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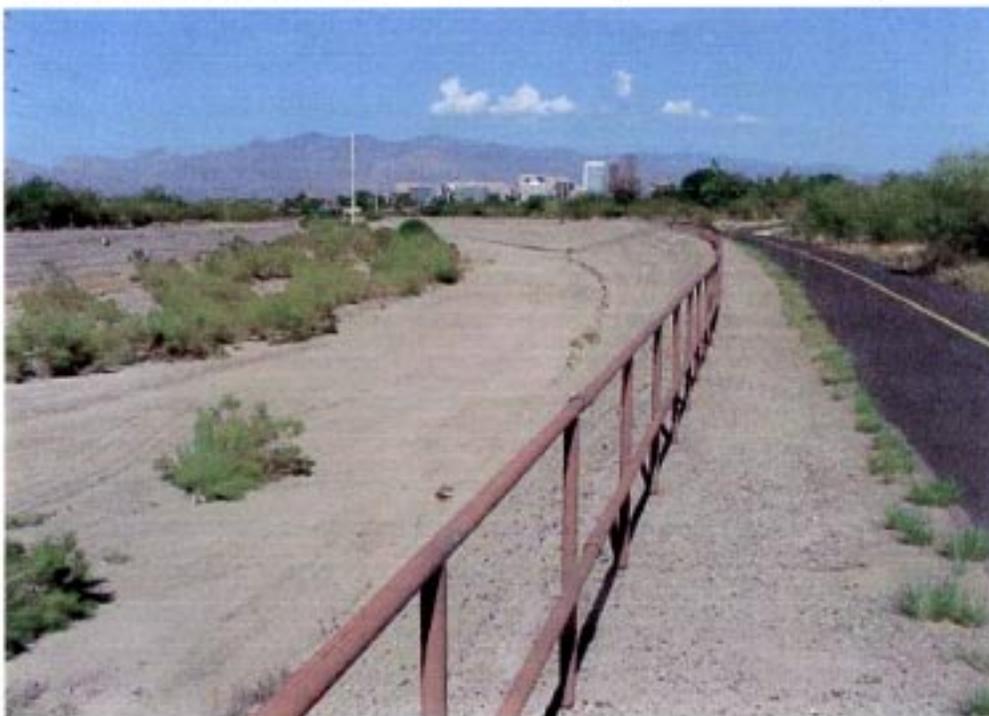
Los Angeles District

Paseo de las Iglesias Environmental Restoration Study,

Tucson, Arizona

Feasibility F-3 level Geotechnical Appendix,

(an in-kind service contribution from the local sponsor: Pima County Flood Control District)



Santa Cruz River
channel, looking north,
towards downtown
Tucson
near N. 22nd Street

By LMT Engineering, Inc.
180 S. Chelsea Park Place, Tucson, AZ 85748-1720
27 February 2002

Prepared Under Contract (Project No. 21563) for
Pima County Flood Control District
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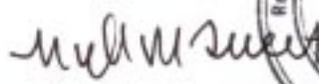
Re: Paseo de las Iglesias Environmental Restoration Study
Santa Cruz River, Congress to Los Reales
Pima County, Arizona
Pima County WO#: 4FPDLI
LMT Project No. 21563

Attached is our report for the referenced study. This report presents the results of our soils, materials and geologic investigations to verify feasibility of alternative solutions for erosion control and bank stabilization along the Santa Cruz River. The study area extends along both sides of the Santa Cruz River from Congress Street on the north to Los Reales Road on the south. The report was prepared in collaboration with Robert L. Sogge, P.E., Ph.D.

This report is the initial phase of the scope of the study to evaluate alternative methods of erosion prevention/control for the Santa Cruz.

If you have any questions or comments about the report, please contact us.

Sincerely,
LMT Engineering, Inc.


Lyle M. Tweet, P.E.
President




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1. INTRODUCTION

PURPOSE AND SCOPE

1.1. This report presents the results of the initial phase of our geologic, soils, and materials evaluation for the Paseo de las Iglesias study. Our services evaluated the existing bed and bank conditions and the types and physical properties of the materials in the bed and banks of the Santa Cruz River and West Branch of the Santa Cruz. In addition, we researched information relating to the geologic and seismic conditions of the area, groundwater conditions, and landfill conditions along the designated stretch of the Santa Cruz River and West Branch in order to provide information to evaluate potential methods of stabilizing the banks along the study alignment.

This report describes the geologic and seismic setting, the field and laboratory tests performed and their results, the results of field studies, the extent and type of trash and debris that were identified and our opinions regarding use of the native soils for construction of soil-cement bank protection.

SITE LOCATION AND DESCRIPTION

1.2. The proposed Paseo de las Iglesias Environmental Restoration Study is located along two northward flowing branches of the Santa Cruz River extending from the central downtown area, specifically Congress St., directly south seven miles to its southern extent at Los Reales Rd in the Tucson, Arizona, metropolitan area in central Pima County. This area is the cradle of modern day Tucson and has a lineage of continued inhabitation dating back to settlement by the Spanish missionaries. San Xavier Mission was developed near the southern extent of the study and a convent was established near the northern end of the study, thus the name “Paseo de las Iglesias”, or “passage between the churches.”

1.3. The main channel of the Santa Cruz River flows in a relatively straight northerly direction from the south to the north ends of the study area. The West Branch of the Santa Cruz River currently extends from the southern border of the study north approximately 3.5 miles to where it flows into the main Santa Cruz River just north of Irvington Road. The portion of this channel just north of Irvington Road has been re-routed. The former channel (before it was re-routed) extends from just north of Irvington to just south of 22nd St. where it joins the main branch of the Santa Cruz River. The Site Plan accompanying this report displays these channels and the general location of the study. The area between the two branches of the Santa Cruz encompasses a relatively flat, alluvial plain. Over much of the study length, a highly urbanized area abuts both sides

of the river. In these regions many of its bank sections have been stabilized with soil cement (reference photos 6 through 12 in Appendix A of this report). (Note that the photos in Appendix A are for this study. The “Landfills and Waste Disposal Sites along the Santa Cruz River from Grant Road to Pima Mine Road” report by the Pima Association of Governments in Appendix E of this report also has photos which have the same numbers. Photo references in the body of this report relate to the photos in Appendix A.)

STUDY DESCRIPTION

1.4 Improvements proposed for the river consist of an environmental restoration of the river and its surrounding overbanks consistent with the population and development extant in the study domain. Alternative restoration types may consist of different types of bank protection having varying levels of resistance to erosion and varying locations within the overbank areas as well as invert stabilizers or grade-control structures.

2. GEOLOGY

TOPOGRAPHY

2.1 The study area is located near the central portion of the Tucson basin, a broad 1,000 sq mi valley in the Santa Cruz River drainage basin. The topography of this basin is typical of the Basin and Range Physiographic Province. Northwestward trending, steep, rugged fault block mountains border the broad, gently northwestward sloping alluvium-filled valley. The basin is about 50 miles long and is approximately 20 miles wide in the southern and central parts, narrowing to 4 miles wide at the northwest outlet. The basin is bounded on the north and east by the Tortolita, Santa Catalina, Tanque Verde, Rincon, Empire and Santa Rita Mountains, and on the west by the Tucson, Black and Sierrita Mountains. The mountains on the west side of the basin range from 3000 to 6000 ft elevation, and those on the north and east side have elevations generally ranging from 6000 to 8000 ft, with peaks rising to elevations of 9400 ft. The metropolitan City of Tucson resides at the approximate center of this basin at an elevation of about 2400 ft. The Santa Cruz River channel extends north from Mexico into the south-central portion of this basin and exits north of the basin where it eventually terminates into the Gila River. Flow occurs in the channel during most of the year south of the Tucson Basin. The flow during dry times of the year is a result of discharges from the Nogales, Arizona, and Nogales, Sonora, Mexico, sewage treatment plants. During dry times of the year, such flow does not normally extend further north than Green Valley, Arizona, approximately 15 to 20 miles south of the study area.

Along the extent of this study area, sixteen tributaries flow into the main Santa Cruz River (including the South Channel), historic and diverted West Branch(es) of the Santa Cruz, Tucson Diversion Channel, and many others. The main channel, west branch(es) and all of these tributaries are ephemeral and generally only flow in direct response to rainfall and/or snow melt in the region and nearby mountains.

REGIONAL GEOLOGY

2.2 The complex geological history of Arizona has resulted in the formation of three geologic physiographical provinces. The three provinces consist of the Colorado Plateau (in the northern area of the state), the Basin and Range Province (encompassing southern and western Arizona), and the Central Highlands or Transitional Zone (encompassing the central part of the state). The Santa Cruz River Watershed lies within the Sonoran Desert of the Basin and Range Physiographic Province. The north to north-west trending alluvial basin is characterized by a semi-arid to arid broad valley.

The Santa Cruz River Basin is paralleled by steep mountain ranges composed of igneous, metamorphic, and sedimentary rocks of Precambrian (over 600 million years old) to Tertiary (63 to 2 million years ago) age. (Anderson 1987) The mountains lie upon a Precambrian igneous and metamorphic basement complex that is composed predominantly of granite and diorite, schist and gneiss, and volcanics.

The present relief of the Santa Cruz River Basin is a direct result of a period of regional uplifting due to block faulting that took place during the late Tertiary (63 to 2 million years ago) or early Quaternary (2 million years ago to present). Concurrent with the uplifting of the regional mountains, large amounts of alluvium from the surrounding mountains have been deposited within the basin (at the center of the Santa Cruz River basin, bedrock is currently buried by more than 11,000 feet of alluvial sediments). The Tucson basin, a structural depression, is filled primarily with unconsolidated to indurated Tertiary and Quaternary age sedimentary deposits, with lesser amounts of intercalated evaporites and volcanic rocks.

The alluvial sediments deposited within the basin have been divided into four geologic units that are, in descending order of depth: surficial or recent alluvial deposits, the Fort Lowell Formation, the Tinaja Beds, and the Pantano Formation (ADWR 1996). The extent of these layers in the study area is shown in Table 9 in this section of the report. The surficial deposits occupy the streambed channels and are generally less than 100 feet thick. The coarse surficial deposits allow the infiltration of surface water to recharge the underlying units. The Fort Lowell Formation underlies the recent alluvial deposits and consists of unconsolidated to moderately consolidated sands and silts 300

to 400 feet thick throughout most of the basin (AMA 1998). The Tinaja Beds lie under the Fort Lowell Formation and are composed of sandstones and conglomerates with a total thickness of up to 5,000 feet at the center of the basin (AMA 1998). The Pantano Formation, which underlies the Tinaja Beds, is up to 6,400 feet thick near Davidson Canyon, which is about 20 miles southeast of Tucson along I-10. This formation consists of consolidated sandstones, conglomerates and mudstones. In addition to these sediments, as a result of intermittent periods of volcanism, there are areas of extrusive igneous rocks interbedded within the valley alluvium layers. Below the alluvial units and beds of volcanic rock, there is an impermeable basement complex, which extends to the surrounding mountainsides.

Table 9 - Stratigraphic Sediment Layers (from Well Logs) *	
At Marana	
Fort Lowell Formation and Recent Alluvium	73 m-thick (240 ft) layer
Upper Tinaja Beds	73 m-thick (240 ft) layer
Volcanic Bedrock	Top at - 146 m (-480 ft)
Near Grant Road Crossing	
Fort Lowell Formation and Recent Alluvium	24 m-thick (80 ft) layer
Upper Tinaja Beds	73 m-thick (240 ft) layer
Middle Tinaja Beds	49 m-thick (160 ft) layer
Volcanic Bedrock	Top at - 146 m (-480 ft)
½ Mile South of I-19/I-10 Interchange	
Fort Lowell Formation and Recent Alluvium	46 m-thick (150 ft) layer
Upper Tinaja Beds	46 m-thick (150 ft) layer
Volcanic Bedrock	Top at - 91 m (-300 ft)
1.5 Miles South of San Xavier Mission	
Fort Lowell Formation and Recent Alluvium	49 m-thick (160 ft) layer
Upper Tinaja Beds	37 m-thick (120 ft) layer
Lower Tinaja Beds	24 m, minimum (80 ft)
1.5 Miles North of Sahuarita/I-19 Interchange	
Fort Lowell Formation and Recent Alluvium	52 m-thick (170 ft) layer
Upper Tinaja Beds	43 m-thick (140 ft) layer
Lower Tinaja Beds	195 m, minimum (640 ft)
1 Mile North of Green Valley	
Fort Lowell Formation and Recent Alluvium	73 m-thick (240 ft) layer
Upper Tinaja Beds	37 m-thick (120 ft) layer
Lower Tinaja Beds	180 m, minimum (600 ft)
* logs adapted from Anderson 1987	

Poorly developed drainage systems gave rise to numerous pluvial lakes during the middle Tertiary, which accounted for rapid sediment filling of the basins. During the

Pleistocene (2 million to 10,000 years ago) drainage was established westward by the Gila River and its tributaries (including the Santa Cruz River). During high erosion and deposition periods, the Santa Cruz River basin floor developed numerous bajadas (smooth slopes originating at the base of the mountains) which extended outward into the Santa Cruz River channel. In more recent geologic time, during the Quaternary Period (present to 2 million years ago), climatic changes and regional uplift accelerated erosion, resulting in the upper bajada slopes being deeply dissected by lateral washes, causing development of terraces along the main drainage systems including the Santa Cruz River Basin.

The Santa Cruz River main channel through Tucson flows on the far west side of the Basin over the relatively thin, peripheral parts of the basin fill sediments. Typical sections, derived from well logs identify specific stratigraphic sediment layers underlying the Santa Cruz River.

SITE GEOLOGY

2.3 The alluvial deposits in the study area consist mainly of recent stream channel and floodplain deposits. These alluvial basin sediments are generally gravel and gravelly sand. Locally, the sediments in the study area are sand to sandy silt of fluvial origin. Lithified sediments do not crop out along the Santa Cruz River and generally they should not be present within excavation depths of the channel for structure installation, though such formations do approach the riverbed elevation in the vicinity of 22nd Street. The nearest rock exposures, classified as the Pantano Formation, occur in the foothills of the Santa Catalina Mountains to the north and east of the study. Rocks of this formation consist of highly faulted and tilted beds of conglomerate, sandstone and mudstone, interbedded in places with volcanic flows and tuffs and locally containing landslide debris and lenses of megabreccia (Anderson 1987a). Other subsurface information is presented in the Subsurface Investigations section of this report.

2.4 The surficial soil deposits as classified by the National Resource Conservation Service (previously Soil Conservation Service) are a Grabe-Anthony-Gila association consisting of level and nearly level to gently sloping soils that are dominantly loam to gravelly sandy loam, on flood plains and alluvial fans in the main channel of the river and Cave-Rillito-Mohave association consisting of nearly level to gently rolling soils that are dominantly gravelly loam and gravelly sandy loam, on low dissected terraces in portions of the banks away from the main channel (U. S. Dept of Agriculture, Soil Conservation Service, U of A Agricultural Experiment Station, Soil Survey of Tucson-Avra Valley Area, Arizona, April 1972).

A study by Jackson classified the soils in the channel as part of the T2 terrace, one of five terraces that exist in the Tucson Basin. The T2 terrace is defined as historically abandoned stream terraces occurring on the Santa Cruz River and Pantano Wash. Forms wide floodplain inset into stream valley. Soils are weakly developed (Torrifluvents). Topographically the T2 terrace is higher than T1 but several meters below T3. Gravelly sand dominates the sediments. Banks are unstable; recent incision and lateral erosion has left banks standing at an angle greater than the angle of repose, often vertical. Middle to late Holocene in age (Jackson, 1989).

FAULTING

2.4 The Tucson basin was formed during the Basin and Range disturbance of middle Miocene time (23 to 5 million years ago). A tectonic event was responsible for producing the deep basins and high ranges characteristic of present-day Basin and Range physiography. This extreme relief resulted from movement along deep-seated, high-angle normal faults. Anderson's (1987a) structural interpretation of the Tucson basin infers two major north to northwest-trending basin-bounding faults: the Santa Cruz fault and a segmented subparallel fault system on the north and east edges of the basin and a secondary, oblique, and generally northeast-trending fault system. The large-scale, low-angle structural feature that extends along a sinuous trace on the south and west flanks of the Santa Catalina and Rincon Mountains, respectively, is referred to as the Catalina detachment fault (Dickenson 1988). This feature represents a stage in the development of the Santa Catalina-Rincon Mountain metamorphic core complex during the mid-Tertiary Orogeny, which preceded the Basin and Range disturbance.

2.5 The concealed basin faults and the detachment fault are not considered to be active or capable faults and are not underlying this study area. The Basin and Range province in southwestern Arizona has been considered tectonically inactive since the waning of the Basin and Range disturbance during the early Pliocene (Anderson 1987a), due in part to the low levels of historical seismicity and the extensive pedimentation of mountain blocks (Pearthree et al. 1983). Quaternary faults are rare in southwestern Arizona and none have been identified in the Tucson metropolitan area (Menges and Pearthree 1983; Scarborough et al. 1986). The nearest concentration of Quaternary faults occurs along the western edge of the Santa Rita Mountains in southeastern Arizona, approximately 20 miles southeast of the study area. Pearthree (1986) estimated that the most recent movement along the Santa Rita fault occurred during the late Pleistocene. The Quaternary faulting observed in southeastern Arizona may represent minor reactivation of older Basin and Range structures or may be related to the Rio Grande Rift system of New Mexico (Pearthree et al. 1983).

