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Introduction

The Groundwater Site Inventory (GWSI) database is ADWR’s main repository for state-wide groundwater data. The GWSI consists of field-verified data regarding wells and springs collected by personnel from Hydrology Division’s Basic Data Section, the U.S. Geological Survey, and other co-operating agencies. The information in GWSI is constantly being updated by ongoing field investigations and through a state-wide network of water level and water quality monitoring sites.

This handbook has been developed for use by both the Basic Data section and other Department personnel. With the Department’s move to a PC based client–server network, the data in GWSI have become more readily available to everyone within the Department. This handbook has been developed to help department personnel understand the GWSI database system, the data available in the system, and how the different data tables in the system can be used to extract meaningful information from the GWSI.

The GWSI data resides in 17 separate Oracle data tables, with each table containing a unique set of data. For example, the SITES data table contains the cadastral location (township, range, section, and quarter, quarter, quarter section), latitude/longitude, site elevation, well use, well depth, and other general information for each GWSI site. There are also a number of other tables in the GWSI folder. These tables contain letter codes associated with fields in the main GWSI data tables and other data related to the GWSI system. A full list of the main GWSI data tables along with a brief description of the data they contain is presented below.

Each data site in GWSI is assigned a unique 15-character identification number, the SITE ID, which is a common field in all the GWSI data tables. All the information available for a specific site can be obtained by using the SITE ID number. Site specific information can be accessed by using either the Oracle Application Forms or a relational database query tool such as Oracle Browser, Access, or Paradox. The SITES data table is the main data table in the GWSI system and can be linked to other GWSI tables using the SITE ID when using a relation database query tools. Data in any of the GWSI tables can be retrieved for any given geographic area using the townships and ranges, groundwater area designations, latitudes and longitudes, or UTM coordinates located in the SITES data table. In addition to the data tables there is an Oracle view, the TRS View, that can be used to aid in designing queries based on a sites township, range, and section.

Listed below are the main GWSI data table and a general description of the information available in each table. The main body of this report presents each data table and lists each field in the table, then the acceptable codes for each field are listed and explained.

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Sites Data Table (SITES)

The SITES Data Table is used for recording general information about the site, including location information, general well construction, and well use information. The Sites data table is the main table in the GWSI system. All other GWSI tables are linked to it by the Site Id field.

Site Identification Number  (Site_Well_Site_Id)

This field contains the 15-digit identification number assigned to the site. The SITE ID contains no blanks or alphabetic characters. It is used as a unique identification number that allows users to link records in the SITES data table with records in other GWSI data tables. By linking across to other GWSI data tables all the data for one specific site can be retrieved.

Although the Site Identification Number is derived initially from the latitude and longitude of the site, the number is a unique identifier and not a locator. It cannot be too strongly emphasized that the site identification number, once assigned, is a pure number and has no locational significance. The site identification number never changes once it is established except under unusual conditions.

The site identification number is assigned by locating the site on the best available map or orthophoto as accurately as possible. Using appropriate locational techniques, the latitude and longitude of the point on the map that represents the site is determined. The location of this point is always scaled to the nearest second of latitude and longitude, even if there is doubt as to the exact location of the site or the accuracy of the map. The first six digits of the site identification number are the value of the latitude, the seventh through thirteenth digits are the value of the longitude, and the value 01 is used for the fourteenth and fifteenth numbers. Leading zeros are used if the value of the minutes, or seconds of the latitude or longitude is less than 10, for example, 01, 02, ...09. No blanks or alphabetic letters are to be used in the Site Id. The site identification number usually ends in 01; however, in rare instances sequential numbers such as, 00, 02, 03, ..., have been assigned to these last two digits. Generally, this happens when more than one well occupies the same latitude and longitude. Some sites have longitude and latitude determined by Global Positioning Satellites (GPS) equipment. Sites with longitude and latitude assigned by GPS are coded according.

Cadastral Location (Site_Local_Id)

This is a 20 character-long site location based on the U. S. Bureau of Land Management’s system of land subdivision. The land survey in Arizona is based on the Gila and Salt River Baseline and Meridian, which divides the state into four quadrants. These quadrants are designated A, B, C, and D in a counterclockwise direction starting in the upper right hand corner (Figure 1). All land with north Townships and east Ranges are in the A quadrant, north Townships and west Ranges in the B quadrant, south Townships and west Ranges in the C quadrant, and south Townships and east Ranges in the D quadrant. The first number in the cadastral location is the Township, the second is the Range, and the third is the Section in which the site is located. The letters following the section number indicate the well location within the section. The first letter indicates the 160-acre quarter section, the second letter the 40-acre quarter-quarter section, and the third letter the 10-acre quarter-quarter-quarter section. These letters are also assigned in a counterclockwise direction, beginning with the northeast quarter of the section. For example, a well with the cadastral location D-04-05 16CAA is located in Township 4 South, Range 5 East, Section 16 in the southwest quarter section, the northeast quarter-quarter section, and the northeast quarter-quarter-quarter section. Leading zeros are included in the township, range, and section numbers. If more than one well or site is located within a 10-acre tract, consecutive numbers beginning with 1 are added as suffixes with the oldest known well labeled as 1.

Oversized sections occur in several areas of the state. If a section is more than a mile in the north/south or east/west dimension, the excess area is considered a part of that section and has the same section number. A control corner is established for the section on the section corner that is closest to the center of the township (see Figures 2a and 2b). The oversized section is divided so that a full square-mile unit is adjacent to the control corner, the rest of the section is considered a separate unit of land. Appropriate N, S, E, W, or X letters are assigned to the separate units of land depending on where they lie in relation to the full square-mile land unit.
The well numbers and letters used by the Geological Survey in Arizona are in accordance with the Bureau of Land Management’s system of land subdivision. The land survey in Arizona is based on the Gila and Salt River meridian and base lines, which divide the state into four quadrants. These quadrants are designated counter clockwise by the capital letters A, B, C, and D. All land north and east of the point of origin is in A quadrant, that north and west is in B quadrant, that south and west in C quadrant, and that south and east in D quadrant. The first digit of a well number indicates the township, the second the range, and the third the section in which the well is situated. The lowercase letters a, b, c, and d after the section number indicate the well location within the section. The first letter denotes a particular 160-acre tract, the second the 40-acre tract, and the third the 10-acre tract. These letters are also assigned in a counter clockwise direction, beginning in the north east quarter. If the location is known within the 10-acre tract, three lowercase letters are shown in the well number. In the example shown in figure 2, well number (A-4-5) 19cba designates the well as being in the SW1/4 NW1/4 NE1/4 sec.19, T. 4 N., R. 5 E. Where there is more than one well within a 10-acre tract, consecutive numbers beginning with 1 are added as suffixes.

When a section is more than 1 mile in any dimension, the section numbers applies as usual. The oversized section is divided so that a full square-mile unit of the section is adjacent to a normal section within the appropriate N., S., E., or W. letters are assigned to the units, depending upon where they lie in relation to the full square-mile unit. A well would be designated as shown in figure 2 with the appropriate letter following the section number in which the well is located.

![Figure 2 - Well numbering system in Arizona](image-url)
Figure 2a. Cadastral location of over-sized section in one direction.

Figure 2b. Cadastral locations for over-sized sections in two directions.

Figure 2. Cadastral locations for over-sized sections in Arizona.
For example, in Figure 2a, the section is over-sized in only one direction (East-West). Well A-17-21E06AAA is in the northeast quarter, of the northeast quarter, of the northeast quarter, of the western unit of Section 6, Township 17 North, Range 21 East. The well location is determined by placing the lower right hand corner of the map locator on the control corner and reading the location within the full-sized section of land. The location of well A-17-21W06AAA is determined by moving the lower right hand corner of the map locator to the lower right hand corner of the eastern unit of Section 6 and reading the location within the over-sized unit of land (Figure 2a). Sections that are over-sized in the north-south direction use the same general procedure.

Figure 2b illustrates how wells are identified for sections that are over-sized in both east-west and north-south directions. Wells in the full section can be identified as being in either the eastern or southern unit of Section 6. A well located in the unit of land north of the full section are in the northern unit, and a well located in the unit of land to the west of the full unit is in the western unit of section six. A well in the small unit of land to the north and west of the full section uses an X as identifier, for example, X06 (Figure 2b).

Some areas of the state have half townships and half ranges. Half township and half ranges are designated by the letter H following the township or range. In some areas of the state survey lines have not been established. Sites in these areas have the suffix UNSURV in the last six spaces of the LOCAL ID field to indicate that the location is in an unsurveyed area. The cadastral location of a site in an unsurveyed area may not be as accurate as in a surveyed area and may only be identified to the 160 or 40 – acre location. Listed below are examples of some typical cadastral locations:

- A-09-12 19ADD2
- D-05-04N27CDD
- A-10H05 06ACD
- B-24-12 13BA UNSURV

A different numbering system is used to locate GWSI sites on the Navajo and Hopi Indian Reservations. The Navajo Indian Reservation is divided into 17 administrative districts, numbered 1 to 5 and 7 to 18, and the Hopi Indian Reservation comprises District 6. The Reservation is further divided into 15-minute quadrangles arbitrarily numbered from 1 to 151 starting in the northeast corner of the area and numbering consecutively in a row from east to west. Within the 15-minute quadrangle a site is located in miles south and west from the northeast corner of the quadrangle. The first two numbers in the well number represent the district, the next three numbers are the quadrangle, the decimal numbers are miles west by (X) miles south of the northeast corner of the quadrangle. For example, the site identified as 02 021-05.28X10.68 identifies a well that is in district 2, quadrangle 21, and is 5.28 miles west by 10.68 miles south of the northeast corner of the map.

GWSI sites located in California, New Mexico, Nevada, and Utah use different baselines and meridians. Cadastral identifications for Non-Arizona GWSI sites are presented in Appendix D. The complete list of land net meridians is listed below. Some land in Arizona falls in the California Survey because changes in the Colorado River have left parts of California on the Arizona side of the river.

**Land Net Meridian (Site_Meridian)**

This field records the land net meridian that is used to establish the Local Id or cadastral location of the site. In general all sites located in Arizona, except those on the Navajo and Hopi Indian Reservation, use the Gila and Salt River Meridian and Baseline. There are six meridian codes in GWSI. They are:

- B - San Bernardino Meridian and Baseline
- D - Mount Diablo Meridian and Baseline
- G - Gila and Salt River Meridian and Baseline
- N - Navajo Meridian and Baseline
- P - New Mexico Principal Meridian and Baseline
- S - Salt Lake Meridian and Baseline
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**Site Type** *(Site_Type_Code_Entry)*

This field is used to describe what is at the location of the site. Generally ADWR is interested only in wells and springs, however, several different types of sites have been entered in the past. The site codes and their descriptions are listed below.

- **C** - Collector or Ranney type well.
- **D** - Drain dug to intercept the water table or potentiometric surface to either lower the water table or serve as a water supply.
- **E** - Excavation
- **M** - Multiple Wells. Used for well fields consisting of a group of wells that are pumped through a single header and for which little or no data are available.
- **S** - Spring
- **T** - Tunnel or Shaft. Tunnel, shaft, or mine from which groundwater is obtained.
- **W** - Well. For single wells other than wells of the collector or Ranney type.

**Reliability** *(Site_Rely_Code_Entry)*

This field is used to describe the reliability of the data available for the site.

- **C** - Field Checked. The data have been field checked by the reporting agency.
- **L** - Location Not Accurate. Location of the latitude and/or longitude is not accurate.
- **M** - Minimal Data. Used when modifying an existing record when the investigator is unsure if the site has been field checked.
- **U** - Unchecked. The data have not been field checked by the reporting agency, but the reporting agency considers the data reliable.

