JURISDICTIONAL WATERS DETERMINATION FOR THE RESOLUTION WEST PLANT AND EAST PLANT ANALYSIS AREAS, PINAL COUNTY, ARIZONA

Prepared for: U.S. Army Corps of Engineers

Prepared by: WestLand Resources, Inc., on behalf of Resolution Copper Mining, L.L.C.

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EXECUTIVE SUMMARY

WestLand Resources, Inc. (WestLand), was retained by Resolution Copper Mining, L.L.C. (RCM; the Applicant) to evaluate two areas, the West Plant and East Plant Analysis Areas (together, the Analysis Areas), totaling approximately 3670 acres, for the presence of potential waters of the U.S. (Waters). This formal Jurisdictional Determination (JD) request is being submitted by WestLand on behalf of the Applicant.

The areas considered under this analysis were developed to support RCM's ongoing Resolution Copper Project, and are located in the general proximity of the Town of Superior, Pinal County, Arizona. Hydrologically, the Analysis Areas occur within separate portions of the Queen Creek watershed. The nearest designated downstream traditionally navigable water (TNW) to both Analysis Areas is the 6.9-mile reach of the Gila River between Powers Butte and Gillespie Dam. The considerations in this analysis, including the downstream flow path, share a number of similarities with those for the Lost Dutchman Heights/Portalis Project (Corps File No. SPL-2008-00674-SDM). As such, that previous analysis would be anticipated to inform this one.

All of the drainages considered in this analysis are ephemeral drainages, flowing only briefly in direct response to storm events. In addition, several potentially jurisdictional wetlands were identified within the Analysis Areas. As such, per the December 2008 Corps/EPA guidance entitled *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States and Carabell v. United States* (Guidance), the onsite ephemeral drainages and associated wetlands were evaluated to determine whether or not they constitute non-navigable, non-RPW tributaries possessing a significant nexus with a TNW.

A summary of the findings of the significant nexus analyses completed for each area is provided below.

Hydrologic factors:

West Plant Analysis Area:

- Downstream flow path through ephemeral drainages into effluent-dependent reach of Queen Creek, through ephemeral reaches and one small intermittent reach of Queen Creek, through the ephemeral East Maricopa Floodway (EMF), through an ephemeral reach of the Gila River, and finally into the effluent-dependent reach of the Gila River and the TNW.
- Analysis Area drainages are approximately 125 miles from downstream TNW reach of the Gila River.
- The watershed of the largest drainage within the Analysis Area (WP1A) represents approximately 0.0012 percent, or approximately one thousandth of a percent, of the watershed of the nearest TNW.

- Mean annual precipitation is approximately 18 inches.
- Q_2 discharges for Drainage WP1 range from 29 to 89 cfs; Q_{100} peak discharges from 864 to 881 cfs.
- Flow path to TNW includes a number of man-made impoundments, including Whitlow Ranch Dam, Sonoqui Dike, the CAP canal, and in-stream sand and gravel mining operations.
- Coincident flow analysis shows potential connectivity between the Analysis Area and the TNW only once during the 10-year analysis interval (2000 to 2010), and, in general, significant transmission losses along the largely ephemeral flow path. Potential concurrent flow between the Whitlow Ranch Dam and the EMF occurred during only 2% of the 10-year analysis period.
- A routing analysis that included flows from the most significant drainages at both the West and East Plant Analysis Areas (WP1 and EP1) showed surface flows percolating into the ground approximately 14 miles downstream of the Analysis Areas, within the current flood pool of Whitlow Ranch Dam. Surface flows in the 100-year runoff event stopped 23.7 miles downstream of the Analysis Areas, approximately half-way between the U.S. Hwy 60 crossing of Queen Creek near Florence Junction and the CAP canal. It should be noted that this routing analysis ignored the presence of the intervening man-made impoundments, including the Whitlow Ranch Dam.
- The significant nexus analysis indicates that it is highly unlikely that potential flows in the West Plant Analysis Area will reach the TNW stretch of the Gila River in anything less than a series of the most significant storm events (i.e., greater than the 100-year storm). As such, the potential hydrologic connectivity between the ephemeral drainages within the West Plant Analysis Area and the downstream TNW is minimal.

East Plant Analysis Area:

- Downstream flow path through ephemeral drainages into intermittent reach of Queen Creek, through effluent-dependent, ephemeral and one small intermittent reach of Queen Creek, through the ephemeral East Maricopa Floodway (EMF), through an ephemeral reach of the Gila River, and finally into the effluent-dependent reach of the Gila River and the TNW.
- Analysis Area drainages are approximately 128 miles from downstream TNW reach of the Gila River.
- The watershed of the largest drainage within the Analysis Area (EP1) represents approximately 0.0051 percent, or approximately five thousandths of a percent, of the watershed of the nearest TNW.
- Mean annual precipitation is approximately 18 inches.

- Q_2 discharges for Drainage EP1 range from 74 to 210 cfs; Q_{100} peak discharges from 2,260 to 2,540 cfs.
- Flow path to TNW, coincident flow analysis, and routing analysis identical to that for West Plant Analysis Area.
- The significant nexus analysis indicates that it is highly unlikely that potential flows in the East Plant Analysis Area will reach the TNW stretch of the Gila River in anything less than a series of the most significant storm events (i.e., greater than the 100-year storm). As such, the potential hydrologic connectivity between the ephemeral drainages within the West Plant Analysis Area and the downstream TNW is minimal.

Physical/Chemical Factors: The Analysis Area drainages do not have more than a speculative or insubstantial effect on the physical or chemical integrity of the nearest downstream TNW. The reach of Queen Creek near the Analysis Areas is listed by ADEQ as impaired for copper. However, given historic and ongoing reclamation activities, as well as existing stormwater controls associated with the Resolution Copper Project, there is little risk of pollutants currently discharging through the Analysis Area drainages. The TNW, by comparison, is designated as impaired due to historic and ongoing runoff from agricultural activities; pollutants contributing to the impaired designation include boron, selenium, DDT metabolites, toxaphene, and chlordane found in fish tissue. There are no agricultural activities within or adjacent to the Analysis Areas, so even if there were regular hydrologic connectivity between the ephemeral drainages of the Analysis Areas and the TNW, these would not be expected to contribute the pollutants causing current impairment in the TNW. In addition, water quality sampling of the effluent-dependent reach of the Gila River above the designated TNW did not show any exceedances for copper. Potential sediment transport from either Analysis Area is precluded or at least significantly impeded by the presence of numerous impoundments along the downstream flow path, particularly Whitlow Ranch Dam and the Sonoqui Dike.

Ecological/Biological Factors: The Analysis Area drainages do not have more than a speculative or insubstantial effect on the ecological or biological integrity of the nearest downstream TNW. The drainages within the Analysis Areas are all ephemeral washes, and the few associated wetlands are generally ephemeral as well and of relatively poor habitat quality. Therefore, these surface water features do not generally provide habitat or life cycle support functions, or support only limited functions, for aquatic species. Nor do they provide significant nutrient cycling and energy functions to downstream habitats. In addition, although four federally listed or candidate species (Arizona hedgehog cactus, lesser long-nosed bat, ocelot, and Sonoran desert tortoise) have some potential to occur within the Analysis Areas, these are all exclusively upland species, utilizing upland habitats, and therefore represent no association between the Analysis Area drainages and the nearest downstream TNW. The significant distance between the Analysis Areas and the TNW also serves to preclude a significant biological nexus between the two areas.

INTRODUCTION

WestLand Resources, Inc. (WestLand), was retained by Resolution Copper Mining, L.L.C. (RCM; the Applicant) to evaluate two areas, the West Plant and East Plant Analysis Areas (together, the Analysis Areas), totaling approximately 3670 acres, for the presence of potential waters of the U.S. (Waters). This formal Jurisdictional Determination (JD) request is being submitted by WestLand on behalf of the Applicant. Agent Designation and Authorization for Federal Access documentation is included as Attachment 1. Directions to the Analysis Areas are provided as Attachment 2.

This evaluation was conducted in general accordance with the June 5, 2007 *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* (the Guidebook) and its attachments (revised December 2008). The format of this memorandum has been developed to facilitate the completion of the *Approved Jurisdictional Determination Form* (the Form; Appendix B of the Guidebook). We have prepared one Form for each stream classification or grouping present on site (as determined by WestLand based on a variety of parameters such as watershed size, stream order, etc.), per verbal guidance from the U.S. Army Corps of Engineers (Corps) and experience with the Corps in evaluating past jurisdictional determinations. This technical memorandum provides supporting documentation for all completed Forms. An electronic copy of the Forms is included for Corps use.

SECTION I: PROJECT LOCATION AND BACKGROUND INFORMATION

The areas considered under this analysis were developed to support RCM's Resolution Copper Project, and are located in the general proximity of the Town of Superior, Pinal County, Arizona. The West Plant Analysis Area is located entirely on lands owned by RCM, immediately north of and adjacent to Superior in portions of Sections 25-27 and 34-36, Township 1 South, Range 12 East and portions of Sections 3 and 4, Township 2 South, Range 12 East (Figure 1). The East Plant Analysis Area is comprised of RCM-owned lands and portions of the Tonto National Forest (TNF), and is located approximately 1 aerial mile east of Superior in: portions of Section 36, Township 1 South, Range 12 East; portions of Sections 28, 29, and 31-33, Township 1 South, Range 13 East; portions of Section 1, Township 2 South, Range 12 East; and portions of Section 6, Township 2 South, Range 13 East (see Figure 1). Hydrologically, the Analysis Areas occur within separate portions of the Queen Creek watershed. The nearest designated downstream traditionally navigable water (TNW) to both Analysis Areas is the 6.9-mile reach of the Gila River between Powers Butte and Gillespie Dam. Figure 2 provides an aerial overview of the intervening landscape between the Analysis Areas and the TNW reach of the Gila River.