SEISMICITY

2.6 The Tucson metropolitan area straddles the boundary between Zone 1 and Zone 2A of the Seismic Zone Map of the Contiguous States (Uniform Building Code, 1994 and USACE ER 1110-2-1806, dated 31 July 1995) and thus is located in a region of low to moderate seismic potential. Seismic activity has occurred throughout Arizona but southeastern Arizona (part of Zones 2A and 2B) is one of three regions where more frequent activity and earthquake epicenters with intensities greater than VI on the Modified Mercalli Scale and magnitudes greater than 4.0 have been concentrated (DuBois and Smith, et al. 1982). Estimates of average regional recurrence intervals between surface-rupturing earthquakes over the last 20,000 years for this portion of the state range from 3000 to 4000 years (Pearthree 1986). The report by Pearthree also contains a map of earthquake epicenters in the vicinity of Tucson.

2.7 The largest historical earthquake known to have affected the study area was the 1887 Sonora, Mexico, event with a maximum epicentral intensity of XII and an estimated magnitude of 7.2. An isoseismic map of the earthquake area in DuBois and Smith (1982) indicates an intensity of VII was experienced in the Tucson area. This event, although 130 miles southeast of the study area, resulted in rock falls and landslides in the Santa Catalina Mountains and caused widespread damage in Arizona as far north as Phoenix. A seismicity map of the State of Arizona compiled by Stover et al. (1986) indicates that the largest known historical earthquakes within 100 miles of the study area occurred near Nogales, Arizona, in 1916; in western Pima County in 1961; and near Globe, Arizona, in 1969. The 1916 event, approximately 60 miles south of Tucson, had a maximum epicentral intensity of VI. The 1961 event, about 90 miles west-northwest of Tucson, had a magnitude of 4.7, while the 1969 event, approximately 85 miles northeast of Tucson, had a magnitude of 4.4. Only three earthquakes have been reported within a 25-miles radius of the study area. Two of these events, with maximum epicentral intensities of IV, occurred in 1888, approximately 3 miles southwest of Tucson. The third, a magnitude 4.4 event, occurred in 1965 about 25 miles west of Tucson.

2.8 Using Schnabel and Seed's (1973) attenuation curves for horizontal acceleration in rock (USACE, South Pacific Division, 1979), the previously mentioned earthquakes would have produced maximum bedrock accelerations of less than 0.1g at the study site. By contrast, a maximum credible earthquake of magnitude 6.7 to 7.2 generated by movement on the 12 to 36-mile long Santa Rita fault would produce a maximum bedrock acceleration of approximately 0.2g at the study site. The Uniform Building Code and International Building Code both recommend accelerations of 0.2g for the Tucson metropolitan area.

GROUNDWATER

2.9 The main groundwater in the Tucson basin occurs in the sedimentary rocks and alluvium that form a single aquifer. The aquifer consists of the Pantano Formation, the Tinaja Beds, and the Fort Lowell Formation (from bottom to top) (Anderson 1987b). The Pantano Formation yields small to moderate amounts of water to wells while the Tinaja beds yield small to large amounts of water to wells, frequently in excess of 1000 gal/min (Anderson 1987b). The water table for this main aquifer is within 350 ft of the ground surface throughout most of the basin. Due to localized and/or perched water tables, the depth to groundwater ranges from less than 20 feet to about 170 ft below the ground surface along the Santa Cruz and Rillito Rivers (Babcock et al. 1988; City of Tucson 1996). Groundwater is generally under unconfined conditions. However, it may occur locally under confined or perched conditions. Groundwater movement is typically in a west-northwest direction, away from the basin margins toward the narrow northwest outlet (Osterkamp 1974). A groundwater contour map prepared by Tucson Water is attached to this report. This map shows the depth to groundwater throughout the Tucson Basin and in this study area.

2.10 We obtained information from the Arizona Department of Water Resources (ADWR) regarding depth of groundwater in wells in this study area. This information is included in Appendix C of this report. The key to the locations of the wells is also included in this Appendix. The wells with current water level readings are denoted with letters “A” through “K” on the right side of the well data sheets. These well locations are noted as ADWR Well Locations A through K on the aerial photo of the study region included with this report. The current well information included in this report indicates that depths to groundwater in the wells generally ranged from about 100 to 200 feet below ground surface in areas close to the Santa Cruz channel. Groundwater data were also obtained from soil borings made for bridges along the Santa Cruz River. Reports for the bridges at Congress, 22nd St., Irvington, and Valencia were reviewed. Information in these reports indicates groundwater (perched) was encountered at depths ranging from about 5 to 35 feet at Congress, Irvington, and Valencia. No groundwater was encountered in the test boring for the 22nd St. Bridge where the borings were advanced to depths of 45 to 60 feet. Due to the perched and/or localized nature of the groundwater along the Santa Cruz channel, these groundwater conditions are expected to vary in relation to flows in the River, well pumping, subsurface stratification, and other factors.

2.11 Long-term groundwater withdrawal has resulted in a general decline in water levels in the Tucson area since the 1900's. This groundwater decline can be noted in the ADWR data for the depth to groundwater for the wells in this vicinity.

2.12 Large-scale pumping of groundwater in the Tucson basin began about 1900 and increased dramatically in the 1940's. Most of the groundwater pumped in 1940 was used for irrigation. Later, groundwater pumpage was approximately equally divided among irrigation, municipal, and industrial uses (Anderson et al. 1982). The centers of greatest water-level decline are along the Santa Cruz River near Sahuarita and in the City of Tucson. Declines exceeding 100 ft have occurred in Tucson and portions of the study area, while to the south along the river, the maximum decline has been about 150 ft (Schumann and Genualdi 1986). This difference has resulted in the formation of two distinct cones of depression in the groundwater table.

2.13 Infiltration of storm runoff in the stream channels during the rainy seasons is the major source of recharge to the groundwater basin (Davidson 1973). Seepage of runoff along the mountain fronts constitutes the second largest source of recharge. This natural system recharges about 100,000 acre-ft/yr; however, there is currently a demand for 300,000 to 400,000 acre-ft annually. The resulting deficit is causing the water table to decline at an approximate average annual rate of 2.7 ft (PCDOT 1986).

2.14 Several studies have been performed to evaluate the rate of recharge for both the Santa Cruz and Rillito Rivers (Wilson 1979; Katz 1987; Wilson and Newman 1987; Cluff et al. 1987). These studies attempted to evaluate the recharge rate using primarily empirical methods. The study by Katz indicated that the infiltration rates for all the studies ranged from 286 to 551 acre-feet/day for the Santa Cruz River and from 272 to 1,262 acre-feet/day for the Rillito. The studies by Cluff, et. al., and Wilson and Newman, evaluate the effects of channel stabilization on infiltration and ground water recharge. These reports are available at the Pima County Flood Control in-house library.

SUBSIDENCE, FISSURING AND COLLAPSING SOILS

2.15 Groundwater depletion in the Tucson basin has caused the aquifer system to compact. This compaction, in turn, has resulted in large areas of land subsidence, a problem that exists in other parts of the Basin and Range province of southern Arizona. The U.S. Geological Survey (USGS) is currently using seven vertical extensometer installations (VEIs) to measure and monitor aquifer compaction and water-level changes in the Tucson Basin. The VEIs are located in areas where the potential for land subsidence is believed to be large. Measurements made by the USGS from 1980 to the end of 1987 indicate that approximately 0.01 to 0.1 ft of compaction has occurred in the aquifer-system deposits underlying the basin during this period (Babcock et al. 1988). The amount of land subsidence resulting from aquifer compaction would be equal to the amount of compaction in all the compressible deposits of the aquifer. Since the water

wells used in the USGS study do not fully penetrate the aquifer, measured aquifer compaction would be less than or equal to the amount of land subsidence (Anderson et al. 1982). Thus, the greatest amount of land subsidence that has occurred in the Tucson basin between 1980 and 1987 is approximately 0.1 ft. This would equate to a subsidence rate of about 0.01 ft/yr. The closest VEI to the study area is located at well D-13-14 31cac, about 2-1/4 miles south of the Rillito River at First Avenue and about 2-1/2 miles northeast of the north end of this study area. A total of about 0.04 ft of aquifer compaction was measured at this installation. From 1982, this amount would correspond to a minimum subsidence rate of less than 0.01 ft/yr. An aquifer compaction study near the town of Eloy, Arizona, in the lower Santa Cruz basin, revealed that compaction and expansion of the aquifer materials corresponds to seasonal trends in water-level fluctuations, while measured land subsidence corresponds to net annual water-level declines (Schumann et al. 1986).

2.16 Land subsidence was also identified and measured by National Geodetic Survey releveling in the Tucson basin in 1980 (Anderson 1987b; Winikka 1984). Results indicated that from 1951-54 to 1979-80, land subsidence ranged from less than 0.1 ft to almost 0.5 ft; the largest amount occurred southeast of Tucson in an area south of Davis-Monthan Air Force Base, approximately 7 to 10 miles east of the Santa Cruz River channel. Subsidence generally was small in relation to water-level decline in the basin during this period. Long-term data indicate a ratio of subsidence to water-level decline of generally less than 0.003 foot per foot (Anderson 1987b).

2.1. The area of greatest potential land subsidence in the Tucson basin is from the Davis-Monthan Air Force Base area to south of Sahuarta, where water-level declines have been large (Anderson 1987b). Anderson (1987b) indicates that by the year 2030, approximately 3 to 10-plus feet of potential subsidence may result from a 200 to 400 foot decline in 1940 water levels in this region.

2.18 Earth fissures, produced in alluvial deposits by differential land subsidence, have not yet been reported in the Tucson basin but have been mapped near seven groundwater areas in southern Arizona where maximum water-level declines have equaled or exceeded 200 ft (Schumann et al. 1986). The greatest concentration of fissures is found about 30 miles north of Tucson in the lower Santa Cruz basin, which has experienced the most severe groundwater depletion. The closest earth-fissure sites to the study area are in the Avra Valley, approximately 20 miles west of Tucson.

2.19 Earth fissures, which generally occur on the periphery of subsidence areas, may eventually develop in the Tucson basin if the magnitude of groundwater depletion approaches that found in the areas noted above that presently contain fissures. Anderson (1987b) delineated zones of potential severe localized differential land

subsidence in the Tucson basin and noted that geohydrologic similarities with the Eloy-Picacho area in the lower Santa Cruz basin strongly indicate that earth fissures may occur in the Tucson basin by the year 2030, or perhaps sooner, assuming further ground water overdraft in the Tucson basin. The area from south of the Tucson International Airport to southeast of Sahuarita, which parallels a 15-mile segment of the Santa Cruz fault, was identified as the area most likely to be seriously affected by fissuring. However, a recent U.S. Geological Survey assessment of potential surface subsidence in response to overdraft in the Tucson area (Tucson Water et al. 1998) indicates that the Santa Cruz Mainstem in the Tucson Vicinity has potential to subside “less than two feet (0.6 m) to the north of the Interstate 19/I-10 interchange (the lowest number assigned in the potential ranking scheme) and no potential to subside south of that interchange.” Those subsidence potential numbers represent a significant decrease in estimated subsidence potential from earlier U.S. Geological Survey work. The decrease is related to local control of groundwater pumping instituted in the interim between the two U.S. Geological Survey studies (Anderson 1987).

2.20 The ADWR well data indicate water-level declines exceeding 100 ft in the wells in the vicinity of this study. Therefore, this vicinity and the Tucson metropolitan area in general will likely to continue to be affected by subsidence as long as groundwater overdraft continues. Efforts are being made to reduce groundwater overdraft through water conservation and groundwater replacement. Specifically, the goal of the Tucson Active Management Area is to achieve a long-term balance of groundwater withdrawal with natural and artificial recharge by the year 2025 (USACE, 1986).

2.21 Collapsible soils are common in the southwestern desert environments where the natural evaporation greatly exceeds the precipitation. Collapsible soil deposits are formed when the alluvially deposited soils dry and form chemical bonds between the soil particles. These chemical bonds “tack weld” the soil particles together and give the soil a high dry strength. However, when these soils become wet, the chemical bonds weaken or dissolve and the soil structure reaches a point when it cannot withstand the applied overburden stress and the soil structure collapses. Structures supported on collapsing soils that undergo this collapsing phenomenon can undergo significant settlements and damage. Collapsing soils are typically composed of sands, silts and clays of low plasticity. These soils types and soils with collapsing potentials are known to exist within this vicinity. Usually, such collapsing soils occur at a distance of $\frac{1}{2}$ to 1 mile from the main channel of a river where silts and clays are deposited by channel overflows. Specific studies should be undertaken once the type of remedial measures have been determined to evaluate the existence of collapsing soils.

3. SUBSURFACE INVESTIGATIONS AND RESULTS

SUBSURFACE INVESTIGATIONS

3.1. The subsurface investigation for this study consisted of excavating shallow pits in the banks and bed of the rivers using a standard, wheel-mounted backhoe. These pits were excavated to maximum depths of about 10 feet below existing grade to obtain samples of the bed and bank materials to perform laboratory classification tests. The laboratory tests were performed to determine the gradation of the soil samples. Locations of the samples are noted on the site plan included with the maps in the jacket at the end of this report. Results of laboratory tests on these samples are presented in Appendix B of this report.

3.2. In addition to the sampling performed for this study, information from geotechnical engineering studies for several of the bridges along the Santa Cruz channel was reviewed - specifically the bridges at Congress, 22nd St., Irvington, and Valencia. Based on the information available in these reports and the authors' personal experience on other projects in this vicinity, the subsurface materials below the channels generally consist of sands and gravels, with some cobble layers. These soils generally become more granular and denser with increasing depth. However, some interbedded layers of silt and clay were also encountered in the borings for the Congress Bridge. These silt and clay layers existed at various depths in the borings, generally between about 15 and 50 feet. The perched water encountered in these borings appears to sit on top of the silt/clay layers. The subsurface soils are generally not cemented, although there is a heavily cemented layer approximately 25 feet below the riverbed at the site of the 22nd Street Bridge.

4. LABORATORY TESTING AND TEST RESULTS

4.1. Samples obtained in the backhoe test pits for this study were transported to the laboratory. Tests were performed on the samples to determine the gradation of all the samples. Atterberg Limits tests were performed on those samples determined to have significant portions of silt and clay.

4.2. Results of the laboratory tests are included in Appendix B of this report. The tests indicate that most of the soils sampled from the riverbed were sands with some gravel and relatively small percentages of silts and clays. The soils from the banks tend to be finer grained, especially toward the southern end of the study, specifically test locations

6, 7 and 8. The gradation test result plots have been separated for the materials obtained from the bed and banks of the river.

4.3. Pima County DOT specifications for soil cement mixtures to be used for soil-cement bank protection call for less than 15% passing the #200 sieve (0.074 mm) and a maximum aggregate size of 2 inches (50.8 mm) with a compressive strength of 750 psi (5,170 kPa) in 7 days. Their experience has shown that the required cement content is reduced if the percent soil passing the #200 sieve (0.06 mm) is in the range of 6 to 8 percent and the material is a well-graded sand. Therefore, most of the bed material samples obtained for this study could be used for soil cement, although some screening and blending of some of the materials would be required to achieve a gradation that would reduce the required cement content and increase the strength.

5. RESULTS OF THE VISUAL OBSERVATIONS

OBSERVATIONS

5.1. The photos included in Appendix A of this report are representative of the conditions along the Santa Cruz and West Branch of the Santa Cruz at the time of our field work. As shown (reference photos 6 – 12), soil cement bank protection extends along both sides of the Santa Cruz channel from Congress to approximately 300 feet south of Silverlake Road (29th St.). From that point south, sections of the bank of the main channel are protected by soil cement, but large sections of the channel are natural (reference photos 17 – 34). Many of these natural banks are nearly vertical (photos 17 – 23, 25, 26, 28) and some have developed tension cracks along the banks (photos 26, 28). There are also some soil cement grade control structures in the bed of the channel (photos 2, 3, 4). We also noted a soil cement apron across the main channel just north of Mission Lane. It appeared this apron was constructed to protect a fiber optics cable that crossed beneath the channel at this location.

5.2. The channel of the West Branch of the Santa Cruz north of Irvington was realigned. The original alignment extended roughly parallel to the main channel to the point of confluence near the site of the existing Pima County Jail (near 29th Street). Portions of the original alignment of this channel are shown in photos 31 – 34. The channel was diverted into the main branch of the Santa Cruz River just north of Irvington Road, as shown on the site plan accompanying this report. The diverted portion of the West Branch channel intersects the main channel just north of Irvington Road, at which point an energy dissipation structure has been constructed (reference photos 27 - 29). Some sections of the northern portion of this channel have bank protection consisting of vertical, driven railroad rails connected with cable interlaced

through a wire mesh filled with gravel and cobbles. Other portions of the banks of the West Branch, particularly near the southern end of the study area, are protected by shotcrete lining. Much of the bed of the diverted channel supports a dense growth of grass (photos 26 - 28). The portion of the channel extending from just north of Irvington Road currently carries only the flow from the tributary washes, primarily from the west, and much of the channel supports a dense growth of vegetation. The bed of the main channel of the Santa Cruz supports varying amounts and types of vegetation, depending on the amount of water available and the amount of water flow in that particular portion of the channel. As shown on most of the photos of the main channel, a relatively dense growth of grass, weeds, bushes (mainly desert broom) and some small trees (primarily salt cedars and mesquites) grow in the bed of the river. However, as illustrated on photos 1 – 25, 30, sparse to no vegetation exists in the low-flow channel.