**Topo Setting** *(Site_Toposet_Code_Entry)*

The Topographic Setting field contains codes that best describe the topographic setting of the area in which the site is located. *(Figure 3).*

- ***** - Undetermined
- **A** - Alluvial Fan. Refers to a sloping mass of material, shaped like an open fan or cone, deposited by a stream or wash at a place where it issues from a narrow mountain valley onto a plain or broad valley.
- **B** - Playa. Refers to a dried-up, vegetation-free, flat-floored area composed of thin, evenly stratified sheets of fine clay, silt, or sand, that represents the bottom of a shallow, enclosed or undrained desert lake basin in which water accumulates and is quickly evaporated, usually leaving deposits of soluble salts.
- **C** - Stream Channel. Refers to the bed in which a natural stream of water runs. The stream may be perennial, intermittent, or ephemeral. The term includes washes, arroyos, and coulees.
- **D** - Depression. Refers to an area that has no external surface drainage. Depressions can range from a few acres to several square miles and should be considered local features. Do not use for regional features such as the large closed basins found in the Basin and Range province, or on the undulating surface of glacial drift (use undulating).
E - Dunes. Refers to mounds or ridges of windblown, or eolian sand. This term should not be used for an isolated mound unless it has a rather extensive area and is of hydrologic significance to the site.

F - Flat. Refers to a flat surface that may be part of a larger feature, such as an upland flat, mesa or plateau, coastal plain, lake plain, or pediment. Terraces and valley flats, which are special varieties of flat surfaces, are classified separately.

G - Floodplain. Refers to the surface or strip of relatively smooth land adjacent to a river channel, constructed by the present river in its existing flow regime and covered with water when the river overflows its banks at flood stage.

H - Hilltop. A hilltop is the upper part of a hill or ridge above a well-defined break in slope.

K - Sink. A sinkhole is a special type of depression that results from the dissolving of soluble rock (salt, gypsum, limestone) and the subsequent collapse of the earth into the solution cavity.

L - Lake. This code stands for any inland body of water where the ground may be saturated, or water may stand above the land surface for a period of time.

M - Mangrove Swamp. Refers to a tropical or subtropical marine swamp containing abundant mangrove trees.

P - Pediment. Refers to a plain of combined erosional material that forms at the foot of a mountain range.

S - Hillside. Refers to the sloping side of a hill, i.e., the area between a hilltop and valley flat.

T - Terrace. Refers to an alluvial or marine terrace that is generally a flat surface, usually parallel to but elevated above a stream valley or coast line. Due to the effects of erosion, the terrace surface may not be as smooth as a valley flat, and within the general terrace area there may be undulating areas.

U - Undulating. Refers to topography characteristic of areas which have many small depressions and low mounds. An undulating surface is primarily a depositional feature, not an erosional one. The term should not be used for areas that have a slightly irregular shape due to erosion.

V - Valley Flat. Refers to a low flat area between valley walls and bordering a stream channel. It includes the stream floodplain and, generally, is the flattest area in the valley. A valley flat may have a slight slope towards the main drainage, towards the valley walls, or may be cut by smaller streams. Generally, the valley flat is separated from alluvial terraces or the upland by a pronounced break in slope.

W - Upland Draw. Refers to a small natural drainage or depression, usually dry, on a hillside or upland area.
Figure 3. Diagrammatic sketch of Topographic features.
Site Data Source (Site_sisrc_Code)

This field contains the agency making the original field check and initial data entry, usually ADWR or USGS.

ADWR - Arizona Department of Water Resources
USBR - U.S. Bureau of Reclamation
USGS - U.S. Geological Survey

Topographic Quad Name (Site_Tqnam_Quad_Name)

This field contains the name of the U.S. Geological Survey Topographic Quadrangle map on which the site is located. Use the drop-down list to select the proper map name.

Map Scale (Site_Map_Scale)

This field records the scale of the topographic quadrangle map on which the site is located.

ALRIS Quadrangle Number (Site_Quad_No)

This field contains the Arizona Land Resource Information System (ALRIS) number of the topographic quadrangle that the site is located on. ALRIS is supported by the Arizona State Land Department and is based on a row - column grid of all 7.5 minute quadrangle maps that cover a part of the state. The first two numbers represent the column a map is in and the second two numbers are the row the map occupies. ORACLE assigns the ALRIS quadrangle number based on the name that is entered into the Topographic Quadrangle Name field.

Latitude and Longitude (Site_Latit_Degree, Site_Latit_Min, Site_Latit_Sec)
(Site_longit_Degree, Site_longit_Min, Site_longit_Sec)

The three latitude fields and the three longitude fields contain the best available value for the latitude and longitude of the site in degrees, minutes, and seconds. The site is located on an orthophoto and/or best available map in the field. The position of the site may be measured in the field by global positioning system (G.P.S.) equipment if available. The longitude and latitude will be determined from the orthophoto or map by the field person in the office. Each value for the degrees, minutes and seconds should be entered into the appropriate field.

Latitude/Longitude Accuracy (Site_Llaccr_Code)

This field records the accuracy of the latitude/longitude location for the site. If the site cannot be spotted on an orthophoto within 2 seconds, then the field person will indicate the appropriate accuracy. In general a site can be located to within five seconds on a map, Two seconds on an orthophoto with a templet, and one second if it is digitized. The appropriate codes are listed below:

* - Undetermined
2 - The measurement is accurate to + or - two seconds
B - 0.2 Seconds
F - The measurement is accurate to + or - five seconds
G - 0.5 Seconds
M - The measurement is accurate to + or - one minute
R – 0.005 seconds
S - The measurement is accurate to + or - one second
T - The measurement is accurate to + or - ten seconds
G - 0.5 Seconds

Decimal Latitude (Site_Latitude_Decimal)

This field contains the latitude in decimal format of the site which is calculated by ORACLE.

Decimal Longitude (Site_Longit_Decimal)

This field contains the longitude in decimal format of the site which is calculated by ORACLE.
UTM Coordinates (Site_Utm_East, Site_Utm_North)

The two UTM fields contain the Universal Transverse Mercator (UTM) location of the site. The Universal Transverse Mercator system is a special application of the Transverse Mercator map projection. The UTM system divides the globe into sixty (60) zones, each spanning six (6) degrees of longitude. Each UTM zone has a central meridian which divides the zone into two equal parts, three degrees east and three degrees west. The origin of a zone is the central meridian and the equator, all points within a zone are referenced from this point in meters. To eliminate negative values the origin is assigned a false easting value of 500,000 meters; thus Easting values of less than 500,000 meters are located in the east half of a zone and easting values of more than 500,000 meters are located in the west half of a zone. The UTM values for a GWSI site are calculated from the latitude and longitude coordinates.

State Well Registration Number (Site_Well_Reg_Id)

This field contains the State Well Registration (55) number of the well if the site can be positively matched to a registered well. The 55 number is matched with a GWSI well only when the field investigator is absolutely positive that the wells are the same. If there is any doubt about the match, the 55 number is not entered until those doubts are resolved.

Site Altitude (Site_Well_Altitude)

This field contains the altitude of the site in feet above NGVD, precision to two decimals can be coded if available. This value is determined by the person field checking the site.

Method of Altitude Measurement (Site_Altmeth_Code_Entry)

This field records the method used to determine the altitude of the site.

- * - Undetermined
- A - Altimeter
- G – Hand held G.P.S. unit
- L - Level or other surveying method
- M - from topographic map
- R – Survey Grade G.P.S. unit

Altitude Accuracy (Site_Altit_Accuracy)

This field contains the level of accuracy, in feet, of the site altitude. Site altitudes taken from a map are generally accurate to one half the maps contour interval. Sites that are leveled in from a bench mark are considered accurate to within 1.0 foot.

ADWR Basin Codes (Site_Ama_Code_Entry)

This field contains the appropriate letter code for the ADWR groundwater basin or Active Management Area (AMA) in which the site is located. For sites that are in either a subdivided and non-subdivided basin the appropriate basin code is entered into this field. For sites that are in Active Management Areas (AMAs) the appropriate AMA code is entered. Sites that are located in Irrigation Non-Expansion Areas (INAs) have the three letter code of the groundwater basin within which the INA occurs entered in this field, and the three letter INA code entered into the ADWR Sub-basin field. See Appendix A for the appropriate ADWR Basin, Sub-basin, AMA, and INA Codes.

ADWR Sub-basin Codes (Site_Adwbas_Code_Entry)

Many of the ADWR groundwater basins and AMAs are subdivided into smaller sub-basins based on hydrologic conditions. This field contains the appropriate three letter code for the ADWR designated groundwater sub-basin. For sites that are in basins or AMAs with no Sub-basins, i.e., non-subdivided basins, the three letter basin or AMA code is entered into this field. Sites that are located in Irrigation Non-Expansion Areas (INAs) have the three letter INA code entered into this field. See Appendix A which contains the ADWR Basin, Sub-basin, AMA, and INA Codes.
Groundwater Site Inventory (GWSI) Database

USGS Basin Codes  (Site_Usbasn_Code_Entry)

This field contains the appropriate three letter code for the U S Geological Survey groundwater area in which the site is located.  See Appendix B which contains the USGS area codes.

State Codes  (Site_State_Code)

This field contains the appropriate letter code for the state in which the site is located.

AZ - Arizona
CA - California
CO - Colorado
NM - New Mexico
NV - Nevada
SO - Sonora
UT - Utah

County Codes  (Site_Cnty_Code)

This field contains the appropriate numeric code for the county in which the site is located.

<table>
<thead>
<tr>
<th>Arizona</th>
<th>Nevada</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 - Apache</td>
<td>03 - Clark</td>
</tr>
<tr>
<td>03 - Cochise</td>
<td></td>
</tr>
<tr>
<td>05 - Coconino</td>
<td>25 - Kane</td>
</tr>
<tr>
<td>07 - Gila</td>
<td></td>
</tr>
<tr>
<td>09 - Graham</td>
<td>27 - Yuma</td>
</tr>
<tr>
<td>11 - Greenlee</td>
<td>83 - Montezuma</td>
</tr>
<tr>
<td>12 - La Paz</td>
<td></td>
</tr>
<tr>
<td>13 – Maricopa</td>
<td></td>
</tr>
<tr>
<td>15 – Mohave</td>
<td>57 - Imperial</td>
</tr>
<tr>
<td>17 – Navajo</td>
<td>65 - Riverside</td>
</tr>
<tr>
<td>19 - Pima</td>
<td>71 - San Bernardino</td>
</tr>
<tr>
<td>21 – Pinal</td>
<td></td>
</tr>
<tr>
<td>23 - Santa Cruz</td>
<td></td>
</tr>
<tr>
<td>25 - Yavapai</td>
<td></td>
</tr>
<tr>
<td>27 – Yuma</td>
<td></td>
</tr>
<tr>
<td>29 - Yuma</td>
<td></td>
</tr>
</tbody>
</table>

Temporal Codes  (Site_Temp_Code)

This field contains the appropriate letter code for the time at which the site was visited.

Site Use  (Site_Use_1, Site_Use_2, Site_Use_3)

The three Site Use fields contain the appropriate letter codes for the use of the site. SITE_USE1 is the principal use of the site at the time of the last field visit. If the site is used for more than one purpose then the second and third Site Use entries can be coded with the appropriate letter codes.

* - Undetermined

A - Anode. An anode is a hole used as an electrical anode. Included in this category are wells used solely for cathodic protection of pipelines or electronic relays and other installations.
Site Use (cont)

C - Standby, Emergency Supply. This refers to a water supply source that is used only when the principal source of water is unavailable.

D - Drain. Refers to the drainage of surface water underground.

E - Geothermal. A geothermal well is a hole drilled for geothermal energy development. Use this category for dry geothermal wells or wells into which water is injected for heating. For a wet geothermal well, from which water is withdrawn, use W – Withdrawal of water for the site use, and E - Power Generation as the primary use of water.

