all land south and east is in quadrant D. The first digit of a well number indicates the township, the second digit the range, the third digit the section in which the well is located. The lowercase letters a, b, c, and d after the section number indicate the well location within the section. The first letter denotes the 160-acre tract or quarter section; the second 40-acre tract or quarter-quarter section; the third letter denotes the 10-acre tract or quarter-quarter-quarter section. These letters are also assigned in a counter-clockwise direction, beginning in the northeast quarter. As **Figure A-1** shows, well number (D-01-12) 27aad designates the well as being in the Southeast 1/4 of the Northeast 1/4 of the Northeast 1/4, Section 27, Township 1 South, Range 12 East. Where more than one well is within a 10-acre tract, consecutive numbers, beginning with "1" are added as suffixes.

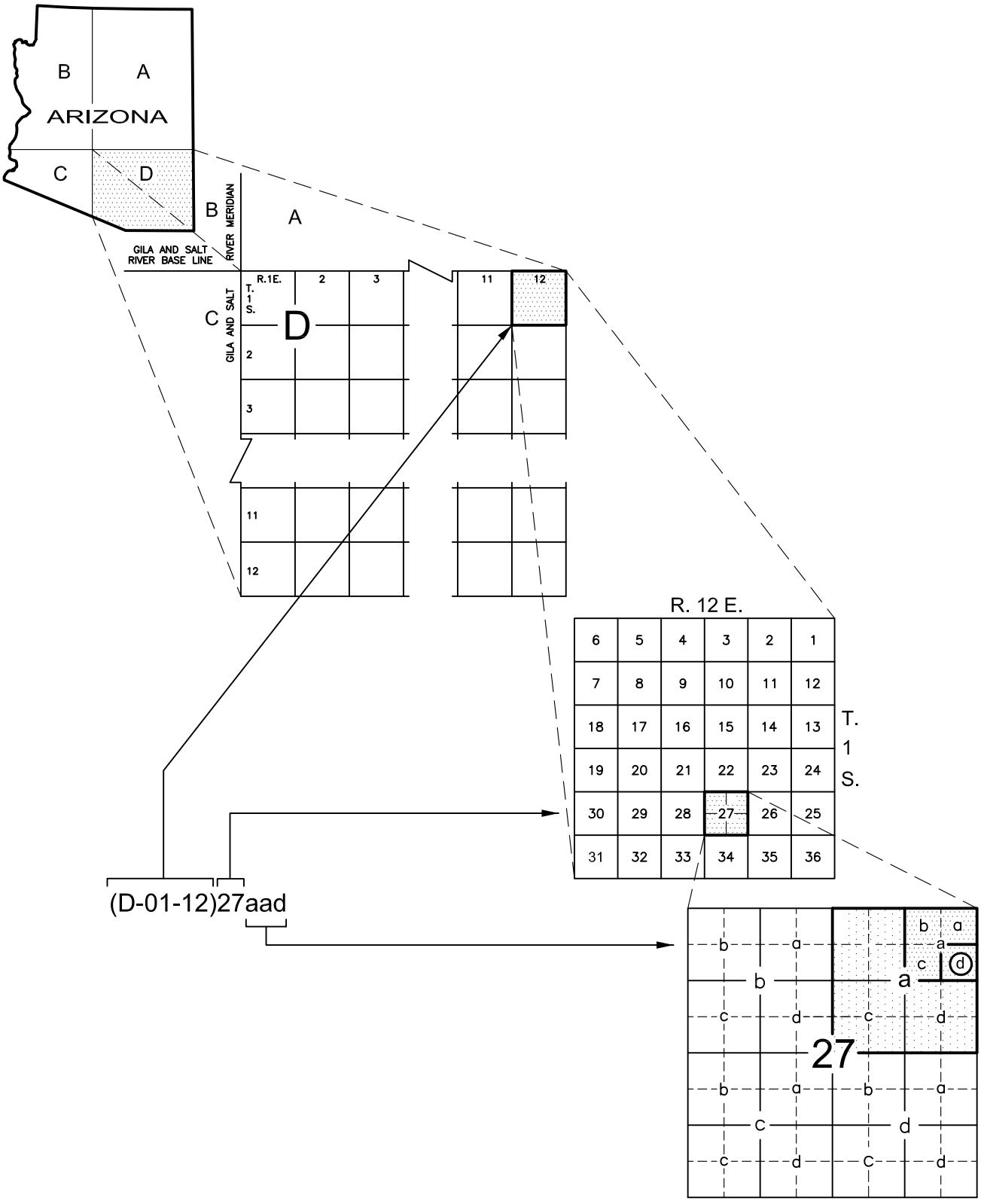


FIGURE A-1. WELL NUMBERING DIAGRAM

MONTGOMERY & ASSOCIATES

APPENDIX B

WELL INVENTORY TABLES FOR SUPERIOR BASIN AND ADJACENT AREAS PINAL COUNTY, ARIZONA

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(A-01-10) 24abc	604328	KNUTSON, A L	1/17/1980	150	23	60	DOMESTIC	NON-EXEMPT	474257	3697859
(A-01-10) 24acb	604330	KNUTSON, A L	3/8/1980	265	125	10	DOMESTIC	EXEMPT	474256	3697658
(A-01-10) 24cca	623362	BONDO, G	3/10/1980	271	0	30	DOMESTIC	EXEMPT	473652	3696854
(A-01-10) 25ccd	633060	MARTIN, W H	12/31/1943	20	10	5	STOCK	EXEMPT	473644	3695038
(A-01-10) 25dd	600801	TONTO NATL FOREST	1/1/1956	0	0	0	STOCK	EXEMPT	474752	3695136
(A-01-10) 36bab	614006	AZ STATE LAND DEPT	1/1/1920	20	7	2	STOCK	EXEMPT	473844	3694837
(A-01-10) 36bab	636283	BACKUS, CHARLES E	1/1/1920	20	10	2	STOCK	EXEMPT	473844	3694837
(A-01-11) 21dd	600823	TONTO NATL FOREST	1/1/1946	0	0	0	STOCK	EXEMPT	479597	3696753
(A-01-11) 22ac	600824	TONTO NATL FOREST	6/15/1956	0	0	0	STOCK	EXEMPT	480790	3697558
(A-01-11) 36ca	600826	TONTO NATL FOREST	1/1/1956	0	0	0	STOCK	EXEMPT	483582	3693897
(A-01-13) 21cdc	221321	CARLOTA COPPER COMPANY	1/11/2006	840	0	0	INDUSTRIAL	NON-EXEMPT	496163	3696638
(A-01-13) 31cbc	533259	CARLOTA COPPER COMPANY	2/4/1992	200	140	0	MONITORING	MONITOR	493575	3693859
(A-01-13) 34cac	907277	CARLOTA COPPER COMPANY	11/21/2007	310	50	0	MONITORING	MONITOR	497758	3693836
(D-01-10) 06ccd	636285	BACKUS, CHARLES E	12/31/1930	100	40	3	STOCK	EXEMPT	465592	3692071
(D-01-10) 23ccc	615225	AZ STATE LAND DEPT	1/1/1953	199	53	0	STOCK	EXEMPT	471837	3687241
(D-01-10) 24bb	805784	BROWN, ROBERTA LEE	12/31/1930	28	10	0	DOMESTIC	EXEMPT	473549	3688541
(D-01-10) 24cab	604329	KNUTSON, A L	4/25/1980	155	40	60	DOMESTIC	NON-EXEMPT	473848	3687835
(D-01-10) 24ccc	524223	RUIZ RANCH, INC	4/24/1989	445	280	0	DOMESTIC	EXEMPT	473443	3687232
(D-01-10) 24ccc	573264	TERRY L. SAMSON	4/16/1999	720	280	5	DOMESTIC	EXEMPT	473443	3687232
(D-01-10) 24dab	574758	VICTORIA BLACKSTONE	8/30/1999	1300	0	0	DOMESTIC	EXEMPT	474652	3687832
(D-01-10) 24dac	577976	VICTORA BLACKSTONE	2/7/2002	860	0	0	STOCK	EXEMPT	474651	3687630
(D-01-10) 24dbb	502152	WORST, C	2/12/1983	1	0	0	DOMESTIC	EXEMPT	474250	3687833
(D-01-10) 24dbc	086429	FAGNAN, THERESA	7/6/1981	460	0	0	DOMESTIC	EXEMPT	474249	3687632
(D-01-10) 24dbc	216105	CHAD SUNIGA	11/7/2007	300	60	0	DOMESTIC	EXEMPT	474249	3687632
(D-01-10) 24dcb	086431	FRANK HARBAUGH	4/23/1981	420	0	5	DOMESTIC	EXEMPT	474248	3687430
(D-01-10) 26dbc	901847	JAMES PITRE		400	0	0	DOMESTIC	EXEMPT	472639	3686031
(D-01-10) 26dbc	912217	JAMES PITRE	6/26/2010	400	128	0	DOMESTIC	EXEMPT	472639	3686031
(D-01-10) 34cad	560276	NEAL A MATHESON	11/22/1996	320	160	35	DOMESTIC	EXEMPT	470824	3684403
(D-01-10) 34cad	566103	JERRY BRYANT		0	0	0	DOMESTIC	EXEMPT	470824	3684403
(D-01-10) 34ccc	506642	LOCKEY, G	12/19/1983	215	0	10	DOMESTIC	EXEMPT	470218	3683989
(D-01-10) 34ccc	600749	MANUEL RUIZ, JR	7/7/1971	450	260	15	DOMESTIC	EXEMPT	470218	3683989
(D-01-10) 34cda	566201	PAUL T BRYANT		0	0	0	DOMESTIC	EXEMPT	470824	3684198
(D-01-10) 34cda	579264	JERRY K HEGLIE	2/9/2002	250	180	13	DOMESTIC	EXEMPT	470824	3684198
(D-01-10) 34cda	628139	QUEEN VALLEY DOMESTIC WATER IMP DIST	3/15/2002	380	106	110	UTILITY (WATER CO)	NON-EXEMPT	470824	3684198
(D-01-10) 34dcd	201500	QUEEN VALLEY SANITARY DISTRICT		0	0	0	MONITORING	MONITOR	471227	3683993
(D-01-10) 34ddd	569484	SANDRA TALKINGTON		0	0	0	DOMESTIC	EXEMPT	471630	3683995
(D-01-10) 34ddd	576720	SANDRA TALKINGTON	12/20/1999	240	100	0	DOMESTIC	EXEMPT	471630	3683995