LANDFILLS

5.3. Several previous studies have been conducted to locate landfills along the Santa Cruz River and its tributaries. One of these studies, *LANDFILLS AND WASTE DISPOSAL SITES ALONG THE SANTA CRUZ RIVER FROM GRANT ROAD TO PIMA MINE ROAD*, July 1996, summarizes the information in these studies and is included in the Appendix of this report. As noted in this report, landfills along the channels range from major landfills, such as the Rio Nuevo South and A Mountain areas, which were former City of Tucson landfills, to miscellaneous wildcat dumping. In addition to the landfills noted in this report, we noted additional wildcat surface dumping on the east bank of the main Santa Cruz channel just south of Drexel Road. Also, the landfill at Site 21, the 29th St. landfill, appeared to extend farther to the west and north than indicated on the site plan in that report.

6. BANK SLOPE STABILITY

6.1 The material generally encountered within the banks was typically a fine sandy silt. This material is not layered and has little plasticity but is cemented. There are very few cobble-sized rocks within this sandy silt material. As the cementation is readily broken down by water the material, due to its small grain size, enters a state where it is very susceptible to piping. Some areas of piping and surface sinkholes were noted along the alignment. Specifically, two-foot-diameter sinkholes were noted along the bank of the West Branch north of Irvington.

6.2 The stability of the existing native embankments is marginal due to the existence of two conditions. One, the natural cementation of the soils allows the banks to stand at

a near vertical inclination at many locations along the reaches of the study (reference photos 14 - 16 and 23-25). The vertical banks, when impacted by the any significant streamflow, are susceptible to being undercut at the bottom and collapsing into the streambed. The undercutting occurs mainly by the water breaking down the weak cementation present in the silty material. The second form of stream bank erosion is piping. As previously noted, the particle size of the slope embankment material is such that it is very susceptible to piping. Either surface or subsurface water flowing over or beneath the banks form large cavities or cave-like structures as the material is removed by piping thru the embankment and out its face.

7. BED DEGRADATION

7.1 Entrenchment of the channel into the previously unincised flood plain during the late 19th and early 20th centuries caused the greatest channel change on the Santa Cruz River in historical times. Vertical channel change has continued in entrenched and unentrenched reaches of the river over the past few decades. Scour and fill are transient changes in bed elevation that occur during floods. Degradation and aggradation occur over years to decades and may reflect climatic change, adjustments of channel widening or narrowing, sediment storage and episodic transport, and natural or artificial changes in channel-hydraulic properties. Degradation and aggradation can alternate in time and space. Most vertical channel change on the Santa Cruz River near Tucson has been degradational since the late 1950's. The most pronounced channel incision on the Santa Cruz channel has been from Ajo Way in the lower San Xavier reach to Grant Road in the middle of the Tucson reach where 10 to 15 feet of streambed lowering has occurred. The general pattern suggests stable or aggrading conditions through the mid-1950's, and limited evidence suggests that his period of vertical stability may have spanned the preceding 40 years. In the mid 1950's, the streambed at Ajo Way and 1.6 miles downstream at Silverlake Road rose 4 feet. (U.S. Geological Survey 1993). The period of most rapid degradation occurred between 1954 and 1972, when the Santa Cruz channel bed lowered between three to six feet. The cause of this historical channel bed degradation appears to be most directly related to the effects of urbanization such as encroachment along the channel banks, which limits the channel's natural meandering processes, and to the excavation of sand and gravel materials from the channel bed, which disturbs the natural sediment transport continuity of the system. The process of confining a natural, braided channel system into a single, well-defined channel has created increased flow velocities and correspondingly higher sediment transport capacities. As a direct consequence, the Santa Cruz River has responded, in general, by degrading. (Simons Li 1986).

8. CONSTRUCTION CONSIDERATIONS

8.1 Any plan to stabilize the slopes would have to be implemented during the dry season when the Santa Cruz River is not flowing. Wet seasonal times and, consequently, stream flow can be expected to occur during the monsoons of late July and August, the early fall time of late September and October, and during the December and January winter rains. During these times the channel can fill up with flow extending from bank to bank. As the predominate material comprising the channel bed is a fine gravelly sand, significant bed infiltration during flows and quick drainage of the bed material occurs once the stream flow subsides. Deep borings for the bridges have shown the presence of clay layers on which perched water could and, in some cases, does reside. Also, there are cemented soils and/or rock at relatively shallow depths in the vicinity of 22nd and 29th (Silverlake) Streets. The depth of such formations is typically more than 20 ft below the streambed elevation and, thus, would not impact the construction of even the deepest toe-down structures constructed in a soil-cement stabilization program.

11. FLOODING ON THE SANTA CRUZ RIVER

9.1 The greatest flooding that has occurred on the Santa Cruz River was in Sept. – Oct. 1983 when 7.5 inches (19 cm) of rain fell over Pima County within a 7-day period (4 inches (10 cm) fell on a single day). Peak gauged discharge at Congress Street was approximately 53,000 cfs. During this time the Santa Cruz River met and flowed into the Gila River, 50 miles to the north of Tucson.

During this flood event, people were killed, injured, had to be rescued or evacuated, and substantial property damage (> \$200 million) occurred. Most of the damage resulted from bank erosion. Soil cement bank protection along the river prevented losses of at least four times the cost of such protection. Almost all of the flood damage was to structures constructed prior to floodplain management in Pima County.

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APPENDIX A

Site Photographs





#1: Santa Cruz channel just S. of Congress



#2: Grade control structure S. of Congress
in the main channel



#3: Grade control structure S of Congress
in the main channel



#4: Grade control structure S of Congress
in the main channel



#5: Santa Cruz channel S of Congress



#6: Santa Cruz channel just N of A Mtn



#7: Santa Cruz channel view S from Congress Bridge



#8: View to S. of main channel (22nd St Bridge in background)



#9: Santa Cruz channel - view N. of 22nd St. toward downtown



#10: View to S. of the main channel and the 29th St. Bridge



#11: View to S. of Santa Cruz channel S of Ajo



#12: View to S. of Santa Cruz channel 1/4 mile S of Ajo



#13: Power pole base in Santa Cruz channel just S. of Drexel



#14: Same pole foundation as previous showing bed degradation



#15: East bank of Santa Cruz channel just N. of Valencia



#16: East bank of Santa Cruz channel north of Valencia



#17: Santa Cruz channel N of Valencia



#18: Santa Cruz channel N of Valencia



#19: Tension Cracks in W. bank, just S. of Valencia



#20: Valencia Bridge



#21: Tension Cracks in W. Bank just S. of Valencia



#22: Power pole base in Santa Cruz channel



#23: Santa Cruz channel west bank, south of Irvington (view to north)



#24: Santa Cruz channel bank, south of Irvington (view to south)



#25: Santa Cruz Riv. bank, south of Irvington (view to south) (closeup of previous photo)



#26: View Upstream of West Branch, just W. of the Santa Cruz channel intersection



#27: Energy dissipation structure @ W. Branch just upstream of Santa Cruz River



#28: Energy dissipators @ West Branch and Santa Cruz intersection (view to S)



#29: Intersection of W. Branch and Santa Cruz channels (view to N)



#30: Santa Cruz channel - view to S. just below W. Branch intersection



#31: W. Branch Santa Cruz south of Ajo near Mission (view to south)



#32: W. Branch of Santa Cruz south of Ajo near Mission (view to south)



#33: View to south of the old (near) and new/diverted (distance) W. Branch channels



#34: View to north of the diverted (old) W Branch Channel

APPENDIX B

Laboratory Test Results



APPENDIX C

ADWR Well Data

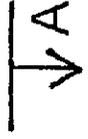


11 Well Site Locations Selected

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1 D-14-13 11BAD	55-620304	321400110592101	01/08/60	77	2259
2	55-620304	321400110592101	01/29/62	82	2253
3	55-620304	321400110592101	02/01/63	87	2248
4	55-620304	321400110592101	01/29/64	90	2245
5	55-620304	321400110592101	02/02/65	90	2245
6	55-620304	321400110592101	07/26/65	96	2239
7	55-620304	321400110592101	02/01/68	89	2246
8	55-620304	321400110592101	02/10/69	89	2246
9	55-620304	321400110592101	05/01/70	93	2242
10	55-620304	321400110592101	02/01/71	94	2241
11	55-620304	321400110592101	02/01/72	97	2238
12	55-620304	321400110592101	02/01/73	99	2236
13	55-620304	321400110592101	12/28/81	120	2215
14	55-620304	321400110592101	12/01/82	120	2215
15	55-620304	321400110592101	01/06/84	113	2222
16	55-620304	321400110592101	01/06/85	113	2222
17	55-620304	321400110592101	12/30/85	110	2226
18	55-620304	321400110592101	12/30/86	111	2224
19	55-620304	321400110592101	12/28/87	114	2221
20	55-620304	321400110592101	01/08/89	116	2219
21	55-620304	321400110592101	12/26/90	122	2213
22	55-620304	321400110592101	12/18/91	124	2211
23	55-620304	321400110592101	01/21/94	127	2208
24	55-620304	321400110592101	02/03/95	129	2206
25	55-620304	321400110592101	01/09/97	133	2202
26	55-620304	321400110592101	02/11/98	136	2199
27	55-620304	321400110592101	12/02/98	137	2198
28	55-620304	321400110592101	01/03/00	149	2186
29 D-14-13 11BBB1	55-620302	321403110594201	01/21/94	130	2205
30 D-14-13 11DAA		321339110584201	01/01/65	60	2285
31 D-14-13 11DBB		321338110590701	09/12/53	59	2282
32		321330110590701	03/01/54	68	2273
33		321338110590701	02/04/55	67	2274
34		321338110590701	01/27/58	73	2268

Arizona Department of Water Resources
GWSI Water Level Measurements

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
35		321338110590701	01/29/59	73	2268
36		321338110590701	01/30/61	79	2262
37		321338110590701	01/29/62	82	2259
38		321338110590701	01/31/63	90	2251
39		321338110590701	01/24/64	89	2252
40		321338110590701	02/02/65	89	2252
41		321338110590701	02/17/66	89	2252
42		321338110590701	01/25/67	87	2254
43		321338110590701	02/01/68	86	2255
44		321338110590701	02/01/69	89	2252
45		321338110590701	02/06/70	93	2248
46		321338110590701	02/18/71	93	2248
47		321338110590701	02/06/72	96	2245
48		321338110590701	02/15/73	98	2243
49		321338110590701	01/04/74	99	2242
50		321338110590701	01/03/75	109	2233
51		321338110590701	02/18/76	110	2231
52		321338110590701	02/01/77	111	2230
53		321338110590701	02/01/78	107	2234
54		321338110590701	02/01/79	105	2236
55		321338110590701	12/29/81	121	2220
56		321338110590701	12/15/83	108	2233
57		321338110590701	01/04/84	112	2229
58		321338110590701	12/10/84	110	2231
59		321338110590701	06/19/85	109	2232
60		321338110590701	12/03/85	110	2231
61		321338110590701	05/28/86	110	2231
62		321338110590701	06/03/87	115	2226
63	D-14-13 14CAB	321247110592001	09/11/39	28	2422
64		321247110592001	09/25/39	28	2422
65		321247110592001	11/13/39	28	2422
66		321247110592001	12/30/39	28	2422
67		321247110592001	02/19/40	27	2423
68	D-14-13 23ACA	55-619926	01/05/82	87	2283



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
69	55-619926	321209110585401	01/09/84	82	2288
70	55-619926	321209110585401	01/09/85	74	2296
71	55-619926	321209110585401	12/30/85	66	2304
72	55-619926	321209110585401	12/30/86	70	2300
73	55-619926	321209110585401	12/30/87	75	2295
74	55-619926	321209110585401	01/10/89	78	2292
75	55-619926	321209110585401	12/26/90	85	2285
76	55-619926	321209110585401	12/18/91	90	2280
77	55-619926	321209110585401	01/21/94	93	2277
78	55-619926	321209110585401	02/03/95	90	2280
79	55-619926	321209110585401	01/09/97	103	2267
80	55-619926	321209110585401	02/10/98	116	2254
81	55-619926	321209110585401	01/08/99	120	2250
82	55-619926	321209110585401	12/29/99	123	2247
83 D-14-13 23ACC	55-646738	321158110590101	12/30/81	82	2289
84	55-646738	321158110590101	01/05/84	85	2286
85	55-646738	321158110590101	11/30/87	78	2293
86	55-646738	321158110590101	01/16/95	92	2279
87	55-646738	321158110590101	02/28/00		
88 D-14-13 23ADC					
89 D-14-13 23BDA	55-619925	321202110584901	09/29/39	19	2357
90	55-619925	321207110591201	07/31/50	24	2339
91	55-619925	321207110591201	10/05/50	25	2338
92	55-619925	321207110591201	02/23/51	26	2337
93	55-619925	321207110591201	10/24/51	29	2334
94	55-619925	321207110591201	02/04/52	26	2337
95	55-619925	321207110591201	02/05/53	32	2331
96	55-619925	321207110591201	02/04/54	34	2329
97	55-619925	321207110591201	02/04/55	28	2335
98	55-619925	321207110591201	02/02/56	27	2336
99	55-619925	321207110591201	02/06/57	27	2336
100	55-619925	321207110591201	01/27/58	29	2334
101	55-619925	321207110591201	01/29/59	29	2334
102	55-619925	321207110591201	01/29/60	28	2335
			01/26/61	32	2331



Arizona Department of Water Resources
 GWSI Water Level Measurements

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
103	55-619925	321207110591201	01/25/62	31	2332
104	55-619925	321207110591201	01/29/63	35	2328
105	55-619925	321207110591201	02/05/64	41	2322
106	55-619925	321207110591201	02/03/65	38	2325
107	55-619925	321207110591201	06/10/65	40	2323
108	55-619925	321207110591201	08/12/65	43	2320
109	55-619925	321207110591201	09/27/65	41	2322
110	55-619925	321207110591201	10/15/65	42	2321
111	55-619925	321207110591201	12/15/65	38	2325
112	55-619925	321207110591201	01/15/66	36	2327
113	55-619925	321207110591201	02/17/66	32	2331
114	55-619925	321207110591201	03/04/66	33	2330
115	55-619925	321207110591201	03/17/66	33	2330
116	55-619925	321207110591201	04/19/66	36	2327
117	55-619925	321207110591201	06/22/66	35	2328
118	55-619925	321207110591201	08/22/66	35	2329
119	55-619925	321207110591201	10/15/66	34	2329
120	55-619925	321207110591201	11/18/66	34	2330
121	55-619925	321207110591201	12/28/66	34	2329
122	55-619925	321207110591201	01/15/67	32	2331
123	55-619925	321207110591201	02/20/67	31	2332
124	55-619925	321207110591201	03/01/67	31	2332
125	55-619925	321207110591201	04/17/67	32	2331
126	55-619925	321207110591201	06/20/67	36	2327
127	55-619925	321207110591201	08/23/67	34	2329
128	55-619925	321207110591201	09/01/67	35	2328
129	55-619925	321207110591201	10/01/67	35	2328
130	55-619925	321207110591201	11/01/67	34	2329
131	55-619925	321207110591201	12/01/67	33	2330
132	55-619925	321207110591201	01/18/68	31	2332
133	55-619925	321207110591201	02/01/68	33	2330
134	55-619925	321207110591201	02/16/68	32	2331
135	55-619925	321207110591201	03/01/68	32	2331
136	55-619925	321207110591201	04/19/68	32	2331



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
137	55-619925	321207110591201	05/16/68	32	2331
138	55-619925	321207110591201	06/17/68	34	2329
139	55-619925	321207110591201	02/11/69	35	2328
140	55-619925	321207110591201	04/23/70	41	2322
141	55-619925	321207110591201	01/05/82	87	2276
142	55-619925	321207110591201	12/01/82	89	2274
143	55-619925	321207110591201	12/30/85	66	2297
144	55-619925	321207110591201	12/30/86	69	2294
145	55-619925	321207110591201	12/30/87	75	2288
146	55-619925	321207110591201	12/26/90	85	2278
147	55-619925	321207110591201	12/18/91	89	2274
148	55-619925	321207110591201	01/21/94	93	2270
149	55-619925	321207110591201	12/24/97	105	2258
150	55-619925	321207110591201	04/28/98	135	2228
151 D-14-13 23CAA1		321154110591201	01/23/46	55	2505
152 D-14-13 23CDD	55-802875	321134110591301	01/09/89	86	2299
153	55-802875	321134110591301	12/28/90	94	2291
154 D-14-13 26ACA	55-619921	321108110590901	12/06/30	21	2374
155	55-619921	321108110590901	12/16/31	17	2378
156	55-619921	321108110590901	02/15/32	16	2379
157	55-619921	321108110590901	02/01/33	16	2379
158	55-619921	321108110590901	01/01/34	16	2379
159	55-619921	321108110590901	01/01/35	18	2377
160	55-619921	321108110590901	01/21/36	17	2378
161	55-619921	321108110590901	02/24/37	18	2377
162	55-619921	321108110590901	01/18/38	20	2375
163	55-619921	321108110590901	01/01/39	21	2374
164	55-619921	321108110590901	02/01/40	21	2374
165	55-619921	321108110590901	01/01/41	22	2373
166	55-619921	321108110590901	02/28/47	78	2317
167	55-619921	321108110590901	02/10/49	32	2363
168	55-619921	321108110590901	02/10/50	35	2360
169	55-619921	321108110590901	02/22/51	37	2358
170	55-619921	321108110590901	02/08/52	36	2359