G - Seismic. A seismic hole is one drilled for seismic exploration. A seismic hole converted for other uses should be coded based on its current use.

H - Heat Reservoir. Refers to a well in which a fluid is circulated in a closed system. Water is neither added nor withdrawn from the well.

M - Mine. A mine includes any tunnel, shaft, or other excavation constructed for minerals extraction.

N - Non-exempt well in AMA/INA

O - Observation - Water Level. An observation well is a well that is used for water level observations. Do not use this category for oil test holes or water-supply wells used only occasionally as observation wells. ADWR statewide water level monitoring wells are identified by convention with the code O only in the Site_Use_2 or Site_Use_3 fields.

P - Oil or Gas. Refers to any well or hole drilled in search of, or for production of, petroleum or gas. This category includes any oil or gas production well, dry hole, core-hole, or injection well drilled for secondary recovery of oil and/or gas. An oil-test hole converted to a water supply hole should be classified as Withdrawal.

Q - Water Quality Monitoring. An observation well is a well that is used for water-quality observations. Do not use this category for oil test-holes or water supply wells used only occasionally as observation wells. ADWR statewide water quality monitoring wells are identified by convention by the code Q only in the Site_Use_2, or Site_Use_3 fields

R - Recharge. A recharge site is a site constructed for, or converted for, use in replenishing the aquifer. Use this category for wells that are used only to place water into an aquifer.

S - Repressurized. Refers to pumping water into an aquifer in order to increase the pressure in the aquifer for a specific purpose, for example, water flood purposes in an oil field.

T - Test. Refers to either an uncased or temporarily cased hole, that was drilled for water, or for geologic or hydrogeologic testing. The hole may be temporarily equipped with a pump in order to make a pump test, but if the well is developed after testing it is still a test hole. A core hole that is part of mining or quarrying exploration work should be in this class.

U - Unused. Refers to an abandoned site or one for which no use is contemplated. At an abandoned farmstead a domestic, or stock well equipped with a pump may be classed as unused. An irrigation well that is not equipped with a pump, nor used for other reasons, also may be classified unused.

W - Withdrawal. Refers to a site that withdraws water for one of the purposes listed under water use. It includes a dewatering well if the dewatering is accomplished by pumping groundwater.

X - Waste. Refers to a site used to convey industrial waste, domestic sewage, oil-field brine, mine drainage, radioactive waste, or other waste fluid into an underground zone. An oil-test or deep-water well converted to waste disposal should be in this category.

Z - Well Destroyed. Refers to a site that is has been destroyed and is no longer in existence.
The three Water Use fields are used to indicate to what purpose any water withdrawn from the site is used. Use WATER_USE_1 to indicate the principal use of the water from the site. Other uses are entered in the other two water use fields.

* - Undetermined

A - Air Conditioning. Refers to water supplied solely or principally for the heating or cooling of a building. Water used to cool industrial machinery should be coded as Industrial, not as Air Conditioning.

B - Bottling. Refers to the storage of water in bottles and use of the water for potable purposes.

C - Commercial. Refers to use by a business that does not fabricate or produce a product. Filling stations and motels are examples of commercial establishments. If some product is manufactured, assembled, remodeled, or otherwise fabricated, use of water at the plant should be considered as Industrial, even though the water is not used directly in the production and/or manufacture of the product.

D - Dewatering. Refers to water pumped for dewatering a construction or mining site, or to lower the water table for agricultural purposes. In this respect, it differs from a drainage well that is used to drain surface water underground. If the main purpose for which the water is withdrawn is to provide drainage, Dewatering should be indicated even though the water may be discharged into an irrigation ditch and subsequently used to irrigate land.

E - Power. Refers to water withdrawn for the use of generating any type of power.

F - Fire. Refers to the principal use of the water and should be indicated if the site was constructed principally for this purpose, even though the water may be used at times for other purposes.

H - Domestic. Refers to water used to supply household needs, principally for drinking, cooking, washing, and sanitary purposes, but includes watering a lawn and caring for pets. Most domestic wells will be in suburban or farm homes, but wells supplying small quantities of water for domestic purposes to one-room schools, turnpike gates, and similar installations, should also be included in the category.

I - Irrigation. Refers to water used to irrigate cultivated crops. Most irrigation site will supply water for farm crops, but this category should include wells used to water the grounds of schools, industrial plants, cemeteries, or golf courses if more than a small amount is used and that is the sole use of the water.

J - Industrial Cooling. Refers to a well that supplies water used solely for industrial cooling.

K - Mining. Refers to a well that supplies water used solely for mining purposes.

M - Medicinal. Refers to water believed to have therapeutic value. Water may be used for bathing and/or drinking. If used of water is mainly because of its claimed therapeutic value, use this category even if the water is bottled.

N - Industrial. Refers to water used within a plant that manufactures or fabricates a product. The water may or may not be incorporated into the product being manufactured. Industrial water may be used to cool machinery, to provide sanitary facilities, to air condition the plant, or to irrigate the grounds at the plant.

O - Observation. Refers to water that is used for water quality sampling.
Groundwater Site Inventory (GWSI) Database

Water Use (continued)

P - Public Supply. Refers to water that is pumped and distributed through a network that supplies several homes. Such supplies may be owned by a municipality or community, a water district, or a private water company. If the system supplies five or more homes it should be considered. "Public Supply"; for four or fewer homes classify use as "Domestic". Wells that supply motels and hotels should be classified as "Commercial". Many public supply wells also supply water for a variety of uses, such as industrial, institutional, and commercial.

Q - Aquaculture. Refers to water used solely for aquaculture, such as fish farms.

R - Recreation. Refers to water discharged into pools, or channels, which are dammed to form pools, that are used for swimming, boating, fishing, ice rinks, or other recreational uses. Also used for wells that irrigate golf courses and parks.

S - Stock. Refers to a well pumped to supply water to livestock.

T - Institution. Refers to water used in the maintenance and operation of institutions such as large schools, universities, hospitals, rest homes, or similar institutions. Owners of the institutions may be individuals, corporations, churches, or government bodies.

U - Unused. Means that water is not being removed from the site for one of the purposes listed above. A test hole, oil or gas well, recharge, drainage, observation, or waste-disposal well will be in the category. Do not use this classification for a stock, irrigation, domestic, or other well during off season or other temporary periods of nonuse.

Z - Other.

Depth of Hole (Site_Hole_Depth)

This field records the total depth to which the hole was drilled in feet, below the land surface datum, even though it may have been plugged back in completing the well. For collector or Ranney-type wells, the depth of the central shaft should be entered. For multiple-well fields, ponds, tunnels, springs, or drains, the field should be blank. If the hole depth is given, all other depths associated with the site will be compared with it for validity.

Depth of Well (Site_Well_Depth)

This field contains the depth of the finished, or cased, portion of the well in feet below land surface datum. The depth of the well is usually taken from the completed well drillers report.

Source of Depth Data (Site_Adwrs_Code)

This field contains the source of the reported depth of a well.

* - Undetermined
A - Arizona Department of Water Resources.
B - U.S. Bureau of Reclamation.
C - Consultant.
D - Driller. Depth taken from a drillers log or report.
E - New Mexico Office of State Engineer.
G - Geologist.
L - Logs.
M - Memory. Depth from owner, driller, or well operator.
O - Owner. Depth reported by well owner.
R - Other Reported. Depth reported by person other than owner, driller, or another governmental agency.
Z - Other. Depth reported by other source. Explain source in Remarks section.
Groundwater Site Inventory (GWSI) Database

**Geological Unit** (Site_Geo_Unit)

This field contains an 8-character code that identifies the lithologic unit in which the well is finished. See Appendix C for the appropriate Geological Unit Codes.

**Site Creation Date** (Site_Create_Date)

This field is filled by ORACLE with the date when the SITES entry was created.

**Site Update Date** (Site_Update_Date)

This field is filled by ORACLE with the date when information in any of the data tables related to the GWSI site is updated or modified.

**Last Action Date** (Site_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the SITES data table is changed or modified.

**Last Action Operator** (Site_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to change or modify any field in the SITES data table.

**Valid Entry Dates** (Site_Cdate_Valid, Site_Udate_Valid)

The two Valid Entry Date fields contain flags that indicate the accuracy of the dates in the Site Create or Site Update fields. Prior to being loaded into the ORACLE data tables GWSI was located on an IBM mainframe computer. Some of the date fields in the GWSI on IBM mainframe had no month or day values. The ORACLE GWSI date fields would not accept the null date entries when the IBM data were loaded into the ORACLE forms. To get around this problem, values were added to those GWSI entries with null dates. The month field was assigned a value of one (1) if it was empty, and the day field was assigned a value of one (1) if it was empty. The letter code M in this field indicates the month value has been assigned to the date and the date is only accurate to the year. The letter code D in this field indicates the day value has been added to the date and the date is accurate only to the month. A blank entry indicates that the full date is accurate. Each data table in GWSI that contains date fields will contain a Date Valid field.

**Arizona Watershed Codes** (Site_Wshd_Code)

This field contains the Arizona Watershed that the site falls in. Watershed codes are listed below:

- 01 - Virgin River
- 02 - Colorado River
- 03 - Little Colorado River
- 04 - Bill Williams River
- 05 - Verde River
- 06 - Agua Fria River
- 07 - Salt River
- 08 - Upper Gila River
- 09 - Santa Cruz River
- 10 - San Simon River
- 11 - San Pedro River
- 12 - Willcox Playa
- 13 - White Water Draw
- 14 - Rio Yaqui
- 15 - La Paz

**Index Well Book** (Site_Indx_Book)

If the site an active index well the number of the index book is entered in this field. It needs to be noted that this field only includes active index wells. Other wells that were index wells and then were removed from the index lines are not noted in this field. Wells that are on the index lines are a good place to start when looking for long-term water level records. However, other wells in the area of interest still need to be checked. A well that has been removed from the index line may still contain a very useful water level history.
**Well Completions Data Table** (WELL_COMPLETIONS)

The Well Completions Data Table is used to record detailed information about the construction of a site that is a well. The information includes the drillers’ names, dates of completion, drilling methods, casing finishes, and sources of the data.

**Construction Entry Number** (Wlco_Id)

Construction data can be entered more than once for a given site, such as when a well is deepened or some other major work is done. Therefore, a unique identifying control number is assigned by Oracle for each construction data entry. The number need not be sequential but needs to be unique for the site. The unique construction number is also assigned to any related construction information that is entered into the Bore Completions, Casing Completions and Perforation Completions Data Tables.

**Well Completion Date** (Wlco_Completion_Date)

This entry is the date the work was completed. If the day or month are not known enter 01 for the month and 01 for the day, and code the appropriate letter is entered into the Date Valid Field.

**Method of Construction** (Wlco_Drilmth_Code_Entry)

This field describes the method by which the site was constructed. Allowable entries are:

- * - Undetermined.
- A - Air Rotary. This method uses a stream of air to cool the bit and bring the rock cuttings to the surface.
- B - Bored or Augured. This method uses an auger to cut and remove the earth material. The auger may be powered by hand or by machinery.
- C - Cable Tool. Refers to a well drilled by the percussion or churn-drill method whereby a heavy drilling tool is raised and lowered with enough force to pulverize the rock. The rock debris is commonly removed from the hole with a bailer.
- D - Dug. Hand dug holes are excavated by hand tools or power-driven digging equipment. Caissons, Ranney-type collectors, and galleries belong in this classification even though they may have laterals that are driven or jetted.
- H - Hydraulic Rotary. With this method a well is constructed by rotating a length of pipe (drill stem) equipped with a drill bit that cuts or grinds the rocks. Water or drilling mud is pumped down the drilling stem. Cuttings are carried to the surface in the annular space between the drilling stem and the wall of the hole. Note that separate categories are provided for air-rotary and reverse-rotary.
- J - Jetted. Jetted wells are excavated by using high velocity streams of water that are pumped through a pipe having a restricted opening or jetting nozzle. For some types of earth material, a cutting bit is attached to the end of the jetting nozzle. The material cut or washed from the hole is carried to the surface in the annular space outside the pipe as in the hydraulic-rotary method.
- P - Air Percussion. This method uses a cutting tool powered by compressed air. A rapid percussion effect, coupled with rotary action, is used to drill through the earth material. Compressed air is also used to blow cuttings from the drill hole. Air-percussion drills are generally used in conjunction with air-rotary drilling rigs.
- R - Reverse Rotary. This method is similar to the hydraulic rotary method except that the water or drilling mud flows down the annular space between the drilling stem and the walls of the hole and the cuttings are pumped out through the drill stem.
Method of Construction (Cont.)