It should be noted that the potential flow path from the Analysis Areas to the designated TNW reach of the Gila River at Powers Butte shares many segments and characteristics with a previously completed JD request and finding of "no significant nexus", that for the Lost Dutchman Heights/Portalis Project (Corps File No. SPL-2008-00674-SDM; hereafter Lost Dutchman). The most significant drainage feature in the Lost Dutchman significant nexus analysis (SNA) is Siphon Draw, with a watershed of over 45 square miles. By comparison, the ephemeral drainages in the Analysis Areas represent much smaller drainages with significantly smaller watersheds (maximum of 2.5 sq miles), at a much greater distance from the downstream TNW reach of the Gila (91 river miles for Lost Dutchman and approximately 125 river miles for the Resolution Analysis Areas). Like the flows at Lost Dutchman, stormwater flows in Queen Creek impound at the CAP Canal before being intercepted by the East Maricopa Floodway, and then discharging to an ephemeral reach of the Gila River at the floodway outfall. Unlike flows at the Lost Dutchman property, potential flows from the ephemeral drainages in the Analysis Areas face another significant impoundment, the Whitlow Ranch Dam on Queen Creek, before ever reaching the impoundment at the CAP Canal. Information on the Whitlow Ranch Dam, published by the Corps, acknowledges that outflow from the dam "usually percolates into the alluvial plain below the dam and rarely travels more than a few miles downstream" (Corps 2011).

Given the above, it would appear that the SNA completed for the Lost Dutchman property would greatly inform this SNA for the Resolution Analysis Areas.

SECTION II: SUMMARY OF FINDINGS

All of the drainages considered in this analysis are ephemeral drainages at the upper extent of their respective watersheds, and flow only briefly in direct response to storm events. These features do not qualify as either TNW (they have not been used, and are not susceptible for use, in waterborne interstate commerce) or relatively permanent waters (RPW) (they do not flow continuously on a year-round or seasonal basis). The reach of Queen Creek immediately downstream of both Analysis Areas has been identified as an intermittent stream by the U.S. Geological Survey (USGS) and the Arizona Department of Water Resources (ADWR). However, Queen Creek itself is not included in either Analysis Area. In addition to the ephemeral drainages, potentially jurisdictional wetlands were also identified within the Analysis Areas.

Per the December 2008 Corps/EPA guidance entitled *Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States and Carabell v. United States* (Guidance), the onsite surface water features were evaluated to determine whether or not they constitute non-navigable, non-RPW tributaries which, in combination with their adjacent wetlands, possess a significant nexus with a TNW.

Mapped surface water features are shown in Attachments 3a and 3b. A summary of the surface water features considered in this analysis is provided in Table 1, below.

Table 1. Surface Water Features Evaluated (see Attachments 3a and 3b)

Drainage ID	Tributary to Potential TNW	Description	Determination
WP1A	Indirectly (~125 river miles from TNW)	Includes Drainage WP1A and tributary Drainages WP1A1 through WP1A4a. Within West Plant Analysis Area. Discharge through Apex Tunnel to Silver King Wash then to Queen Creek.	Non-jurisdictional; no significant nexus with downstream TNW (**see Section III.B**)
WP2	Indirectly (~125 river miles from TNW)	Includes Drainage WP2 and tributary Drainage WP2A. Within West Plant Analysis Area. Discharge generally southwest toward Queen Creek.	Non-jurisdictional; no significant nexus with downstream TNW (**see Section III.B**)
WP3	Indirectly (~125 river miles from TNW)	Includes Drainage WP3 and tributary Drainage WP3A. Within West Plant Analysis Area. Discharge generally southwest toward Queen Creek.	Non-jurisdictional; no significant nexus with downstream TNW (**see Section III.B**)
WP4	Indirectly (~125 river miles from TNW)	Includes Drainage WP4 and tributary Drainage WP4A. Within West Plant Analysis Area. Discharge generally southwest toward Queen Creek.	Non-jurisdictional; no significant nexus with downstream TNW (**see Section III.B**)
EP1	Indirectly (~128 river miles from TNW)	Includes Drainage EP1 and tributary Drainages EP1A through EP1D3c. Within East Plant Analysis Area. Discharge generally north toward Queen Creek.	Non-jurisdictional; no significant nexus with downstream TNW (**see Section III.B**)
EP2	Indirectly (~128 river miles from TNW)	Includes Drainage EP2 and tributary Drainages EP2A and EP2B. Within East Plant Analysis Area. Discharge generally north toward Queen Creek.	Non-jurisdictional; no significant nexus with downstream TNW (**see Section III.B**)

In both this evaluation and in the attached JD Forms, streams have been grouped based on hydrologic characteristics and nature of flows.

Completed JD Forms are provided as Attachment 4. Attachments 5a and 5b provide representative ground photographs for the evaluated drainages; photo locations are shown in the JD maps provided in Attachments 3a and 3b.

SECTION III: CLEAN WATER ACT ANALYSIS

A. TNWs and Wetlands Adjacent to TNWs.

There are no TNWs or wetlands adjacent to TNWs in the Project Areas. As described above, the nearest confirmed TNW is a stretch of the Gila River, located over 120 river miles from the Analysis Areas.

B. Characteristics of Tributary and its Adjacent Wetlands

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

Prior to conducting a field visit, WestLand interpreted regional and site-specific available aerial photography (Cooper Aerial 2010) and the USGS topographical map for the Analysis Areas (Superior 7.5-minute Quadrangle).

WestLand personnel visited the Analysis Areas between June 27 and July 1, 2011 to assess site conditions and to document the physical characteristics of potentially jurisdictional features[1]. WestLand collected data for drainage features at field-determined intervals. Channel characteristics were measured at selected points where appropriate and photographs were taken at each data point, generally alternating between upstream and downstream views. WestLand personnel revisited the Analysis Area on July 7 and 8, and July 19 and 20, 2011, to document the physical characteristics of any identified potential wetland areas. Based upon the data collected during the field reconnaissance and review of aerial photographs and site topography, the selected data points and photo locations were digitally transferred onto a recent aerial photograph using ArcMap. Wetland sample points and boundaries were digitized in a similar manner.

Analysis of the physical characteristics of the evaluated drainages was informed by the August 2008 delineation manual *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* and the 2007 *U.S. Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook* and its attachments. Wetland evaluations were conducted following the procedures described in the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the Arid West regional supplement to that document.

Table 2 provides a summary of all drainage features within the East Plant and West Plant Analysis Areas; Table 3 includes all delineated wetlands. Figure 4 shows an overview of the East Plant and West Plant Analysis Area. Each drainage feature has been delineated on recent aerial photography (Attachments 3a and 3b). Representative ground photographs are provided in Attachment 5a and 5b and referenced by data point in Table 2 below. The Approved Jurisdictional Determination Forms for each set of surface water features are provided as Attachment 4.

[1] In jurisdictional non-wetland waters, Corps regulations establish the lateral extent of federal jurisdiction using the ordinary high water mark (OHWM). The OHWM is defined at 33 CFR Part 328.3(e) as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." In ephemeral washes in the southwest, the Corps' practice has been to identify an OHWM by changes in substrate (e.g., "sandy-bottomed washes") and the destruction of terrestrial vegetation, with shelving and scour also being frequently used as evidence of an OHWM. The Guidance indicates that the presence of a reliable OHWM with a channel defined by bed and banks may be a physical indicator of flow and therefore relevant to a significant nexus analysis.

In Westland's judgment, using the practices typically utilized by the Corps in assessing ephemeral channels in the arid southwest, an OHWM is present in approximately 18,582 linear feet of ephemeral channel within the West Plant Analysis Area and approximately 63,912 linear feet of ephemeral channel within the East Plant Analysis Area. Based on the observed width of the drainages, the estimated total area of potential non-wetland Waters is approximately 6.17 acres in both Analysis Areas (1.20 acres in the West Plant Analysis Area and 4.97 acres in the East Plant Analysis Area). Observed OHWM characteristics consisted mainly of water staining on bedrock, a lack of woody perennial vegetation, and sediment deposition within the drainage. The photos included in Attachment 5 (which reference data point locations reflected on Attachments 3a and 3b) document the upper extent of the mapped drainages where OHWM is lost.