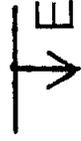
Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
171	55-619921	321108110590901	02/05/53	40	2355
172	55-619921	321108110590901	02/04/54	40	2355
173	55-619921	321108110590901	02/07/55	36	2359
174	55-619921	321108110590901	02/29/56	33	2362
175	55-619921	321108110590901	02/07/57	36	2359
176	55-619921	321108110590901	01/27/58	37	2358
177	55-619921	321108110590901	01/29/59	38	2357
178	55-619921	321108110590901	01/29/60	37	2358
179	55-619921	321108110590901	01/26/61	42	2353
180	55-619921	321108110590901	01/24/62	42	2353
181	55-619921	321108110590901	01/29/63	47	2348
182	55-619921	321108110590901	01/28/64	50	2345
183	55-619921	321108110590901	02/03/65	48	2347
184	D-14-13 26BBC1	321119110593601	09/30/81		
185	D-14-13 26BBC3	321129110593401	01/21/52	37	2353
186		321129110593401	02/02/53	38	2352
187		321129110593401	02/08/54	39	2351
188		321129110593401	02/04/55	36	2354
189		321129110593401	02/08/56	32	2358
190		321129110593401	02/08/57	36	2354
191		321129110593401	01/28/58	37	2353
192		321129110593401	01/28/59	37	2353
193		321129110593401	01/29/60	37	2353
194		321129110593401	01/31/61	40	2350
195		321129110593401	01/30/62	40	2350
196		321129110593401	02/01/63	46	2344
197		321129110593401	01/27/64	49	2341
198		321129110593401	02/05/68	48	2342
199		321129110593401	01/11/69	50	2340
200		321129110593401	12/28/81	97	2293
201		321129110593401	12/30/81	97	2293
202		321129110593401	12/01/82	103	2287
203		321129110593401	01/09/84	94	2296
204		321129110593401	01/08/85	83	2307



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
205	55-619908	321129110593401	12/31/85	80	2310
206	55-619908	321129110593401	01/02/87	82	2309
207	55-619908	321129110593401	12/30/87	85	2305
208	55-619908	321129110593401	12/26/90	99	2291
209	55-619908	321129110593401	01/21/94	105	2285
210	55-619908	321129110593401	02/02/95	105	2285
211	D-14-13 26BCA2	321118110592801	12/22/81		
212	D-14-13 26CDC	321045110592301	12/30/81	116	2285
213	D-14-13 26DBB	321107110590801	01/17/30	22	2373
214		321107110590801	12/01/30	24	2371
215		321107110590801	02/15/32	19	2376
216		321107110590801	02/01/33	18	2377
217		321107110590801	01/01/34	19	2376
218		321107110590801	01/01/35	20	2375
219		321107110590801	01/21/36	20	2375
220		321107110590801	01/01/37	22	2373
221		321107110590801	01/18/38	23	2372
222		321107110590801	01/01/39	24	2371
223		321107110590801	02/01/40	24	2371
224		321107110590801	01/01/41	25	2370
225		321107110590801	02/28/47	32	2363
226		321107110590801	02/10/49	35	2360
227		321107110590801	02/10/50	37	2358
228		321107110590801	02/22/51	39	2356
229		321107110590801	02/08/52	39	2356
230		321107110590801	02/05/53	43	2352
231		321107110590801	02/09/54	43	2352
232		321107110590801	02/07/55	41	2354
233		321107110590801	02/29/56	36	2359
234		321107110590801	02/07/57	39	2356
235		321107110590801	01/27/58	40	2355
236		321107110590801	01/29/59	42	2353
237		321107110590801	01/29/60	41	2355
238		321107110590801	01/26/61	45	2350



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
239	55-619920	321107110590801	01/24/62	46	2349
240	55-619920	321107110590801	01/29/63	51	2344
241	55-619920	321107110590801	01/27/64	55	2340
242	55-619920	321107110590801	02/03/65	54	2341
243	55-619920	321107110590801	02/17/66	51	2344
244	55-619920	321107110590801	02/02/68	50	2345
245	55-619920	321107110590801	02/11/69	55	2340
246	55-619920	321107110590801	01/03/75	90	2305
247	55-619920	321107110590801	01/05/82	108	2287
248	55-619920	321107110590801	01/06/84	103	2292
249	55-619920	321107110590801	01/09/85	91	2304
250	55-619920	321107110590801	12/30/85	90	2305
251	55-619920	321107110590801	12/30/87	94	2302
252	55-619920	321107110590801	01/09/89	99	2296
253	55-619920	321107110590801	12/26/90	108	2287
254	55-619920	321107110590801	12/18/91	112	2283
255	55-619920	321107110590801	01/21/94	114	2281
256	55-619920	321107110590801	02/02/95	116	2279
257	55-619920	321107110590801	01/09/97	136	2259
258	55-619920	321107110590801	02/10/98	144	2251
259	55-619920	321107110590801	01/09/99	147	2248
260	55-619920	321107110590801	12/29/99	152	2243
261 D-14-13 34ACA		321027110595501	02/07/55	52	2350
262		321027110595501	02/10/56	46	2357
263		321027110595501	02/11/57	52	2351
264		321027110595501	01/29/58	53	2349
265		321027110595501	01/30/59	53	2349
266		321027110595501	01/29/60	53	2349
267		321027110595501	01/30/61	57	2345
268		321027110595501	01/25/62	59	2343
269		321027110595501	01/28/63	62	2340
270 D-14-13 34AD		321020110594801	03/24/42	34	2391
271 D-14-13 34ADC		321017110595001	12/08/30	29	2386
272		321017110595001	02/07/31	28	2387



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
273		321017110595001	03/06/31	28	2387
274		321017110595001	01/19/32	25	2390
275		321017110595001	02/24/32	25	2390
276		321017110595001	08/01/32	27	2388
277		321017110595001	09/01/32	27	2388
278		321017110595001	10/01/32	27	2388
279		321017110595001	11/01/32	27	2388
280		321017110595001	12/01/32	26	2389
281		321017110595001	01/01/33	25	2390
282		321017110595001	09/01/34	30	2385
283		321017110595001	11/01/34	30	2385
284		321017110595001	12/01/34	29	2386
285		321017110595001	01/01/35	28	2387
286		321017110595001	09/01/35	33	2382
287		321017110595001	12/01/35	28	2387
288		321017110595001	02/05/36	28	2387
289		321017110595001	04/01/36	28	2387
290		321017110595001	02/24/37	29	2386
291		321017110595001	09/01/37	32	2383
292		321017110595001	10/13/37	32	2383
293		321017110595001	11/17/37	32	2383
294		321017110595001	12/21/37	32	2383
295		321017110595001	01/18/38	31	2384
296		321017110595001	03/16/38	30	2385
297		321017110595001	04/14/38	31	2384
298		321017110595001	05/16/38	32	2383
299		321017110595001	10/01/38	34	2381
300		321017110595001	11/01/38	33	2382
301		321017110595001	12/01/38	33	2382
302		321017110595001	01/01/39	32	2383
303		321017110595001	02/01/39	31	2384
304		321017110595001	09/01/39	34	2381
305		321017110595001	11/01/39	32	2383
306		321017110595001	02/01/40	31	2384



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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
307		321017110595001	03/01/40	30	2385
308		321017110595001	07/01/40	34	2381
309		321017110595001	10/01/40	34	2381
310		321017110595001	01/01/41	32	2383
311		321017110595001	03/01/41	30	2385
312		321017110595001	06/16/41	33	2382
313		321017110595001	02/26/42	32	2383
314		321017110595001	10/20/42	38	2377
315		321017110595001	02/05/52	52	2363
316		321017110595001	02/05/53	55	2360
317		321017110595001	02/09/54	58	2357
318		321017110595001	02/07/55	52	2363
319		321017110595001	02/10/56	47	2368
320		321017110595001	02/11/57	53	2362
321		321017110595001	01/29/58	54	2361
322		321017110595001	02/02/59	54	2361
323		321017110595001	01/29/60	58	2357
324		321017110595001	01/31/61	58	2357
325		321017110595001	01/30/62	59	2356
326		321017110595001	02/04/63	63	2352
327		321017110595001	01/29/64	68	2348
328		321017110595001	02/04/65	65	2350
329		321017110595001	01/26/67	62	2353
330		321017110595001	02/09/70	76	2339
331		321017110595001	12/30/81	131	2285
332		321017110595001	11/30/87	113	2302
333		321017110595001	01/16/95	140	2275
334		321017110595001	02/28/00		
335 D-14-13 34DCD		320950110595801	09/28/39	33	2392
336		320950110595801	11/06/39	33	2392
337		320950110595801	12/26/39	32	2393
338		320950110595801	02/11/40	31	2394
339		320950110595801	03/18/40	32	2393
340		320950110595801	05/01/40	32	2393



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
341		320950110595801	05/28/40	33	2392
342		320950110595801	08/13/40	19	2406
343		320950110595801	10/04/40	18	2407
344	D-14-13 34DDC	320951110595001	09/28/39	33	2392
345		320951110595001	10/04/40	36	2389
346		320951110595001	11/05/40	37	2388
347		320951110595001	02/24/41	34	2391
348		320951110595001	03/25/41	34	2391
349		320951110595001	04/28/41	35	2390
350		320951110595001	09/30/41	38	2387
351		320951110595001	11/13/41	37	2388
352		320951110595001	12/29/41	36	2389
353		320951110595001	03/24/42	35	2390
354		320951110595001	12/23/42	38	2387
355		320951110595001	10/26/43	41	2384
356		320951110595001	11/18/43	40	2385
357		320951110595001	01/14/44	38	2387
358		320951110595001	10/13/44	46	2379
359		320951110595001	12/11/44	42	2383
360		320951110595001	03/10/45	41	2384
361		320951110595001	10/12/45	48	2377
362		320951110595001	10/15/45	47	2378
363		320951110595001	12/06/45	45	2380
364		320951110595001	05/08/46	46	2379
365		320951110595001	07/23/46	50	2375
366		320951110595001	09/30/46	47	2378
367		320951110595001	10/11/46	46	2379
368		320951110595001	10/12/46	48	2377
369		320951110595001	12/02/46	44	2381
370		320951110595001	12/06/46	45	2380
371		320951110595001	03/31/47	45	2380
372		320951110595001	04/29/47	46	2379
373		320951110595001	07/14/47	52	2373
374		320951110595001	07/15/47	52	2373

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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
375		320951110595001	09/26/47	52	2373
376		320951110595001	10/01/47	51	2375
377		320951110595001	10/28/47	50	2375
378		320951110595001	05/21/48	52	2373
379		320951110595001	06/18/48	54	2371
380		320951110595001	07/28/48	56	2369
381		320951110595001	08/24/48	56	2369
382		320951110595001	09/30/48	56	2369
383		320951110595001	10/11/48	56	2369
384		320951110595001	10/25/48	55	2370
385		320951110595001	11/26/48	53	2372
386		320951110595001	01/27/49	49	2376
387		320951110595001	02/07/49	49	2376
388		320951110595001	09/26/49	58	2367
389		320951110595001	10/13/49	57	2368
390		320951110595001	12/16/49	54	2371
391		320951110595001	02/06/50	55	2370
392		320951110595001	09/19/50	59	2366
393		320951110595001	09/26/50	59	2366
394		320951110595001	11/30/50	58	2367
395		320951110595001	12/16/50	52	2373
396		320951110595001	01/18/51	56	2369
397		320951110595001	02/23/51	54	2371
398		320951110595001	12/17/51	58	2367
399		320951110595001	02/08/52	58	2367
400		320951110595001	05/19/52	57	2368
401		320951110595001	11/13/52	63	2362
402		320951110595001	02/03/53	58	2367
403		320951110595001	02/05/53	58	2367
404		320951110595001	04/23/53	59	2366
405		320951110595001	10/21/53	57	2368
406		320951110595001	02/08/54	63	2362
407		320951110595001	05/17/54	63	2362
408		320951110595001	08/04/54	67	2358

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
409		32095110595001	11/08/54	62	2363
410		32095110595001	01/04/55	61	2364
411		32095110595001	02/07/55	57	2368
412		32095110595001	03/25/55	59	2367
413		32095110595001	10/28/55	55	2370
414		32095110595001	01/04/56	51	2374
415		32095110595001	02/10/56	50	2375
416		32095110595001	08/10/56	60	2365
417		32095110595001	02/01/57	55	2370
418		32095110595001	02/11/57	56	2369
419		32095110595001	07/19/57	62	2363
420		32095110595001	12/27/57	58	2367
421		32095110595001	01/29/58	58	2367
422		32095110595001	02/02/59	59	2366
423		32095110595001	01/05/60	61	2364
424		32095110595001	01/29/60	59	2366
425		32095110595001	01/30/61	63	2362
426		32095110595001	02/02/61	63	2362
427		32095110595001	01/25/62	65	2360
428		32095110595001	02/21/62	65	2360
429		32095110595001	10/10/62	74	2351
430		32095110595001	01/31/63	71	2354
431		32095110595001	02/04/63	71	2354
432		32095110595001	01/27/64	74	2351
433		32095110595001	03/05/64	79	2346
434		32095110595001	01/12/65	79	2346
435		32095110595001	02/04/65	72	2353
436		32095110595001	01/10/66	72	2353
437		32095110595001	02/17/66	70	2355
438		32095110595001	03/23/67	75	2350
439		32095110595001	12/11/74	112	2313
440		32095110595001	12/30/81		
441 D-14-13-34DDD		320947110594001	10/26/43	41	2382
442		320947110594001	10/13/44	46	2377

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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
443		320947110594001	12/11/44	42	2381
444		320947110594001	03/10/45	41	2382
445		320947110594001	10/15/45	47	2376
446		320947110594001	05/08/46	44	2379
447		320947110594001	07/23/46	48	2375
448		320947110594001	09/30/46	46	2377
449		320947110594001	10/11/46	44	2379
450		320947110594001	10/23/46	45	2378
451		320947110594001	12/02/46	42	2381
452		320947110594001	12/24/46	42	2381
453		320947110594001	03/31/47	43	2380
454		320947110594001	04/29/47	44	2379
455		320947110594001	09/26/47	50	2373
456		320947110594001	10/27/47	50	2373
457		320947110594001	10/28/47	48	2375
458		320947110594001	05/02/48	52	2371
459		320947110594001	06/18/48	54	2369
460		320947110594001	07/28/48	56	2367
461		320947110594001	08/24/48	56	2367
462		320947110594001	09/30/48	56	2367
463		320947110594001	10/11/48	55	2368
464		320947110594001	10/28/48	55	2368
465		320947110594001	11/26/48	53	2370
466		320947110594001	02/07/49	55	2368
467		320947110594001	09/19/50	59	2364
468		320947110594001	02/23/51	54	2369
469		320947110594001	02/08/52	58	2365
470		320947110594001	02/05/53	59	2364
471		320947110594001	02/11/54	62	2361
472		320947110594001	02/07/55	57	2366
473		320947110594001	02/10/56	50	2373
474		320947110594001	02/11/57	56	2367
475		320947110594001	01/29/58	58	2365
476		320947110594001	02/02/59	58	2365

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
477		320947110594001	01/29/80	60	2363
478		320947110594001	01/30/81	63	2360
479		320947110594001	01/25/82	65	2358
480		320947110594001	02/04/83	69	2354
481		320947110594001	01/27/84	74	2349
482		320947110594001	02/04/85	72	2351
483		320947110594001	01/26/87	69	2354
484		320947110594001	02/01/72	84	2339
485		320947110594001	01/24/73	86	2337
486		320947110594001	02/01/78	116	2307
487		320947110594001	02/01/79	113	2310
488	D-14-13 35AAC	321030110584901	02/28/68	87	2345
489		321030110584901	01/01/82	147	2285
490		321030110584901	08/13/84	138	2295
491		321030110584901	12/30/85	126	2306
492	D-14-13 35ADA	321025110584801	10/10/85	141	2297
493		321025110584801	12/30/85	126	2312
494		321025110584801	05/20/86	137	2301
495		321025110584801	11/17/86	141	2297
496		321025110584801	05/26/87	140	2298
497		321025110584801	05/16/91	166	2272
498		321025110584801	12/23/91	150	2288
499		321025110584801	12/16/94	157	2291
500		321025110584801	01/16/97	183	2255
501		321025110584801	12/05/97	183	2255
502		321025110584801	04/30/98	216	2222
503		321025110584801	01/27/99	183	2255
504		321025110584801	02/02/00	194	2244
505	D-14-13 35ADC	321014110584501	02/10/49	70	2374
506		321014110584501	10/13/49	78	2366
507		321014110584501	02/09/50	74	2370
508		321014110584501	02/26/51	75	2369
509		321014110584501	10/24/51	82	2362
510		321014110584501	02/01/52	77	2367

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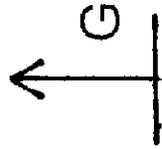
Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
511		321014110584501	02/01/53	80	2364
512		321014110584501	02/08/54	81	2363
513		321014110584501	02/09/55	78	2366
514		321014110584501	02/10/56	71	2374
515		321014110584501	02/11/57	76	2368
516		321014110584501	01/29/58	78	2366
517		321014110584501	01/30/59	79	2365
518		321014110584501	02/01/60	80	2364
519		321014110584501	01/27/61	83	2361
520		321014110584501	01/25/62	86	2358
521		321014110584501	02/04/63	90	2354
522		321014110584501	01/28/64	94	2350
523		321014110584501	02/03/65	93	2351
524		321014110584501	02/20/66	90	2354
525		321014110584501	01/26/67	88	2356
526		321014110584501	02/02/68	87	2357
527		321014110584501	02/14/69	96	2348
528		321014110584501	02/09/70	109	2335
529 D-14-13 35BAB	55-619930	321033110592101	06/01/66	60	2340
530	55-619930	321033110592101	12/01/82	127	2273
531	55-619930	321033110592101	01/06/84	114	2286
532	55-619930	321033110592101	01/08/85	99	2301
533	55-619930	321033110592101	12/30/85	98	2302
534	55-619930	321033110592101	01/09/89	110	2291
535	55-619930	321033110592101	12/26/90	118	2282
536	55-619930	321033110592101	02/03/95	129	2271
537	55-619930	321033110592101	12/16/96	142	2258
538	55-619930	321033110592101	12/24/97	150	2250
539	55-619930	321033110592101	05/19/98	172	2229
540	55-619930	321033110592101	11/18/98	150	2250
541	55-619930	321033110592101	12/28/99	160	2240
542 D-14-13 35BDC		321017110591901	09/29/39	34	2378
543		321017110591901	10/04/40	35	2377
544		321017110591901	09/30/41	35	2377