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-01-10) 35acd	527562	GREEN VALLEY GOLF		0	0	0	COMMERCIAL	NON-EXEMPT	472836	3684815
(D-01-10) 35acd	534890	QUEEN VALLEY GOLF ASSOCIATION		0	0	0	IRRIGATION	NON-EXEMPT	472836	3684815
(D-01-10) 35acd	559028	QUEEN VALLEY GOLF ASSOC		0	0	0	OTHER - PRODUCTION	NON-EXEMPT	472836	3684815
(D-01-10) 35acd	630349	QUEEN VALLEY GOLF ASSOC	4/1/1977	440	50	225	IRRIGATION	NON-EXEMPT	472836	3684815
(D-01-10) 35ca	803597	LUMPKINS, THELMA		0	0	0	DOMESTIC	EXEMPT	472333	3684509
(D-01-10) 35cba	629579	TUCK, J C	7/28/1970	100	75	19	DOMESTIC	EXEMPT	472033	3684610
(D-01-10) 35cbb	202372	TED NELANDER	3/10/2004	300	123	0	DOMESTIC	EXEMPT	471832	3684610
(D-01-10) 35cbb	600694	SMITH, THOMAS		135	70	17	DOMESTIC	EXEMPT	471832	3684610
(D-01-10) 35cbb	807664	TED NELANDER	10/1/1971	135	95	0	DOMESTIC	EXEMPT	471832	3684610
(D-01-10) 35cbc	556175	GOLD, TARI	9/17/1996	140	84	15	DOMESTIC	EXEMPT	471831	3684405
(D-01-10) 35cbd	522904	ROBERTS, JAMESR	12/12/1988	100	41	15	DOMESTIC	EXEMPT	472032	3684406
(D-01-10) 35cbd	527855	FENDLEY, J T	4/26/1990	96	54	20	DOMESTIC	EXEMPT	472032	3684406
(D-01-10) 35cbd	628579	CROSSWHITE, F J	10/1/1969	100	37	30	IRRIGATION	NON-EXEMPT	472032	3684406
(D-01-10) 35cbd	629825	FENDLEY, J T	7/1/1969	80	32	25	DOMESTIC	EXEMPT	472032	3684406
(D-01-10) 35cbd	630922	CRAMER, E E	4/1/1973	100	40	0	DOMESTIC	EXEMPT	472032	3684406
(D-01-10) 35cbd	639839	DEAN, MATTHEW J		0	0	0	DOMESTIC	EXEMPT	472032	3684406
(D-01-10) 35dba	628140	QUEEN VALLEY GOLF ASSOCIATION	6/1/1977	440	40	140	DOMESTIC	NON-EXEMPT	472836	3684611
(D-01-10) 35dbb	628138	QUEEN VALLEY DOM WTR		500	50	145	DOMESTIC	NON-EXEMPT	472635	3684611
(D-01-10) 35dbc	628137	QUEEN VALLEY DOM WTR		550	20	100	DOMESTIC	NON-EXEMPT	472634	3684407
(D-01-10) 35ddc	219737	ROBERT LEE DICKINSON	4/15/2010	200	74	0	DOMESTIC	EXEMPT	473034	3684001
(D-01-11) 01ba	600800	TONTO NATL FOREST	1/1/1956	0	0	0	STOCK	EXEMPT	482247	3693095
(D-01-11) 11ca	600799	TONTO NATL FOREST	1/1/1966	0	0	0	STOCK	EXEMPT	480629	3690812
(D-01-11) 13ba	600828	TONTO NATL FOREST	1/1/1956	0	0	0	STOCK	EXEMPT	482240	3689998
(D-01-11) 21dd	600861	TONTO NATL FOREST	1/6/1947	0	0	0	STOCK	EXEMPT	478228	3687204
(D-01-11) 22ad	600825	TONTO NATL FOREST	2/14/1917	0	0	0	STOCK	EXEMPT	479819	3688004
(D-01-11) 32da	632789	TONTO NATL FOREST	1/9/1947	0	0	0	STOCK	EXEMPT	476614	3684371
(D-01-11) 34bc	600936	TONTO NATL FOREST	1/1/1946	0	0	0	STOCK	EXEMPT	478626	3684782
(D-01-11) 34dad	624611	RESOLUTION COPPER MINING, LLC	1/1/1921	35	10	25	DOMESTIC	EXEMPT	479920	3684262
(D-01-11) 35	804012	JEFFREY, ALBERT L	1/1/1978	107	35	18	DOMESTIC	EXEMPT	480823	3684570
(D-01-11) 35abc	633059	MARTIN, W H	6/24/1950	110	60	15	DOMESTIC	EXEMPT	480924	3685083
(D-01-11) 35dbb	502051	ROSE, R	10/26/1981	100	48	5	DOMESTIC	EXEMPT	480924	3684468
(D-01-11) 35dca	501586	OLIVER, B L	1/1/1981	135	45	12	DOMESTIC	EXEMPT	481125	3684058
(D-01-11) 35ddc	514505	BERRY, GENE	6/10/1986	100	60	0	DOMESTIC	EXEMPT	481326	3683854
(D-01-12) 02caa	218637	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	490372	3692430
(D-01-12) 02ccc	550994	GOMEZ, JESUS	9/1/1995	760	125	0	DOMESTIC	EXEMPT	489760	3691864
(D-01-12) 03baa	906344	RESOLUTION COPPER MINING, LLC	1/30/2007	12	5	0	MONITORING	MONITOR	488766	3693176
(D-01-12) 03bdb	631205	PADILLA, F N		0	0	0	IRRIGATION	NON-EXEMPT	488562	3692802

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-01-12) 03bdb	631206	PADILLA, F N		0	0	0	IRRIGATION	NON-EXEMPT	488562	3692802
(D-01-12) 13	801491	PETTIJOHN, C E	1/1/1900	80	130	150	INDUSTRIAL	NON-EXEMPT	492086	3689355
(D-01-12) 13aab	562908	CHARLES E PETTIJOHN	6/3/1998	400	0	0	DOMESTIC	EXEMPT	492592	3690063
(D-01-12) 13aab	581594	JOHN H DALTON SR		0	0	0	---	EXEMPT	492592	3690063
(D-01-12) 16db	600935	TONTO NATL FOREST	1/1/1956	0	0	0	STOCK	EXEMPT	487461	3689163
(D-01-12) 19cb	600827	TONTO NATL FOREST	6/30/1956	0	0	0	STOCK	EXEMPT	483425	3687561
(D-01-12) 24	801492	PETTIJOHN, C E	1/1/1900	80	30	150	INDUSTRIAL	NON-EXEMPT	492082	3687741
(D-01-12) 24	909919	OMYA ARIZONA INC.		0	0	0	NONE	OTHER	492082	3687741
(D-01-12) 25	519696	BHP COPPER INC	12/11/1987	0	0	0	NONE	OTHER	492081	3686134
(D-01-12) 26acc	912289	RESOLUTION	8/7/2010	2130	100	0	MONITORING	MONITOR	490570	3686238
(D-01-12) 26cdc	558204	BHP COPPER	8/26/1996	430	0	0	MONITORING	MONITOR	490169	3685442
(D-01-12) 27aad	501253	TONTO NATL FOREST	10/21/1981	40	25	2	STOCK	EXEMPT	489568	3686642
(D-01-12) 31dd	600883	TONTO NATL FOREST	1/1/1956	0	0	0	STOCK	EXEMPT	484616	3683945
(D-01-12) 32	914002	FREEPORT MCMORAN COPPER & GOLD-SUPERIOR		0	0	0	NONE	OTHER	485629	3684542
(D-01-12) 33	914003	FREEPORT MCMORAN COPPER & GOLD - SUPERIOR		0	0	0	NONE	OTHER	487244	3684545
(D-01-12) 34	594161	BHP COPPER INC		0	0	0	MINERAL EXPLORATION	OTHER	488861	3684542
(D-01-12) 34	594163	BHP COPPER INC		0	0	0	MINERAL EXPLORATION	OTHER	488861	3684542
(D-01-12) 34aac	522271	SOUTHWEST GAS CORP	12/2/1988	120	0	0	NONE	OTHER	489362	3685045
(D-01-12) 34adb	548184	RESOLUTION COPPER MINING, LLC	3/26/1995	93	42	0	MONITORING	MONITOR	489363	3684844
(D-01-12) 34adb	550412	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	489363	3684844
(D-01-12) 34adc	594157	BHP COPPER INC		0	0	0	MONITORING	MONITOR	489364	3684643
(D-01-12) 34adc	594159	BHP COPPER INC		0	0	0	MONITORING	MONITOR	489364	3684643
(D-01-12) 34add	591860	BHP BILLITON		440	187	0	TEST	MONITOR	489567	3684643
(D-01-12) 34dbc	218677	RESOLUTION COPPER MINING, LLC	3/7/2009	3018	0	0	MONITORING	MONITOR	488962	3684243
(D-01-12) 34dbc	550404	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	488962	3684243
(D-01-12) 34dbc	550405	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	488962	3684243
(D-01-12) 34dbc	550406	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	488962	3684243
(D-01-12) 34dbc	558205	RESOLUTION COPPER MINING, LLC	7/16/1996	600	42	0	MONITORING	MONITOR	488962	3684243
(D-01-12) 34dbc	558206	RESOLUTION COPPER MINING, LLC	7/24/1996	225	48	0	MONITORING	MONITOR	488962	3684243
(D-01-12) 34dbc	563621	RESOLUTION COPPER MINING, LLC	8/19/1997	55	30	0	MONITORING	MONITOR	488962	3684243
(D-01-12) 34dbc	912420	RESOLUTION COPPER	8/28/2010	4018	270	0	MONITORING	MONITOR	488962	3684243
(D-01-12) 34dda	550410	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	489571	3684039
(D-01-12) 34dda	550411	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	489571	3684039
(D-01-12) 34dda	558209	RESOLUTION COPPER MINING, LLC	8/21/1996	225	145	0	NONE	OTHER	489571	3684039
(D-01-12) 35	519005	RESOLUTION COPPER MINING, LLC	9/21/1987	0	0	0	NONE	OTHER	490476	3684535
(D-01-12) 35	594162	BHP COPPER INC		0	0	0	MINERAL EXPLORATION	OTHER	490476	3684535
(D-01-12) 35	594164	BHP COPPER INC		0	0	0	MINERAL EXPLORATION	OTHER	490476	3684535