Table 2. Summary of Drainage Feature Physical Characteristics

Drainage Feature ID	Lat/Long of Centerpoint	Length (ft)	Average Width (ft)	Area (ac)	Data Points
West Plant Analysis Area					
WP1A	33.3102N/-111.1154W	3093	3	0.231	WP1A-1 to WP1A-5
WP1A1	33.3118N/-111.1148W	146	1	0.003	WP1A1-1
WP1A2	33.3107N/-111.1095W	344	2	0.014	WP1A2-1
WP1A2a	33.3119N/-111.1096W	442	3	0.026	WP1A2a-1
WP1A2b	33.3121N/-111.1090W	472	2	0.021	WP1A2b-1 to WP1A2b-2
WP1A3	33.3116N/-111.1073W	1661	2	0.089	WP1A3-1 to WP1A3-3
WP1A4	33.3098N/-111.1073W	1595	3	0.103	WP1A4-1 to WP1A4-5
WP1A4a	33.3105N/-111.1070W	950	3	0.054	WP1A4a-1 to WP1A4a-3
WP2	33.2984N/-111.1185W	2946	3	0.207	WP2-1 to WP2-6
WP2A	33.3013N/-111.1166W	730	2	0.030	WP2A-1 to WP2A-2
WP3	33.2912N/-111.1210W	676	3	0.049	WP3-1 to WP3-4
WP3A	33.2915N/-111.1205W	196	2	0.010	WP3A-1
WP4	33.2926N/-111.1173W	5112	3	0.353	WP4-1 to WP4-7
WP4A	33.2934N/-111.1179W	219	1	0.006	WP4A-1
East Plant Analysis Area					
EP1	33.3065N/-111.0616W	2645	7	0.433	EP1-1 to EP1-2
EP1A	33. 3073N/-111.0592W	1821	2	0.085	EP1A-1 to EP1A-4
EP1B*	33.3030N/-111.0648W	2655	4	0.248	EP1B-1 to EP1B-4
EP1B1	33.2989N/-111.0711W	3082	2	0.168	EP1B1-1 to EP1B1-4
EP1B1a	33.2997N/-111.0683W	325	2	0.014	EP1B1a-1
EP1B2	33.3011N/-111.0702W	2051	4	0.186	EP1B2-1 to EP1B2-3
EP1C*	33. 2981N/-111.0605W	6243	2	0.326	EP1C-1 to EP1C-7
EP1C1	33.2979N/-111.0663W	4904	4	0.419	EP1C1-1 to EP1C1-4
EP1C1a	33.2983N/-111.0625W	824	3	0.057	EP1C1a-1 to EP1C1a-2
EP1C1b	33.2971N/-111.0696W	478	4	0.039	EP1C1b-1
EP1C2	33.2938 N/-111.0548W	7384	3	0.572	EP1C2-1 to EP1C2-7

Table 2. Summary of Drainage Feature Physical Characteristics

Drainage Feature ID	Lat/Long of Centerpoint	Length (ft)	Average Width (ft)	Area (ac)	Data Points
EP1C2a	33.2968N/-111.0572W	525	2	0.027	EP1C2a-1 to EP1C2a-2
EP1C2b	33.2938N/-111.0543W	225	2	0.010	EP1C2b-1
EP1C2c	33.2928N/-111.0544W	619	2	0.034	EP1C2c-1 to EP1C2c-2
EP1C3	33.2953N/-111.0653W	4160	4	0.397	EP1C3-1 to EP1C3-6
EP1C4	33.2932N/-111.0621W	1211	2	0.041	EP1C4-1 to EP1C4-2
EP1C4a	33.2935N/-111.0628W	303	2	0.014	EP1C4a-1
EP1D*	33.3023N/-111.2559W	3382	6	0.491	EP1D-1 to EP1D-3
EP1D1	33.3010N/-111.0546W	952	3	0.061	EP1D1-1 to EP1D1-2
EP1D2	33.2988N/-111.0503W	2631	3	0.183	EP1D2-1 to EP1D2-4
EP1D2a	33.2981N/-111.0519W	773	2	0.036	EP1D2a-1 to EP1D2a-2
EP1D3	33.3018N/-111.0496W	2112	4	0.174	EP1D3-1
EP1D3a	33.3015 N/-111.0505W	194	3	0.014	EP1D3a-1
EP1D3b	33.3028N/-111.0442W	1687	4	0.149	EP1D3b-1 to EP1D3b-2
EP1D3b1	33.3021N/-111.0452W	405	2	0.020	EP1D3b1-1
EP1D3b2	33.3019N/-111.0442W	674	2	0.033	EP1D3b2-1 to EP1D3b2-2
EP1D3b3	33.3023N/-111.0416W	162	2	0.007	EP1D3b3-1
EP1D3b4	33.3034N/-111.0414W	199	2	0.007	EP1D3b4-1
EP1D3c	33.3047N/-111.0454W	1853	3	0.115	EP1D3c-1 to EP1D3c-3
EP2*	33.3100N/-111.0507W	8351	3	0.550	EP2-1 to EP2-9
EP2A	33.3106N/-111.0563W	383	2	0.019	EP2A-1
EP2B	33.3132N/-111.0461W	699	3	0.040	EP2B-1

**Drainage Feature has associated wetlands identified in Table 3*

Similarly, using the practices typically utilized by the Corps in assessing wetland characteristics in the arid southwest, WestLand identified 4.33 acres of potentially jurisdictional wetlands within the Analysis Areas. Three (3) such features (totaling approximately 0.59 acres) were identified in the West Plant Analysis Area, and nine (9) such features (comprising approximately 3.74 acres) were identified in the East Plant Analysis Area. All of the identified features that exhibit wetland characteristics are manmade impoundments, such as stock tanks or water diversions. Each wetland feature has been delineated on recent aerial photography (Attachments 3 and 6). Representative wetland ground photographs are provided in Attachment 6a and referenced by data point in Table 3 below. These features are included with their associated drainages on the Approved Jurisdictional Determination Forms, or given their own forms when not associated with a drainage feature. All Approved Jurisdictional Determination Forms are provided as Attachment 4. Wetland photograph sheets and graphics indicating field soil stations are included as Attachment 6a, and individual Wetland Determination Data Forms are included as Attachment 6b.

Table 3. Summary of Wetland Feature Physical Characteristics

Wetland Feature ID	Lat/Long of Centerpoint	Area (ac)	Associated Drainage Feature	Data Points
West Plant Analysis Area				
Wetland Area 10	33.2903N/-111.1128W	0.058	N/A	W10-1 to W10-3
Wetland Area 11	33.2895N/-111.1139W	0.523	N/A	W11-1 to W11-5
Wetland Area 12	33.2898N/-111.1145W	0.006	N/A	W12-1 to W12-2
East Plant Analysis Area				
Wetland Area 1	33.3004N/-111.0674W	0.186	EP1B	W1-1 to W1-2
Wetland Area 2	33.2972N/-111.0602W	0.171	EP1C	W2-1 to W2-3
Wetland Area 3	33.2969N/-111.0599W	0.056	EP1C	W3-1 to W3-4
Wetland Area 4	33.2965N/-111.0597W	0.859	EP1C	W4-1 to W4-3
Wetland Area 5	33.2955N/-111.0597W	0.113	EP1C	W5-1 to W5-3
Wetland Area 6	33.3086N/-111.0544W	2.070	EP2	W6-1 to W6-5
Wetland Area 7	33.3091N/-111.0551W	0.034	EP2	W7-1 to W7-2
Wetland Area 8	33.3014N/-111.0536W	0.055	EP1D	W8-1 to W8-3
Wetland Area 9	33.3097N/-111.0396W	0.194	N/A	W9-1 to W9-2

Additional details regarding Analysis Area features are provided below. Consistent with the Guidance, the following sections analyze the factors relating to the potential for a hydrological, chemical or biological nexus between the surface water features in the Analysis Areas and the downstream TNW.

Hydrological Nexus Factors

West Plant Analysis Area

Hydrology

The natural topography within the West Plant Analysis Area has been heavily influenced by historic mining activities and features related to the Magma Mine, which operated from the early 1900's through 1970. The vast majority of stormwater runoff within the West Plant Analysis Area reports to the current stormwater control system of the West Plant Operations Area for the Resolution Copper Project. This system channels potential stormwater flows through a series of constructed ditches to a stormwater collection pond in the southwest portion of the Analysis Area. Although RCM has a permit to discharge this stormwater from the facility, all flows into the stormwater collection pond are currently retained, and pumped back for use within the facility operations or discharged to the top of a tailings facility to evaporate. There are very few natural drainages reporting to the West Plant stormwater management system, and in all cases they are relatively minor features with a poorly developed OHWM, or no OHWM at all. Given the minor nature of these features, the general lack of OHWM development, and the fact that they discharge into the West Plant stormwater management system and are maintained on site, these features would not qualify as waters of the U.S.

Only four surface drainage systems within the West Plant Analysis Area, Drainages WP1A through WP4, still possess the potential to discharge stormwater flows to downstream receiving waters. Drainage WP1A includes a combination of relatively small natural drainages and a constructed conveyance, the Apex Tunnel. The tributaries of WP1A (Drainages WP1A1 through WP1A4a) are largely natural drainages which collect stormwater flows and direct them toward the Apex Tunnel. Stormwater flows discharging through the Apex Tunnel would report to a minor tributary of Silver King Wash (treated here as an extension of WP1A), then into Silver King Wash, and ultimately into Queen Creek downstream of the West Plant Analysis Area and the town of Superior. The remaining surface drainage features within the West Plant Analysis Area, Drainages WP2 through WP4 and their tributaries, all discharge stormwater flows through a series of unnamed ephemeral drainages, ultimately discharging to Queen Creek downstream of the West Plant Analysis Area.

Although several man-made impoundments and disturbances are located between the Analysis Areas and the TNW and flows in the Analysis Areas are highly unlikely to reach the TNW even in significant (e.g. 100 year) storm events (described below), a general flow path between the Analysis Areas and the TNW can be discerned via a review of topographic maps and recent aerial photography (Figure 2).

Distance to TNW

As described above, the nearest designated downstream TNW to the West Plant Analysis Area is the reach of the Gila River between Powers Butte and Gillespie Dam. Assuming the flow route described in Section I, above, the drainages within the West Plant Analysis Area lie approximately 125 river miles (93 aerial miles) from this TNW.