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
545		321017110591901	09/29/42	39	2373
546		321017110591901	09/29/43	41	2371
547		321017110591901	09/28/44	44	2368
548		321017110591901	10/22/45	44	2368
549		321017110591901	10/11/46	43	2369
550		321017110591901	09/26/47	49	2363
551 D-14-13 35CAA	55-619922	321008110590801	02/10/50	61	2364
552	55-619922	321008110590801	02/06/52	62	2363
553	55-619922	321008110590801	02/06/53	66	2359
554	55-619922	321008110590801	02/11/54	67	2358
555	55-619922	321008110590801	02/10/55	63	2362
556	55-619922	321008110590801	02/10/56	57	2363
557	55-619922	321008110590801	02/07/57	62	2363
558	55-619922	321008110590801	01/28/58	64	2361
559	55-619922	321008110590801	01/30/59	64	2361
560	55-619922	321008110590801	02/01/60	65	2360
561	55-619922	321008110590801	01/27/61	69	2356
562	55-619922	321008110590801	01/25/62	71	2354
563	55-619922	321008110590801	01/29/63	76	2349
564	55-619922	321008110590801	01/27/64	81	2344
565	55-619922	321008110590801	02/03/65	82	2343
566	55-619922	321008110590801	06/11/65	86	2339
567	55-619922	321008110590801	02/02/68	86	2339
568	55-619922	321008110590801	02/14/69	89	2336
569	55-619922	321008110590801	04/23/70	88	2337
570	55-619922	321008110590801	01/05/82	139	2286
571	55-619922	321008110590801	01/09/84	132	2293
572	55-619922	321008110590801	01/08/85	118	2307
573	55-619922	321008110590801	12/30/85	117	2308
574	55-619922	321008110590801	01/02/87	116	2309
575	55-619922	321008110590801	12/30/87	121	2304
576	55-619922	321008110590801	12/28/90	137	2288
577	55-619922	321008110590801	12/23/91	141	2284
578	55-619922	321008110590801	02/02/95	153	2272



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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
579	55-619922	321008110590801	12/30/96	174	2251
580	55-619922	321008110590801	02/10/98	180	2245
581	55-619922	321008110590801	12/24/98	184	2241
582	55-619922	321008110590801	12/29/99	187	2238
583 D-14-13 35CAB	55-619919	321008110592001	03/16/31	30	2380
584	55-619919	321008110592001	04/15/31	31	2379
585	55-619919	321008110592001	06/16/31	33	2377
586	55-619919	321008110592001	07/15/31	33	2377
587	55-619919	321008110592001	09/15/31	30	2380
588	55-619919	321008110592001	11/16/31	30	2380
589	55-619919	321008110592001	01/16/32	26	2382
590	55-619919	321008110592001	02/15/32	28	2382
591	55-619919	321008110592001	07/01/32	29	2381
592	55-619919	321008110592001	11/01/32	30	2380
593	55-619919	321008110592001	01/01/34	29	2381
594	55-619919	321008110592001	03/01/34	30	2380
595	55-619919	321008110592001	04/01/34	30	2380
596	55-619919	321008110592001	05/01/34	31	2379
597	55-619919	321008110592001	06/01/34	32	2378
598	55-619919	321008110592001	09/01/34	32	2378
599	55-619919	321008110592001	01/01/35	30	2380
600	55-619919	321008110592001	03/01/35	30	2380
601	55-619919	321008110592001	08/01/35	31	2379
602	55-619919	321008110592001	09/01/35	31	2379
603	55-619919	321008110592001	10/01/35	31	2379
604	55-619919	321008110592001	12/01/35	30	2380
605	55-619919	321008110592001	01/21/36	30	2380
606	55-619919	321008110592001	04/01/36	31	2379
607	55-619919	321008110592001	02/24/37	31	2379
608	55-619919	321008110592001	04/23/37	33	2377
609	55-619919	321008110592001	06/10/37	33	2378
610	55-619919	321008110592001	07/15/37	34	2376
611	55-619919	321008110592001	08/19/37	34	2376
612	55-619919	321008110592001	10/13/37	34	2376

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
613	55-619919	321008110592001	11/17/37	34	2376
614	55-619919	321008110592001	12/21/37	33	2377
615	55-619919	321008110592001	01/18/38	33	2377
616	55-619919	321008110592001	02/17/38	32	2378
617	55-619919	321008110592001	03/16/38	33	2377
618	55-619919	321008110592001	04/14/38	33	2377
619	55-619919	321008110592001	05/16/38	35	2375
620	55-619919	321008110592001	08/18/38	31	2379
621	55-619919	321008110592001	10/01/38	36	2374
622	55-619919	321008110592001	12/01/38	35	2375
623	55-619919	321008110592001	01/01/39	34	2376
624	55-619919	321008110592001	02/01/39	33	2377
625	55-619919	321008110592001	03/01/40	32	2378
626	55-619919	321008110592001	10/01/40	36	2374
627	55-619919	321008110592001	01/01/41	33	2377
628	55-619919	321008110592001	02/28/47	45	2365
629	55-619919	321008110592001	10/28/47	49	2361
630	55-619919	321008110592001	02/10/50	53	2357
631	55-619919	321008110592001	02/05/52	54	2356
632	55-619919	321008110592001	02/05/53	56	2354
633	55-619919	321008110592001	02/11/54	58	2352
634	55-619919	321008110592001	02/10/55	54	2356
635	55-619919	321008110592001	02/10/56	47	2363
636	55-619919	321008110592001	02/07/57	54	2356
637	55-619919	321008110592001	01/28/58	55	2355
638	55-619919	321008110592001	01/30/59	56	2354
639	55-619919	321008110592001	02/01/60	56	2354
640	55-619919	321008110592001	01/27/61	60	2350
641	55-619919	321008110592001	01/24/62	62	2348
642	55-619919	321008110592001	01/28/63	66	2344
643	55-619919	321008110592001	01/27/64	70	2340
644	55-619919	321008110592001	02/02/65	69	2341
645	55-619919	321008110592001	06/09/65	72	2338
646	55-619919	321008110592001	07/15/65	75	2335

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
647	55-619919	321008110592001	08/10/65	76	2334
648	55-619919	321008110592001	09/21/65	74	2336
649	55-619919	321008110592001	10/15/65	75	2335
650	55-619919	321008110592001	12/15/65	73	2338
651	55-619919	321008110592001	01/15/66	73	2338
652	55-619919	321008110592001	04/19/66	69	2341
653	55-619919	321008110592001	08/28/67	72	2338
654	55-619919	321008110592001	09/01/67	72	2338
655	55-619919	321008110592001	10/25/67	70	2340
656	55-619919	321008110592001	11/20/67	73	2338
657	55-619919	321008110592001	12/20/67	70	2340
658	55-619919	321008110592001	01/18/68	69	2342
659	55-619919	321008110592001	02/02/68	75	2335
660	55-619919	321008110592001	02/16/68	68	2342
661	55-619919	321008110592001	03/01/68	66	2344
662	55-619919	321008110592001	04/11/68	68	2342
663	55-619919	321008110592001	05/16/68	70	2341
664	55-619919	321008110592001	06/17/68	70	2340
665	55-619919	321008110592001	04/23/70	80	2330
666	55-619919	321003110592001	01/05/82	131	2279
667	55-619919	321008110592001	01/09/84	124	2286
668	55-619919	321008110592001	01/08/85	109	2301
669	55-619919	321008110592001	12/30/85	109	2301
670	55-619919	321008110592001	01/02/87	108	2302
671	55-619919	321008110592001	12/30/87	113	2297
672	55-619919	321008110592001	01/09/89	121	2289
673	55-619919	321008110592001	12/28/90	129	2281
674	55-619919	321008110592001	12/23/91	133	2277
675	55-619919	321008110592001	02/02/95	143	2267
676 D-14-13 35CAC1	55-619910	321003110592101	05/15/31	29	2386
677	55-619910	321003110592101	09/15/31	28	2307
678	55-619910	321003110592101	11/16/31	27	2388
679	55-619910	321003110592101	04/01/32	25	2390
680	55-619910	321003110592101	05/01/32	26	2389

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
681	55-619910	321003110592101	06/01/32	27	2388
682	55-619910	321003110592101	06/01/32	25	2390
683	55-619910	321003110592101	09/01/32	27	2388
684	55-619910	321003110592101	11/01/32	26	2389
685	55-619910	321003110592101	12/01/32	26	2389
686	55-619910	321003110592101	03/01/33	29	2386
687	55-619910	321003110592101	07/01/33	28	2387
688	55-619910	321003110592101	01/01/34	22	2393
689	55-619910	321003110592101	02/01/34	23	2392
690	55-619910	321003110592101	03/01/34	24	2391
691	55-619910	321003110592101	04/01/34	23	2392
692	55-619910	321003110592101	06/01/34	25	2390
693	55-619910	321003110592101	07/01/34	27	2386
694	55-619910	321003110592101	10/01/34	26	2389
695	55-619910	321003110592101	01/01/35	24	2391
696	55-619910	321003110592101	04/01/35	25	2390
697	55-619910	321003110592101	04/01/36	29	2386
698	55-619910	321003110592101	06/10/37	32	2383
699	55-619910	321003110592101	07/15/37	32	2383
700	55-619910	321003110592101	08/19/37	32	2383
701	55-619910	321003110592101	09/16/37	32	2383
702	55-619910	321003110592101	10/13/37	32	2383
703	55-619910	321003110592101	11/17/37	32	2383
704	55-619910	321003110592101	12/21/37	31	2384
705	55-619910	321003110592101	01/18/38	31	2384
706	55-619910	321003110592101	02/17/38	31	2384
707	55-619910	321003110592101	03/16/38	31	2385
708	55-619910	321003110592101	04/14/38	31	2384
709	55-619910	321003110592101	05/16/38	33	2382
710	55-619910	321003110592101	08/18/38	34	2381
711	55-619910	321003110592101	10/01/38	34	2381
712	55-619910	321003110592101	11/01/38	34	2381
713	55-619910	321003110592101	12/01/38	33	2382
714	55-619910	321003110592101	01/01/39	32	2383

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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
715	55-619910	321003110592101	02/01/39	31	2384
716	55-619910	321003110592101	03/01/40	32	2383
717	55-619910	321003110592101	10/01/40	34	2381
718	55-619910	321003110592101	01/01/41	32	2383
719	55-619910	321003110592101	10/13/49	57	2358
720	55-619910	321003110592101	02/10/50	50	2365
721	55-619910	321003110592101	02/06/52	51	2364
722	55-619910	321003110592101	02/05/53	55	2360
723	55-619910	321003110592101	02/11/54	56	2359
724	55-619910	321003110592101	02/10/55	52	2363
725	55-619910	321003110592101	02/01/56	45	2370
726	55-619910	321003110592101	02/07/57	51	2364
727	55-619910	321003110592101	01/28/58	53	2362
728	55-619910	321003110592101	01/30/59	54	2361
729	55-619910	321003110592101	01/29/60	53	2362
730	55-619910	321003110592101	01/27/61	61	2354
731	55-619910	321003110592101	01/24/62	60	2355
732	55-619910	321003110592101	01/28/63	64	2351
733	55-619910	321003110592101	01/27/64	68	2347
734	55-619910	321003110592101	02/02/65	67	2348
735	55-619910	321003110592101	06/09/65	72	2343
736	55-619910	321003110592101	10/29/65	75	2340
737	55-619910	321003110592101	02/02/68	73	2342
738	55-619910	321003110592101	02/01/69	73	2342
739	55-619910	321003110592101	04/23/70	81	2334
740	55-619910	321003110592101	01/05/82	133	2262
741	55-619910	321003110592101	12/01/82	140	2275
742	55-619910	321003110592101	01/09/84	126	2290
743	55-619910	321003110592101	01/08/85	110	2305
744	55-619910	321003110592101	12/30/85	110	2305
745	55-619910	321003110592101	01/02/87	110	2305
746	55-619910	321003110592101	12/30/87	114	2301
747	55-619910	321003110592101	01/09/89	123	2292
748	55-619910	321003110592101	12/28/90	130	2285

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
749	55-619910	321003110592101	12/31/91	136	2279
750	55-619910	321003110592101	02/02/95	145	2270
751	55-619910	321003110592101	12/13/96	166	2249
752	55-619910	321003110592101	02/02/99	170	2245
753	55-619910	321003110592101	12/22/99	180	2235
754	D-14-13 35CCC	320950110593501	02/20/48	46	2378
755		320950110593501	03/19/48	47	2377
756		320950110593501	06/18/48	52	2372
757		320950110593501	10/11/48	54	2371
758		320950110593501	02/07/49	46	2378
759		320950110593501	06/27/49	56	2368
760		320950110593501	10/13/49	55	2369
761		320950110593501	02/23/51	51	2373
762		320950110593501	01/21/52	56	2368
763		320950110593501	02/05/52	54	2370
764		320950110593501	02/09/54	58	2366
765		320950110593501	02/07/55	54	2370
766		320950110593501	02/10/56	47	2377
767		320950110593501	02/11/57	53	2371
768		320950110593501	01/29/58	55	2369
769		320950110593501	02/02/59	55	2369
770		320950110593501	01/29/60	57	2367
771		320950110593501	01/30/61	60	2365
772		320950110593501	01/25/62	62	2362
773		320950110593501	02/04/63	65	2359
774		320950110593501	01/27/64	70	2354
775		320950110593501	02/02/65	68	2356
776		320950110593501	02/02/68	56	2368
777		320950110593501	02/09/70	82	2342
778		320950110593501	02/19/71	81	2343
779		320950110593501	02/01/72	85	2340
780		320950110593501	01/24/73	88	2336
781		320950110593501	01/15/74	86	2338
782		320950110593501	02/18/76	110	2314

Arizona Department of Water Resources
 GWSI Water Level Measurements

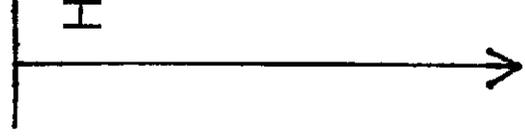
Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
783		320950110593501	02/01/77	116	2308
784		320950110593501	02/01/78	130	2295
785		320950110593501	02/01/79	127	2297
786		320950110593501	09/30/81	134	2290
787	D-14-13 35CDB	320957110591801	09/15/31	32	2393
788		320957110591801	11/16/31	31	2394
789		320957110591801	12/15/31	29	2396
790		320957110591801	01/16/32	29	2396
791		320957110591801	02/15/32	29	2396
792		320957110591801	05/01/32	30	2395
793		320957110591801	06/01/32	32	2393
794		320957110591801	07/01/32	31	2394
795		320957110591801	08/01/32	30	2395
796		320957110591801	09/01/32	32	2393
797		320957110591801	10/01/32	32	2393
798		320957110591801	11/01/32	31	2394
799		320957110591801	05/01/33	31	2394
800		320957110591801	07/01/33	32	2394
801		320957110591801	01/01/34	30	2395
802		320957110591801	04/01/34	31	2394
803		320957110591801	07/01/34	35	2390
804		320957110591801	10/01/34	34	2391
805		320957110591801	02/01/35	32	2393
806		320957110591801	03/01/35	31	2394
807		320957110591801	04/01/35	33	2392
808		320957110591801	06/01/35	34	2391
809		320957110591801	04/01/36	32	2393
810		320957110591801	07/17/36	35	2390
811		320957110591801	02/24/37	32	2393
812		320957110591801	04/23/37	34	2391
813		320957110591801	07/15/37	35	2390
814		320957110591801	08/19/37	35	2390
815		320957110591801	09/16/37	37	2388
816		320957110591801	10/13/37	35	2390

GWS\ Water | Measurements

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
817	55-619915	320957110591801	11/17/37	35	2390
818	55-619915	320957110591801	12/21/37	34	2391
819	55-619915	320957110591801	01/18/38	35	2391
820	55-619915	320957110591801	02/17/38	34	2391
821	55-619915	320957110591801	03/16/38	34	2391
822	55-619915	320957110591801	04/14/38	34	2391
823	55-619915	320957110591801	05/16/38	36	2389
824	55-619915	320957110591801	03/01/40	34	2391
825	55-619915	320957110591801	10/01/40	37	2388
826	55-619915	320957110591801	01/01/41	34	2391
827	55-619915	320957110591801	10/13/49	58	2367
828	55-619915	320957110591801	02/09/50	54	2371
829	55-619915	320957110591801	02/05/52	57	2368
830	55-619915	320957110591801	02/09/54	63	2362
831	55-619915	320957110591801	02/10/55	56	2369
832	55-619915	320957110591801	02/15/56	50	2375
833	55-619915	320957110591801	02/07/57	56	2369
834	55-619915	320957110591801	01/28/58	58	2367
835	55-619915	320957110591801	01/30/59	58	2367
836	55-619915	320957110591801	01/01/60	59	2366
837	55-619915	320957110591801	01/27/61	63	2362
838	55-619915	320957110591801	01/24/62	65	2360
839	55-619915	320957110591801	01/28/63	68	2357
840	55-619915	320957110591801	01/27/64	73	2352
841	55-619915	320957110591801	02/02/65	71	2354
842	55-619915	320957110591801	06/09/65	76	2349
843	55-619915	320957110591801	08/13/65	79	2346
844	55-619915	320957110591801	09/27/65	79	2346
845	55-619915	320957110591801	10/15/65	79	2346
846	55-619915	320957110591801	12/15/65	76	2350
847	55-619915	320957110591801	01/15/66	72	2353
848	55-619915	320957110591801	03/04/66	69	2356
849	55-619915	320957110591801	03/17/66	70	2355
850	55-619915	320957110591801	01/05/67	70	2355