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-01-12) 35	621501	VAUGHAN,B G	1/1/1935	100	25	45	STOCK	NON-EXEMPT	490476	3684535
(D-01-12) 35	633593	URQUIJO, JOE M	11/21/1996	300	240	10	IRRIGATION	EXEMPT	490476	3684535
(D-01-12) 35	906297	RESOLUTION COPPER MINING, LLC	2/2/2007	20	15	0	NONE	OTHER	490476	3684535
(D-01-12) 35aaa	218766	RESOLUTION COPPER MINING, LLC		0	0	0	MINERAL EXPLORATION	NON-EXEMPT	491177	3685231
(D-01-12) 35aac	912484	RESOLUTION COPPER MINING, LLC	11/28/2010	4233	2466	0	MONITORING	MONITOR	490977	3685033
(D-01-12) 35aac	912941	RESOLUTION COPPER MINING, LLC		4012	3154	0	MONITORING	MONITOR	490977	3685033
(D-01-12) 35adb	558203	RESOLUTION COPPER COMPANY	8/7/1996	121	50	0	MONITORING	MONITOR	490979	3684832
(D-01-12) 35add	907034	RESOLUTION COPPER COMPANY	5/24/2007	190	60	0	MONITORING	MONITOR	491183	3684630
(D-01-12) 35bbc	914375	RESOLUTION COPPER MINING, LLC		0	0	0	---	MONITOR	489766	3685044
(D-01-12) 35bcc	200644	BHP SUPERIOR OPERATIONS		0	0	0	NONE	OTHER	489769	3684642
(D-01-12) 35bcd	218676	RESOLUTION COPPER MINING, LLC	2/28/2009	2340	0	0	MONITORING	MONITOR	489971	3684640
(D-01-12) 35bcd	910437	RESOLUTION COPPER MINING, LLC	2/16/2009	1962	0	0	MONITORING	MONITOR	489971	3684640
(D-01-12) 35bdd	910699	RESOLUTION COPPER MINING, LLC	5/12/2009	88	67	0	MONITORING	MONITOR	490375	3684637
(D-01-12) 35c	561537	RESOLUTION COPPER MINING, LLC		0	0	0	NONE	OTHER	490076	3684136
(D-01-12) 35cab	550403	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	490175	3684438
(D-01-12) 35cab	550407	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	490175	3684438
(D-01-12) 35cab	558207	RESOLUTION COPPER MINING, LLC	7/29/1996	100	48	0	MONITORING	MONITOR	490175	3684438
(D-01-12) 35cac	560980	SHACKELFORD, LEROY H	4/15/1997	240	0	7	DOMESTIC	EXEMPT	490176	3684237
(D-01-12) 35cba	907036	RESOLUTION COPPER COMPANY	5/29/2007	130	120	0	MONITORING	MONITOR	489972	3684439
(D-01-12) 35cba	910698	RESOLUTION COPPER MINING, LLC	5/12/2009	180	110	0	MONITORING	MONITOR	489972	3684439
(D-01-12) 35cbb	548188	RESOLUTION COPPER MINING, LLC	3/29/1995	325	59	0	MONITORING	MONITOR	489770	3684440
(D-01-12) 35ccd	906303	RESOLUTION COPPER MINING, LLC	1/29/2007	17	8	0	MONITORING	MONITOR	489977	3683836
(D-01-12) 35cdb	550409	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	490178	3684036
(D-01-12) 35cdb	550413	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	490178	3684036
(D-01-12) 35cdb	550414	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	490178	3684036
(D-01-12) 35cdb	558208	RESOLUTION COPPER MINING, LLC	7/27/1996	390	8	0	MONITORING	MONITOR	490178	3684036
(D-01-12) 35cdc	548186	RESOLUTION COPPER MINING, LLC	3/23/1995	500	0	0	MONITORING	MONITOR	490179	3683834
(D-01-12) 35cdc	563622	RESOLUTION COPPER MINING, LLC	8/20/1997	122	44	0	MONITORING	MONITOR	490179	3683834
(D-01-12) 35cdc	906298	RESOLUTION COPPER MINING, LLC	1/25/2007	27	17	0	MONITORING	MONITOR	490179	3683834
(D-01-12) 35dab	907035	RESOLUTION COPPER COMPANY	6/4/2007	140	0	0	MONITORING	MONITOR	490983	3684432
(D-01-12) 35dba	914372	RESOLUTION COPPER MINING, LLC		150	74	0	---	MONITOR	490781	3684433
(D-01-12) 35dba	914374	RESOLUTION COPPER MINING, LLC		0	0	0	---	MONITOR	490781	3684433
(D-01-12) 35dbc	807409	WALKER, GLADYS M	1/10/1997	265	200	15	DOMESTIC	EXEMPT	490581	3684234
(D-01-12) 35dbc	914373	RESOLUTION COPPER MINING, LLC		80	45	0	---	MONITOR	490581	3684234
(D-01-12) 35dbd	803944	NADER, GERTRUDE L	4/14/1986	125	10	30	DOMESTIC	EXEMPT	490783	3684232
(D-01-12) 35dc	650993	GUERRA, G E		42	36	25	IRRIGATION	EXEMPT	490684	3683932
(D-01-12) 36	519007	RESOLUTION COPPER MINING, LLC	10/24/1987	0	0	0	NONE	OTHER	492094	3684529
(D-01-12) 36bbc	525311	RESOLUTION COPPER MINING, LLC		0	0	0	MINING	OTHER	491381	3685030
(D-01-13) 03abd	609690	INTEGRITY LAND AND CATTLE, LLC	6/26/1964	1500	390	35	STOCK	EXEMPT	497662	3693061

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-01-13) 07ccc	086780	AUTSON, R		0	0	0	DOMESTIC	EXEMPT	492922	3690303
(D-01-13) 07da	600812	TONTO NATL FOREST	12/31/1980	0	0	0	STOCK	EXEMPT	493274	3690803
(D-01-13) 07dd	600813	TONTO NATL FOREST	1/1/1980	0	0	0	STOCK	EXEMPT	493270	3690396
(D-01-13) 07ddc	609689	INTEGRITY LAND AND CATTLE, LLC		180	5	35	STOCK	EXEMPT	493240	3690295
(D-01-13) 17	907478	OMYA ARIZONA INC.	9/10/2007	0	0	0	NONE	OTHER	494127	3689373
(D-01-13) 17	909920	OMYA ARIZONA INC.		0	0	0	NONE	OTHER	494127	3689373
(D-01-13) 17bbd	609683	INTEGRITY LAND AND CATTLE, LLC		180	0	10	STOCK	EXEMPT	493624	3689884
(D-01-13) 17dcb	609674	INTEGRITY LAND AND CATTLE, LLC		30	15	45	STOCK	NON-EXEMPT	494227	3688867
(D-01-13) 18	909921	OMYA ARIZONA INC.		0	0	0	NONE	OTHER	493109	3689393
(D-01-13) 19	909922	OMYA ARIZONA INC.		0	0	0	NONE	OTHER	493112	3687765
(D-01-13) 21abc	609682	INTEGRITY LAND AND CATTLE, LLC	11/1/1964	1200	360	35	STOCK	EXEMPT	495838	3688259
(D-01-13) 21cbc	912601	RESOLUTION COPPER	3/3/2011	6724	1010	0	MONITORING	MONITOR	495030	3687445
(D-01-13) 21cbc	912917	RESOLUTION COPPER MINING, LLC		2140	206	0	MONITORING	MONITOR	495030	3687445
(D-01-13) 22acc	912993	RESOLUTION COPPER MINING, LLC	4/3/2011	1460	529	0	MONITORING	MONITOR	497444	3687864
(D-01-13) 22daa	609681	INTEGRITY LAND AND CATTLE, LLC	1/1/1972	1863	350	35	STOCK	EXEMPT	498047	3687665
(D-01-13) 27cbd	913292	RESOLUTION COPPER MINING, LLC	6/17/2011	1978	648	0	MONITORING	MONITOR	496837	3685836
(D-01-13) 27ccc	609678	INTEGRITY LAND AND CATTLE, LLC	5/1/1971	1082	360	35	STOCK	EXEMPT	496636	3685427
(D-01-13) 28aad	609677	INTEGRITY LAND AND CATTLE, LLC	8/1/1973	1400	360	35	STOCK	EXEMPT	496429	3686647
(D-01-13) 28ddb	201851	RESOLUTION COPPER MINING, LLC		1500	342	0	MONITORING	MONITOR	496233	3685630
(D-01-13) 28ddc	526592	TONTO NATL FOREST	4/28/1990	936	287	0	NONE	OTHER	496234	3685427
(D-01-13) 29cdd	609673	INTEGRITY LAND AND CATTLE, LLC	8/9/1924	18	6	80	STOCK	NON-EXEMPT	494017	3685437
(D-01-13) 31db	600804	TONTO NATL FOREST	1/1/1956	0	0	0	STOCK	EXEMPT	493157	3684330
(D-01-13) 32	206156	RESOLUTION COPPER MINING, LLC		0	0	0	MINERAL EXPLORATION	OTHER	494120	3684530
(D-01-13) 32	526327	MAGMA COPPER CO		0	0	0	NONE	OTHER	494120	3684530
(D-01-13) 32	557633	BHP COPPER INC		0	0	0	NONE	OTHER	494120	3684530
(D-01-13) 32aac	912634	RESOLUTION COPPER MINING, LLC		6735	0	0	MINERAL EXPLORATION	OTHER	494622	3685032
(D-01-13) 32bac	912625	RESOLUTION COPPER MINING, LLC		7310	0	0	MINERAL EXPLORATION	OTHER	493812	3685033
(D-01-13) 32bbd	525312	RESOLUTION COPPER MINING, LLC		0	0	0	MINING	OTHER	493609	3685033
(D-01-13) 32bca	201852	RESOLUTION COPPER MINING, LLC		1600	0	0	MONITORING	MONITOR	493611	3684832
(D-01-13) 32bdd	213994	RESOLUTION COPPER MINING, LLC		7634	0	0	MINERAL EXPLORATION	OTHER	494017	3684631
(D-01-13) 32bdd	512401	HYDR/WTR RESOUR		0	0	0	NONE	OTHER	494017	3684631
(D-01-13) 32bdd	516107	UNIV OF AZ	11/10/1986	146	0	0	NONE	OTHER	494017	3684631
(D-01-13) 32caa	217417	RESOLUTION COPPER MINING, LLC		6485	300	0	MONITORING	MONITOR	494019	3684430
(D-01-13) 32cab	217418	RESOLUTION COPPER MINING, LLC		0	0	0	MINERAL EXPLORATION	OTHER	493816	3684430
(D-01-13) 32cab	218877	RESOLUTION COPPER MINING, LLC		1535	0	0	MINERAL EXPLORATION	OTHER	493816	3684430
(D-01-13) 32cab	536975	UNIVERSITY OF ARIZONA/DEPT OF HYDROLOGY	1/6/1993	662	634	0	NONE	OTHER	493816	3684430
(D-01-13) 32cab	546847	UNIVERSITY OF ARIZONA	12/16/1994	560	555	0	NONE	MONITOR	493816	3684430
(D-01-13) 32cab	911951	RESOLUTION COPPER MINING, LLC		0	0	0	MINERAL EXPLORATION	OTHER	493816	3684430