The potential flow path from the West Plant Analysis Area to the TNW includes reaches of Queen Creek, the East Maricopa Floodway (the EMF; also sometimes identified as the Roosevelt Canal), and the Gila River (see Figure 2). Although the reach of Queen Creek nearest the West Plant Analysis Area is classified as intermittent (A.A.C. Title 18, Chapter 11, Appendix B), potential flows originating from the West Plant Analysis Area would actually discharge to a downstream reach classified as effluent-dependent. Effluent-dependent waters are defined in Arizona’s water quality standards regulations as “a surface water that, without the…discharge of wastewater, would be an ephemeral water” (A.A.C. Title 18, Chapter 11, Article 1).

Queen Creek is designated as effluent-dependent to Potts Canyon, intermittent from Potts Canyon to the Whitlow Ranch Dam and the Queen Valley golf course, and ephemeral until it enters the Gila River at S. Arizona Avenue immediately south of Phoenix (A.A.C. Title 18, Chapter 11, Appendix B). This last ephemeral reach includes an approximately 11-mile stretch of the EMF, a flood control channel which alternates earthen and concrete-lined stretches. The Gila River downstream of the confluence with the EMF is classified as ephemeral to the confluence with the Salt River. Beginning at the confluence of the Gila and Salt Rivers, the Gila River is an effluent-dependent water for the remainder of the 40 river miles to the TNW reach at Powers Butte (A.A.C. Title 18, Chapter 11, Appendix B). As noted here, there are no perennial reaches between the West Plant Analysis Area and the downstream TNW.

Watershed Comparison to TNW

The watershed of the TNW reach of the Gila River, as measured at the Gillespie Dam, is 49,650 square miles. The largest system of drainages within the West Plant Analysis Area, Drainage WP1A and its tributaries, has an approximate watershed size of 0.58 square miles. This watershed represents approximately 0.0012 percent, or approximately one thousandth of a percent, of the watershed of the nearest TNW. The combined watersheds of the remaining drainages in the West Plant Analysis Area (Drainages WP2, WP3, WP4 and their tributaries) are less than half the size of the WP1A system.

Mean Annual Precipitation

Measures of the mean annual precipitation within the West Plant Analysis Area were obtained from the Western Regional Climate Center (WRCC), and are based on data collected at the National Climate Data Center (NCDC) station located in Superior (Station ID 028348). The records from this station show a mean annual precipitation of 18.32 inches between the years 1920 and 2006. For the purposes of this evaluation, mean annual precipitation for the site is assumed to be 18 inches. The vast majority of this precipitation comes in the form of rain, although light snow is possible. The mean annual snowfall recorded by the station was 1.4 inches. The snowfall in the area generally functions in the same capacity as rainfall, usually melting and running off in the course of a single day. Snowfall in the area never forms a “snow pack” in the traditional sense of that term.

Stream Flow Data

No gages for the measurement of stream flow are located within the surface water features of the West Plant Analysis Area. The nearest downstream gages that provide stream flow data are located on Queen Creek at the Whitlow Ranch Dam. There are three gages on the dam, each maintained by a different entity: ID 6739 by the Flood Control District of Maricopa County (FCDMC), ID 09478500 by the USGS, and an unnumbered gage maintained by the Corps. Eight additional gages are located along the path of interest between the Whitlow Ranch Dam and the gage on the Gila River at Gillespie Dam, the downstream end of the TNW reach.

In the absence of gage data for the drainage features being evaluated, USGS Regression Equations were used to compute peak discharges from the largest system of drainages, Drainage WP1A and its tributaries, in the West Plant Analysis Area. JE Fuller Hydrology & Geomorphology, Inc. (JEF) computed peak discharges for this system of drainages for the 2, 5, 10, 25, 50, and 100-year recurrence intervals (Attachment 7). A similar analysis, also using the USGS Regression Equations, was performed for the watershed reporting to the Whitlow Ranch Dam for means of comparison. The full results of the flow analysis are provided in the JEF technical memorandum (hereafter JEF 2011) included as Attachment 7.

WestLand is aware that in documentation submitted in support of at least four previously approved jurisdictional determinations within Arizona (Wood, Patel & Associates, Inc. 2007, EcoPlan Associates, Inc. 2008, Cardno WRG 2009, CMX 2009), other applicants evaluated the hydrologic connectivity (or lack thereof) of drainages on project sites with the nearest TNW by analyzing instances of possible coincident streamflow between the project drainages and the TNW. The attached JEF memorandum (Attachment 7) uses a similar evaluation of potential hydrologic connectivity between the West Plant Analysis Area drainages and the downstream TNW. As none of the West Plant Analysis Area drainages are gaged, flow recorded at the Whitlow Ranch Dam was used as a proxy measure for potential instances of flow in these drainages for purposes of identifying coincident streamflow. Given the size of the total watershed reporting to the Whitlow Ranch Dam (144 square miles) and the detaining effect of the dam on potential flows, it should be noted that the use of this data as an indicator of flows within the West Plant Analysis Area drainages likely greatly overestimates the frequency and duration of those flows.

Estimated Onsite Peak Flows

The peak discharges for the 2-year (Q_2) and 100-year (Q_{100}) recurrence interval events for Drainage WP1A and its tributaries (Drainages WP1A1 through WP1A4a) within the West Plant Analysis Area have been calculated using the USGS Regression Equations. The equations used in this analysis were taken from the USGS Fact Sheet 111-98 "The National Flood-Frequency Program – Methods for Estimating Flood Magnitude and Frequency in Rural Areas of Arizona" (JEF 2011). The equations for this method are developed based on the characteristics of the various physio-geographic regions of Arizona. The West Plant Analysis Area, although located in USGS Regression Equation Region 13, lies close to the shared boundary of Region 13 and Region 12. For this reason, two separate calculations were performed for the West Plant Analysis Area, one using the Region 13 equations, the second using those of Region 12. Both sets of values for peak discharges of the Q_2 and Q_{100} recurrence interval events for Drainage WP1A and its tributaries are provided below.

Using the USGS Regression Equations for Region 13, the Q_2 for Drainage WP1A (which incorporates tributary Drainages WP1A1 through WP1A4a) was calculated to be 89 cubic feet per second (cfs); for the Region 12 equations, 29 cfs (JEF 2011). The watershed of these drainages was assumed to be as described above, 0.58 square miles. The calculation for the Q_{100} peak discharges from the same drainage system provides a value of 864 cfs using the Region 13 equations and a value of 881 cfs using those for Region 12 (JEF 2011).

Potential Hydrologic Connectivity to TNW

Given the USGS Regression Equation discharge values calculated above, the flow characteristics of the onsite drainages, the incidence of transportation losses through percolation (see below), and the presence of several man-made impoundment features (e.g. the Whitlow Ranch Dam, the Sonoqui Dike, gravel pit operations) along the route of potential flow, it is unlikely that potential flows in the West Plant Analysis Area reach the TNW stretch of the Gila River in anything less than a series of the most significant storm events (i.e., greater than the 100-year storm). As described above, the potential flow path from the West Plant Analysis Area to the TNW includes reaches of Queen Creek, the EMF, and the Gila River (see Figure 2). However, several man-made impoundments and disturbances are present along this path of potential flow.

The most significant of these impoundments is the Whitlow Ranch Dam located on Queen Creek north of Florence Junction in Pinal County. The Whitlow Ranch Dam is an earthfill dam constructed by the Corps in 1960 to provide flood protection to farmland and developed areas in the eastern portion of the Phoenix Basin. The dam detains stormwater flood flows and slowly meters out water impounded in the reservoir of the dam, limiting peak discharge while increasing flow duration. The Corps' reservoir regulations website acknowledges that outflow from the dam "usually percolates into the alluvial plain below the dam and rarely travels more than a few miles downstream" (Corps 2011). The reservoir behind the dam has a total volume of 30,000 acre-feet with a peak outflow at this volume of approximately 1,004 cfs (Corps 2011).

A second impoundment, the Sonoqui Dike, is located on Queen Creek immediately upgradient of the CAP Canal, and approximately 15 miles downstream of the Whitlow Ranch Dam. This dike is part of series of flood protection structures built by the Bureau of Reclamation to protect the CAP Canal from floods. The dike, like the Whitlow Ranch Dam, is designed to detain stormwater flood flows and slowly release these potential flows downstream. The detention of flows allows sediments conveyed by stormwater to settle out of the flow and be retained behind the dike. A recent Public Notice for a Corps Section 404 Permit for discharge related to the proposed Queen Creek Channel Improvements Project (Corps File No. SPL-2010-00916-WHM) illustrates the effectiveness of sediment trapping behind the Sonoqui Dike. The loss of sediment supply and increased flow duration are identified in the Public Notice as contributing to the severe erosion and lateral migration of 2,400 feet of the Queen Creek channel, threatening a Pinal County-maintained bridge crossing.