T - Trenching. Refers to the construction of a sump or open pit from which groundwater may be pumped. Trenching may be done by hand, but more commonly power equipment, such as a bulldozer, power shovel, or backhoe is used. Ponds and Drains belong in this category.

V - Driven. A well constructed by driving a length of pipe, usually of a small diameter and generally equipped with a sand point, to a desired depth. These wells may be driven by hand or with an air hammer or other power equipment. An essential feature of a driven well is that no earth material is removed as the well is constructed.

W - Drive and Wash. These wells are constructed by driving a small diameter open-ended casing a few feet into the earth and then washing the material inside the casing out with a jet of water. The process is repeated until the well is at the desired depth.

Z - Other. Any other drilling method that may be used. The method may be described in the Remark Field.

Well Finish (Wlco_Wlcase_Code_Entry)

This data field is used to describe the method of finish or the nature of the openings that allow water to enter the well. The allowable codes are listed below.

* - Undetermined

C - Porous Concrete. This is a concrete casing that is pervious enough to allow groundwater to seep into the well.

F - Gravel Pack with Perforations. Refers to a well that has a gravel envelope opposite a casing section with perforations which allows water to enter the well.

G - Gravel Pack with Screen. Refers to a well that has a gravel envelope opposite a commercially available casing section with screening material which allows water to enter the well.

H - Horizontal Gallery. This type of finish is a horizontal-type well in which the screen, slotted pipe, or gravel-filled trench is horizontal. All horizontal wells should be in this class, including Ranney collectors and infiltration galleries.

O - Open Ended. Refers to a well that is cased to the bottom of the hole so that water can enter the well only through the bottom of the hole.

P - Perforated or Slotted. Refers to casing that has had holes punched or slots cut into it to allow water to enter. Do not use this classification if the well has a gravel pack; use F or G, whichever is appropriate.

S - Screened. Refers to commercially available well screen manufactured for the purpose of allowing water to enter the well casing. Common types of screen are wire mesh, wrapped trapezoidal wire, or shutter screen. Do not use this classification if the well also has gravel pack; use G instead.

T - Sand Point. Refers to the screen part of a drive point and usually is part of a driven well.

W - Walled or Shored. Refers to a dug well that has walls that have been shored up with open-jointed fieldstone, brick, tile, concrete blocks, wood cribbing or other material. A dug well that is mostly open hole but has even a few feet of cribbing, corrugated pipe, or other shoring to prevent caving should be in this category. Wells of this type with gravel walls belong in this category, not in the F or G.

X - Open Hole. Refers to a well that has a finished open hole in the aquifer. A well belongs in this classification even if the casing does not actually extend to the geologic unit or zone from which the water is obtained.

Z - Other. Any other drilling method that may be used. The method may be described in the Remark Field.
Source of Construction Data (Wlco_Adwrs_Code)

This field contains the source of the construction data and has the same letter codes as those found in the Sites_Adwrs_Code field in the Sites Data Table. See page 17 for the appropriate letter codes.

Name of Driller (Wlco_Driller_Name)

This field contains the name of the driller or drilling company that constructed the well. For company names, use meaningful abbreviations if needed to fit the 46 spaces provided.

Last Action Date (Wlco_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Well Completions data table is changed or modified.

Last Action Operator (Wlco_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to modify or change any field in the Well Completions data table.

Valid Completion Date (Wlco_Valid_Date)

This field contains a flag that indicates if the accuracy of the well completion date. See previous explanation of the Valid Date field.

Bore Hole Completions Data Table (BORE_COMPLETIONS)

The Bore Hole Completions Data Table is used to record specific data describing the drill hole for a well site.

Construction Entry Number (Bore_Wlcomp_Id)

The construction entry is the unique control number assigned by Oracle to well construction data in the Well Completions Data Table. This control number is assigned to the corresponding bore hole construction information.

Bore Hole Interval (Bore_Hole_Interval)

This field contains a sequential number assigned by Oracle to each separate bore hole diameter record for a specific construction entry number. For example, a bore hole that is drilled at 16 inches in diameter from land surface to 500 feet below land surface and then drilled at 12 inches in diameter from 500 feet below land surface to 750 feet below land surface would have two bore hole intervals. The first interval is 0 to 500 feet, the second bore hole interval is 501 to 750 feet. The interval numbers for the bore hole completions, data table is assigned sequentially and generally starts from the construction entry number. For example, for a well with a construction entry number of 451384 the first bore hole interval would be assigned 451385, a second bore hole interval would be assigned 451386.

Top of Bore Hole (Bore_Hole_Top)

This is the depth to the point at which the top of a segment of the hole begins in feet below land surface. The first section of the hole begins at zero (0).

Bottom of Bore Hole (Bore_Hole_Bottom)

This is the depth to the bottom of the hole segment, in feet below land surface.

Diameter of the Bore Hole (Bore_Hole_Diameter)

This is the normal diameter of the bit used to drill this section of the hole, or the diameter to which the hole was reamed, in inches. Two decimal places are provided for fractional sizes.
Groundwater Site Inventory (GWSI) Database

Last Action Date (Wlco_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Bore Completions data table is changed or modified.

Last Action Operator (Wlco_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to modify or change any field in the Bore Completions data table.

Casing Completion Data Table (CASING_COMPLETIONS)

The Casing Completions Data Table describes information about the casing of a well.

Construction Entry Number (Case_Wlcomp_Id)

The construction entry number is the unique control number assigned by Oracle to well construction data in the Well Completions Data Table. This control number is assigned to the corresponding well casing information.

Casing Interval (Case_Interval)

This is a sequential number assigned to each casing diameter for a specific construction entry number. For example, a well that is cased at 16 inches in diameter from land surface to 500 feet below land surface and then cased at 12 inches in diameter from 500 feet below land surface to 750 feet below land surface would have two casing intervals. The first casing interval is 0 to 500 feet, the second casing interval is 500 to 750 feet. The casing interval numbers are assigned sequentially and generally starts from the construction entry number.

Top of Casing (Case_Top)

This is the depth to the point at which the top of a casing segment begins in feet below land surface. The first section of casing begins at zero (0).

Bottom of Casing (Case_Bottom)

This is the depth to the bottom of the casing segment, in feet below land surface.

Diameter of the Casing (Case_Diameter)

This is the outside diameter of the casing segment in inches. Two decimal places are provided for fractional sizes.

Casing Material (Case_Material_Code)

This data table indicates the material from which the casing is made. The codes and their meanings are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>Undetermined</td>
</tr>
<tr>
<td>B</td>
<td>Brick</td>
</tr>
<tr>
<td>C</td>
<td>Concrete</td>
</tr>
<tr>
<td>D</td>
<td>Copper</td>
</tr>
<tr>
<td>G</td>
<td>Galvanized Iron</td>
</tr>
<tr>
<td>I</td>
<td>Wrought Iron</td>
</tr>
<tr>
<td>M</td>
<td>Other Metal</td>
</tr>
<tr>
<td>P</td>
<td>PVC or Plastic</td>
</tr>
<tr>
<td>R</td>
<td>Rock or Stone</td>
</tr>
<tr>
<td>S</td>
<td>Steel</td>
</tr>
<tr>
<td>T</td>
<td>Tile</td>
</tr>
<tr>
<td>U</td>
<td>Coated Steel</td>
</tr>
<tr>
<td>W</td>
<td>Wood</td>
</tr>
<tr>
<td>Z</td>
<td>Other</td>
</tr>
</tbody>
</table>

Last Action Date (Case_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Casing Completions Data Table is changed or modified.
**Groundwater Site Inventory (GWSI) Database**

**Last Action Operator**  (Case_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to change or modify the Casing Completions Data Table.

**Perforation Completion Data Table**  (PERFORATION_COMPLETION)

The Perforation Completion Data Table is used to record information about the openings through which water enters a well.

**Construction Entry Number**  (Perf_Wlcomp_Id)

The construction entry number is the unique control number assigned by Oracle to well construction data in the Well Completions Data Table. This control number is assigned to the corresponding well perforation information.

**Perforation Interval**  (Perf_Interval)

This is a sequential number assigned to each perforation interval for a specific construction entry number. For example, a well that is perforated from 200 feet below land surface to 500 feet below land surface and then perforated from 600 feet below land surface to 750 feet below land surface would have two perforation intervals. The first perforated interval is 200 to 500 feet, the second perforated interval is 600 to 750 feet. The interval numbers are assigned sequentially and generally start from the construction entry number.

**Top of perforation**  (Perf_Top)

This field contains the depth to the point at which the top of a perforated segment begins in feet below land surface.

**Bottom of perforation**  (Perf_Bottom)

This field contains the depth to the bottom of the perforated segment, in feet below land surface.

**Diameter of Perforation Casing**  (Perf_Diameter)

This field records the outside diameter, in inches, of the perforated casing or slotted pipe, the diameter of a screen or the diameter of the hole, if the well is finished as an open hole. Two decimal places are provided for fractional sizes.

**Perforation Material**  (Perf_Material_Code)

This is a code that indicates the type of material from which the screen or other open section is made. The codes and their meanings are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>Undetermined</td>
</tr>
<tr>
<td>B</td>
<td>Brass or Bronze</td>
</tr>
<tr>
<td>C</td>
<td>Concrete</td>
</tr>
<tr>
<td>G</td>
<td>Galvanized Iron</td>
</tr>
<tr>
<td>I</td>
<td>Wrought Iron</td>
</tr>
<tr>
<td>M</td>
<td>Other Metal</td>
</tr>
<tr>
<td>P</td>
<td>PVC or Plastic</td>
</tr>
<tr>
<td>R</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>S</td>
<td>Steel</td>
</tr>
<tr>
<td>T</td>
<td>Tile</td>
</tr>
<tr>
<td>X</td>
<td>Open Hole</td>
</tr>
<tr>
<td>Z</td>
<td>Other</td>
</tr>
<tr>
<td>M</td>
<td>Mesh</td>
</tr>
<tr>
<td>T</td>
<td>Sand Point</td>
</tr>
</tbody>
</table>

**Perforation Type**  (Perf_Type_Code)

This entry indicates the type of open section that allows groundwater to enter the well. The codes and their meanings are:

<table>
<thead>
<tr>
<th>Code</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>Undetermined</td>
</tr>
<tr>
<td>F</td>
<td>Fracture</td>
</tr>
<tr>
<td>L</td>
<td>Louvered or Shuttered</td>
</tr>
<tr>
<td>M</td>
<td>Mesh</td>
</tr>
<tr>
<td>P</td>
<td>Perforated or Slotted</td>
</tr>
<tr>
<td>R</td>
<td>Wire Wound</td>
</tr>
<tr>
<td>S</td>
<td>Screen</td>
</tr>
<tr>
<td>T</td>
<td>Sand Point</td>
</tr>
<tr>
<td>W</td>
<td>Walled</td>
</tr>
<tr>
<td>X</td>
<td>Open Hole</td>
</tr>
<tr>
<td>Z</td>
<td>Other</td>
</tr>
</tbody>
</table>
Length of Perforations (Perf_Length)

This field records the long dimension of the perforations or slots, in inches, or the individual openings in the screen or slotted pipe.