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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
851	55-619915	320957110591801	02/01/67	69	2356
852	55-619915	320957110591801	07/20/67	77	2348
853	55-619915	320957110591801	08/28/67	76	2349
854	55-619915	320957110591801	09/01/67	78	2347
855	55-619915	320957110591801	10/25/67	79	2346
856	55-619915	320957110591801	02/02/68	76	2349
857	55-619915	320957110591801	02/14/69	76	2349
858	55-619915	320957110591801	04/23/70	84	2341
859	55-619915	320957110591801	01/05/82	135	2290
860	55-619915	320957110591801	12/01/82	141	2284
861	55-619915	320957110591801	01/09/84	127	2298
862	55-619915	320957110591801	01/08/85	111	2314
863	55-619915	320957110591801	12/30/85	111	2314
864	55-619915	320957110591801	01/02/87	110	2315
865	55-619915	320957110591801	12/30/87	115	2310
866	55-619915	320957110591801	01/09/89	124	2301
867	55-619915	320957110591801	12/28/90	131	2294
868	55-619915	320957110591801	12/23/91	135	2290
869	55-619915	320957110591801	12/16/93	139	2286
870 D-14-13 35CDC1	55-619914	320947110591801	03/16/31	31	2394
871	55-619914	320947110591801	04/15/31	32	2393
872	55-619914	320947110591801	05/15/31	32	2393
873	55-619914	320947110591801	06/16/31	34	2391
874	55-619914	320947110591801	07/15/31	34	2391
875	55-619914	320947110591801	08/17/31	31	2394
876	55-619914	320947110591801	09/15/31	31	2394
877	55-619914	320947110591801	10/15/31	31	2394
878	55-619914	320947110591801	11/16/31	30	2395
879	55-619914	320947110591801	12/15/31	28	2397
880	55-619914	320947110591801	01/16/32	28	2397
881	55-619914	320947110591801	02/15/32	28	2397
882	55-619914	320947110591801	03/15/32	28	2397
883	55-619914	320947110591801	04/01/32	29	2396
884	55-619914	320947110591801	05/01/32	29	2396



GWSI Water Level Measurements

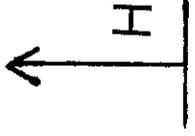
Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
885	55-619914	320947110591801	06/01/32	31	2394
886	55-619914	320947110591801	07/01/32	31	2394
887	55-619914	320947110591801	08/01/32	30	2395
888	55-619914	320947110591801	09/01/32	31	2394
889	55-619914	320947110591801	10/01/32	32	2393
890	55-619914	320947110591801	11/01/32	31	2394
891	55-619914	320947110591801	12/01/32	30	2395
892	55-619914	320947110591801	02/01/33	29	2396
893	55-619914	320947110591801	03/01/33	30	2395
894	55-619914	320947110591801	04/01/33	30	2395
895	55-619914	320947110591801	05/01/33	30	2395
896	55-619914	320947110591801	06/01/33	31	2394
897	55-619914	320947110591801	07/01/33	31	2394
898	55-619914	320947110591801	11/01/33	31	2394
899	55-619914	320947110591801	12/01/33	31	2394
900	55-619914	320947110591801	01/01/34	30	2395
901	55-619914	320947110591801	02/01/34	30	2395
902	55-619914	320947110591801	03/01/34	31	2394
903	55-619914	320947110591801	04/01/34	31	2394
904	55-619914	320947110591801	05/01/34	32	2393
905	55-619914	320947110591801	06/01/34	33	2392
906	55-619914	320947110591801	07/01/34	34	2391
907	55-619914	320947110591801	08/01/34	34	2392
908	55-619914	320947110591801	10/01/34	34	2391
909	55-619914	320947110591801	11/01/34	34	2391
910	55-619914	320947110591801	12/01/34	32	2393
911	55-619914	320947110591801	02/01/35	31	2394
912	55-619914	320947110591801	03/01/35	31	2394
913	55-619914	320947110591801	04/01/35	33	2392
914	55-619914	320947110591801	06/01/35	34	2392
915	55-619914	320947110591801	09/01/35	33	2392
916	55-619914	320947110591801	10/01/35	33	2392
917	55-619914	320947110591801	12/01/35	31	2394
918	55-619914	320947110591801	01/21/36	31	2394



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
919	55-619914	320947110591801	04/01/36	31	2394
920	55-619914	320947110591801	07/17/36	34	2391
921	55-619914	320947110591801	01/12/37	32	2393
922	55-619914	320947110591801	02/24/37	32	2393
923	55-619914	320947110591801	04/23/37	33	2392
924	55-619914	320947110591801	06/10/37	34	2391
925	55-619914	320947110591801	07/15/37	34	2391
926	55-619914	320947110591801	08/19/37	35	2390
927	55-619914	320947110591801	10/13/37	35	2390
928	55-619914	320947110591801	11/17/37	34	2391
929	55-619914	320947110591801	12/21/37	33	2392
930	55-619914	320947110591801	01/18/38	33	2392
931	55-619914	320947110591801	02/17/38	31	2394
932	55-619914	320947110591801	04/14/38	32	2393
933	55-619914	320947110591801	06/16/38	37	2388
934	55-619914	320947110591801	10/01/38	36	2389
935	55-619914	320947110591801	11/01/38	36	2389
936	55-619914	320947110591801	01/01/39	40	2385
937	55-619914	320947110591801	03/01/40	38	2392
938	55-619914	320947110591801	06/25/46	51	2374
939	55-619914	320947110591801	02/28/47	46	2379
940	55-619914	320947110591801	10/28/47	50	2375
941	55-619914	320947110591801	02/23/48	48	2377
942	55-619914	320947110591801	06/18/48	56	2369
943	55-619914	320947110591801	10/14/48	55	2370
944	55-619914	320947110591801	02/10/49	49	2376
945	55-619914	320947110591801	06/29/49	58	2367
946	55-619914	320947110591801	10/13/49	57	2368
947	55-619914	320947110591801	02/09/50	54	2371
948	55-619914	320947110591801	11/06/50	58	2367
949	55-619914	320947110591801	02/23/51	54	2371
950	55-619914	320947110591801	07/13/51	65	2360
951	55-619914	320947110591801	02/05/52	56	2369
952	55-619914	320947110591801	02/06/53	61	2364



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
953	55-619914	320947110591801	02/08/84	60	2365
954	55-619914	320947110591801	12/30/85	167	2259
955	55-619914	320947110591801	02/10/88	172	2253
956	55-619914	320947110591801	12/24/88	177	2248
957	55-619914	320947110591801	12/29/89	180	2245
958	D-14-13 35DAD	321000110584901	12/28/81	160	2292
959	55-620146	321000110584901	12/01/82	166	2285
960	55-620146	321000110584901	01/06/84	152	2299
961	55-620146	321000110584901	01/07/85	138	2313
962	55-620146	321000110584901	07/09/85	146	2305
963	55-620146	321000110584901	10/10/85	149	2302
964	55-620146	321000110584901	12/30/85	136	2315
965	55-620146	321000110584901	02/20/86	140	2311
966	55-620146	321000110584901	05/20/86	142	2309
967	55-620146	321000110584901	08/26/86	147	2304
968	55-620146	321000110584901	11/17/86	146	2305
969	55-620146	321000110584901	01/02/87	136	2315
970	55-620146	321000110584901	02/23/87	142	2309
971	55-620146	321000110584901	05/26/87	145	2306
972	55-620146	321000110584901	12/23/87	142	2309
973	55-620146	321000110584901	01/09/89	150	2301
974	55-620146	321000110584901	12/23/91	161	2290
975	55-620146	321000110584901	01/21/94	164	2287
976	55-620146	321000110584901	01/10/95	172	2279
977	55-620146	321000110584901	12/19/96	187	2264
978	55-620146	321000110584901	02/10/98	206	2245
979	55-620146	321000110584901	01/19/99	209	2242
980	55-620146	321000110584901	12/29/99	207	2244
981	D-14-13 35DCB	320958110590201	01/05/82	152	2283
982	55-619924	320958110590201	12/01/82	158	2277
983	55-619924	320958110590201	01/09/84	144	2291
984	55-619924	320958110590201	01/07/85	130	2305
985	55-619924	320958110590201	10/10/86	142	2293
986	55-619924	320958110590201	12/30/86	128	2307



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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
987	55-619924	320958110590201	05/20/86	136	2299
988	55-619924	320958110590201	11/17/86	139	2296
989	55-619924	320958110590201	01/02/87	127	2308
990	55-619924	320958110590201	12/30/87	133	2302
991	55-619924	320958110590201	01/09/89	142	2293
992	55-619924	320958110590201	12/28/90	149	2286
993	55-619924	320958110590201	12/23/91	152	2283
994	55-619924	320958110590201	01/21/94	155	2280
995	55-619924	320958110590201	01/10/95	163	2272
996	55-619924	320958110590201	12/19/96	187	2248
997	55-619924	320958110590201	02/10/98	194	2241
998	55-619924	320958110590201	01/19/99	198	2237
999	55-619924	320958110590201	12/29/99	198	2237
1000	D-14-13 35DDA	320954110584201	04/27/98	230	2224
1001	55-533858	320954110584201	11/10/98	201	2252
1002	55-533858	320954110584201	12/27/99	208	2245
1003	D-14-13 35DDB1	320957110585101	11/09/98	200	2248
1004	55-533856	320957110585101	12/27/99	203	2245
1005	D-14-13 35DDB2	320956110584901	04/24/98	228	2220
1006	55-533857	320956110584901	05/08/98	223	2225
1007	55-533857	320956110584901	11/09/98	200	2248
1008	55-533857	320956110584901	12/27/99	204	2244
1009	D-15-13 11AAB	320853110584601	07/10/85	151	2329
1010	55-507256	320853110584601	07/10/85	168	2312
1011	55-507256	320853110584601	10/09/85	151	2329
1012	55-507256	320853110584601	02/18/86	146	2334
1013	55-507256	320853110584601	02/18/86	164	2316
1014	55-507256	320853110584601	05/19/86	146	2334
1015	55-507256	320853110584601	05/19/86	163	2318
1016	55-507256	320853110584601	08/26/86	150	2330
1017	55-507256	320853110584601	08/26/86	166	2314
1018	55-507256	320853110584601	11/19/86	149	2331
1019	55-507256	320853110584601	11/19/86	166	2314
1020	55-507256	320853110584601	12/23/86	148	2333

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1021	55-507256	320853110584601	02/24/87	146	2334
1022	55-507256	320853110584601	02/24/87	164	2316
1023	55-507256	320853110584601	05/26/87	147	2333
1024	55-507256	320853110584601	05/26/87	165	2315
1025	55-507256	320853110584601	11/17/87	152	2328
1026	55-507256	320853110584601	11/17/87	169	2311
1027	55-507256	320853110584601	12/21/87	153	2327
1028	55-507256	320853110584601	03/01/88	142	2338
1029	55-507256	320853110584601	03/01/88	170	2310
1030	55-507256	320853110584601	03/01/88	170	2310
1031	55-507256	320853110584601	03/01/88	142	2338
1032	55-507256	320853110584601	05/25/88	155	2325
1033	55-507256	320853110584601	05/25/88	172	2308
1034	55-507256	320853110584601	08/10/88	158	2322
1035	55-507256	320853110584601	08/10/88	176	2304
1036	55-507256	320853110584601	10/19/88	159	2321
1037	55-507256	320853110584601	10/19/88	176	2304
1038	55-507256	320853110584601	01/23/89	159	2321
1039	55-507256	320853110584601	01/23/89	178	2302
1040	55-507256	320853110584601	04/24/89	162	2318
1041	55-507256	320853110584601	04/24/89	177	2303
1042	55-507256	320853110584601	02/25/92	172	2308
1043	55-507256	320853110584601	02/01/94	174	2306
1044	55-507256	320853110584601	01/30/95	177	2303
1045 D-15-13 11AAD1	55-505575	320846110583801	10/09/85	152	2329
1046	55-505575	320846110583801	10/09/85	156	2325
1047	55-505575	320846110583801	05/21/86	149	2332
1048	55-505575	320846110583801	05/21/86	152	2329
1049	55-505575	320846110583801	11/18/86	151	2330
1050	55-505575	320846110583801	11/18/86	154	2327
1051	55-505575	320846110583801	12/23/86	150	2332
1052	55-505575	320846110583801	11/16/87	156	2326
1053	55-505575	320846110583801	11/16/87	159	2322
1054	55-505575	320846110583801	12/21/87	155	2326

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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1055	55-505575	320846110583801	05/23/88	160	2322
1056	55-505575	320846110583801	05/23/88	163	2319
1057	55-505575	320846110583801	10/17/88	164	2317
1058	55-505575	320846110583801	10/17/88	167	2315
1059	55-505575	320846110583801	02/25/92	174	2307
1060	55-505575	320846110583801	02/01/94	171	2310
1061	55-505575	320846110583801	01/10/95	180	2302
1062	55-505575	320846110583801	12/30/96	196	2285
1063	55-505575	320846110583801	02/25/97	196	2285
1064	55-505575	320846110583801	12/24/97	202	2280
1065	55-505575	320846110583801	12/27/99	211	2271
1066	D-15-13 11AAD2	320845110583801	07/11/85	100	2382
1067	55-505576	320845110583801	07/11/85	118	2365
1068	55-505576	320845110583801	10/09/85	99	2383
1069	55-505576	320845110583801	10/09/85	117	2366
1070	55-505576	320845110583801	02/19/86	99	2383
1071	55-505576	320845110583801	02/19/86	120	2362
1072	55-505576	320845110583801	05/21/86	100	2382
1073	55-505576	320845110583801	05/21/86	118	2364
1074	55-505576	320845110583801	08/27/86	100	2382
1075	55-505576	320845110583801	08/27/86	118	2364
1076	55-505576	320845110583801	11/18/86	100	2382
1077	55-505576	320845110583801	11/18/86	118	2364
1078	55-505576	320845110583801	12/23/86	99	2383
1079	55-505576	320845110583801	02/24/87	99	2383
1080	55-505576	320845110583801	02/24/87	117	2366
1081	55-505576	320845110583801	05/24/87	118	2364
1082	55-505576	320845110583801	05/25/87	101	2381
1083	55-505576	320845110583801	11/16/87	101	2381
1084	55-505576	320845110583801	11/16/87	118	2364
1085	55-505576	320845110583801	12/21/87	100	2382
1086	55-505576	320845110583801	03/01/88	102	2381
1087	55-505576	320845110583801	03/01/88	118	2364
1088	55-505576	320845110583801	03/01/88	119	2364

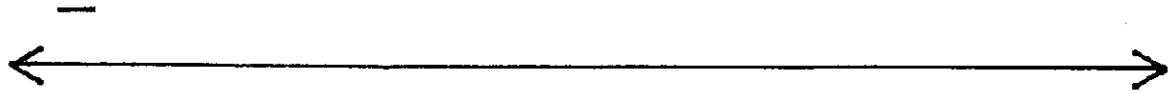
Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1089	55-505576	320845110583801	03/01/88	102	2381
1090	55-505576	320845110583801	05/23/88	102	2381
1091	55-505576	320845110583801	05/23/88	119	2364
1092	55-505576	320845110583801	08/10/88	102	2380
1093	55-505576	320845110583801	08/10/88	118	2364
1094	55-505576	320845110583801	10/17/88	102	2380
1095	55-505576	320845110583801	10/17/88	118	2364
1096	55-505576	320845110583801	01/23/89	102	2380
1097	55-505576	320845110583801	01/23/89	118	2364
1098	55-505576	320845110583801	04/24/89	103	2379
1099	55-505576	320845110583801	04/24/89	119	2363
1100	55-505576	320845110583801	02/25/92	101	2381
1101	55-505576	320845110583801	02/01/94	100	2383
1102	55-505576	320845110583801	01/10/95	105	2377
1103	55-505576	320845110583801	12/30/96	115	2367
1104	55-505576	320845110583801	02/25/97	114	2368
1105	55-505576	320845110583801	12/24/97	115	2368
1106	55-505576	320845110583801	12/27/99	106	2376
1107 D-15-13 11ADB	55-620160	320837110585001	02/05/99	64	2417
1108	55-620160	320837110585001	02/08/60	65	2415
1109	55-620160	320837110585001	02/02/61	65	2415
1110	55-620160	320837110585001	02/01/62	98	2382
1111	55-620160	320837110585001	02/13/63	104	2376
1112	55-620160	320837110585001	02/06/64	111	2369
1113	55-620160	320837110585001	02/05/65	109	2371
1114	55-620160	320837110585001	04/25/66	109	2371
1115	55-620160	320837110585001	11/02/66	110	2370
1116	55-620160	320837110585001	01/26/67	110	2371
1117	55-620160	320837110585001	11/01/67	117	2363
1118	55-620160	320837110585001	11/01/68	119	2361
1119	55-620160	320837110585001	12/28/81	147	2333
1120	55-620160	320837110585001	12/01/82	140	2340
1121	55-620160	320837110585001	01/05/84	149	2331
1122	55-620160	320837110585001	01/04/85	157	2323