In addition to the impoundments described above, potential flows within the reach of Queen Creek downstream of the CAP Canal and the Gila River at the outfall of the EMF are further impounded by the presence of in-stream sand-and-gravel mining operations. The entirety of the channel of Queen Creek at North Schnepf Road in Queen Creek, Arizona, already restricted by housing developments and agricultural operations, is disturbed by a sand-and-gravel mining operation. Flows within this reach of the creek are impounded by existing gravel pits within the operation. A second sand-and-gravel mining operation is located in the channel of the Gila River, approximately 7 miles downstream of the outfall of the EMF into the river. A direct fluvial connection of low flow channels is visible in aerial photography between the EMF outfall and the existing gravel pits of this operation. Given the man-made impediments to flow and the channel disturbances described above, it is unlikely that potential flows in the West Plant Analysis Area reach the TNW stretch of the Gila River in anything less than a series of the most significant storm events.

Similar to other previously approved SNA's completed in Arizona (Wood, Patel & Associates, Inc. 2007, EcoPlan Associates, Inc. 2008, Cardno WRG 2009, CMX 2009) an evaluation of potential coincident stream flow between drainages in the West Plant Analysis Area was performed using gage data from instruments located along the path of interest between the Whitlow Ranch Dam and the gage on the Gila River at Gillespie Dam, the downstream end of the TNW reach.

JEF (2011) identified ten gaged locations along the path of interest from the Whitlow Ranch Dam to the Gila River at the Gillespie Dam. These locations and their associated gages (operated by various entities including the Corps, the USGS, the FCDMC, and Pinal County) are presented in Table 4 below. As described above, the flow recorded at the gages of the Whitlow Ranch Dam were used as a proxy indicator of flow in the ungaged drainages of the West Plant Analysis Area, which likely greatly overestimates the frequency and duration of any potential flows from the Analysis Area due to the distance of the Analysis Area from Whitlow Ranch Dam, the intervening ephemeral (losing) reach of Queen Creek, the relatively small size of the Analysis Area drainages and associated watersheds relative to the watershed of the dam, and the detaining effect of the dam.

Table 4. Summary of Gages used in Coincident Flow Analysis (adapted from JEF 2011 Table 4)

Gage Name	Operator	Gage ID	Dates of Operation
Whitlow Ranch Dam	FCDMC	6739	8/2/2000 to present
Queen Creek below Whitlow Dam NR Superior, AZ	USGS	09478500	1917-59 and 2001 to present
Whitlow Ranch Dam	Corps	None	1917, 1948-59 and 2011
Queen Creek at CAP	FCDMC	6723	1/14/1999 to present
Queen Creek at Ironwood Rd.	Pinal County	719	5/22/2008 to present
Queen Creek at Rittenhouse Rd.	FCDMC	6707	9/14/1993 to present
EMF at Arizona Ave.	FCDMC	6598	2/10/1989 to present
Gila at Maricopa Rd.	FCDMC	778	4/9/1995 to present
Gila River near Maricopa, AZ	USGS	09479350	5/19/1995 to present
Gila River near Laveen, AZ	USGS	09479500	1916, 1926, 1940-95
Gila River at 116th Ave.	FCDMC	6848	12/16/1998 to present
Gila at Estrella Parkway	FCDMC	6853	12/2/1992 to present
Gila River at Estrella Parkway near Goodyear, AZ	USGS	09514100	10/1/1992 to present
Gila River below Gillespie Dam, AZ (Low Water Gage)	USGS	09519501	10/1/1992 to present

Data measurements for the available period of record of each of the gages were downloaded and overlain in a matrix for the coincident flow analysis. The analysis identified an overlapping period of concurrent operation of slightly more than 10 years, between the year 2000 and the present (JEF 2011). Mean daily flow rate data from the gages for these 10 years, a period from 2000 to 2010, was then analyzed for instances of non-zero flow at each gage, and these instances correlated to identify potential concurrent flow in the path of interest between Whitlow Ranch Dam and the Gila River at Gillespie Dam. For the purposes of this analysis, potential concurrent flow was defined as recorded flow at all gages in the reach of interest in the same day.

Based on the analysis of gage data, no flow was present at the Whitlow Ranch Dam for approximately 98 percent of the 10-year period of record (JEF 2011). Similarly, no flow was recorded for 97 percent of the period of record on Queen Creek at the CAP Canal (Gage 6723), and 96 percent of the period of record on the EMF at Arizona Avenue (Gage 6598), the point at which the EMF enters the Gila River. Analysis of the 10-year period of record identified no instances of potential concurrent flow within the reach of interest. JEF (2011) selected five different two-week periods of gage data correlated with known sizeable precipitation events in central Arizona: January 2005, February 2005, January 2008, January 2010, and March 2010. In only one of these two-week periods, from January 17th through January 30th, 2010, was flow recorded at all gages within the reach of interest over a period of several days (JEF 2011).

Although the data do not illustrate instances of coincident flow along the entire path of interest, the analysis of these five two-week periods do show instances of coincident flow from the Whitlow Ranch Dam on Queen Creek to the Gila River at the EMF outfall (JEF 2011). The data suggest large transmission losses, likely due to percolation, along Queen Creek between Sonoqui Dike and the EMF, and within the EMF itself before the outfall into the Gila River. The data also suggest that those stormwater flows which do discharge to the Gila River from the EMF are lost through percolation into the alluvium of the Gila River and are not transmitted downstream (JEF 2011).

Given the high transmission losses suggested by the gage data, JEF (2011) performed a routing analysis for potential stormwater flows for the ephemeral drainages WP1A and its tributaries in the West Plant Analysis Area and ephemeral drainage EP1 and its tributaries in the East Plant Analysis Area (see below). Using the flood hydrograph modeling package HEC-1 developed by the Corps and the Region 12 USGS Regression Equations, JEF (2011) modeled the 10-year and 100-year runoff events within the drainage systems, and routed the runoff through the downstream flow path to identify the point at which these flows would be lost to percolation into the alluvium. This runoff model used the following assumptions: 1) the storm events producing runoff occurred in both the West Plant and East Plant Analysis Areas simultaneously, 2) soil percolation rates were derived from National Resource Conservation Service (NRCS) and Tonto National Forest soil data for the capacity of the most limiting soil layer within flow path drainages to transmit water, and 3) existing impoundments currently along the flow path, such as the Whitlow Ranch Dam, were not present.

The hydrograph for the 10-year runoff event identified a peak discharge of 689 cfs (197 cfs from the West Plant Analysis Area and 492 cfs from the East Plant Analysis Area) and a total flow volume of 39 acre-feet from the WP1A and EP1 drainages and their tributaries. The results of the routing analysis showed that these potential flows would percolate completely into the bed of Queen Creek approximately 14 miles downstream of the Analysis Areas, a location within the current flood pool of Whitlow Ranch Dam (JEF 2011). The hydrograph for the 100-year runoff event identified a peak discharge of 3,344 cfs (2,502 cfs from the West Plant Analysis Area and 842 cfs from the East Plant Analysis Area) and a total volume of 191 acre-feet from the WP1A and EP1 drainages and their tributaries. The routing analysis identified that these potential flows would percolate completely into the bed of Queen Creek approximately 23.7 miles downstream of the Analysis Areas, a location approximately halfway between the U.S. Highway 60 crossing of Queen Creek near Florence Junction and the CAP Canal (JEF 2011). It should be noted that, as stated above, the routing analyses for the 10-year and 100-year runoff events ignored the presence of man-made impoundments, including the Whitlow Ranch Dam.

Given the USGS Regression Equation discharge values calculated above, the flow characteristics of the onsite drainages, the incidence of transportation losses through percolation, and the presence of several man-made impoundment features (e.g. the Whitlow Ranch Dam, the Sonoqui Dike, gravel pit operations) along the route of potential flow, it is highly unlikely that potential flows in the West Plant Analysis Area reach the TNW stretch of the Gila River in anything less than a series of the most significant storm events (i.e., greater than the 100-year storm). The runoff calculations, routing analyses, and geomorphology of the flow path provide evidence that normal flows, as well as flows as high as the 100-year runoff event, from the West Plant Analysis Area would not reach the Gila River for potential transmission to the TNW reach at Powers Butte. Although potential concurrent flow is infrequently present (less than 2 percent, or 87 days, of the 10-year period of record) between the Whitlow Ranch Dam and the EMF at Arizona Avenue, gage data suggest that these flows are not transmitted downstream, but rather lost to percolation before reaching the gage on the Gila River at Maricopa Avenue, less than 13 river miles downstream of the EMF and more than 59 river miles upstream of the TNW reach at Powers Butte. The evidence presented in the above discussion suggests that very little potential exists for hydrologic connectivity between the ephemeral drainages within the West Plant Analysis Area and the downstream TNW.

East Plant Analysis Area

Hydrology

The topography within the East Plant Analysis Area retains much of its natural character despite limited historic mining activities and the construction of well over 2,000 check dams by the Civilian Conservation Corps as a means of soil conservation in the 1930's. The two surface drainage systems of the East Plant Analysis Area, Drainages EP1 and EP2, and their tributaries are natural drainages which collect stormwater flows and direct them to the reach of Queen Creek immediately north of and adjacent to the Analysis Area. As described for the West Plant Analysis Area, a general flow path can be traced from the Analysis Areas to the TNW reach of the Gila River via Queen Creek and the EMF.

Distance to TNW

As with the West Plant Analysis Area, the nearest designated downstream TNW to the East Plant Analysis Area is the reach of the Gila River between Powers Butte and Gillespie Dam. The drainages within the East Plant Analysis Area lie approximately 128 river miles (96 aerial miles) from this TNW.