Width of Perforations (Perf_Width)

This field records the short dimension of the perforations or slots, or the mesh size of the screen, in inches.

Last Action Date (Perf_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Perforation Completions Data Table is changed or modified.

Last Action Operator (Perf_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to modify or change any field in the Perforation Completions Data Table.

Flowing Discharge Data Table (FLOWING_DISCHARGES)

The Flowing Discharge Data Table is used to record water discharge data or springs that flow naturally. Occasionally data for both flowing and pumped conditions will be collected for the same site. In the event data are collected at a flowing site during natural flow and also while being pumped (to increase discharge or during a time of no natural flow), the pumped data should be entered in the Well Production Data Table.

Discharge Number (Flwd_Id)

Each flowing discharge entry for a site is assigned a unique identifying number by Oracle. The discharge numbers are assigned sequentially starting from the construction entry number and including any sequential numbers already assigned to records in other data tables with the same sites Id.

Measurement Date (Flwd_Measure_Date)

This field records the date on which the discharge was measured. The associated data field Date Valid indicates the accuracy of the measurement date. See page 18 for an explanation of the Valid Date field.

Discharge Rate (Flwd_Discharge_Rate)

This is the discharge rate of the site in gallons per minute. If discharge is determined in other units (such as cfs or other metric units) convert to gallons per minute. Two decimal places are provided for very small discharges.

Discharge Measurement Method (Flwd_Dscmth_Code_Entry)

This is the method by which the discharge was measured. The methods and their codes are:

- * - Undetermined
- B - Bailer
- C - Current Meter
- E - Estimated
- F - Flume
- M - Totaling Meter
- O - Orifice Plate
- P - Pitometer
- R - Reported
- S - Ultrasonic Transit Time
- T - Trajectory
- V - Volumetric
- Z - Other

1 A current meter may be either a propeller-type meter in a discharge pipe, or an induction-type in a channel (e.g. Marsh-McBirney).
Groundwater Site Inventory (GWSI) Database

**Discharge Data Source** (Flwd_Datasrc_Code_Entry)

This entry indicates who provided the discharge data. The codes are listed below:

- * - Undetermined
- L - Arizona State Land Department
- A - Arizona Department of Water Resources
- M - Bureau of Land Management
- B - U.S. Bureau of Reclamation
- O - Owner
- C - Consultant
- R - Other Reported
- D - Driller
- S - Salt River Project
- E - New Mexico Office of the State Engineer
- T - City of Tucson
- F - Arizona Public Service
- U - U.S. Geological Survey
- G - University of Arizona
- Z - Other
- J - Military

**Last Action Date** (Flwd_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Flowing Discharges data table is changed or modified.

**Last Action Operator** (Flwd_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to modify or change any field in the Flowing Discharges data table.

**Flow Date Valid** (Flwd_Date_Valid)

This field contains a flag that indicates the accuracy of the flowing discharge date.

**Pumping Discharge Data Table** (PUMPING_DISCHARGE)

The Pumping Discharge Data Table is used to record water levels and discharge data needed to estimate well performance for pumped well sites. Occasionally data for both flowing and pumped conditions will be collected for the same site. In the event data are collected at a flowing site during natural flow and also while being pumped (to increase discharge or during a time of no natural flow), the pumped data should be entered in this Data Table.

**Discharge Number** (Pmpd_Id)

Each discharge entry for a site is assigned a unique identifying number by Oracle. The discharge numbers are assigned sequentially starting from the construction entry number and including any sequential numbers already assigned to records in other data tables with the same sites Id.

**Measurement Date** (Pmpd_Measure_Date)

This field records the date on which the discharge was measured. The associated data field Date Valid indicates the accuracy of the pumping discharge measurement date.

**Discharge Rate** (Pmpd_Discharge_Rate)

This field contains the discharge rate of the site in gallons per minute. If discharge is determined in other units (such as cfs or other metric units) convert to gallons per minute. Two decimal places are provided for very small discharges.

**Discharge Measurement Method** (Pmpd_Pmpdmth_Code_Entry)

This field records the method by which the discharge was measured. The methods and their codes are the same as for Flowing Discharge Methods and can be found on pages 25-26.
**Discharge Data Source** (Pmpd_Data_Source)

This field indicates who provided the discharge data. The codes are the same as for Flowing Discharge Source and can be found on Page 22.

**Production Water Level** (Pmpd_Prod_Water_Level)

This field records the water level in feet below land surface, while the well was discharging. The difference between this value and the static water level is the production drawdown.

**Static Water Level** (Pmpd_Static_Water_Level)

This field records the static, or pre-pumping, water level in feet below land surface. If the static water level is above the land surface, the head (if measurable) is preceded by a minus sign (-).

**Static Water Level Method** (Pmpd_Statmth_Code_Entry)

This field records the code that indicates the method by which the static water level was measured. If the static and production water levels were measured by different methods, record the method considered least accurate. The water level measurement codes are listed below.

- * - Undetermined
- A - Airline
- B - Analog
- C - Calibrated Airline
- E - Estimated
- G - Pressure Gauge
- H - Calibrated Pressure Gauge
- L - Geophysical Logs
- M - Manometer
- N - Non-recording Gauge
- R - Reported
- S - Steel Tape
- T - Electric Tape
- V - Electric Sounder
- Z - Other

**Static Water Level Source** (Pmpd_Static_Source)

This field contains the code that indicates the source of the static water level measurement. The code letters are the same as for the source of the Flowing Discharge Data Source, see Discharge Data Source on page 24.

**Pumping Period** (Pmpd_Pumping_Period)

This field contains the length of time, in hours, that the well was pumped prior to the measurement of the production levels. Two decimal points are provided for times less than an hour.

**Well Drawdown** (Pmpd_Well_Drawdown)

This field contains the drawdown, in feet, of the pumping well (static level - pumping level).

**Specific Capacity** (Pmpd_Specific_Capacity)

The specific capacity is calculated by Oracle from the Pumping level and the discharge rate.

**Last Action Date** (Pmpd_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Pumping Discharges data table is changed or modified.

**Last Action Operator** (Pmpd_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to modify or change any field in the Pumping Discharges data table.

**Pumping Date Valid** (Flwd_Date_Valid)

This field contains a flag that indicates the accuracy of the Pumping Discharge date. See the previous explanation of the Valid Date field.
**Groundwater Site Inventory (GWSI) Database**

**Well Lifts Data Table (WELL_LIFTS)**

The Well Lifts Data Table contains information about the pump that is used to bring water to the surface at the site.

**Lift Number (Wlli_Id)**

Each lift entry for a site is assigned a unique identifying number by Oracle that is a sequential variation of the well construction entry number.

**Lift Date (Wlli_Entry_Date)**

This entry is the date on which the well lift was observed. The associated data field Date Valid indicates whether the date has been modified to be accepted by ORACLE.

**Lift Type (Wlli_Type_Code)**

This field contains the code for the type of pump or lift that brings water to the surface.

- * - Undetermined.

- A - Air lift. An air lift is a jet of air pumped below the water table that causes a stream of mixed air and water to flow from the well.

- B - Bucket. This type of lift includes a rope and bucket, chain and bucket lifts, and a small bailer lifted by a rope or chain and pulley.

- C - Centrifugal. Centrifugal pumps have rotating impellers in a closed chamber that draw the water into the pump. The water is then discharged from the pump, under pressure, by centrifugal force. Centrifugal pumps have a maximum lift of about 25 feet.

- J - Jet. Jet pumps have two pipes extending from the pump into the well. One pipe forces air down the well bore under pressure while the other pipe discharges water that has been forced to the surface by the jet.

- N - None. The well has no pump.

- P - Piston. Piston pumps include the familiar lift and pitcher pumps, reciprocating pumps, and deep-wells with “walking-beam jacks pumps.

- R - Rotary. Rotary pumps operate on the principle that direct pressure is created by squeezing water between specially designed runners. A high vacuum is created on the intake side so that a suction lifts the water to the surface. Rotary pumps have a maximum lift of about 25 feet.

- S - Submersible. A submersible pump is a special type of turbine pump that is designed to be submerged in water. An electric motor is connected directly to impellers and then submerged in water.

- T - Turbine. There are several types of turbine pumps that are designed for either deep or shallow wells. In a turbine pump a series of impellers are placed below the surface of the water and rotated by a vertical shaft connected to a power source at the land surface. The impellers pick up the water and force it to the surface through the pump column. Turbine pumps are capable of lifting large amounts of water at high pressure. Most high capacity public supply, industrial, and irrigation wells use turbine pumps.

- U - Unknown. If the pump type is unknown or cannot be identified.


Groundwater Site Inventory (GWSI) Database

Lift Type (cont.)

V - Not Assigned.

Z - Other. Any lifting device that is not listed above.

Lift Power Type (Wlli_Power_Type)

This field contains the code for the type of power used to power the pump.

- * - Undetermined
- G - Gasoline
- N - Natural Gas
- D - Diesel
- H - Hand
- W - Wind
- E - Electric
- L - LP Gas
- Z - Other

Lift Meter Number (Wlli_Meter_Num)

This field can contain the meter number of the gas or electric meter which records the power consumption of the pump. This information in this field can be used as a cross reference to help identify a well.

Power Company (Wlli_Power_Company)

This field contains a three letter code for the name of the company that provides electrical, natural gas, or other power for the pump. For a complete list use the pull/down menu in the ORACLE forms application.

- APS Arizona Public Service
- CAL Calapco
- CIT Citizens Utility
- COM City of Mesa
- DIX Dixieletta (Utah)
- DVE Duncan Valley Electric Co-Op
- ED1 Electrical District 1
- ED2 Electrical District 2
- ED3 Electrical District 3
- ED4 Electrical District 4
- ED5 Electrical District 5
- ED7 Electrical District 7
- ED8 Electrical District 8
- GAR Garkane Power Association
- GCE Graham County Electrice Co-Op
- IID Imperial Irrigation District
- INT Interstate Utility
- MAG Magma Gas Company
- MEC Mohave Electric Co-Op
- NAE Navapache Electric Co-Op
- NAV Navajo Tribal Utility Authority
- NEW Nevada Power Company
- PHS Public Health Service
- PTU Papago Tribal Utility
- RD1 Electrical Dist. RD1 (Roosevelt District
- REA Rural Electrification Administration
- SCP San Carlos Project
- SOU Southern Union Gas
- SRP Salt River Project
- SSV Sulphur Springs Valley Elec. Co-Op
- SWG Southwest Gas
- TEP Tucson Electric and Power
- TGE Tucson Gas and Electric
- TR1 Trico Electric Co-Op
- USB U.S. Bureau of Reclamation
- WD1 Elect. District WD1 (Maricopa Water Dist.)
- WEM Welton Mohawk Irrigation and Power
- WMIDD Welton Mohawk Irrigation and Drainage District

Lift Horsepower (Wlli_Horsepower)

This field contains the power rating, in horsepower, of the wells primary power source. Two decimal places are provided for small motors.

Lift Account Number (Wlli_Account_Num)

This field contains the account number under which the power company stores power consumption rates for the site.

Lift Power Divider (Wlli_Divider)

This field contains the pump rating as the unit of power consumed per volume of water lifted. The value should be expressed as kilowall-hours per acre-foot of electricity or therms per acre-feet of water depending on the type of power used by the pump.
Source of Divider Measurement (Wlli_Source_Code)

This field contains the name of the source of the power divider or the rating of the pump as the volume of water lifted per unit of power consumed.

* - Undetermined
A - Arizona Department of Water Resources
B - U S Bureau of Reclamation
C - Consultant
D - Driller
E - New Mexico Office of State Engineer
F - Arizona Public Service
G - University of Arizona
J - Military
L - Arizona State Land Department
M - Bureau of Land Management
O - Owner
R - Other Reported
S - Salt River Project
T - City of Tucson
U - U. S. Geological Survey
W - WMIDD (Wellton-Mohawk Irrigation and Drainage District)
Z - Other

Method of Power Divider Measurement (Wlli_Method_Code)

This field contains the method of the measurement that determined the power divider, or pump rating.