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-01-13) 32dbb	914053	RESOLUTION COPPER MINING, LLC		0	0	0	NONE	OTHER	494222	3684430
(D-01-13) 32dbd	206873	RESOLUTION COPPER MINING, LLC		0	0	0	NONE	OTHER	494426	3684228
(D-01-13) 32dbd	213993	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	494426	3684228
(D-01-13) 32dbd	217407	RESOLUTION COPPER MINING, LLC	9/11/2008	6713	1935	0	MONITORING	MONITOR	494426	3684228
(D-01-13) 32dbd	551745	RESOLUTION COPPER MINING, LLC	2/13/1996	0	0	0	NONE	OTHER	494426	3684228
(D-01-13) 32dbd	590833	RESOLUTION COPPER MINING, LLC	1/30/2003	0	0	0	NONE	MONITOR	494426	3684228
(D-01-13) 32dbd	913244	RESOLUTION COPPER MINING, LLC		7477	0	0	MINERAL EXPLORATION	OTHER	494426	3684228
(D-01-13) 32dca	201850	RESOLUTION COPPER MINING, LLC		1310	295	0	MONITORING	MONITOR	494428	3684027
(D-01-13) 32dca	599453	RESOLUTION COPPER MINING, LLC		0	0	0	---	OTHER	494428	3684027
(D-01-13) 32dcd	532680	MAGMA COPPER CO		0	0	0	NONE	OTHER	494430	3683825
(D-01-13) 32dcd	562940	BHP COPPER INC	2/4/1998	2945	5354	0	NONE	OTHER	494430	3683825
(D-01-13) 32dcd	587213	RESOLUTION COPPER MINING, LLC		0	0	0	TEST	MONITOR	494430	3683825
(D-01-13) 33	526328	MAGMA COPPER CO		0	0	0	NONE	MONITOR	495733	3684528
(D-01-13) 33ccd	201849	RESOLUTION COPPER MINING, LLC		1440	401	0	MONITORING	MONITOR	495237	3683826
(D-01-13) 33ccd	217151	RESOLUTION COPPER MINING, LLC	4/15/2008	6872	0	0	MINERAL EXPLORATION	OTHER	495237	3683826
(D-01-13) 33ccd	217406	RESOLUTION COPPER MINING, LLC	6/23/2008	6002	1916	0	TEST	NON-EXEMPT	495237	3683826
(D-01-13) 33ccd	592574	RESOLUTION COPPER MINING, LLC	1/19/2003	7563	2400	0	MINERAL EXPLORATION	OTHER	495237	3683826
(D-01-13) 33dca	211540	RESOLUTION COPPER MINING, LLC	7/20/2008	7477	0	0	NONE	OTHER	496038	3684026
(D-02-10) 03aac	806619	QUEEN VLY SANITARY	12/31/1920	0	0	0	IRRIGATION	EXEMPT	471406	3683587
(D-02-10) 23bbc	221592	ARIZONA STATE LAND DEPARTMENT		0	0	0	---	OTHER	471859	3678724
(D-02-10) 24aaa	221591	ARIZONA STATE LAND DEPARTMENT		0	0	0	---	OTHER	474877	3678925
(D-02-10) 24aab	914091	RESOLUTION COPPER COMPANY		0	0	0	NONE	OTHER	474676	3678925
(D-02-10) 24cbc	914090	RESOLUTION COPPER COMPANY		0	0	0	MONITORING	NON-EXEMPT	473476	3677918
(D-02-10) 24dbc	615237	AZ STATE LAND DEPT	1/1/1967	525	127	0	STOCK	EXEMPT	474282	3677921
(D-02-10) 25aab	914093	RESOLUTION COPPER COMPANY		0	0	0	NONE	OTHER	474690	3677319
(D-02-10) 25aab	914258	RESOLUTION COPPER COMPANY		0	0	0	TEST	MONITOR	474690	3677319
(D-02-10) 26bab	914079	RESOLUTION COPPER COMPANY		0	0	0	TEST	NON-EXEMPT	472276	3677307
(D-02-10) 26bab	914092	RESOLUTION COPPER COMPANY		0	0	0	NONE	OTHER	472276	3677307
(D-02-10) 35bbb	914080	RESOLUTION COPPER COMPANY		0	0	0	TEST	NON-EXEMPT	471891	3675683
(D-02-10) 35bbb	914094	RESOLUTION COPPER COMPANY		0	0	0	NONE	OTHER	471891	3675683
(D-02-10) 35bdb	914042	RESOLUTION COPPER COMPANY		0	0	0	NONE	MONITOR	472296	3675280
(D-02-10) 35bdb	914044	RIO TINTO RESOLUTION COPPER COMPANY		0	0	0	TEST	NON-EXEMPT	472296	3675280
(D-02-10) 35ccc	221593	ARIZONA STATE LAND DEPARTMENT		0	0	0	---	OTHER	471906	3674267
(D-02-10) 36aaa	914088	RESOLUTION COPPER COMPANY		0	0	0	MONITORING	NON-EXEMPT	474903	3675704
(D-02-10) 36bcb	914095	RESOLUTION COPPER COMPANY		0	0	0	NONE	OTHER	473499	3675285

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-02-10) 36ddd	221594	ARIZONA STATE LAND DEPARTMENT		0	0	0	---	OTHER	474913	3674278
(D-02-10) 36ddd	914096	RESOLUTION COPPER COMPANY		0	0	0	NONE	OTHER	474913	3674278
(D-02-11) 01cd	627523	HERRON, J C	1/1/1920	60	40	40	DOMESTIC	NON-EXEMPT	483643	3682360
(D-02-11) 01cda	215463	FRANCIS PHYLLIS HERRON		0	0	0	IRRIGATION	NON-EXEMPT	483743	3682458
(D-02-11) 01cda	908053	FRANK HERRON	10/28/2007	400	68	35	DOMESTIC	EXEMPT	483743	3682458
(D-02-11) 01cdc	582656	JAMES & PHYLLIS HERRON		0	0	0	IRRIGATION	NON-EXEMPT	483542	3682261
(D-02-11) 01cdc	582657	FRANK HERRON		150	0	25	DOMESTIC	EXEMPT	483542	3682261
(D-02-11) 01cdc	627522	FRANK HERRON		60	40	500	IRRIGATION	NON-EXEMPT	483542	3682261
(D-02-11) 01cdc	627524	FRANK HERRON	1/1/1946	60	40	10	DOMESTIC	EXEMPT	483542	3682261
(D-02-11) 01cdd	904495	ADOT, ATTN:NORM WETZ		60	36	0	MONITORING	MONITOR	483745	3682261
(D-02-11) 01dcd	560518			0	0	300	RECREATION	NON-EXEMPT	484149	3682260
(D-02-11) 02dbb	519775	KAREN & NEIL BLINDAUER	1/27/1988	100	30	20	DOMESTIC	EXEMPT	482330	3682854
(D-02-11) 02dd	600868	TONTO NATL FOREST	1/1/1932	0	0	9	DOMESTIC	EXEMPT	482835	3682360
(D-02-11) 03aaa	504943	HAMRICK, D C	3/9/1983	104	44	15	DOMESTIC	EXEMPT	481320	3683652
(D-02-11) 11da	600808	TONTO NATL FOREST	9/16/1940	0	0	0	STOCK	EXEMPT	482837	3681156
(D-02-11) 12bbb	570829	SHAWN & BITSY WILSON	5/8/1999	240	200	0	DOMESTIC	EXEMPT	483138	3682062
(D-02-11) 15ac	600807	TONTO NATL FOREST	1/1/1966	0	0	0	STOCK	EXEMPT	480830	3679953
(D-02-11) 20	213149	ECCO HOLDINGS LLC		0	0	0	TEST	OTHER	477428	3678161
(D-02-11) 24ac	600806	TONTO NATL FOREST	1/1/1966	0	0	0	STOCK	EXEMPT	484065	3678341
(D-02-11) 25ab	600805	TONTO NATL FOREST	9/23/1959	0	0	0	STOCK	EXEMPT	484061	3677135
(D-02-11) 30aaa	914087	RESOLUTION COPPER COMPANY		0	0	0	MONITORING	NON-EXEMPT	476530	3677259
(D-02-11) 31ccd	636013	SHUMWAY,H C		160	60	30	STOCK	EXEMPT	475319	3674250
(D-02-11) 32aac	221595	ARIZONA STATE LAND DEPARTMENT		0	0	0	---	OTHER	477939	3675453
(D-02-11) 32cbc	914089	RESOLUTION COPPER COMPANY		0	0	0	MONITORING	NON-EXEMPT	476739	3674650
(D-02-12) 01	912847	RESOLUTION COPPER MINING, LLC		4223	0	0	MINERAL EXPLORATION	OTHER	493415	3682939
(D-02-12) 02caa	912725	RESOLUTION COPPER MINING, LLC		629	0	0	MONITORING	MONITOR	491718	3682839
(D-02-12) 02caa	912770	RESOLUTION COPPER MINING, LLC	2/16/2011	3571	664	0	MONITORING	MONITOR	491718	3682839
(D-02-12) 03	621753	BRYANT, P T	1/1/1973	128	30	5	---	EXEMPT	490205	3682939
(D-02-12) 03	634028	TAMERON, F O		30	0	0	---	EXEMPT	490205	3682939
(D-02-12) 03	634259	LIRA JR, H B	1/1/1937	28	7	10	DOMESTIC	EXEMPT	490205	3682939
(D-02-12) 03	636294	ZAVALA, S V	3/15/1969	60	10	20	DOMESTIC	EXEMPT	490205	3682939
(D-02-12) 03	640302	MARTINEZ, G		54	40	12	DOMESTIC	EXEMPT	490205	3682939
(D-02-12) 03	804528	PINO, DIEGO R	6/22/1978	160	85	25	DOMESTIC	EXEMPT	490205	3682939
(D-02-12) 03	906296	RESOLUTION COPPER MINING, LLC	2/1/2007	51	15	0	NONE	OTHER	490205	3682939
(D-02-12) 03a	635650	MENDOZA, H M	1/1/1962	70	50	1	DOMESTIC	EXEMPT	490605	3683335
(D-02-12) 03aaa	529320	SOUTHWEST GAS CORP	11/13/1990	160	0	0	NONE	OTHER	490905	3683630
(D-02-12) 03aaa	529358	TAMERON, RICHARD		0	0	0	DOMESTIC	EXEMPT	490905	3683630