The potential flow path from the East Plant Analysis Area drainages to the TNW is similar to that of the West Plant Analysis Area, and includes reaches of Queen Creek, the EMF, and the Gila River (see Figure 2). Potential flows originating from the East Plant Analysis Area would enter the intermittent reach of Queen Creek immediately adjacent to the Analysis Area. This reach is classified as intermittent to the wastewater treatment plant outfall in Superior (A.A.C. Title 18, Chapter 11, Appendix B), downstream of which Queen Creek is classified as effluent-dependent. After this reach, the potential downstream flow path would be identical for that described for the West Plant Analysis Area.

Watershed Comparison to TNW

As described in the previous sections, the TNW reach of the Gila River has an estimated watershed of 49,650 square miles. The largest system of drainages in the East Plant Analysis Area (Drainage EP1, and its tributaries EP1A through EP1D3c) has an approximate watershed size of 2.54 square miles. This watershed includes nearly all of the identified drainages within the East Plant Analysis Area, excluding only the relatively minor EP2 and its tributaries EP2A and EP2B. The watershed of the EP1 system of drainages represents approximately 0.0051 percent, or approximately five thousandths of a percent, of the watershed of the nearest TNW.

Mean Annual Precipitation

Mean annual precipitation in the East Plant Analysis Area is expected to be similar to that in the West Plant Analysis Area because of the geographical proximity of the two sites to each other and to the weather station located in Superior (Station ID 028348). Therefore, as with the West Plant Analysis Area, the mean annual precipitation for the East Plant Analysis Area is assumed to be 18 inches, based on rainfall data recorded at the mine between 1920 and 2006.

Stream Flow Data

No gages for the measurement of stream flow are located within the surface water features of the East Plant Analysis Area. As with the West Plant Analysis Area, the nearest downstream gages that provide stream flow data are located on Queen Creek at the Whitlow Ranch Dam. In the absence of gage data for the drainage features being evaluated, USGS Regression Equations were again used to compute peak discharges from the largest system of drainages, Drainage EP1 and its tributaries, in the East Plant Analysis Area. JEF (2011) computed peak discharges for this system of drainages for the 2, 5, 10, 25, 50, and 100-year recurrence intervals, and for the watershed reporting to the Whitlow Ranch Dam for means of comparison.

Again, JEF (2011) used gage data to identify instances of possible coincident streamflow as an evaluation of potential hydrological connectivity between the East Plant Analysis Area drainages and the downstream TNW. Flow recorded at the Whitlow Ranch Dam was used as a proxy measure for potential instances of flow in the East Plant Analysis Area drainages for purposes of identifying coincident streamflow. As for the West Plant Analysis Area drainages, it should be noted that, given the size of the total watershed reporting to the Whitlow Ranch Dam (144 square miles) and the detaining effect of the dam on potential flows, the use of this data as an indicator of flows within the East Plant Analysis Area drainages likely greatly overestimates the frequency and duration of those flows.

Estimated Onsite Peak Flows

The peak discharges for the 2-year (Q_2) and 100-year (Q_{100}) recurrence interval events for Drainage EP1 and its tributaries (Drainages EP1A through EP1D3c) within the East Plant Analysis Area were calculated using the USGS Regression Equations (JEF 2011). As with the West Plant Analysis Area, the East Plant Analysis Area although located in USGS Regression Equation Region 13, lies close to the shared boundary of Region 13 and Region 12. Therefore, two separate calculations were again performed for the East Plant Analysis Area, one using the Region 13 equations, the second using those of Region 12. Both sets of values for peak discharges of the Q_2 and Q_{100} recurrence interval events for Drainage EP1 and its tributaries are provided below.

Using the USGS Regression Equations for Region 13, the Q_2 for Drainage EP1 and its tributaries was calculated to be 210 cfs; for the Region 12 equations, 74 cfs (JEF 2011). The watershed of these drainages was determined to be, as described above, 2.52 square miles. The calculation for the Q_{100} peak discharges from the same drainage system provides a value of 2,260 cfs using the Region 13 equations and a value of 2,540 cfs using those for Region 12 (JEF 2011).

Potential Hydrologic Connectivity to TNW

Except for an approximately 8-river-mile-long reach of Queen Creek, the downstream flow path to the TNW from the East Plant Analysis Area is identical to that of the West Plant Analysis Area. Both include reaches of Queen Creek, the EMF, and the Gila River (see Figure 2). Given the USGS Regression Equation discharge values calculated above, the flow characteristics of the onsite drainages, the incidence of transmission losses through percolation, and the presence of several man-made impoundment features (e.g. the Whitlow Ranch Dam, the Sonoqui Dike, gravel pit operations) along the route of potential flow, it is extremely unlikely that potential flows in the West Plant Analysis Area reach the TNW stretch of the Gila River in anything less than a series of the most significant storm events (i.e., greater than the 100-year storm).

As for the West Plant Analysis Area, the runoff calculations, routing analyses, and geomorphology of the downstream flow path provide evidence that normal flows, as well as flows as high as the 100-year runoff event, from the East Plant Analysis Area would not reach the Gila River for potential transmission to the TNW reach at Powers Butte. Although potential concurrent flow is infrequently present (less than 2 percent, or 87 days, of the 10-year period of record) between the Whitlow Ranch Dam and the EMF at Arizona Avenue, gage data suggest that these flows are not transmitted downstream, but rather lost to percolation before reaching the gage on the Gila River at Maricopa Avenue, less than 13 river miles downstream of the EMF and more than 59 river miles upstream of the TNW reach at Powers Butte. The evidence presented for the East Plant Analysis Area suggests that little potential exists for hydrologic connectivity between the ephemeral drainages within the East Plant Analysis Area and the downstream TNW.

Physical/Chemical Nexus Factors

The ephemeral drainages in the West Plant Analysis Area and the East Plant Analysis Area share a number of physical characteristics, and are located in relative proximity to one another. Additionally, both Analysis Areas share an almost identical potential flow path to the nearest downstream TNW, the 6.9-mile reach of the Gila River between Powers Butte and Gillespie Dam. As such, the potential for the drainages within both Analysis Areas to have a more than insubstantial or speculative effect on the physical or chemical integrity of the TNW will be addressed concurrently in this section.

Although the West Plant Analysis Area is more heavily disturbed, with the East Plant Analysis Area retaining much of its natural character, identified potential pollutant sources from these two areas are similar and originate mostly from historic mining and mineral exploration activities. Potential pollutant sources within the West Plant Analysis Area include historic mine workings, shafts, and tailings, as well as unpaved roads. Much of the historic mine workings and tailings area has undergone, and is currently undergoing, reclamation by Resolution. As part of the Resolution Project's coverage under the Arizona Pollutant Discharge Elimination System (AZPDES) Multi-Sector General Permit (MSGP), for stormwater discharges from industrial facilities, the West Plant Analysis Area contains constructed structural controls (including diversions, berms, and settling ponds) to minimize the discharge of pollutants to downstream receiving waters. As described above, stormwater that is impacted by mining activities is almost entirely contained on site, reporting to a stormwater collection pond and then pumped back up to a tailings facility. The single stormwater outfall identified in the West Plant Analysis Area, located at the stormwater collection pond, does not currently discharge.

The reach of Queen Creek downstream of both Analysis Areas is currently listed as impaired for copper (NEMO 2009), likely due to the runoff of sediments impacted by past mining activities. Although the mine workings and tailings in the West Plant Analysis Area may have historically contributed to this impairment, reclamation activities and stormwater controls within the Analysis Area have significantly reduced or eliminated the discharge of pollutants to downstream receiving waters from this area. There appears to have been little potential for the discharge of copper through the drainages in the East Plant Analysis Area, given the minimal mining activity in this area.

Of particular concern for the Gila River (including the designated TNW stretch) are the effects of nitrogen and phosphorous contamination from agricultural fertilizers and residues of agricultural pesticides. Of note, most of the TNW reach of the Gila River is listed as impaired (ADEQ 2008) for waterborne concentrations of the elements boron and selenium, as well as concentrations of DDT metabolites, toxaphene, and chlordane found in fish tissue, all a result of current and historic agricultural activities. No agricultural activities exist in the Analysis Areas or in immediate proximity to those areas. Therefore, even if there were regular hydrologic connectivity between the ephemeral drainages of the Analysis Areas and the TNW, these would not be expected to contribute the pollutants causing current impairment in the TNW.

The reach of the Gila River between its confluences with the Salt River and Waterman Wash (which lies downstream of the Analysis Areas and above the TNW reach of the Gila River) has been sampled for copper by ADEQ as part of the agency's CWA 303(d) impaired waters assessment program. There were no exceedances of copper concentrations in this reach of the Gila River as part of this sampling effort.

As evidenced in the previous section, there is little to no hydrological connection between the Analysis Area drainages and the Gila River, even in the 100-year runoff event. However, in a report prepared for the EPA during review of a subsequently approved JD (Trillium, Corps file SPL-2008-00333-SDM), Tetra Tech (a consultant retained by EPA) suggested a need to consider a discussion of hydrological connectivity "related to ecological and evolutionary time" (2008: pg 15), particularly with regards to sediment and pollutant transport. This suggestion was based on research done by Izbicki (2007) and Alexander et al. (2007) on the connectivity of headwater streams and their role in downstream water quality. Although the research done by Izbicki (2007) and Alexander et al. (2007) actually refers to headwater streams that are perennial, and the Analysis Areas support only ephemeral headwater streams, and although it is not apparent that the Tetra Tech position represents official Corps or EPA policy, the concerns raised by the cited research are addressed here.