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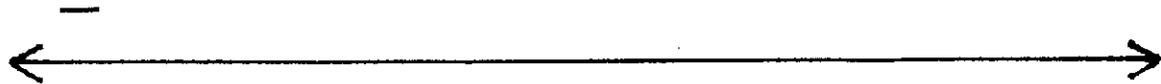
Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1123	55-620160	320837110585001	01/10/86	102	2378
1124	55-620160	320837110585001	12/31/87	142	2338
1125	55-620160	320837110585001	01/17/89	147	2334
1126	55-620160	320837110585001	01/08/91	139	2341
1127	55-620160	320837110585001	02/28/92	138	2342
1128	55-620160	320837110585001	12/17/93	113	2367
1129	55-620160	320837110585001	02/01/95	127	2353
1130	55-620160	320837110585001	12/19/96	122	2358
1131	55-620160	320837110585001	02/11/98	123	2357
1132	55-620160	320837110585001	12/23/98	124	2356
1133	55-620160	320837110585001	12/28/99	114	2366
1134 D-15-13 11ADC	55-801435	320828110585201	12/22/81	101	2384
1135	55-801435	320828110585201	01/05/84	93	2392
1136	55-801435	320828110585201	12/01/87	94	2391
1137	55-801435	320828110585201	01/17/95	97	2388
1138	55-801435	320828110585201	02/28/00	89	2397
1139 D-15-13 11BAA	55-807326	320850110591201	05/01/62	65	2400
1140 D-15-13 11CBA	55-619918	320824110593001	07/15/31	37	2421
1141	55-619918	320824110593001	09/15/31	33	2425
1142	55-619918	320824110593001	11/15/31	33	2425
1143	55-619918	320824110593001	12/15/31	31	2426
1144	55-619918	320824110593001	01/16/32	31	2426
1145	55-619918	320824110593001	02/15/32	31	2427
1146	55-619918	320824110593001	03/15/32	31	2427
1147	55-619918	320824110593001	05/01/32	32	2426
1148	55-619918	320824110593001	06/01/32	32	2425
1149	55-619918	320824110593001	06/01/32	33	2424
1150	55-619918	320824110593001	10/01/32	34	2424
1151	55-619918	320824110593001	11/01/32	34	2424
1152	55-619918	320824110593001	12/01/32	34	2424
1153	55-619918	320824110593001	02/01/33	33	2425
1154	55-619918	320824110593001	03/01/33	33	2424
1155	55-619918	320824110593001	04/01/33	34	2424
1156	55-619918	320824110593001	05/01/33	34	2424



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1157	55-619918	320824110593001	11/01/33	34	2423
1158	55-619918	320824110593001	12/01/33	34	2424
1159	55-619918	320824110593001	01/01/34	34	2424
1160	55-619918	320824110593001	02/01/34	34	2424
1161	55-619918	320824110593001	03/01/34	34	2424
1162	55-619918	320824110593001	05/01/34	35	2422
1163	55-619918	320824110593001	07/01/34	36	2421
1164	55-619918	320824110593001	08/01/34	36	2422
1165	55-619918	320824110593001	10/01/34	36	2422
1166	55-619918	320824110593001	11/01/34	36	2421
1167	55-619918	320824110593001	12/01/34	36	2422
1168	55-619918	320824110593001	01/01/35	35	2423
1169	55-619918	320824110593001	02/01/35	34	2423
1170	55-619918	320824110593001	03/01/35	34	2423
1171	55-619918	320824110593001	04/01/35	35	2423
1172	55-619918	320824110593001	08/01/35	36	2422
1173	55-619918	320824110593001	12/01/35	36	2422
1174	55-619918	320824110593001	01/21/36	36	2422
1175	55-619918	320824110593001	01/01/37	35	2423
1176	55-619918	320824110593001	02/24/37	34	2423
1177	55-619918	320824110593001	04/23/37	34	2423
1178	55-619918	320824110593001	07/15/37	37	2420
1179	55-619918	320824110593001	08/19/37	38	2419
1180	55-619918	320824110593001	09/16/37	38	2419
1181	55-619918	320824110593001	10/13/37	37	2421
1182	55-619918	320824110593001	11/17/37	37	2421
1183	55-619918	320824110593001	12/21/37	36	2421
1184	55-619918	320824110593001	01/19/38	36	2421
1185	55-619918	320824110593001	02/17/38	36	2422
1186	55-619918	320824110593001	03/16/38	36	2422
1187	55-619918	320824110593001	04/14/38	37	2421
1188	55-619918	320824110593001	05/16/38	40	2418
1189	55-619918	320824110593001	06/16/38	38	2419
1190	55-619918	320824110593001	08/18/38	38	2420



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1191	55-619918	320824110593001	10/01/38	39	2419
1192	55-619918	320824110593001	11/01/38	38	2420
1193	55-619918	320824110593001	12/01/38	37	2420
1194	55-619918	320824110593001	01/01/39	37	2421
1195	55-619918	320824110593001	02/01/39	36	2421
1196	55-619918	320824110593001	04/01/39	37	2420
1197	55-619918	320824110593001	05/01/39	38	2419
1198	55-619918	320824110593001	07/01/39	39	2419
1199	55-619918	320824110593001	08/01/39	36	2421
1200	55-619918	320824110593001	11/01/39	37	2420
1201	55-619918	320824110593001	01/01/40	35	2422
1202	55-619918	320824110593001	02/01/40	36	2421
1203	55-619918	320824110593001	03/01/40	39	2419
1204	55-619918	320824110593001	10/01/40	40	2417
1205	55-619918	320824110593001	06/25/46	46	2412
1206	55-619918	320824110593001	02/28/47	44	2413
1207	55-619918	320824110593001	06/12/47	47	2411
1208	55-619918	320824110593001	10/28/47	47	2411
1209	55-619918	320824110593001	02/23/48	46	2411
1210	55-619918	320824110593001	06/26/48	49	2408
1211	55-619918	320824110593001	10/15/48	49	2409
1212	55-619918	320824110593001	02/07/49	48	2409
1213	55-619918	320824110593001	06/29/49	53	2405
1214	55-619918	320824110593001	10/13/49	52	2405
1215	55-619918	320824110593001	02/09/50	50	2407
1216	55-619918	320824110593001	11/07/50	52	2405
1217	55-619918	320824110593001	02/26/51	52	2406
1218	55-619918	320824110593001	07/13/51	59	2398
1219	55-619918	320824110593001	02/08/52	54	2404
1220	55-619918	320824110593001	02/09/53	58	2399
1221	55-619918	320824110593001	02/09/54	62	2395
1222	55-619918	320824110593001	02/14/55	59	2399
1223	55-619918	320824110593001	02/13/56	51	2406
1224	55-619918	320824110593001	02/09/57	52	2395



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1225	55-619918	320824110593001	01/29/58	61	2397
1226	55-619918	320824110593001	02/02/59	63	2394
1227	55-619918	320824110593001	02/01/60	65	2393
1228	55-619918	320824110593001	01/30/61	70	2388
1229	55-619918	320824110593001	01/30/62	72	2386
1230	55-619918	320824110593001	01/28/63	77	2380
1231	55-619918	320824110593001	01/29/64	83	2374
1232	55-619918	320824110593001	02/05/65	83	2375
1233	55-619918	320824110593001	06/11/65	86	2371
1234	55-619918	320824110593001	08/06/65	88	2369
1235	55-619918	320824110593001	09/27/65	89	2369
1236	55-619918	320824110593001	10/15/65	90	2367
1237	55-619918	320824110593001	12/15/65	88	2370
1238	55-619918	320824110593001	01/15/66	85	2372
1239	55-619918	320824110593001	03/17/66	82	2376
1240	55-619918	320824110593001	04/19/66	84	2374
1241	55-619918	320824110593001	01/01/67	81	2377
1242	55-619918	320824110593001	02/01/67	79	2378
1243	55-619918	320824110593001	03/01/67	81	2376
1244	55-619918	320824110593001	10/25/67	89	2368
1245	55-619918	320824110593001	01/22/68	84	2374
1246	55-619918	320824110593001	02/21/68	83	2374
1247	55-619918	320824110593001	03/22/68	84	2374
1248	55-619918	320824110593001	04/22/68	85	2373
1249	55-619918	320824110593001	05/22/68	85	2372
1250	55-619918	320824110593001	06/20/68	87	2370
1251	55-619918	320824110593001	07/19/68	90	2368
1252	55-619918	320824110593001	08/22/68	89	2368
1253	55-619918	320824110593001	09/23/68	90	2367
1254	55-619918	320824110593001	10/23/68	89	2368
1255	55-619918	320824110593001	11/21/68	88	2369
1256	55-619918	320824110593001	12/24/68	88	2370
1257	55-619918	320824110593001	01/24/69	87	2370
1258	55-619918	320824110593001	02/26/69	86	2369

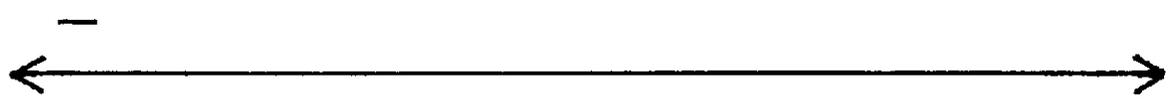


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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1259	55-619918	320824110593001	03/25/69	92	2366
1260	55-619918	320824110593001	04/25/69	92	2366
1261	55-619918	320824110593001	05/23/69	93	2364
1262	55-619918	320824110593001	06/25/69	95	2362
1263	55-619918	320824110593001	07/24/69	97	2361
1264	55-619918	320824110593001	08/22/69	97	2360
1265	55-619918	320824110593001	09/23/69	98	2359
1266	55-619918	320824110593001	10/24/69	98	2360
1267	55-619918	320824110593001	11/25/69	96	2362
1268	55-619918	320824110593001	12/23/69	95	2363
1269	55-619918	320824110593001	01/23/70	94	2363
1270	55-619918	320824110593001	02/19/70	94	2364
1271	55-619918	320824110593001	03/20/70	94	2364
1272	55-619918	320824110593001	04/21/70	95	2362
1273	55-619918	320824110593001	05/25/70	97	2360
1274	55-619918	320824110593001	06/25/70	99	2359
1275	55-619918	320824110593001	07/27/70	99	2358
1276	55-619918	320824110593001	08/26/70	100	2357
1277	55-619918	320824110593001	09/24/70	100	2358
1278	55-619918	320824110593001	10/28/70	99	2358
1279	55-619918	320824110593001	11/24/70	99	2359
1280	55-619918	320824110593001	12/28/70	98	2359
1281	55-619918	320824110593001	01/26/71	97	2361
1282	55-619918	320824110593001	02/25/71	96	2361
1283	55-619918	320824110593001	03/25/71	97	2361
1284	55-619918	320824110593001	04/26/71	98	2359
1285	55-619918	320824110593001	05/24/71	100	2357
1286	55-619918	320824110593001	06/24/71	101	2356
1287	55-619918	320824110593001	07/29/71	103	2355
1288	55-619918	320824110593001	08/24/71	104	2354
1289	55-619918	320824110593001	09/27/71	102	2355
1290	55-619918	320824110593001	10/26/71	104	2354
1291	55-619918	320824110593001	11/23/71	101	2356
1292	55-619918	320824110593001	12/21/71	101	2357



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1293	55-619918	320824110593001	01/24/72	100	2358
1294	55-619918	320824110593001	02/22/72	100	2357
1295	55-619918	320824110593001	03/22/72	102	2356
1296	55-619918	320824110593001	04/27/72	104	2353
1297	55-619918	320824110593001	05/25/72	106	2352
1298	55-619918	320824110593001	06/27/72	107	2350
1299	55-619918	320824110593001	07/26/72	109	2348
1300	55-619918	320824110593001	08/25/72	110	2347
1301	55-619918	320824110593001	09/25/72	111	2346
1302	55-619918	320824110593001	10/26/72	111	2347
1303	55-619918	320824110593001	11/27/72	109	2348
1304	55-619918	320824110593001	12/21/72	109	2349
1305	55-619918	320824110593001	01/24/73	110	2348
1306	55-619918	320824110593001	02/27/73	110	2347
1307	55-619918	320824110593001	03/21/73	110	2348
1308	55-619918	320824110593001	04/26/73	110	2347
1309	55-619918	320824110593001	05/29/73	112	2345
1310	55-619918	320824110593001	06/25/73	113	2344
1311	55-619918	320824110593001	07/24/73	115	2342
1312	55-619918	320824110593001	08/28/73	118	2340
1313	55-619918	320824110593001	09/26/73	119	2338
1314	55-619918	320824110593001	10/25/73	120	2337
1315	55-619918	320824110593001	11/26/73	120	2337
1316	55-619918	320824110593001	12/20/73	120	2337
1317	55-619918	320824110593001	01/28/74	119	2338
1318	55-619918	320824110593001	02/25/74	119	2339
1319	55-619918	320824110593001	03/26/74	120	2338
1320	55-619918	320824110593001	04/26/74	122	2336
1321	55-619918	320824110593001	05/22/74	123	2334
1322	55-619918	320824110593001	07/24/74	128	2330
1323	55-619918	320824110593001	08/26/74	130	2328
1324	55-619918	320824110593001	09/26/74	131	2326
1325	55-619918	320824110593001	10/22/74	131	2327
1326	55-619918	320824110593001	11/26/74	131	2327



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1327	55-619918	320824110593001	12/23/74	129	2328
1328	55-619918	320824110593001	01/27/75	129	2329
1329	55-619918	320824110593001	02/24/75	129	2328
1330	55-619918	320824110593001	03/24/75	130	2327
1331	55-619918	320824110593001	04/22/75	132	2326
1332	55-619918	320824110593001	05/22/75	131	2327
1333	55-619918	320824110593001	06/23/75	134	2324
1334	55-619918	320824110593001	08/25/75	136	2321
1335	55-619918	320824110593001	08/25/75	137	2321
1336	55-619918	320824110593001	10/28/75	138	2320
1337	55-619918	320824110593001	11/24/75	138	2320
1338	55-619918	320824110593001	12/22/75	138	2320
1339	55-619918	320824110593001	01/27/76	137	2320
1340	55-619918	320824110593001	02/23/76	137	2320
1341	55-619918	320824110593001	03/25/76	138	2320
1342	55-619918	320824110593001	04/22/76	138	2320
1343	55-619918	320824110593001	05/28/76	138	2319
1344	55-619918	320824110593001	08/24/76	139	2318
1345	55-619918	320824110593001	07/26/76	141	2316
1346	55-619918	320824110593001	08/25/76	141	2316
1347	55-619918	320824110593001	09/22/76	142	2316
1348	55-619918	320824110593001	11/24/76	142	2316
1349	55-619918	320824110593001	12/23/76	141	2316
1350	55-619918	320824110593001	01/02/77	141	2316
1351	55-619918	320824110593001	01/25/77	140	2317
1352	55-619918	320824110593001	02/23/77	135	2322
1353	55-619918	320824110593001	03/28/77	139	2318
1354	55-619918	320824110593001	04/27/77	140	2318
1355	55-619918	320824110593001	05/25/77	142	2316
1356	55-619918	320824110593001	05/28/77	142	2315
1357	55-619918	320824110593001	07/28/77	143	2315
1358	55-619918	320824110593001	08/26/77	144	2314
1359	55-619918	320824110593001	09/23/77	144	2313
1360	55-619918	320824110593001	10/27/77	144	2313



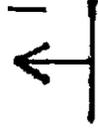
Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1361	55-619918	320824110593001	11/28/77	144	2314
1362	55-619918	320824110593001	12/21/77	144	2314
1363	55-619918	320824110593001	01/25/78	147	2311
1364	55-619918	320824110593001	02/23/78	144	2314
1365	55-619918	320824110593001	03/21/78	141	2316
1366	55-619918	320824110593001	04/21/78	146	2311
1367	55-619918	320824110593001	05/25/78	140	2317
1368	55-619918	320824110593001	06/23/78	141	2317
1369	55-619918	320824110593001	07/25/78	143	2315
1370	55-619918	320824110593001	08/28/78	144	2313
1371	55-619918	320824110593001	09/25/78	146	2312
1372	55-619918	320824110593001	10/26/78	146	2311
1373	55-619918	320824110593001	11/22/78	147	2310
1374	55-619918	320824110593001	12/26/78	148	2310
1375	55-619918	320824110593001	01/24/79	145	2312
1376	55-619918	320824110593001	02/22/79	140	2317
1377	55-619918	320824110593001	03/26/79	138	2319
1378	55-619918	320824110593001	04/23/79	138	2320
1379	55-619918	320824110593001	05/23/79	136	2321
1380	55-619918	320824110593001	06/25/79	139	2319
1381	55-619918	320824110593001	07/24/79	140	2318
1382	55-619918	320824110593001	08/24/79	141	2317
1383	55-619918	320824110593001	09/24/79	142	2315
1384	55-619918	320824110593001	10/23/79	154	2304
1385	55-619918	320824110593001	10/25/79	144	2314
1386	55-619918	320824110593001	11/21/79	143	2314
1387	55-619918	320824110593001	12/20/79	142	2315
1388	55-619918	320824110593001	01/24/80	141	2317
1389	55-619918	320824110593001	02/22/80	140	2317
1390	55-619918	320824110593001	03/25/80	139	2318
1391	55-619918	320824110593001	04/24/80	140	2318
1392	55-619918	320824110593001	05/25/80	140	2318
1393	55-619918	320824110593001	06/24/80	141	2317
1394	55-619918	320824110593001	07/25/80	142	2315