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-02-12) 03aaa	639388	MARTINEZ, M R	1/1/1924	35	25	0	DOMESTIC	EXEMPT	490905	3683630
(D-02-12) 03aaa	643719	SMITH, H	1/1/1958	236	30	20	DOMESTIC	EXEMPT	490905	3683630
(D-02-12) 03aad	575547	TREJO OIL COMPANY	9/30/1999	30	26	0	TEST	MONITOR	490907	3683432
(D-02-12) 03aad	575548	TREJO OIL COMPANY	6/15/1999	30	0	0	MONITORING	MONITOR	490907	3683432
(D-02-12) 03aad	635958	LUCKE J & JOY EVELAND	1/1/1979	117	0	0	DOMESTIC	EXEMPT	490907	3683432
(D-02-12) 03ab	639051	CARTER, H W		48	20	35	DOMESTIC	EXEMPT	490404	3683534
(D-02-12) 03abc	643720	LAYNE, G D	1/1/1907	30	15	0	DOMESTIC	EXEMPT	490305	3683434
(D-02-12) 03abd	528212	D-C ENTERPRISES		0	0	0	DOMESTIC	EXEMPT	490506	3683433
(D-02-12) 03acb	213949	TREJO INVESTMENT	1/4/2007	33	28	0	REMEDIATION	OTHER	490307	3683236
(D-02-12) 03acb	575549	TREJO OIL COMPANY	11/17/1999	20	16	0	TEST	MONITOR	490307	3683236
(D-02-12) 03acb	586003	TREJO OIL COMPANY	5/9/2001	30	12	0	TEST	MONITOR	490307	3683236
(D-02-12) 03acb	590392	TREJO OIL COMPANY	4/18/2002	20	16	0	TEST	MONITOR	490307	3683236
(D-02-12) 03acb	643721	LAYNE, S D	1/1/1907	28	14	0	DOMESTIC	EXEMPT	490307	3683236
(D-02-12) 03add	606678	JOSEPHINE J SAWAIA		0	0	0	---	EXEMPT	490910	3683037
(D-02-12) 03baa	906299	RESOLUTION COPPER MINING, LLC	1/26/2007	22	8	0	MONITORING	MONITOR	490101	3683634
(D-02-12) 03baa	906300	RESOLUTION COPPER MINING, LLC	1/31/2007	17	4	0	MONITORING	MONITOR	490101	3683634
(D-02-12) 03baa	906360	RESOLUTION COPPER MINING, LLC	2/1/2007	14	6	0	MONITORING	MONITOR	490101	3683634
(D-02-12) 03bab	563620	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	489900	3683635
(D-02-12) 03bab	906302	RESOLUTION COPPER MINING, LLC	1/23/2007	27	10	0	MONITORING	MONITOR	489900	3683635
(D-02-12) 03bac	906301	RESOLUTION COPPER MINING, LLC	1/24/2007	82	8	0	MONITORING	MONITOR	489902	3683435
(D-02-12) 03bba	907155	RESOLUTION COPPER MINING, LLC	6/15/2007	35	0	0	MONITORING	MONITOR	489699	3683636
(D-02-12) 03bbb	594158	BHP COPPER INC		0	0	0	MONITORING	MONITOR	489499	3683635
(D-02-12) 03bbb	594160	BHP COPPER INC		0	0	0	MONITORING	MONITOR	489499	3683635
(D-02-12) 03bbc	591861	BHP BILLITON		100	36	0	TEST	MONITOR	489499	3683436
(D-02-12) 03bcb	545883	ADOT-EQUIP SERVICES	12/13/1994	38	15	0	MONITORING	MONITOR	489499	3683239
(D-02-12) 03bcb	545884	ADOT-EQUIP SERVICES	12/13/1994	38	15	0	MONITORING	MONITOR	489499	3683239
(D-02-12) 03bcb	545926	ADOT-EQUIP SERVICES	12/12/1994	38	15	0	MONITORING	MONITOR	489499	3683239
(D-02-12) 03bcb	545927	ADOT-EQUIP SERVICES	12/12/1994	38	15	0	MONITORING	MONITOR	489499	3683239
(D-02-12) 03bcd	559434	RUIZ, MANUEL JR	8/31/1996	400	110	20	DOMESTIC	EXEMPT	489703	3683040
(D-02-12) 03bdc	086423	BESICK, S	1/1/1981	320	102	0	DOMESTIC	EXEMPT	489905	3683040
(D-02-12) 03bdc	529316	TAMERON, JOHN,A	1/16/1991	350	320	20	DOMESTIC	EXEMPT	489905	3683040
(D-02-12) 03cca	638029	WILLIAM OLIVER	5/15/1967	140	40	12	DOMESTIC	EXEMPT	489706	3682447
(D-02-12) 03ccd	086403	BYRD, W J		0	0	0	DOMESTIC	EXEMPT	489707	3682249
(D-02-12) 03cd	602822	SMITH, F S	11/1/1954	300	260	15	STOCK	EXEMPT	490011	3682347
(D-02-12) 03cdb	635076	FLOREZ, F M	1/1/1968	300	270	10	IRRIGATION	EXEMPT	489909	3682446
(D-02-12) 03cdc	528516	GOMEZ, ANGEL	8/4/1990	360	320	10	DOMESTIC	EXEMPT	489910	3682249
(D-02-12) 03cdd	506271	AXA VASQUEZ	9/20/1983	320	280	20	DOMESTIC	EXEMPT	490114	3682248
(D-02-12) 03daa	482329	TREJO OIL COMPANY		0	0	0	REMEDIATION	OTHER	490913	3682838
(D-02-12) 03daa	482330	TREJO OIL COMPANY		0	0	0	REMEDIATION	OTHER	490913	3682838

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-02-12) 03daa	482331	TREJO OIL COMPANY		0	0	0	REMEDIATION	OTHER	490913	3682838
(D-02-12) 03dbb	200978	SOUTHWEST GAS CORPORATION	12/14/2003	100	0	0	OTHER - PRODUCTION	OTHER	490311	3682841
(D-02-12) 03dbc	613780	PADILLA, O R		50	0	0	DOMESTIC	NON-EXEMPT	490313	3682643
(D-02-12) 03dbd	643722	TOMERLIN SR, J R		208	0	0	IRRIGATION	EXEMPT	490516	3682642
(D-02-12) 04	633771	HING, A O	1/1/1958	80	20	5	DOMESTIC	EXEMPT	488591	3682945
(D-02-12) 04aaa	541251	YBARRA, FRANCISCO E	1/7/1994	168	20	0	DOMESTIC	EXEMPT	489297	3683635
(D-02-12) 04aab	563618	BHP COPPER	8/16/1997	590	50	0	MONITORING	MONITOR	489096	3683637
(D-02-12) 04aab	563619	BHP COPPER		713	0	0	NONE	MONITOR	489096	3683637
(D-02-12) 04aca	550408	BHP COPPER INC		0	0	0	MONITORING	MONITOR	488896	3683241
(D-02-12) 04aca	558210	BHP COPPER	8/13/1996	420	120	0	NONE	OTHER	488896	3683241
(D-02-12) 04adb	548187	BHP COPPER INC	4/1/1995	225	138	0	MONITORING	MONITOR	489097	3683240
(D-02-12) 04add	200643	BHP SUPERIOR OPERATIONS		0	0	0	NONE	OTHER	489298	3683041
(D-02-12) 04add	907037	RESOLUTION COPPER COMPANY	5/31/2007	60	53	0	MONITORING	MONITOR	489298	3683041
(D-02-12) 04bad	508525	AZ PUBLIC SERVICE	7/20/1984	150	0	0	NONE	OTHER	488493	3683442
(D-02-12) 04bda	553898	HARBORLITE CORP	10/20/1996	760	700	0	COMMERCIAL	EXEMPT	488494	3683242
(D-02-12) 04dcd	571999	JOHN NORIEGA		0	0	0	DOMESTIC	EXEMPT	488897	3682249
(D-02-12) 04ddc	556793	MASHAW, GREGORY	11/21/1996	220	40	0	DOMESTIC	EXEMPT	489098	3682249
(D-02-12) 04ddc	592991	JOHN R & SUSAN N YBARRA	9/10/2002	200	110	10	DOMESTIC	EXEMPT	489098	3682249
(D-02-12) 05	552442	KENNECOTT EXPLORATION	11/28/1995	0	0	0	NONE	OTHER	486997	3682948
(D-02-12) 05cbc	618724	AZ BOARD OF REGENTS	11/1/1963	120	45	21	DOMESTIC	EXEMPT	486301	3682651
(D-02-12) 05cda	553490	KENNECOTT EXPLORATION	3/5/1996	80	0	0	NONE	OTHER	486895	3682447
(D-02-12) 06d	635628	ARIZONA STATE PARKS	10/1/1940	130	40	35	IRRIGATION	EXEMPT	485816	3682550
(D-02-12) 06d	635629	ARIZONA STATE PARKS	4/10/1973	125	35	35	IRRIGATION	EXEMPT	485816	3682550
(D-02-12) 06daa	552444	KENNECOTT EXPLORATION	1/25/1996	80	0	0	NONE	OTHER	486104	3682850
(D-02-12) 06daa	635758	CHARLES P & BEVERLY M TRIMBLE	7/26/1968	96	37	0	DOMESTIC	EXEMPT	486104	3682850
(D-02-12) 06dac	218525	RICHARD & TINA ROSE	1/16/2009	200	45	0	DOMESTIC	EXEMPT	485910	3682650
(D-02-12) 06ddd	507771	AVENDANO, DANIEL D	4/20/1984	95	50	10	DOMESTIC	EXEMPT	486111	3682253
(D-02-12) 07aba	624605	BOYCE THOMPSON SW AR	1/1/1925	21	18	175	INDUSTRIAL	NON-EXEMPT	485722	3682049
(D-02-12) 08	528041	HARBORLITE CORP	5/31/1990	110	0	0	NONE	OTHER	486998	3681333
(D-02-12) 08	546429	KENNECOTT EXPLORATION	3/22/1995	0	0	0	NONE	OTHER	486998	3681333
(D-02-12) 08add	520421	CASTLEBERRY, OLIN E	2/8/1989	195	40	0	DOMESTIC	EXEMPT	487704	3681434
(D-02-12) 08daa	588114	HARBORLITE CORPORATION		0	0	0	DEWATERING	NON-EXEMPT	487707	3681233
(D-02-12) 09	528040	HARBORLITE CORP	5/31/1990	105	0	0	NONE	OTHER	488603	3681343
(D-02-12) 09	553393	HARBORLITE CORP		0	0	0	NONE	OTHER	488603	3681343
(D-02-12) 09bad	558551	MARTINEZ, GEORGE	8/9/1996	145	15	0	DOMESTIC	EXEMPT	488499	3681841
(D-02-12) 09bbb	552443	KENNECOTT EXPLORATION	3/1/1996	0	0	0	NONE	OTHER	487894	3682040
(D-02-12) 10ba	602821	HARRY E. SMITH AND HELEN E. SMITH, TRUSTEES	4/10/1973	300	240	30	IRRIGATION	NON-EXEMPT	490010	3681948
(D-02-12) 10bab	086388	LIRA, D	2/13/1981	275	90	15	DOMESTIC	EXEMPT	489908	3682049