Transport of sediment from either Analysis Area would be significantly impeded, if not completely precluded, by the presence of the Whitlow Ranch Dam, the Sonoqui Dike, and other man-made impoundments and disturbances along the downstream flow path. Whitlow Ranch Dam is known to function as an effective sediment trap, as is the Sonoqui Dike, evidenced by the Section 404 Permit Public Notice for the Queen Creek Channel Improvements Project (Corps File No. SPL-2010-00916-WHM). Additionally, the ephemeral drainages within the Analysis Areas do not possess the required surface flow and hyporheic zone identified by Alexander et al. (2007) as important in the removal of upstream pollutant inputs, particularly nitrogen compounds. Therefore, the drainages in the Analysis Areas are not expected to either contribute or filter pollutants, or contribute sediments at an amount or frequency that would affect the chemical or physical integrity of the downstream TNW.

Based on the above analysis, the drainages within the Analysis Areas do not have more than an insubstantial or speculative effect on the physical or chemical integrity of the TNW. No potential sources of those pollutants causing the impairment of the downstream TNW reach of the Gila River (which are tied to agricultural runoff), have been identified in either the West Plant or East Plant Analysis Areas. Potential sediment transport from either Analysis Area is precluded or at least significantly impeded by the presence of numerous impoundments along the downstream flow path, particularly Whitlow Ranch Dam and the Sonoqui Dike.

Biological/Ecological Nexus Factors

In discussing biological considerations, the 2008 Post-Rapanos Guidance notes that ephemeral tributaries in the arid west may provide habitat for wildlife and aquatic organisms in downstream TNWs. The drainages within the West Plant and East Plant Analysis Areas are all ephemeral streams and do not provide habitat or life cycle support functions for aquatic species. Winter (2007) notes that "nearly all streams need to have some contribution from ground water in order to provide reliable habitat for aquatic organisms." Moreover, the significant distance (over 120 river miles and 90 aerial miles) between the drainages in the Analysis Areas and the TNW effectively limits the ability of these drainages to provide habitat for species that also use the TNW.

Native vegetation along the ephemeral drainages in the Analysis Areas is characteristic of the Arizona Upland subdivision of Sonoran Desertscrub and Interior Chaparral, as described by Brown (1994). Native vegetation between the Analysis Areas and the Gila River is generally xeroriparian in nature and characteristic of the Arizona Upland and Lower Colorado River subdivisions of the Sonoran Desertscrub biotic community (Brown 1994). These xeroriparian habitats support a variety of common plant species, most of which also occur within adjacent upland habitats. The xeroriparian habitats subject to this analysis are interrupted downstream from the Project Area by man-made impoundments (described above) and residential and commercial development in the East Phoenix Valley. The drainages within the Analysis Areas do not provide significant habitat or life cycle support functions for any species population found within the TNW reach of the Gila River beginning at Powers Butte. This lack of life cycle support can be extended to include potential contributions of nutrients and organic carbon to species within the TNW. Headwater streams provide an input of dissolved organic matter and particulate matter that is transported downstream to receiving waters (Wipfli et al. 2007). The drainages within the Analysis Areas and those downstream from the Analysis Areas are ephemeral streams and do not contain aquatic resources that are dependent upon allochthonous inputs to establish and maintain the energy and nutrient dynamics of these systems. Desert streams depend more on nutrient inputs from surrounding land than on upstream inputs. The xeroriparian habitats associated with the downstream ephemeral waters are not expected to be dependent upon energy or nutrient inputs from the Analysis Areas. Almost all of the species found within these habitats are also found in adjacent uplands, and many of the species are able to fix nitrogen. These systems do not provide significant nutrient cycling and energy functions to downstream habitats. Given these conditions, the drainages within the Analysis Areas do not significantly affect the integrity of the aquatic habitat or the amount of nutrient transport to the TNW reach of the Gila River.

Although a full biological evaluation has not been completed for this significant nexus analysis, a preliminary screening analysis (Attachment 8) shows that four federally listed, proposed, or candidate species have some potential to occur on or within the vicinity of the Analysis Areas: Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*), lesser long-nosed bat (*Leptonycteris yerbabuenae*), ocelot (*Leopardus [Felis] pardalis*), and the Sonoran desert tortoise (*Gopherus agassizii*). None of these species are aquatic or riparian, and there is no designated critical habitat within the Analysis Areas or along the downstream flow path to the nearest TNW.

Based on the above, the Analysis Area drainages do not have more than an insubstantial or speculative effect on the ecological or biological integrity of the TNW.

2. Characteristics of wetlands adjacent to non-TNW, non-RPW tributaries that flow directly or indirectly into TNW

As shown in Table 3 and Attachment 6, 12 areas meeting the criteria for potential wetland Waters were delineated under the current analysis: three in the West Plant Analysis Area and nine in the East Plant Analysis Area. All wetlands identified were indirectly created from man-influenced disturbance. Of these 12 areas, four (Wetland Areas 9 through 12) are not adjacent to any of the ephemeral drainage features identified for this analysis. These four areas are discussed as potential isolated Waters in **Section E.** below. The remaining eight areas are characterized here.

The eight Wetland Areas identified as adjacent are either the result of man-made impoundments or roads constructed across ephemeral drainage features (Wetland Areas 2, 3, 4, 6, 7, and 8) or of areas dug out of uplands and lined with clay (Wetland Areas 1 and 5). The primary purpose of the ponding areas is to provide a seasonal water source for livestock. Because of the impoundments and the landscape position relative to the ephemeral drainages, these Wetland Areas receive and pond water for extended periods of time after storm events, encouraging development of hydric soils and germination of hydrophytic vegetation species. Even with the presence of the impoundment features, the wetlands are ephemeral in nature, saturated and submerged for some periods of time throughout the year and essentially dry habitat for the rest.

Generally, the quality of the adjacent Wetland Areas is poor, accommodating a low species and vegetative strata diversity. Most vegetative communities were herbaceous with Wetland Areas 3, 6, and 8 having dominant species in the tree strata. Lacking perennial hydrology, these Wetland Areas provide minimal habitat for aquatic species. Terrestrial wildlife may utilize the areas to feed or water or as a bedding opportunity as herbaceous browse may be of higher quality within and adjacent to the Wetland Areas than the surrounding uplands. Riparian vegetation communities are not associated with these Wetland Areas.

C. Significant Nexus Determination

Based on the information provided in Section III.B, above, none of the ephemeral drainage features within either the West Plant or East Plant Analysis Areas possesses a significant nexus with a designated TNW. The identified wetlands in the Analysis Areas do not contribute significantly to the hydrological regime of the drainages to which they are adjacent and do not enhance the potential for these drainages to possess a significant nexus with a downstream TNW.

The surface water features within the Analysis Areas constitute non-navigable, non-RPW tributaries which, in combination with their adjacent wetlands, do not possess a significant nexus with a downstream TNW. Therefore, none of the subject surface water features are jurisdictional Waters.

D. Determinations of Jurisdictional Findings

As described above, none of the surface water features within the West Plant Analysis Area or the East Plant Analysis Area would be considered jurisdictional Waters.

E. Isolated Waters, the Use, Degradation, or Destruction of Which Could Affect Interstate Commerce Connection

Four isolated wetland areas were identified under the current analysis, three (Wetland Areas 10, 11, and 12) in the West Plant Analysis Area, and one (Wetland Area 9) in the East Plant Analysis Area. These wetland areas are not located adjacent to any surface drainage features. These features represent man-made impoundments or areas dug out of uplands providing a ponding area for livestock watering.

These are highly disturbed, relatively small wetland features lacking reliable hydrology needed to support fish or shellfish communities. These small, and often dry, isolated areas have not been used, and are not susceptible for use, in waterborne interstate commerce, and do not provide the opportunity for recreational activities.

F. Non-Jurisdictional Waters

All of the surface water features considered in this analysis are non-jurisdictional. A summary of drainage features possessing the physical characteristics of an OHWM is provided as Table 2, and a summary of all areas meeting the criteria for wetlands is provided as Table 3. All surface water features identified within the West Plant and East Plant Analysis Areas are delineated on recent aerial photography in Attachments 3a and 3b of this document.