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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1395	55-619918	320824110593001	08/26/80	144	2314
1396	55-619918	320824110593001	09/22/80	145	2313
1397	55-619918	320824110593001	10/24/80	148	2309
1398	55-619918	320824110593001	11/24/80	145	2313
1399	55-619918	320824110593001	12/23/80	144	2313
1400	55-619918	320824110593001	01/27/81	145	2312
1401	55-619918	320824110593001	02/24/81	143	2314
1402	55-619918	320824110593001	03/25/81	143	2314
1403	55-619918	320824110593001	04/24/81	144	2313
1404	55-619918	320824110593001	05/22/81	145	2313
1405	55-619918	320824110593001	06/25/81	148	2309
1406	55-619918	320824110593001	07/30/81	150	2308
1407	55-619918	320824110593001	08/27/81	150	2308
1408	55-619918	320824110593001	09/24/81	148	2309
1409	55-619918	320824110593001	10/27/81	151	2306
1410	55-619918	320824110593001	11/25/81	155	2303
1411	55-619918	320824110593001	12/28/81	155	2302
1412	55-619918	320824110593001	01/04/82	149	2308
1413	55-619918	320824110593001	01/28/82	152	2306
1414	55-619918	320824110593001	02/24/82	150	2307
1415	55-619918	320824110593001	03/29/82	151	2307
1416	55-619918	320824110593001	04/27/82	151	2306
1417	55-619918	320824110593001	12/30/83	146	2312
1418	55-619918	320824110593001	12/30/84	130	2328
1419	55-619918	320824110593001	01/13/86	124	2334
1420	55-619918	320824110593001	12/23/86	124	2334
1421	55-619918	320824110593001	12/30/87	128	2330
1422	55-619918	320824110593001	01/04/89	134	2323
1423	55-619918	320824110593001	01/09/91	141	2316
1424	55-619918	320824110593001	12/26/91	145	2313
1425	55-619918	320824110593001	12/16/93	146	2311
1426	55-619918	320824110593001	02/01/95	149	2308
1427	55-619918	320824110593001	12/19/96	162	2295
1428	55-619918	320824110593001	02/11/99	169	2289





Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1429	55-619918	320824110593001	12/24/98	173	2285
1430	55-619918	320824110593001	12/28/99	177	2280
1431 D-15-13 11DDB1	55-619969	320815110585201	06/04/52	54	2436
1432	55-619969	320815110585201	02/09/53	56	2434
1433	55-619969	320815110585201	02/11/54	56	2434
1434	55-619969	320815110585201	02/10/55	55	2435
1435	55-619969	320815110585201	02/13/56	54	2436
1436	55-619969	320815110585201	02/15/57	55	2435
1437	55-619969	320815110585201	02/05/58	55	2435
1438	55-619969	320815110585201	02/05/59	57	2433
1439	55-619969	320815110585201	02/08/60	58	2432
1440	55-619969	320815110585201	02/02/61	59	2431
1441	55-619969	320815110585201	02/02/62	59	2431
1442	55-619969	320815110585201	02/05/63	60	2430
1443	55-619969	320815110585201	02/06/64	61	2429
1444	55-619969	320815110585201	02/05/65	61	2429
1445	55-619969	320815110585201	04/25/66	65	2425
1446	55-619969	320815110585201	11/02/66	62	2428
1447	55-619969	320815110585201	01/26/67	62	2428
1448	55-619969	320815110585201	11/01/67	62	2428
1449	55-619969	320815110585201	02/06/68	60	2430
1450	55-619969	320815110585201	12/22/81	67	2423
1451	55-619969	320815110585201	12/01/82	67	2423
1452	55-619969	320815110585201	01/05/84	65	2425
1453	55-619969	320815110585201	01/04/85	66	2424
1454	55-619969	320815110585201	01/09/86	54	2436
1455	55-619969	320815110585201	12/21/87	61	2426
1456	55-619969	320815110585201	01/08/91	65	2425
1457	55-619969	320815110585201	01/21/94	66	2424
1458	55-619969	320815110585201	02/01/95	65	2425
1459	55-619969	320815110585201	12/19/96	67	2423
1460	55-619969	320815110585201	02/11/98	67	2423
1461	55-619969	320815110585201	12/23/98	67	2423
1462	55-619969	320815110585201	12/28/99	68	2422

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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1463 D-15-13.11DDB2	55-619970	320810110585001	02/10/55	65	2426
1464	55-619970	320810110585001	02/13/56	61	2430
1465	55-619970	320810110585001	02/07/57	61	2430
1466	55-619970	320810110585001	02/05/58	61	2430
1467	55-619970	320810110585001	02/05/59	59	2432
1468	55-619970	320810110585001	02/03/60	58	2433
1469	55-619970	320810110585001	02/02/61	94	2397
1470	55-619970	320810110585001	01/30/62	101	2391
1471	55-619970	320810110585001	02/05/63	107	2384
1472	55-619970	320810110585001	02/06/64	113	2378
1473	55-619970	320810110585001	02/05/65	113	2378
1474	55-619970	320810110585001	11/01/68	123	2368
1475	55-619970	320810110585001	11/01/69	124	2367
1476	55-619970	320810110585001	12/01/70	129	2362
1477	55-619970	320810110585001	01/17/72	130	2361
1478	55-619970	320810110585001	01/04/73	141	2350
1479	55-619970	320810110585001	12/26/73	146	2345
1480	55-619970	320810110585001	12/11/74	159	2332
1481	55-619970	320810110585001	12/01/76	168	2324
1482	55-619970	320810110585001	01/01/77	171	2320
1483	55-619970	320810110585001	12/22/81	172	2319
1484	55-619970	320810110585001	12/01/82	174	2317
1485	55-619970	320810110585001	01/04/85	157	2334
1486	55-619970	320810110585001	01/05/85	165	2326
1487	55-619970	320810110585001	01/09/86	146	2345
1488	55-619970	320810110585001	12/23/86	148	2343
1489	55-619970	320810110585001	12/21/87	152	2339
1490	55-619970	320810110585001	12/17/88	157	2334
1491	55-619970	320810110585001	01/08/91	157	2334
1492	55-619970	320810110585001	01/21/94	156	2335
1493	55-619970	320810110585001	02/01/95	156	2335
1494	55-619970	320810110585001	12/19/96	165	2326
1495	55-619970	320810110585001	02/11/98	168	2323
1496	55-619970	320810110585001	12/23/98	169	2322

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1497	55-618547	320810110585001	12/28/99	170	2321
1498 D-15-13 11DDC		320805110585001	06/15/72	144	2357
1499 D-15-13 14ACA		320746110585601	02/09/53	52	2438
1500		320746110585601	02/11/54	53	2437
1501		320746110585601	02/10/55	50	2440
1502		320746110585601	02/13/56	48	2442
1503		320746110585601	02/13/57	51	2439
1504		320746110585601	02/05/58	51	2439
1505		320746110585601	02/05/59	52	2438
1506		320746110585601	02/08/60	53	2437
1507		320746110585601	02/02/61	55	2435
1508		320746110585601	01/20/62	56	2434
1509		320746110585601	02/05/63	57	2433
1510		320746110585601	02/06/64	58	2432
1511		320746110585601	02/05/65	62	2428
1512		320746110585601	02/06/68	63	2427
1513		320746110585601	02/14/69	71	2419
1514		320746110585601	11/01/69	76	2414
1515		320746110585601	12/01/70	77	2413
1516 D-15-13 14BCC1	55-625411	320735110593701	12/23/81	114	2358
1517	55-625411	320735110593701	01/07/84	69	2403
1518 D-15-13 14BCC2	55-618545	320736110593701	12/01/87	134	2398
1519	55-618545	320736110593701	01/17/95	155	2317
1520 D-15-13 14CCC	55-618547	320716110593701	02/16/55	78	2409
1521	55-618547	320716110593701	02/01/56	65	2422
1522	55-618547	320716110593701	02/02/60	73	2414
1523	55-618547	320716110593701	02/01/62	84	2403
1524	55-618547	320716110593701	02/05/65	100	2387
1525	55-618547	320716110593701	11/01/67	104	2383
1526	55-618547	320716110593701	11/01/68	110	2377
1527	55-618547	320716110593701	11/01/69	114	2373
1528	55-618547	320716110593701	12/01/70	121	2366
1529	55-618547	320716110593701	11/15/76	131	2356
1530	55-618547	320716110593701	11/10/77	130	2357

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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1531	55-618547	320716110593701	11/12/78	129	2358
1532	55-618547	320716110593701	11/15/79	132	2355
1533 D-15-13 14CDD	55-618546	320713110572801	03/18/55	76	2402
1534	55-618546	320713110572801	01/30/58	71	2407
1535	55-618546	320713110572801	02/02/59	79	2399
1536	55-618546	320713110572801	02/02/60	72	2406
1537	55-618546	320713110572801	02/02/61	87	2391
1538	55-618546	320713110572801	02/02/62	83	2395
1539	55-618546	320713110572801	01/30/63	92	2306
1540	55-618546	320713110572801	02/05/65	100	2378
1541 D-15-13 14CDD1	55-801510	320716110590801	12/22/81	186	2311
1542	55-801510	320716110590801	12/03/87	165	2332
1543	55-801510	320716110590801	01/19/95	162	2335
1544	55-801510	320716110590801	02/22/00	202	2295
1545 D-15-13 14CDD2	55-801178	320713110591201	12/22/81	50	2443
1546	55-801178	320713110591201	12/03/87	56	2437
1547	55-801178	320713110591201	01/19/95	42	2451
1548	55-801178	320713110591201	02/22/00	47	2446
1549 D-15-13 15AAB1		320757110595001	09/01/39	36	2432
1550		320757110595001	09/28/39	38	2432
1551		320757110595001	11/13/39	36	2432
1552		320757110595001	12/26/39	36	2432
1553		320757110595001	03/18/40	35	2433
1554		320757110595001	05/01/40	36	2432
1555		320757110595001	05/28/40	36	2432
1556		320757110595001	08/13/40	37	2431
1557		320757110595001	10/04/40	38	2430
1558		320757110595001	12/30/40	38	2430
1559		320757110595001	02/24/41	36	2432
1560		320757110595001	06/05/41	36	2432
1561		320757110595001	07/11/41	37	2431
1562		320757110595001	08/12/41	37	2431
1563		320757110595001	09/30/41	37	2431
1564		320757110595001	11/13/41	37	2431

Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1565		320757110595001	12/29/41	36	2432
1566		320757110595001	03/06/42	36	2432
1567		320757110595001	08/24/42	38	2430
1568		320757110595001	12/23/42	38	2430
1569		320757110595001	04/15/43	38	2430
1570		320757110595001	11/10/43	39	2429
1571		320757110595001	12/16/43	39	2429
1572		320757110595001	01/14/44	39	2429
1573		320757110595001	07/18/44	42	2426
1574		320757110595001	02/12/45	40	2428
1575		320757110595001	07/27/45	42	2426
1576		320757110595001	10/12/45	41	2427
1577		320757110595001	12/06/45	41	2427
1578		320757110595001	03/01/46	40	2428
1579		320757110595001	05/09/46	41	2427
1580		320757110595001	06/17/46	41	2427
1581		320757110595001	07/23/46	42	2426
1582		320757110595001	08/30/46	41	2427
1583		320757110595001	10/11/46	42	2426
1584		320757110595001	12/02/46	40	2428
1585		320757110595001	12/24/46	42	2426
1586		320757110595001	02/14/47	43	2425
1587		320757110595001	03/31/47	43	2425
1588		320757110595001	04/29/47	43	2425
1589		320757110595001	07/14/47	44	2424
1590		320757110595001	08/28/47	44	2424
1591		320757110595001	09/26/47	44	2424
1592		320757110595001	10/28/47	43	2425
1593		320757110595001	01/07/48	44	2424
1594		320757110595001	05/21/48	46	2422
1595		320757110595001	07/28/48	45	2423
1596		320757110595001	08/24/48	45	2423
1597		320757110595001	09/30/48	44	2424
1598		320757110595001	10/25/48	44	2424

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Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1599		320757110595001	11/26/48	45	2423
1600		320757110595001	01/27/49	44	2424
1601	D-15-13 15ABC	320751111000701	02/02/60	64	2411
1602		320751111000701	02/02/62	76	2399
1603		320751111000701	01/30/63	79	2396
1604		320751111000701	01/31/64	86	2389
1605		320751111000701	12/03/64	84	2391
1606		320751111000701	01/15/65	84	2391
1607		320751111000701	02/04/65	84	2391
1608		320751111000701	11/01/67	96	2379
1609		320751111000701	02/06/68	90	2385
1610	D-15-13 15BAB	320756111002001	07/05/72	148	2332
1611	D-15-13 15BBD	320749111002601	06/25/46	43	2432
1612	D-15-13 15BCD	320738111002901	05/05/64	93	2385
1613	D-15-13 15BDC	320738111002201	02/21/55	70	2405
1614		320738111002201	02/15/56	60	2415
1615		320738111002201	02/13/57	64	2411
1616		320738111002201	02/02/59	66	2409
1617		320738111002201	02/04/60	74	2401
1618		320738111002201	02/02/61	81	2394
1619		320738111002201	02/02/62	77	2398
1620		320738111002201	02/06/63	84	2391
1621		320738111002201	01/31/64	89	2386
1622	D-15-13 15CAC	320726111002001	01/31/64	90	2390
1623		320726111002001	05/01/70	129	2351
1624		320726111002001	12/04/74	144	2336
1625		320726111002001	12/01/75	158	2322
1626		320726111002001	01/05/78	167	2313
1627		320726111002001	02/02/78	164	2316
1628		320726111002001	12/26/78	172	2308
1629		320726111002001	03/05/79	165	2315
1630		320726111002001	01/11/80	167	2314
1631		320726111002001	12/22/80	174	2306
1632		320726111002001	12/28/81	171	2309



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1633	55-620157	320726111002001	12/01/82	174	2308
1634	55-620157	320726111002001	01/09/84	158	2322
1635	55-620157	320726111002001	01/04/85	146	2334
1636	55-620157	320726111002001	01/10/86	132	2348
1637	55-620157	320726111002001	12/23/86	132	2348
1638	55-620157	320726111002001	12/23/87	134	2346
1639	55-620157	320726111002001	01/04/89	141	2339
1640	55-620157	320726111002001	01/08/91	151	2329
1641	55-620157	320726111002001	12/26/91	151	2329
1642	55-620157	320726111002001	12/16/93	156	2324
1643	55-620157	320726111002001	02/03/95	157	2323
1644	55-620157	320726111002001	12/20/96	165	2315
1645	55-620157	320726111002001	02/11/98	173	2307
1646	55-620157	320726111002001	01/21/99	179	2301
1647 D-15-13 15CCC1		320711111002801	02/01/52	52	2438
1648 D-15-13 15CCD2		320710111003301	02/01/52	42	2448
1649		320710111003301	02/12/54	65	2425
1650		320710111003301	02/11/55	62	2428
1651		320710111003301	02/15/56	53	2437
1652		320710111003301	02/13/57	50	2431
1653		320710111003301	01/30/58	60	2430
1654		320710111003301	02/02/59	62	2428
1655		320710111003301	02/04/60	62	2428
1656		320710111003301	02/02/61	70	2420
1657		320710111003301	02/02/62	70	2420
1658		320710111003301	02/05/63	76	2414
1659		320710111003301	01/31/64	81	2409
1660		320710111003301	09/01/65	86	2404
1661		320710111003301	02/06/68	86	2404
1662 D-15-13 15CDB		320719111002101	02/01/70	145	2341
1663 D-15-13 15CDC		320712111002201	09/05/39	32	2459
1664		320712111002201	09/23/39	32	2458
1665		320712111002201	11/13/39	32	2458
1666		320712111002201	12/26/39	32	2458



Location	Registration No.	Well Site ID	Date Measured	Depth to Water	Water Level Elevation
1667		320712111002201	02/19/40	35	2455
1668		320712111002201	03/18/40	35	2455
1669		320712111002201	05/01/40	36	2454
1670 D-15-13 15DBB	55-625405	320732111003701	01/16/53	60	2415
1671	55-625405	320732111003701	02/09/53	62	2413
1672	55-625405	320732111003701	02/18/55	66	2409
1673	55-625405	320732111003701	02/15/56	57	2418
1674	55-625405	320732111003701	02/13/57	62	2413
1675	55-625405	320732111003701	01/30/58	67	2408
1676	55-625405	320732111003701	02/02/60	66	2409
1677	55-625405	320732111003701	02/02/62	76	2399
1678	55-625405	320732111003701	01/30/63	83	2392
1679	55-625405	320732111003701	01/31/64	91	2384
1680	55-625405	320732111003701	12/01/64	86	2389
1681	55-625405	320732111003701	02/08/68	95	2380
1682	55-625405	320732111003701	11/01/68	103	2372
1683	55-625405	320732111003701	11/01/69	113	2362
1684	55-625405	320732111003701	12/01/70	117	2358
1685	55-625405	320732111003701	12/01/75	133	2342
1686	55-625405	320732111003701	11/15/76	129	2346
1687	55-625405	320732111003701	11/10/77	129	2346
1688	55-625405	320732111003701	11/12/78	127	2348
1689	55-625405	320732111003701	11/15/79	131	2344
1690	55-625405	320732111003701	12/22/81	169	2307
1691	55-625405	320732111003701	01/07/84	157	2318
1692	55-625405	320732111003701	11/30/87	134	2341
1693	55-625405	320732111003701	01/18/95	156	2319
1694	55-625405	320732111003701	02/22/00	183	2292
1695 D-15-13 15DCB	55-618549	320720111000601	01/31/64	103	2381
1696	55-618549	320720111000601	02/20/78	157	2327
1697 D-15-13 15DCC	55-625404	320712111000601	10/29/47	48	2442
1698	55-625404	320712111000601	02/20/48	46	2444
1699	55-625404	320712111000601	02/09/49	133	2357
1700	55-625404	320712111000601	07/13/50	58	2432