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-02-12) 11cbb	624610	RESOLUTION COPPER MINING, LLC	1/1/1977	74	7	16	STOCK	EXEMPT	491126	3681247
(D-02-12) 22bdc	582476	FRANK HERRON	8/16/2002	120	40	35	STOCK	EXEMPT	489904	3678244
(D-02-12) 26bbb	801090	GRONLUND, CAROLYN M		0	0	35	DOMESTIC	EXEMPT	491108	3677238
(D-02-12) 26bbc	801092	GRONLUND, CAROLYN M		0	0	30	IRRIGATION	EXEMPT	491107	3677037
(D-02-12) 26bbd	801088	GRONLUND, CAROLYN M		0	0	30	DOMESTIC	EXEMPT	491307	3677038
(D-02-12) 26bbd	801091	GRONLUND, CAROLYN M		0	0	35	IRRIGATION	EXEMPT	491307	3677038
(D-02-12) 26bcb	801089	GRONLUND, CAROLYN M		20	15	35	IRRIGATION	EXEMPT	491106	3676835
(D-02-12) 27aa	600934	TONTO NATL FOREST	1/1/1956	0	0	0	STOCK	EXEMPT	490808	3677138
(D-02-12) 31cc	632955	BLM-PHOENIX DISTRICT	1/1/1975	300	0	0	STOCK	EXEMPT	484848	3674322
(D-02-12) 35ada	548185	BHP COPPER INC	3/25/1995	255	25	0	MONITORING	MONITOR	492495	3675232
(D-02-13) 04	532983	BHP COPPER INC	12/8/1991	0	0	0	NONE	OTHER	497731	3682993
(D-02-13) 04bbd	615241	AZ STATE LAND DEPT	1/1/1976	1106	400	16	STOCK	EXEMPT	497230	3683452
(D-02-13) 04dba	913342	RESOLUTION COPPER MINING, LLC	7/4/2011	1160	384	0	MONITORING	MONITOR	498030	3682900
(D-02-13) 05	532956	BHP COPPER INC	11/27/1991	0	0	0	NONE	OTHER	496118	3682990
(D-02-13) 05	557632	BHP COPPER INC	11/5/1996	0	0	0	NONE	OTHER	496118	3682990
(D-02-13) 05adc	615242	AZ STATE LAND DEPT	1/1/1973	1445	500	0	---	EXEMPT	496625	3683083
(D-02-13) 05bbb	213991	RESOLUTION COPPER MINING, LLC	10/2/2008	7754	0	0	MINERAL EXPLORATION	OTHER	495407	3683633
(D-02-13) 05bbb	911938	RESOLUTION COPPER MINING, LLC		6703	0	0	MINERAL EXPLORATION	OTHER	495407	3683633
(D-02-13) 05cac	913052	RESOLUTION COPPER MINING, LLC		0	400	0	MONITORING	MONITOR	495815	3682714
(D-02-13) 05cac	913053	RESOLUTION COPPER MINING, LLC		0	460	0	MONITORING	MONITOR	495815	3682714
(D-02-13) 05cba	911875	RESOLUTION COPPER MINING, LLC	4/12/2010	1122	255	0	MONITORING	MONITOR	495612	3682897
(D-02-13) 05cba	911954	RESOLUTION COPPER MINING, LLC	10/8/2010	5207	1220	0	MONITORING	MONITOR	495612	3682897
(D-02-13) 05cbd	913051	RESOLUTION COPPER MINING, LLC		0	360	0	MONITORING	MONITOR	495612	3682713
(D-02-13) 05cca	913050	RESOLUTION COPPER		0	260	0	MONITORING	MONITOR	495613	3682529
(D-02-13) 05ccb	201848	RESOLUTION COPPER MINING, LLC	3/11/2004	0	0	0	MONITORING	MONITOR	495410	3682529
(D-02-13) 05ccb	615243	AZ STATE LAND DEPT		0	0	0	---	EXEMPT	495410	3682529
(D-02-13) 06	212592	RESOLUTION COPPER MINING, LLC		0	0	0	MINING	OTHER	494759	3682988
(D-02-13) 06	532681	BHP COPPER INC	8/7/1992	0	0	0	NONE	OTHER	494759	3682988
(D-02-13) 06	551163	BHP COPPER INC	3/9/1996	0	0	0	NONE	OTHER	494759	3682988
(D-02-13) 06	552943	BHP COPPER INC	6/6/1996	0	0	0	NONE	OTHER	494759	3682988
(D-02-13) 06	557634	BHP COPPER INC	11/1/1996	0	0	0	NONE	OTHER	494759	3682988
(D-02-13) 06	562941	BHP COPPER INC		0	400	0	NONE	OTHER	494759	3682988
(D-02-13) 06acc	912952	RESOLUTION COPPER MINING, LLC		7497	0	0	NONE	OTHER	494828	3683081
(D-02-13) 06b	591060	RESOLUTION COPPER MINING, LLC		0	0	0	NONE	OTHER	494487	3683356
(D-02-13) 06bac	912873	RESOLUTION COPPER MINING, LLC		7497	0	0	NONE	OTHER	494556	3683449
(D-02-13) 06bba	217150	RESOLUTION COPPER MINING, LLC	4/20/2008	5429	0	0	MINERAL EXPLORATION	OTHER	494421	3683632
(D-02-13) 06bba	597972	RESOLUTION COPPER MINING, LLC		5160	2500	0	TEST	MONITOR	494421	3683632
(D-02-13) 06bbb	216751	RESOLUTION COPPER MINING, LLC		7385	0	0	MINERAL EXPLORATION	OTHER	494284	3683632
(D-02-13) 06bbb	221331	RESOLUTION COPPER MINING, LLC		0	0	0	NONE	OTHER	494284	3683632