* - Undetermined
O - Old Data
A - Dedicated power meter, instantaneous discharge with approved equipment/method, with static pressure <10 psi
B - Dedicated power meter, instantaneous discharge with approved device with static pressure <10 psi
D - Non-Dedicated power meter, instantaneous discharge with approved equipment/method, with static pressure <10 psi
E - Non-Dedicated power meter, instantaneous discharge with approved device with static pressure <10 psi
P - Dedicated power meter, instantaneous discharge with approved equipment/method, with static pressure ≥ 10 psi
Q - Dedicated power meter, instantaneous discharge with approved device with static pressure ≥ 10 psi
R - Non-Dedicated power meter, instantaneous discharge with approved equipment/method, with static pressure ≥ 10 psi
S - Non-Dedicated power meter, instantaneous discharge with approved device, with static pressure ≥ 10 psi

Last Action Date (Wlli_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Well Lifts Data table is changed or modified.

Last Action Operator (Wlli_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to modify or change any field in the Well Lifts Data table.

Date Valid (Wlli_Date_Valid)

This field contains a flag that indicates the accuracy of the Well Lifts date. See page 18 for an explanation of the Data Valid Field.

Well Log Data Table (WELL_LOGS)

The Well Log Data Table contains information about the types of geophysical and/or other log data available for the site.
**Log Type** (Wllo_Logty_Code_Entry)

This field contains letter codes for the types of logs that are available for a site.

* - Undetermined  I - Induction  Q - Radioactive
A - Time       J - Gamma Ray   S - Sonic
B - Collar     K - Dipmeter    T - Temperature
C - Caliper    L - Lathering   U - Gamma-Gamma
D - Driller    M - Microlog    V - Fluid Velocity
E - Electric   N - Neutron     X - Core
F - Fluid Conductance O - U Later Z - Other
G - Geologist  P - Photo

**Log Start** (Wllo_Log_Start)

This field contains the depth to the top of the logged interval in feet below land surface.

**Log End** (Wllo_Log_End)

This field contains the depth to the bottom of the logged interval in feet below land surface.

**Source of Log Data** (Wllo_Adwrs_Code)

This field contains information that indicates who provided the log information. The codes are the same as those found in the Sites_Adwrs_Code field in Sites Data Table. See page 16.

**Last Action Date** (Wllo_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Well Logs Data table is changed or modified.

**Last Action Operator** (Wllo_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to modify or change any field in the Well Logs Data Table.

**Well Owners Data Table** (WELL_OWNERS)

The Well Owners Data Table contains the name of the site owner and the date of their known ownership of the site. It should be emphasized that the last entry in this data table may not be the current owner of the site, but is the owner at the time indicated in the Owner Entry Date Field.

**Owner Id** (Wlow_Id)

Each ownership entry for a site is assigned a unique identifying number by Oracle that is a sequential variation of the construction entry number.

**Owner Entry Date** (Wlow_Entry_Date)

This entry is the date that the owner acquired ownership of the site, or the earliest date on which the owner was known to own the site. The associated Date Valid field indicates the accuracy of the Well Owner Entry date.
Owner Last Name  (Wlow_Last_Name)
This field contains twenty-seven (27) spaces for recording the last name of the well owner.

Owner First Name  (Wlow_First_Name)
This field contains twenty-two (22) spaces for recording the first name of the well owner.

Owner Middle Initial  (Wlow_Middle_Initial)
This field contains one (1) space for recording the middle initial of the well owner.

Last Action Date  (Wlow_Last_Act_Date)
This field is filled by ORACLE with the date when any field in the Well Owners Data Table is changed or modified.

Last Action Operator  (Wlow_Last_Act_Oper)
This field is filled by ORACLE with the user id of the last person to modify or change any field in the Well Owners Data Table.

Date Valid  (Wlow_Date_Valid)
This field contains a flag that indicates the accuracy of the Well Owners date. See the previous explanation of the Date Valid Field.

Other Site ID Data Table  (OWNER_SITE_NAMES)
The Owner Site ID Data Table contains identifying numbers or names that have been assigned to a site, usually by the site owner. For example, a city or town may assign a number to each of its wells.

Owner ID  (Owns_Other_Id)
This field contains thirty (30) spaces for recording the name or number used to by the owner to identify the site.

Assigner  (Owns_Assigner)
This field contains thirty (30) spaces for recording the person or organization that assigned the other Id.

Last Action Date  (Owns_Last_Act_Date)
This field is filled by ORACLE with the date when any field in the Owners Site Name Data Table is changed or modified.

Last Action Operator  (Owns_Last_Act_Oper)
This field is filled by ORACLE with the user id of the last person to modify or change any field in the Owner Site Name Data Table.
Remarks Data Table (REMARKS)

The Remarks data table contains remarks from field investigators that may help clarify data entered in other data tables regarding the site.

Remarks Id (Rem_Id)

Each remarks entry for a site is assigned a unique identifying number by Oracle that is a sequential variation of the construction entry number.

Remarks Date (Rem_Remarks_Date)

This entry is the date that the remarks for the site were recorded. The associated Date Valid field indicates the accuracy of the Remarks Date.

Remarks (Rem_Remarks)

This field contains thirty-one (31) spaces to record the remark used to clarify information associated with the site. More than one line can be used to record the site remarks.

Last Action Date (Rem_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Remarks Data Table is changed or modified.

Last Action Operator (Rem_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to change or modify any field in the Remarks Data Table.

Date Valid (Rem_Date_Valid)

This field contains a flag that indicates the accuracy of the Remarks Date. See the previous explanation of the Date Valid Field.

Site Inventories Data Table (SITE_INVENTORIES)

The Site Inventories Data Table contains information on the date of the site visit and the name of the person who made the site visit.

Site Inventory Id (Siti_Id)

Each site inventory visit is assigned a unique identifying number by Oracle that is a sequential variation of the construction entry number.

Site Inventory Date (Siti_Inventory_Date)

This field records the date that the site was visited. The associated Date Valid field indicates the accuracy of the Inventory Date.

Inventoried By (Siti_Inventoried_by)

This field is used to record the name of the person making the site inventory or visit. (The last name is entered first followed by a space and the first and middle initials, do not include periods. Examples are listed below.)

BARNES RL   BLACK K   MASON DA   RASCONA S
Groundwater Site Inventory (GWSI) Database

**Last Action Date** (Siti_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Site Inventories Data Table is changed or modified.

**Last Action Operator** (Siti_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to change or modify any field in the Site Inventories Data Table.

**Date Valid** (Siti_Date_Valid)

This field contains a flag that indicates the accuracy of the Inventory Date. See the previous explanation of the Date Valid Field.

**Spring Names Data Table** (SPRING_NAMES)

The Spring Names Data Table is used to record the name of flowing springs that have been inventoried. Additional data such as, spring type, flow variability, spring name and any site improvements may also be entered into the record.

**Spring Name** (Spna_Spring_Name)

This field contains forty-four (44) spaces to record the name, if any is given, that has been assigned to the spring.

**Permanence** (Spna_Spperm_Code_Entry)

This field is used to describe the dependability of the spring flow, if it is known, at the site.

- * - Undetermined
- P - Perennial
- E - Periodic - Ebb and Flow
- R - Response to Precipitation
- G - Geyser
- S - Seasonal
- I – Intermittent
- Z – Other

**Type of Spring** (Spna_Sptype_Code_Entry)

This field is used to describe the type of spring found at the site.

- * - Undetermined
- F - Fracture
- P - Perched
- A - Artesian
- H - Perched or Tubular
- R - Perched Seepage
- B - Perched or Contact
- J - Artesian and Depression
- S - Seepage of Filtration
- C - Contact
- K - Artesian and Seepage
- T - Tubular - Cave
- D - Depression
- L - Fracture and Depression
- Z - Other
- E - Perched or Depression
- O - Perched and Fracture

**Spring Improvements** (Spna_imprv_Code_Entry)

This field contains the record of any improvements that have been made to the site to improve, impound or redirect the spring flow.

- * - Undetermined
- H - Spring House
- R - Pipe
- B - Boxed Basin
- L - Lined
- T - Trough
- C - Concrete Gallery
- N - None
- Z - Other
- G - Gallery
- P - Pond

**Last Action Date** (Spna_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Spring Name Data Table is changed or modified.
Last Action Operator  (Spna_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to modify or change any field in the Spring Name Data Table.

Water Levels Data Table  (WW_LEVELS)

The Water Levels Data Table contains information related to the depth to water at the site. Data that is contained includes, depth to water, water table elevation, measurement date, method of measurement, measurement remarks and source of the water level measurement.

Water Level Id  (Wlwa_Id)

Each water level entry for a site is assigned a unique identifying number by Oracle that is a sequential variation of the construction entry number.

Date Measured  (Wlwa_Measurement_Date)

This field records the date that the water level was recorded for the site. The associated Date Valid field indicates the accuracy of the Water Level Measurement Date.

Depth to Water  (Wlwa_Depth_To_Water)

This field records the depth to water, in feet, below land surface. Depth to water can be carried out to two decimal places. If the water level is above land surface, enter the water level in feet above land surface preceded by a minus (-) sign. If the head at a flowing site is unknown, if the water level can not be measured, the site is dry, or the well destroyed then this field is left blank and the appropriate code must be placed in the associated Water Level Remarks Code field (Wlwa_Remarks). (By default there can be no 0.00 depth to water.)

Water Level Elevation  (Wlwa_Water_Level_Elevation)

This field contains the elevation of the water table above mean sea level datum. This field is calculated by subtracting the depth to water from the well altitude as entered in the Sites Data table. Except for flowing wells water level elevations are blank for records that have no depth to water measurements.

Method of Water Level Measurement  (Wlwa_Method Code)

This field contains the code for the method used to measure the depth to water.

    * - Undetermined   G - Pressure Gauge   R - Reported
    A - Airline        H - Calibrated Pressure Gauge  S - Steel Tape
    B - Analog         L - Geophysical Logs         T - Electric Tape
    C - Calibrated Airline  M - Manometer      V - Electric Sounder
    E - Estimated      N - Non-recording Gauge    Z - Other

Remarks  (Wlwwa_Remarks)

This field contains letter codes that describe the status of the site at the time of the water level measurement.

    * - Undetermined.
    C - Cascading Water. Water was cascading down the well casing from some point above the water table.
    D - Dry. The site was dry and no water level was recorded.
    E - Recently Flowing. The site had recently been flowing.
    F - Flowing. The site was flowing, but no head could be measured (no water level is recorded).
**Water Level Remarks (cont)**

- **G** - Nearby Flowing. A nearby site was flowing at the time of measurement.
- **H** - Nearby Recently Flowing. A nearby site had recently flowed.
- **I** - Well Injecting. The well was being used to inject water into the aquifer at the time of the measurement attempt. Examples of injection wells are wells used to recharge water into an aquifer.
- **N** - Measurements Discontinued at the site.
- **O** - Obstructed. An obstruction in the well casing prevented a measurement (no water level is recorded).
- **P** - Pumping. The site was being pumped at the time of measurement.
- **R** - Recently Pumped. The site had been pumped recently.
- **S** - Nearby Pumping. A site nearby was being pumped at the time of measurement.
- **T** - Nearby Recently Pumped. A nearby site had recently been pumped.
- **U** - Nearby Injecting. A site nearby was being used to inject water into an aquifer.
- **V** - Foreign Material (Oil). A foreign material, usually oil, was encountered on the surface of the water table.
- **W** - Well Destroyed. The well has been destroyed and no water level is recorded.
- **X** - Surface Water Effects. The water level may be affected by the a nearby surface water site.
- **Z** - Other. Other conditions that may affect the measured water level. (Explain in the Remarks Data Table).