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-02-13) 06bca	587214	RESOLUTION COPPER MINING, LLC	9/28/2002	0	0	0	TEST	MONITOR	494418	3683265
(D-02-13) 06bcd	912953	RESOLUTION COPPER MINING, LLC		7269	0	0	NONE	OTHER	494417	3683082
(D-02-13) 06bdb	221330	RESOLUTION COPPER MINING, LLC		0	0	0	NONE	OTHER	494555	3683265
(D-02-13) 06c	537526	MAGMA COPPER CO	6/9/1993	0	4667	0	NONE	OTHER	494482	3682623
(D-02-13) 06cba	221332	RESOLUTION COPPER MINING, LLC		0	0	0	NONE	OTHER	494416	3682899
(D-02-13) 06daa	216752	RESOLUTION COPPER MINING, LLC		0	0	0	MINERAL EXPLORATION	OTHER	495240	3682897
(D-02-13) 06dab	213992	RESOLUTION COPPER MINING, LLC		0	0	0	MONITORING	MONITOR	495103	3682897
(D-02-13) 06dac	217258	RESOLUTION COPPER MINING, LLC	4/29/2008	7842	0	0	MINERAL EXPLORATION	OTHER	495103	3682713
(D-02-13) 06ddb	912102	RESOLUTION COPPER MINING, LLC	9/30/2010	6320	0	0	MONITORING	MONITOR	495104	3682529
(D-02-13) 07abb	609675	INTEGRITY LAND AND CATTLE, LLC		1400	300	35	STOCK	EXEMPT	494824	3682154
(D-02-13) 07bab	912967	RESOLUTION COPPER MINING, LLC	3/6/2011	900	471	0	MONITORING	MONITOR	494547	3682155
(D-02-13) 08aaa	907947	RESOLUTION COPPER MINING, LLC	11/16/2007	1067	0	0	MONITORING	MONITOR	496829	3682155
(D-02-13) 08acb	615244	AZ STATE LAND DEPT	1/1/1910	200	3	0	STOCK	EXEMPT	496221	3681749
(D-02-13) 08bab	615245	AZ STATE LAND DEPT		0	0	0	---	EXEMPT	495816	3682152
(D-02-13) 08cbb	907946	RESOLUTION COPPER MINING, LLC	11/28/2007	1455	455	0	MONITORING	MONITOR	495411	3681339
(D-02-13) 08ccc	911688	RESOLUTION COPPER MINING, LLC	4/29/2010	2689	797	0	MONITORING	MONITOR	495411	3680730
(D-02-13) 09abd	615246	AZ STATE LAND DEPT	1/1/1970	205	50	35	STOCK	EXEMPT	498028	3681953
(D-02-13) 09bbc	615247	AZ STATE LAND DEPT	1/1/1972	1	1	0	---	EXEMPT	497030	3681953
(D-02-13) 16aab	615251	AZ STATE LAND DEPT	1/1/1964	2303	700	0	---	EXEMPT	498230	3680540
(D-02-13) 19dc	600811	TONTO NATL FOREST	1/1/1980	0	0	0	STOCK	EXEMPT	494893	3677622
(D-02-13) 31da	600810	TONTO NATL FOREST	1/1/1974	0	0	0	STOCK	EXEMPT	495173	3674816
(D-03-10) 01dda	595036	ARIZONA ARMY NATIONAL GUARD		0	0	0	NONE	OTHER	474923	3672854
(D-03-10) 10bad	541764	BHP MINERALS		0	0	0	NONE	OTHER	470900	3672243
(D-03-10) 12bad	541763	BHP MINERALS		0	0	0	NONE	OTHER	474117	3672247
(D-03-11) 01cc	642347	BLM-PHOENIX DISTRICT		0	0	0	STOCK	EXEMPT	483254	3672861
(D-03-11) 01cc	801540	BLM-PHOENIX DISTRICT		0	50	0	STOCK	EXEMPT	483254	3672861
(D-03-11) 01cca	636014	SHUMWAY,H C		275	80	30	STOCK	EXEMPT	483354	3672950
(D-03-11) 02bab	615306	AZ STATE LAND DEPT		18	5	0	---	EXEMPT	481947	3674038
(D-03-11) 02ccc	615307	AZ STATE LAND DEPT		100	46	0	---	EXEMPT	481553	3672771
(D-03-11) 03bd	642345	BLM-PHOENIX DISTRICT		0	0	0	STOCK	EXEMPT	480449	3673590
(D-03-11) 03bdc	636017	SHUMWAY,H C		360	100	30	STOCK	EXEMPT	480349	3673500
(D-03-11) 03da	642344	BLM-PHOENIX DISTRICT		0	0	0	STOCK	EXEMPT	481251	3673225
(D-03-11) 04bc	642355	BLM-PHOENIX DISTRICT	1/1/1975	0	0	0	STOCK	EXEMPT	478444	3673597
(D-03-11) 04bcb	636016	SHUMWAY,H C		30	15	30	STOCK	EXEMPT	478344	3673687
(D-03-11) 04dac	542557	WAYNE W. HANSEN		0	0	0	MINING	NON-EXEMPT	479542	3673143
(D-03-11) 04dad	806679	WAYNE W. HANSEN	11/4/1958	280	22	80	DOMESTIC	NON-EXEMPT	479743	3673143
(D-03-11) 05caa	636012	SHUMWAY,H C	8/9/1967	60	15	34	STOCK	EXEMPT	477344	3673331
(D-03-11) 05cab	801175	SHUMWAY,H C	8/15/1955	25	15	10	DOMESTIC	EXEMPT	477145	3673332
(D-03-11) 07	556485	BROWN, JAMES		0	0	0	NONE	OTHER	475836	3671898

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-03-11) 07aaa	213339	POG MINERAL MOUNTAIN LLC ETAL		100	0	0	MONITORING	MONITOR	476543	3672604
(D-03-11) 07aaa	217835	POG MINERAL MOUNTAIN LLC ETAL	5/29/2008	100	150	0	MONITORING	MONITOR	476543	3672604
(D-03-11) 07aad	541793	SMT MINERAL MOUNTAIN LLC	10/15/1994	265	22	20	MINING	NON-EXEMPT	476544	3672403
(D-03-11) 08cbd	213336	POG MINERAL MOUNTAIN LLC ETAL	10/31/2006	85	0	0	MONITORING	MONITOR	476946	3671594
(D-03-11) 08cca	213338	POG MINERAL MOUNTAIN LLC ETAL	10/23/2006	160	137	0	MONITORING	MONITOR	476947	3671393
(D-03-11) 08ccd	213337	POG MINERAL MOUNTAIN LLC ETAL	10/26/2006	102	0	0	MONITORING	MONITOR	476947	3671191
(D-03-11) 08cdb	213341	POG MINERAL MOUNTAIN LLC ETAL		70	0	0	MONITORING	MONITOR	477146	3671391
(D-03-11) 08dbd	213340	POG MINERAL MOUNTAIN LLC ETAL	10/17/2006	102	0	0	MONITORING	MONITOR	477744	3671588
(D-03-11) 09	556486	BROWN, JAMES		0	0	0	NONE	OTHER	479046	3671882
(D-03-11) 10acc	636015	SHUMWAY,H C		180	65	15	STOCK	EXEMPT	480751	3671982
(D-03-11) 10dd	642356	BLM-PHOENIX DISTRICT	1/1/1975	0	0	0	STOCK	EXEMPT	481255	3671281
(D-03-11) 10ddb	801252	NICHOLS, C B	1/1/1920	50	25	35	DOMESTIC	EXEMPT	481154	3671380
(D-03-11) 11	550532	CLARK, FRANK H	4/20/1996	0	0	0	NONE	OTHER	482263	3671876
(D-03-11) 15d	642354	BLM-PHOENIX DISTRICT		0	0	0	STOCK	EXEMPT	481056	3669873
(D-03-11) 17bbb	213335	POG MINERAL MOUNTAIN LLC ET AL	10/27/2006	110	0	0	MONITORING	MONITOR	476749	3670991
(D-03-11) 18aad	217779	POG MINERAL MOUNTAIN LLC ET AL	11/3/2006	150	150	0	MONITORING	MONITOR	476547	3670790
(D-03-12) 03aac	579057	TREJO OIL COMPANY	10/4/2002	20	0	0	TEST	MONITOR	490233	3673851
(D-03-12) 18	516419	PLATA ORO RESOURCES	12/17/1986	450	0	0	NONE	OTHER	485194	3670212
(D-03-13) 04bbb	508699	ASARCO INC	7/26/1984	0	0	0	NONE	OTHER	497019	3674104
(D-03-13) 05bbb	503106	DUGAN, R M	11/7/1982	59	16	29	DOMESTIC	EXEMPT	495415	3674111
(D-03-13) 05bbb	644326	DUGAN, R M	2/2/1966	23	17	29	DOMESTIC	EXEMPT	495415	3674111
(D-03-13) 05cc	633773	HING, A O	1/1/1964	128	75	5	DOMESTIC	EXEMPT	495519	3672807
(D-03-13) 06bac	581015	BLM	6/24/2002	590	0	0	INDUSTRIAL	EXEMPT	494234	3673866
(D-03-13) 07bdb	615310	AZ STATE LAND DEPT		0	0	0	---	EXEMPT	494232	3672104
(D-03-13) 07cda	615311	AZ STATE LAND DEPT		40	40	0	---	EXEMPT	494429	3671302
(D-03-13) 08ba	633774	HING, A O	1/1/1964	35	10	5	DOMESTIC	EXEMPT	495922	3672403
(D-03-13) 08bab	645882	ALDRIDGE, JESSE	2/21/1964	35	0	0	STOCK	EXEMPT	495821	3672504
(D-03-13) 08bba	579019	EUGENE MCWHORTER		0	0	0	DOMESTIC	EXEMPT	495620	3672505
(D-03-13) 08bba	593892	MICHAEL AND PATRICIA BUTLER	1/22/2003	100	42	11	DOMESTIC	EXEMPT	495620	3672505
(D-03-13) 08cac	270	PEDRO H LOMELI		0	0	0	DOMESTIC	EXEMPT	495820	3671498
(D-03-13) 08cac	645884	ALDRIDGE, JESSE	2/19/1962	90	22	0	STOCK	EXEMPT	495820	3671498
(D-03-13) 08cb	633772	HING, A O	1/1/1967	400	150	10	DOMESTIC	EXEMPT	495518	3671599
(D-03-13) 08cbb	908290	WADE LUECK	4/30/2008	500	14	0	STOCK	EXEMPT	495418	3671700
(D-03-13) 08cbd	645888	ALDRIDGE, JESSE	10/17/1964	128	0	0	STOCK	EXEMPT	495619	3671498
(D-03-13) 08cca	580504	JOHNNY HUNT	5/23/2002	300	12	10	DOMESTIC	EXEMPT	495618	3671297
(D-03-13) 09ddb	514644	ASARCO INC-RAY	9/3/1986	340	0	0	NONE	OTHER	498239	3671293
(D-03-13) 09ddb	518065	ASARCO INC	6/18/1987	0	0	0	NONE	OTHER	498239	3671293
(D-03-13) 09ddb	521210	ASARCO INC	5/27/1988	400	0	0	NONE	OTHER	498239	3671293
(D-03-13) 09ddb	524873	ASARCO INC	6/19/1989	0	200	0	NONE	OTHER	498239	3671293

TABLE B-1. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR 55 WELL REGISTRY DATABASE

Cadastral	ADWR 55 Reg No.	Owner Name	Drill Date	Well Depth (ft)	Depth to Water (ft bls)	Pump Capacity (gpm)	Primary Water Use (ADWR)	Well Type	UTM NAD 83 East (m)	UTM NAD 83 North (m)
(D-03-13) 09ddc	527946	ASARCO INC	5/17/1990	0	0	0	NONE	OTHER	498239	3671093
(D-03-13) 16acb	807139	ASARCO INC-RAY	12/31/1977	1951	116	0	NONE	OTHER	497835	3670491
(D-03-13) 16bda	615312	AZ STATE LAND DEPT		40	0	0	---	EXEMPT	497633	3670491

ADWR 55 Reg. No. = Arizona Department of Water Resources 55-series registration number
ft = feet
ft bls = feet below land surface
gpm = gallons per minute
UTM NAD 83 = Universal Transverse Mercator coordinates - North American Datum 1983
m = meters