**Water Level Source Code (Wlwa_Source_Code)**

This field contains letter codes for the source of the water level measurement.

- ***** - Undetermined
- **A** - Arizona Department of Water Resources
- **B** - U. S. Bureau of Reclamation
- **C** - Consultant
- **D** - Driller
- **E** - New Mexico Office of State Engineer
- **F** - Arizona Public Service
- **G** - University of Arizona
- **J** - Military
- **L** - Arizona State Land Department
- **M** - Bureau of Land Management
- **O** - Owner
- **R** - Other Reported
- **S** - Salt River Project
- **T** - City of Tucson
- **U** - U. S. Geological Survey
- **W** – WMIDD (Welton Mohawk Irrigation & Drainage District)
- **Z** - Other

**Last Action Date (Wlwa_Last_Act_Date)**

This field is filled by ORACLE with the date when any field in the Water Levels Data Table is changed or modified.

**Last Action Operator (Wlwa_Last_Act_Oper)**

This field is filled by ORACLE with the user id of the last person to modify or change any field in the Water Levels Data Table.

**Date Valid (Wlwa_Date_Valid)**

This field contains a flag that indicates the accuracy of the Water Levels Date. The previous explanation of the Date Valid Field.
**Groundwater Site Inventory (GWSI) Database**

**Water Level Measuring Point Data Table (WM_POINTS)**

The Water Level Measuring Point Data Table contains a description of the point used to measure the depth to water in a well.

**Water Level Point Id (Welm_Id)**

Each water level measuring point entry for a site must have a unique identifying number that is used only once at a site.

**Date Measured (Welm_Date_Measured)**

This field records the date that the water level measuring point was established for the site. The associated Date Valid field indicates the accuracy of the Measuring Point Date.

**Measuring Point Height (Welm_Measure_Point_Height)**

This entry is the height above the land surface from which the depth to water measurement was made. If the measurement point is below land surface, the measurement height is preceded by a minus sign (-).

**Measuring Point Descriptions (Welm_Mp_Description)**

This field contains a description of the point use to measure the depth to water. Listed below and illustrated in Figure 4 are some of the common measuring point descriptions.

- HTCA, W - Hole in Top of Casing, West Side
- HSCA, N - Hole in Side of Casing, North Side
- TCA, SE - Top of Casing, Southeast Side
- HBOP, S - Hole in Pump Base, South Side
- BOP, N - Access under Base of Pump, North Side
- ACTB, S - Measuring (Access) Tube, South Side
- AIRL, S - Airline, South Side
- HISP, NE - Hole in Submersible Plate, Northeast Side

**Last Action Date (Welm_Last_Act_Date)**

This field is filled by ORACLE with the date when any field in the Measuring Point Data Table is changed or modified.

**Last Action Operator (Welm_Last_Act_Oper)**

This field is filled by ORACLE with the user id of the last person to modify or change any field in the Measuring Point Data Table.

**Date Valid (Welm_Date_Valid)**

This field contains a flag that indicates the accuracy of the Measuring Point Date. See the previous explanation of the Date Valid Field.

**Water Quality Reports Data Table (WQ_REPORT)**

The Water Quality Data table contains six (6) basic water quality parameters that are gathered by Department personnel during field investigations. The seven parameters are specific conductance, in microsiemens per centimeter at 25 degrees Celsius; fluoride, in milligrams per liter (mg/L); temperature, in degrees Celsius; pH; alkalinity as CaCO3, in milligrams per Liter; and dissolved oxygen, in milligrams per Liter. Not all parameters may have been tested for at any given site and at any given time. Blank data in the water quality fields indicate that the parameter was not tested for at the time of sampling.

**Water Quality Id (Watq_Id)**

Each water quality measurement entry for a site is assigned a unique identifying number by Oracle that is a sequential variation of the construction entry number.
Groundwater Site Inventory (GWSI) Database

**Date Measured** (Watq_Date_Measured)

This field records the date that the water quality sample was analyzed at the site. The associated Date Valid field indicates the accuracy of the Date Measured.

**Specific Conductance** (Watq_Specific_Conductance)

Specific conductance is a measure of the electrical conductance of a water sample, and as such, is an indicator of the amount of total dissolved solids (TDS) in a sample. The specific conductance value is reported as microsiemens per centimeter at 25 degrees Celsius.

**Fluoride** (Watq_Fluoride)

Fluoride is measured to one decimal point in milligrams per liter (mg/L).

**Temperature** (Watq_Temperatur_Celsius)

Temperature is the water temperature in degrees Celsius (°C) at the time of sampling. The temperature can be entered to one decimal point.

**pH** (Watq_Ph)

The pH is a measure of the hydrogen activity of the sample. The pH can be entered to one decimal point.

**Alkalinity** (Watq_Alkalinity)

Alkalinity is a measure of metallic ions, principally calcium and magnesium, in the water sample and is reported as milligrams per liter (mg/l) of calcium carbonate (CaCO₃).

**Dissolved Oxygen** (Watq_Dissolved_Oxygen)

Dissolved oxygen is the measure of the amount of oxygen dissolved in water and is measured in milligrams per liter.

**Last Action Date** (Welm_Last_Act_Date)

This field is filled by ORACLE with the date when any field in the Water Quality Data Table is changed or modified.

**Last Action Operator** (Welm_Last_Act_Oper)

This field is filled by ORACLE with the user id of the last person to modify or change any field in the Water Quality Data Table.

**Date Valid** (Welm_Date_Valid)

This field contains a flag that indicates the accuracy of the Water Quality Date. See the previous explanation of the Date Valid Field.
Figure 4. Well Casing Measurement Descriptions.
Appendix A : ADWR Groundwater Basin Codes
Listed below are the letter codes used to identify the ADWR Groundwater Basins, Sub-basins and Active Management Areas (AMAs).

<table>
<thead>
<tr>
<th>ADWR Non-Subdivided Groundwater Basins</th>
<th>ADWR Subdivided Groundwater Basins</th>
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</thead>
<tbody>
<tr>
<td><strong>Basin Name</strong></td>
<td><strong>Basin Code</strong></td>
</tr>
<tr>
<td>Agua Fria</td>
<td>AGF</td>
</tr>
<tr>
<td>Aravaipa Canyon</td>
<td>ARA</td>
</tr>
<tr>
<td>Bonita Creek</td>
<td>BON</td>
</tr>
<tr>
<td>Butler Valley</td>
<td>BUT</td>
</tr>
<tr>
<td>Cienega Creek</td>
<td>CCK</td>
</tr>
<tr>
<td>Coconino Plateau</td>
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</tr>
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<td>Douglas</td>
<td>DOU</td>
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<tr>
<td>Dripping Springs Wash</td>
<td>DSW</td>
</tr>
<tr>
<td>Duncan Valley</td>
<td>DUN</td>
</tr>
<tr>
<td>New Mexico section of Duncan Valley Basin</td>
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</tr>
<tr>
<td>Gila Bend</td>
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</tr>
<tr>
<td>Grand Wash</td>
<td>GWA</td>
</tr>
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<td>Hualapai Valley</td>
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<td>Kanab Plateau</td>
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<td>San Simon Wash</td>
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<td>Shivwits Plateau</td>
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<td>Tonto Creek</td>
<td>TON</td>
</tr>
<tr>
<td>Upper Hassayampa</td>
<td>UHA</td>
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<tr>
<td>Virgin River</td>
<td>VRG</td>
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<tr>
<td>Western Mexican Drainage</td>
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<td>Wilcox</td>
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<td><strong>Basin</strong></td>
<td><strong>Subbasin</strong></td>
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<td>Bill Williams</td>
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<td>Lower Gila</td>
<td>LGB</td>
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<tr>
<td>Lower San Pedro</td>
<td>LSP</td>
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<tr>
<td>Parker</td>
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<tr>
<td>Safford</td>
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<td>Salt River</td>
<td>SRB</td>
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<td>Upper San Pedro</td>
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<td>Verde River</td>
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<td>Burro Creek</td>
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<td>Clara Peak</td>
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<td>Santa Maria</td>
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<td>Childs Valley</td>
<td>DEN</td>
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<td>Dendora Valley</td>
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<td>Lower San Pedro</td>
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<td>Safford</td>
<td>Gila Valley</td>
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<td>Black River</td>
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<td>Salt River</td>
<td>Salt River Lakes</td>
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<td>Allen Flat</td>
<td>SEV</td>
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<td>Sierra Vista</td>
<td>Verde River</td>
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<td>Big Chino</td>
<td>BIC</td>
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<td>Verde Canyon</td>
<td>LVR</td>
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<td>Verde Valley</td>
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Figure 5. ADWR Groundwater Basins and Subbasins Map.
### ADWR Active Management Areas (AMA)

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<td>ESR</td>
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<td>Hassayampa</td>
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<td>Tucson AMA</td>
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<tr>
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### ADWR Irrigated Non-Expansion Areas (INA)

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<td>Harquahala INA</td>
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<td>Joseph City INA</td>
<td>JCI</td>
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</table>
Figure 6  ADWR Active Management Areas and sub-basins Map.
Appendix B: U.S. Geological Survey Groundwater Area Codes
Listed below are the letter codes used to identify the U.S. Geological Groundwater Areas

<table>
<thead>
<tr>
<th>Basin Name</th>
<th>Basin Code</th>
<th>Basin Name</th>
<th>Basin Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agua Fria Basin</td>
<td>AGF</td>
<td>San Francisco Peaks</td>
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<td>ALT</td>
<td>San Francisco River Basin</td>
<td>SFR</td>
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<td>Aravaipa Valley</td>
<td>ARA</td>
<td>San Simon Basin</td>
<td>SSI</td>
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<td>Avra Valley</td>
<td>AVR</td>
<td>San Simon Wash</td>
<td>SSW</td>
</tr>
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<td>Big Chino Valley</td>
<td>BIC</td>
<td>Shivwits</td>
<td>SHV</td>
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<td>Upper Santa Cruz Basin</td>
<td>USC</td>
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<tr>
<td>Canyon Diablo</td>
<td>CDI</td>
<td>Upper Verde River</td>
<td>VER</td>
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<td>Virgin River</td>
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<td>White Mountains</td>
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<td>CON</td>
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<td>Gila River, Painted Rock</td>
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<td>Dam to Texas Hill</td>
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<td>Gila River, San Carlos</td>
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<td>Reservoir to Kelvin</td>
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<td>GRA</td>
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<td>Kanab</td>
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<td>Lower San Pedro</td>
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<td>Lower Verde River</td>
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<td>Safford Basin</td>
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<td>Saint Johns</td>
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<td>San Bernardino Valley</td>
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</table>
Figure 7. U. S. Geological Survey Groundwater Areas
Appendix C: Geological Unit Codes
Cenozoic

Quaternary

Holocene

Alluvium (Flood-Plain and Stream Channel)  111ALVM

Pleistocene

Basaltic Flows  112BLCF
Basin Fill - Upper, Lower, Undifferentiated  112BSFL
Basin Fill - Upper  112BSFLU
Sand and Gravel - Upper  112SDGVU
Terrace (and Surficial) Deposits  112TRRC

Tertiary

Consolidated Sedimentary Rocks,  
Tertiary and Mesozoic Undifferentiated  120CDSM
Datil Formation  120DATIL
Felsic Volcanic Rocks  120FCVC
Intrusive Rocks  120IRSV
Mafic Volcanic Rocks  120MFCV
Mafic and Felsic Volcanic Rocks  120MFFV
Sedimentary Rocks  120SDMR
Volcanic Rocks  120VLCC