TABLE B-2. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM ADWR GROUNDWATER SITE INVENTORY (GWSI) DATABASE

Cadastral	ADWR 55 Reg. No.	GWSI Well ID	Owner Name	Well Depth (ft)	Casing Diameter (inches)	Casing Top & Bottom (ft)	Perforation Interval (ft)	Land Surface Elevation (ft msl)	Primary Water Use	UTM NAD 27 East (m)	UTM NAD 27 North (m)
(A-01-10) 22aba		332520111182801	USFS					2950	RECREATION	471385.7	3697945.9
(D-01-10) 34ccb		331747111190901	JENNER, JAMES S	450	8	0-60		2040	UNDETERMINED	470284.1	3683998.7
(D-01-10) 34cdd	628139	331742111184301	WHITLOW DAM WATER CO	385	8	0-44		1995	PUBLIC SUPPLY	470956.1	3683842.7
(D-01-10) 35bbd		331841111175901		500	10	0-54		2040	RECREATION	472099.3	3685656.3
(D-01-10) 35cba1		331801111175801	HAGGBERG, MATTHEW O	100	6	0-100	40-100	2038	UNDETERMINED	472121.6	3684424.4
(D-01-10) 35cba2		331800111180201	HAGGBERG, MATTHEW O		6	0-100	40-100	2035	UNUSED	472095.7	3684393.7
(D-01-10) 35cba2	629579	331802111175801	TUCK, JAMES C	105	8	0-105	65-85	2038	DOMESTIC	472121.7	3684455.2
(D-01-10) 35cbd1	629825	331754111175901	FENDLY, J T	80	8	0-80	40-70	2006	DOMESTIC	472095.1	3684208.9
(D-01-10) 35cbd2		331755111175901	FOUTZ, TOM A	84	8	0-75	40-75	2006	UNDETERMINED	472095.2	3684239.7
(D-01-10) 35dba	628140	331803111172901	QUEEN VALLEY COUNTRY CLUB	440	8	0-55		2040	IRRIGATION	472871.8	3684483.9
(D-01-10) 35dbb	628138	331754111173601	WHITLOW DAM WATER CO	500	12	0-38		2015	PUBLIC SUPPLY	472690.7	3684484.4
(D-01-10) 35dbc	628137	331756111173701	WHITLOW DAM WATER CO	500	12	0-38		2010	PUBLIC SUPPLY	472664.3	3684268.9
(D-01-10) 35dda		331749111171201	KEITH, KEN	65	12	0-35	15-30	2080	UNDETERMINED	473310.2	3684051.5
(D-01-11) 33cbb	632789	331755111145301	USFS		4			2120	STOCK	476879.7	3684227.2
(D-01-11) 34bcb	600936	331810111134501	USFS					2180	STOCK	478639.3	3684685.1
(D-01-11) 35dbc	502051	331718111121401	ROSE, R	100	4			2265	UNUSED	481015.3	3683078.8
(D-01-11) 35dca1		331744111120601			4			2040	DOMESTIC	481223.8	3683879.0
(D-01-11) 35dca2		331745111120701						2040	DOMESTIC	481198.0	3683940.7
(D-01-13) 22dab	609681	331943111011901	ASARCO INC.	1863	4.5			4318	UNUSED	497957.6	3687525.7
(D-01-13) 23cbc	609680	331935111010401	ASARCO INC.	1971	4.75			4600	UNUSED		
(D-01-13) 28ddb1	526592	331832111022101	USFS	936	16 10	0-936	410-419	4076	UNUSED	496353.9	3685339.7
(D-01-13) 32dcd		331735111033201	MAGMA COPPER CO		2.5			4020	UNUSED	494517.0	3683585.3
(D-02-11) 01cdc2	627524	331645111103301	HERRON, JAMES	60	4			2420	IRRIGATION	483625.9	3682057.8
(D-02-11) 11dab	600808	331616111110201	USFS					2405	STOCK	482874.2	3681166.0
(D-02-12) 03cdd		331642111062101			8 6			2740	DOMESTIC	490144.4	3681956.6
(D-02-12) 07aba	624605	331640111090801	BOYCE TRHOMPSON ARBORETUM	43	120			2440	IRRIGATION	485850.2	3681807.9
(D-02-12) 26bbc		331356111053801			5			2060	UNUSED	491252.1	3676843.6
(D-02-13) 07aaa	609675	331644111030501	ASARCO INC.	1400	3.5			4040	UNUSED	495214.5	3682014.4
(D-03-13) 16aab		331037111010501	ASARCO INC.		2.5			2520	MINING	498316.7	3670711.7
(D-03-13) 16acb	807139	331022111012501	ASARCO INC.	1951	3.5			2842	UNUSED	497798.6	3670249.9

ADWR Reg. No. = Arizona Department of Water Resources 55-series Registration Number
ft = feet
ft msl = feet above mean sea level
UTM NAD 27 = Universal Transverse Mercator coordinates - North American Datum 1927
m = meters

TABLE B-3. WELL INVENTORY FOR SUPERIOR BASIN AND ADJACENT AREAS, PINAL COUNTY, ARIZONA FROM 35 WELL REGISTRY DATABASE

Cadastral	ADWR 35 Reg. ID	ADWR 35 Reg. No.	Owner Name	Completion Date	Well Depth (ft)	Casing Diameter (inches)	Casing Top & Bottom (ft)	Perforation Interval (ft)	Depth to Water (ft bls)	Well Yield (gpm)	Primary Water Use (ADWR)	UTM NAD 27 East (m)	UTM NAD 27 North (m)
(A-01-10) 24abc	749	83016	COPEMAN, J	1/17/1980	150	8	0-13		23	60	DOMESTIC	474320	3697661
(A-01-10) 24acb	750	83422	COPEMAN, J	3/10/1980	265	8	0-7		125	1	DOMESTIC	474319	3697459
(A-01-10) 24cca	751	83015	COPEMAN, J	3/10/1980	371	8 6	0-188 178-371	178-371	125	30	DOMESTIC	473714	3696656
(A-01-10) 25ccd	752	XX039	MARTIN, W H	10/30/1943	20				10	5	STOCK	473707	3694839
(D-01-10) 23ccc	16672		RUIZ, M	9/2/1963	199	8	0-13		52	0	STOCK	471900	3687043
(D-01-10) 24bab	16673	71524	COPEMAN, J W	12/23/1979	720				0	0	DOMESTIC	473914	3688443
(D-01-10) 24cab	16674	83482	COPEMAN, J	5/9/1980	155	8	0-32		40	60	DOMESTIC	473910	3687636
(D-01-10) 34ccb	16677		JENNER, J S	7/7/1971	450	8	0-60		260	0	DOMESTIC	470281	3683997
(D-01-10) 34cda	16678	45313	QUEEN VALLEY CNTRY CB	6/9/1977	385	8	0-44		120	0	DOMESTIC	470887	3683999
(D-01-10) 35acd	16679	45694	QUEEN VALLEY CTRY CLB	6/15/1977	440	8	0-55		50	0	DOMESTIC	472899	3684616
(D-01-10) 35bbd	16680		QUEEN VALLEY DEVEL	8/30/1971	500	10	0-54		456	0	DOMESTIC	472097	3685025
(D-01-10) 35cba	16681		HAGGBERG, M O	4/16/1970	100	7	0-100	40-100	40	0	DOMESTIC	472095	3684412
(D-01-10) 35cba	16682		TUCK, J C	11/18/1970	105	8	0-105	65-85	72	30	DOMESTIC	472095	3684412
(D-01-10) 35cbd	16683		FENDLEY, J T	6/30/1969	80	8	0-80	40-70	30	0	DOMESTIC	472095	3684207
(D-01-10) 35cbd	16684		FOUTZ, T A	9/27/1969	84	8	0-75	40-75	32	0	DOMESTIC	472095	3684207
(D-01-10) 35daa	16685		ALLEN, C S	6/15/1957	28	15	0-28	24-28	18	500	IRRIGATION	473300	3684413
(D-01-10) 35dbc	16686		QUEEN VALLEY DEVEL	6/3/1971	500	12	0-38		478	0	UTILITY (WATER CO)	472697	3684209
(D-01-10) 35dda	16687		KIETH, K	1/10/1970	65	12	0-35	15-30	11	0	DOMESTIC	473299	3684007
(D-01-11) 11bca	16688	73947	MARTIN, W H	9/30/1960	15				10	10	STOCK	480387	3691115
(D-01-11) 35abc	16689	67972	MARTIN, W H	1/1/1950	110	8	0-110		40	15	DOMESTIC	480987	3684885
(D-01-13) 15ccc	16702	70683	SALT RIVER PROJECT	11/4/1978	1400	8 4	0-20 0-1399		980	0	EXPLORATION	496710	3688466
(D-02-10) 24dbb	17330		HORSE TRACK RANCHES	7/5/1967	525	6	1-511	211-511	460	6	STOCK	474343	3677923
(D-02-10) 31abb	17331			1/1/1959	780	16			0	0	MUNICIPAL	466316	3675478
(D-02-10) 31abc	17332		ARIZ WTR CO	11/24/1959	780	16	0-780	775-780	471	1300	DOMESTIC	466319	3675276
(D-02-10) 31abd	17333				0				0	0	MUNICIPAL	466521	3675276
(D-02-12) 03aad	17334	74432	VINDIOLA, J M	3/20/1979	117	4	0-117	100-117	0	0	DOMESTIC	490969	3683234
(D-02-12) 05cbc	17335	78468	AZ BRD OF REGENTS	11/1/1963	120	8 6	0-87 87-120		45	21	IRRIGATION	486364	3682452
(D-02-13) 04bca	17336	47766	ASARCO INCORPORATED	2/18/1976	1106	10	0-10		400	20	STOCK	497292	3683070
(D-03-13) 08bab	17561		HING, A O	1/1/1964	35	13	?-35		0	9	DOMESTIC	495884	3672305
(D-03-13) 08cac	17562		HING, A O	2/19/1962	90	14 9	2-18 2-90	 20-90	0	20	DOMESTIC	495882	3671299
(D-03-13) 08cbd	17563		HING, A O	10/17/1964	128	8	0-104	9-104	0	0	EXPLORATION	495681	3671300

ADWR 35 Reg. ID/No. = Arizona Department of Water Resources 35-series Registration Idenfier/Number
ft = feet
ft bls = feet below land surface
gpm = gallons per minute
UTM NAD 27 = Universal Transverse Mercator coordinates - North American Datum 1927
m = meters