Pliocene

Bidahochi Formation  121BDHC
Bidahochi Formation - Lower  121BDHCL
Bidahochi Formation - Middle  121BDHCM
Bidahochi Formation - Upper  121BDHCU
Basaltic Flows  121BLCF
Basin Fill - Lower  121BSFLL
Chuska Sandstone  121CHSK
Lower Basin Fill and Miocene Sedimentary Rocks - Undifferentiated  121LBFM

Miocene

Basalt-Andesite Flows  122BLAD
Sedimentary Rocks  122SDMR
Volcanic Breccias, Agglomerates, and Tuffs  122VBAT
Muddy Creek Formation  121MDCK
Verde Formation  121VERD
Tertiary

Oligocene

Felsic Flows or Welded Tuffs
Sedimentary Rocks
Mafic Flows
Volcanic Breccias, Agglomerates, or Tuffs
Volcanic Rocks

Eocene

Felsic Volcanic Rocks
Mafic Volcanic Rocks
Sedimentary Rocks

Paleocene

Nacimiento Formation
Ojo Alamo Formation

Mesozoic

Felsic Intrusive Rocks
Felsic Volcanic Rocks
Mafic Volcanic Rocks
Mafic Intrusive Rocks
Sedimentary Rocks
Volcanic Rocks

Cretaceous

Upper Cretaceous

Allison Member of Menefee Formation of the Mesaverde Group
Bartlett Barren Member of Crevasse Canyon Formation of the Mesaverde Group
Cliff House Sandstone of the Mesaverde Group
Cleary Coal Member of Menefee Formation of the Mesaverde Group
Crevasse Canyon Formation of the Mesaverde Group
Dilco Coal Member of Crevasse Canyon Formation of the Mesaverde Group
Dalton Sandstone Member of Crevasse Canyon Formation of the Mesaverde Group
Dakota Sandstone
Fruitland Formation
Farmington Sandstone Member of Kirkland Shale
Gallup Sandstone
Mesozoic

Cretaceous

Upper Cretaceous (cont.)

- Hosta Tounge of Point Lookout Sandstone of the Mesaverde Group (211HOST)
- Juana Lopez Member of Mancos Shale (211JLPZ)
- Kirkland Shale - Upper (211KRLDU)
- Lewis Shale (211LWIS)
- Menefee Formation (211MENF)
- Mulatto Tongue of Mancos Shale (211MLTT)
- Mancos Sahle (211MNCS)
- Pictured Cliffs Sandstone (211PCCF)
- Point Lookout Sandstone (211PNLK)
- Pescado Tongue of Mancos Shale (211PSCD)
- Santan Tongue of Mancos Shale (211SATN)
- Sedimentary Rocks - Undifferentiated (211SDMR)
- Toreva Formation (211TORV)
- Wepo Formation (211WEPO)
- Yale Point Sandstone (211YLPN)

Lower Cretaceous

- Burro Canyon Formation (217BRCN)

Jurassic

- Navajo Sandstone (220NVJO)

Upper Jurassic

- Bluff Sandstone (221BLFF)
- Brushy Basin Shale Member of Morrison Formation (221BRSB)
- Carmel Formation (221CRML)
- Cow Springs Sandstone (221CSPG)
- Entrada Sandstone (221ENRD)
- Entrada Sandstone - Lower (221ENSDL)
- Entrada Sandstone - Middle (221ENSDM)
- Entrada Sandstone - Upper (221ENSDU)
- Morrison Formation (221MRSN)
- Recapture Shale Member of the Morrison Formation (221RCPR)
- Salt Wash Sandstone Member of the Morrison Formation (221SLWS)
- Summerville Formation (221SMVL)
- Todilto Limestone (221TDLT)
- Westwater Canyon Sandstone Member of the Morrison Formation (221WSRC)

Mesozoic

Triassic

- Hoskinnini Member of the Moenkopi Formation (230HSKN)
- Moenkopi Formation (230MNKP)
Triassic

Upper Triassic

Church Rock Member of Chinle Formation 231CCRK
Chinle Formation 231CHNL
Correo Sandstone Bed of Petrified Forest Member of Chinle Formation 231CORR
Dinosaur Canyon Sandstone Member of Moenave Formation 231DSRC
Kayenta Formation 231KYNT
Lukachukai Member of Wingate Sandstone 231LKCK
Monitor Butte Member of Chinle Formation 231MNRB
Moenave Formation 231MOONV
Mesa Redondo Member of Chinle Formation 231MRDD
Owl Rock Member of Chinle Formation 231ORCK
Petrified Forest Member - Lower - of Chinle Formation 231PFDD
Petrified Forest Member - Upper - of Chinle Formation 231PFDFU
Rock Point Member of Wingate Sandstone 231RCKP
Sonsela Sandstone Bed of Petrified Forest Member of Chinle Formation 231SNSL
Springdale Sandstone Member of Moenave Formation 231SPGD
Shinarump Member of Chinle Formation 231SRMP
Wingate Sandstone 231WNGT

Middle Triassic

Holbrook Sandstone Member of Moenkopi Formation 224HLBK

Lower Triassic

Moqui Member of Moenkopi Formation 237MOQU
Wapatki Member of Moenkopi Formation 237WPTK

Paleozoic

Limestone 300LMSN
Quartzite 300QRTZ
Sandstone 300SNDS

Permian

Abo Formation 310ABO
Coconino Formation 310CCNN
Cedar Mesa Sandstone Member of Cutler Formation 310CDRM
Cutler Formation 310CTLR
De Chelly Sandstone 310DCLL
Glorieta Sandstone 310GLRT
Halgaito Tongue of Cutler Formation 310HLGT
Hermit Shale 310HRMT
Kaibab Limestone 310KIBB
Meseta Blanca Sandstone Member of Yeso Formation 310MBLC
Naco Formation 310NACO
Paleozoic

Permian

Organ Rock Tongue of Culter Formation 310OGRK
Rico Formation 310RICO
Supai Formation 310SUPI
Supai Formation - Lower 310SUPIL
Supai Formation - Middle 310SUPIM
Supai Formation - Upper 310SUPIU
San Ysidro Member of Yeso Formation 310SYDR
Toroweap Formation 310TRWP
Yeso Formation 310YESO

Guadalupian

San Andres Limestone 313SADR

Pennsylvanian

Hermosa Formation 320HRMS
Molas Formation 320MOLS

Mississippian

Redwall Limestone 330RDLL

Devonian

Upper Devonian

Martin Limestone 341MRTN

Cambrian

Middle Cambrian

Bright Angle Shale 374BGAG
Muav Limestone 374MUAV
Tapeats Sandstone 374TPTS

Precambrian

Granitic Gneiss 400GRCG
Granite 400GRNT
Schist 400SCST
Sedimentary Rocks 400SDMR
Appendix D: Non-Arizona Well Identification Systems
Well Numbering System

The local well identification (Local_Id) system for GWSI sites located in California, Colorado, Nevada, New Mexico, and Utah is based on the system of land subdivision used by the Bureau of Land Management. This system uses a surveyed base line and principal meridian from which townships and ranges are located. Townships are located north or south of the base line and ranges are located east or west of the principal meridian. Sections are designated 1 through 36 and are numbered in rows following a serpentine pattern beginning in the northeast corner of a township and ending in the southeast corner of the township. The method of locating sites within a section varies with each state and is described in detail below.

California Well Numbering System

The California well numbering system is based in the San Bernardino Baseline and Meridian. A GWSI site located in California in the NW 1/4 of the NE 1/4 of the NE 1/4 of Section 35, Township 15 South, Range 23 East, would be identified as 15S/23E-35 Jb. The number preceding the slash (/) is the township and the letter after the township (N or S) indicates its position north or south of the San Bernardino Baseline. The number after the slash is the range and the letter following the range (E or W) indicates its position east or west of the San Bernardino Meridian. The number following hyphen (-) is the section and the two letters following the section number identify the 40-acre and 10-acre subdivisions. The 40-acre subdivisions are identified using the same serpentine pattern used to identify section numbers in a township (Figure 1). Each 40-acre subdivision is assigned a capital letter A through R, omitting I and O. The 10-acre tracts are assigned the lowercase letters a, b, c, or d in a counter-clockwise direction in the same manner as the 10-acre subdivisions in the Arizona. In some cases a second lowercase letter is added if the 21/2 acre location is known.

Colorado Well Numbering System

The southwestern corner of Colorado, the part closest to Arizona, is part of the New Mexico Baseline and Meridian. The New Mexico Well Numbering System is used and described below.

New Mexico Well Numbering System

The New Mexico well numbering system is based on the New Mexico Principal Baseline and Meridian. The local identifications (Local_Id) based on this well numbering system consists of four parts, each separated by spaces (Figure 2). The first three parts are the township number, the range number, and the section number, respectively. The township number is followed by the letters N or S to indicate if the township lies north or south of the New Mexico Base Line. The range number is followed by the letters E or W to indicate if the range lies east or west of the New Mexico Principal Meridian. The letters T and R, for Township and Range, are omitted from the GWSI local identification. Hence, a site located in Township 29 South, Range 22 West, Section 25 would be identified as 29S 22W 25.

The fourth part of the well identification consists of three numbers that identify the 10-acre tract within the section in which the site is located. The method of numbering the tracts within the section is different that used in Arizona and is shown in Figure 2. The section is divided into four 160-acre quarters, numbered 1, 2, 3, and 4, using a normal reading order from left to right, for the northwest, northeast, southwest and southeast quarters, respectively. Each 160-acre quarter section is subdivided in the same manner to produce the second number, which defines a 40-acre quarter-quarter section. The 40-acre tract is divided in the same manner to produce the third number, which identifies the 10-acre quarter-quarter-quarter section tract. Thus a site in the NE 1/4 of the SE 1/4 of the NE 1/4 of Section 25, Township 29 South, Range 22 West, would be identified as 29S 22W 25 242. If multiple sites are located within a 10-acre tract, consecutive letters starting with the letter a are added as a suffix, with a being the oldest known site.
Groundwater Site Inventory (GWSI) Database

Figure 7. California Well Identification System

Figure 8. New Mexico Well Identification System

Figure 8. New Mexico Well Location System
Nevada Well Numbering System

GWSI local identifications in Nevada are determined using the Mount Diablo Base Line and Principal Meridian. The subdivision of sections is the same as in Arizona, except that Nevada sections are divided four times to specify the site location to within a 2½ acre tract. A numerical suffix to denote multiple wells within a section is used just as in Arizona. Letters denoting the township or range location relative to the base line and meridian, N or S for the township, E or W for the range, precede the township and range numbers. A prefix of three numbers, 222, is added to identify GWSI wells in Nevada. For example, a site located in the SW 1/4 of the NW 1/4 of the SE 1/4 of the SE 1/4 of Section 28, Township 13 South, Range 71 East, would be identified as 222 S13 E71 28DDBC.

Utah Well Numbering System

In Utah GWSI site locations are based on the Salt Lake Base Line and Meridian. The method of land subdivision is the same as is used in Arizona. The base line and meridian are used to divide the state into four quadrants, A, B, C, and D, starting in the upper right corner (northeast) and moving counter-clockwise to the southeast quadrant. Sections are divided down to quarter-quarter-quarter sections in the same manner as in Arizona. For example, a site located in the NW 1/4 of the NW 1/4 of the NW 1/4 of Section 25, Township 43 South, Range 19 West, would be identified as C-43-19 25BBB.

The well-numbering system used in Utah is based on the Bureau of Land Management’s system of land subdivision. The well – numbering system is familiar to most water users in Utah, and the well number shows the location of the well by quadrant, township, range, section, and position within the section. Well number for most of the State are derived from the Salt Lake Base Line and the Salt Lake Meridian. Well numbers for wells located inside the area of the Utah Base Line and Meridian are designated in the same manner as those based on the Salt Lake Base Line and Meridian, with the addition of the “U” preceding the parentheses. The numbering system is illustrated below in Figure 9.
Figure 9. Utah Well Location System