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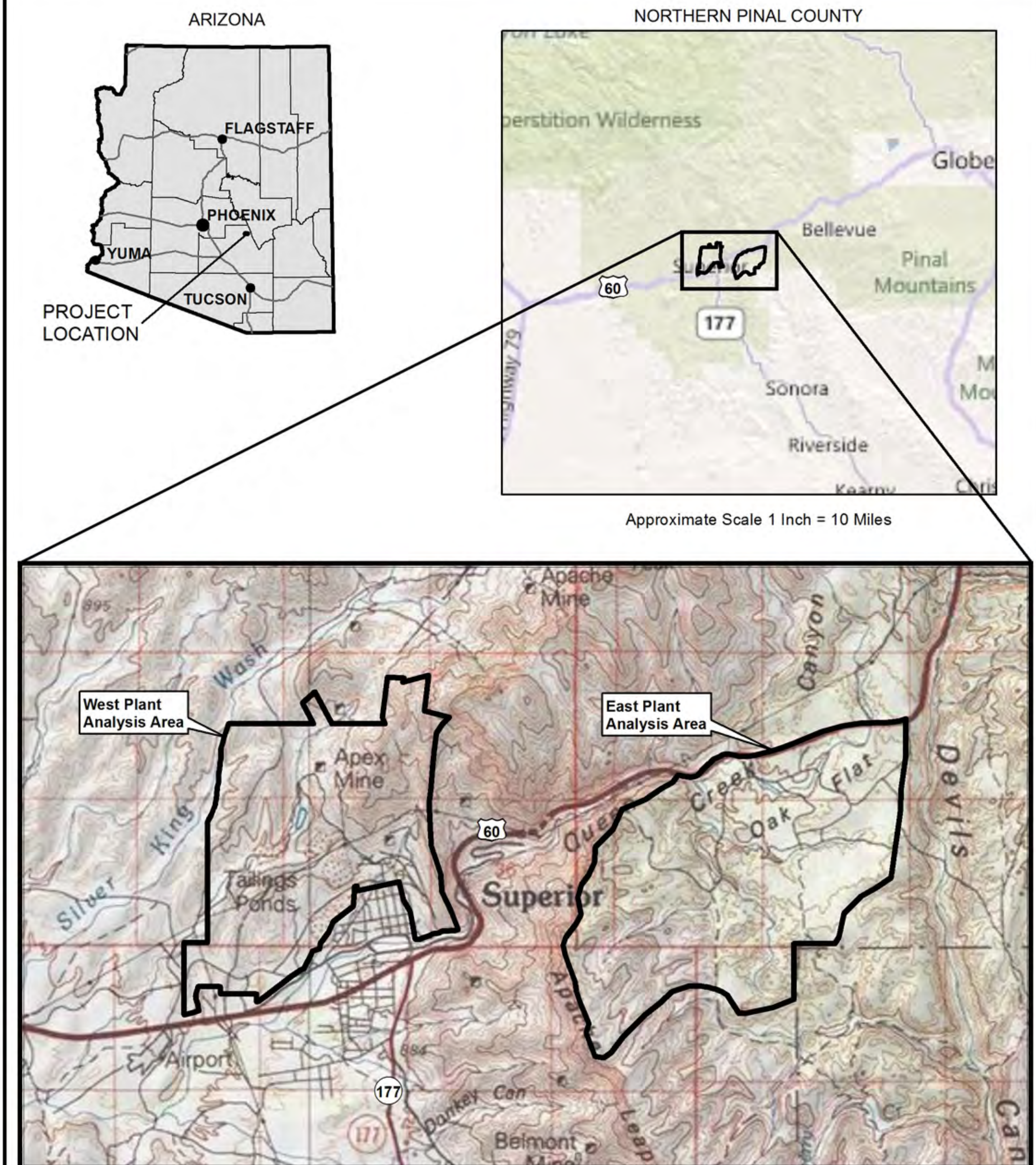
FIGURE 1

VICINITY MAP



T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Superior USGS 7.5' Quadrangle

WestLand Resources, Inc.
Engineering and Environmental Consultants

N

0 2,500 5,000 Feet

RESOLUTION COPPER MINING
Jurisdictional Delineation

VICINITY MAP
Figure 1

FIGURE 2

REGIONAL MAP

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T1S, R12E, Portion of Sections 25-27, 34-36,
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T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: Aerials Express, 2008

WestLand Resources, Inc.
Engineering and Environmental Consultants

N
3 0 3 Miles

LEGEND

- East and West Plant Analysis Areas
- Traditional Navigable Water
- General Downstream Flow Path

RESOLUTION COPPER MINING
Jurisdictional Delineation

REGIONAL OVERVIEW MAP
Figure 2

FIGURE 3

SURFACE MANAGEMENT MAP

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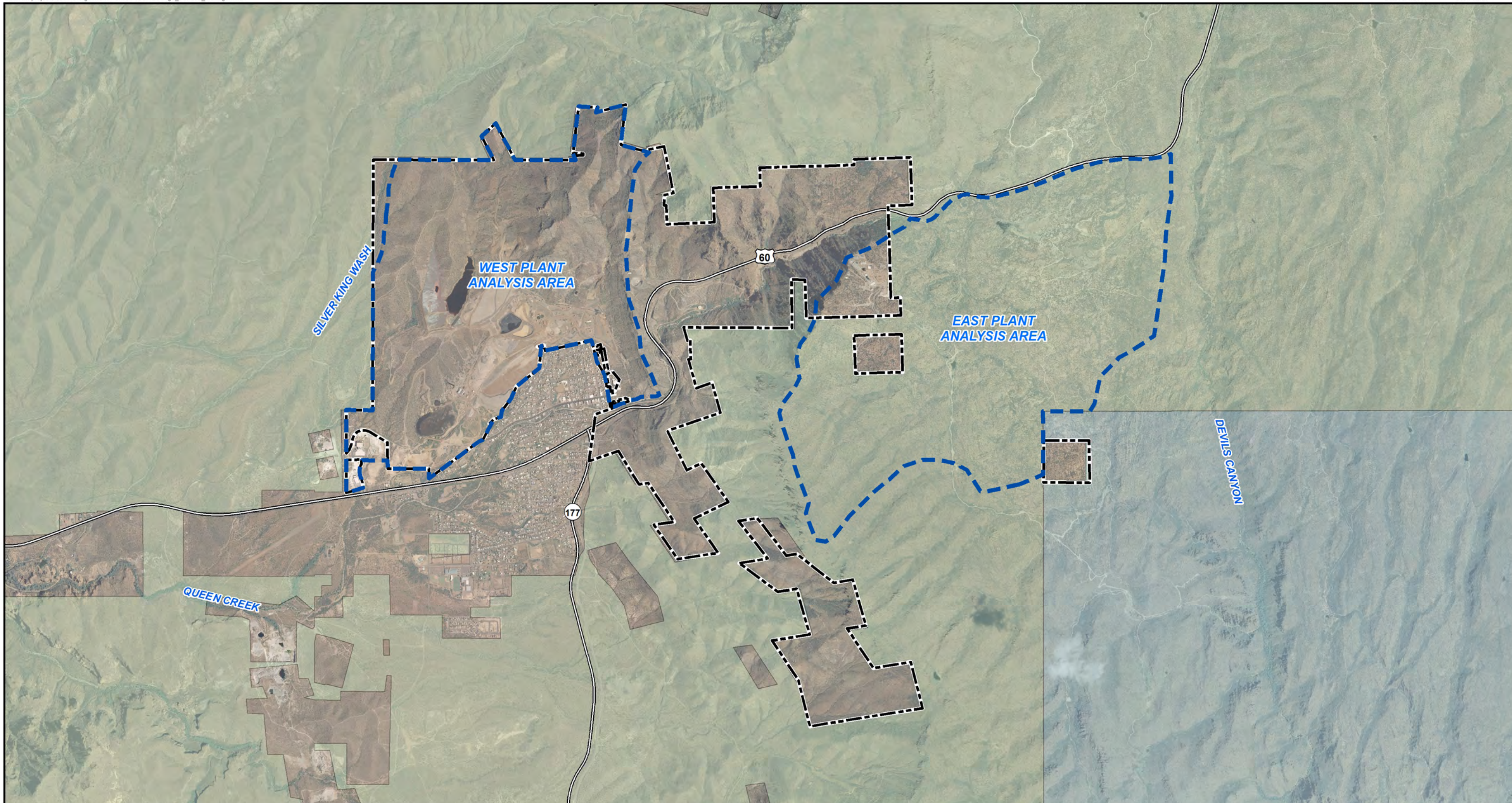
Date: 8/1/2011 User: tomh



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T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: NAIP, 2010

WestLand Resources, Inc.
Engineering and Environmental Consultants

N

0 1,500 3,000 Feet

LEGEND

Analysis Area Boundary

Resolution Copper Mine Property

LAND OWNERSHIP

Private Land (No Color)

State Trust Land

Tonto National Forest (USFS)

RESOLUTION COPPER MINING

Jurisdictional Delineation

SURFACE MANAGEMENT MAP

Figure 3

FIGURE 4

ANALYSIS AREA OVERVIEW MAP

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T1S, R12E, Portion of Sections 25-27, 34-36,
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T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: RCML Aerial Flight 2010, High Res Imagery

WestLand Resources, Inc.
Engineering and Environmental Consultants

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LEGEND

- Analysis Area Boundary
- Wetland Areas
- Potentially Jurisdictional Waters
- Non-channel Flow

RESOLUTION COPPER MINING

Jurisdictional Delineation

ANALYSIS AREA OVERVIEW

Figure 4

ATTACHMENT 1

AGENT DESIGNATION & AUTHORIZATION FOR FEDERAL ACCESS

July 28, 2011

Ms. Sallie McGuire
US ARMY CORPS OF ENGINEERS
5205 East Comanche Street
Davis-Monthan Air Force Base
Tucson, Arizona 85707

RE: JURISDICTIONAL WATERS DETERMINATION FOR THE RESOLUTION WEST PLANT AND EAST PLANT ANALYSIS AREAS, PINAL COUNTY, ARIZONA
AGENT DESIGNATION AND ACCESS AUTHORIZATION

Dear Ms. McGuire:

I am sending this letter to designate WestLand Resources, Inc. as my agent for the purposes of any necessary Clean Water Act Section 404 permitting at the above project. The agent contact information is:

Mr. Brian Lindenlaub.
WestLand Resources, Inc.
4001 E. Paradise Falls Drive
Tucson, Arizona 85712
(520) 206-9585

The Analysis Areas subject to this jurisdictional determination represent a mix of privately and publically-held lands. Publically-held lands within the East Plant Analysis Area are managed by the Globe Ranger District of the Tonto National Forest. The West Plant Analysis Area is located entirely on privately-held lands. The Owner of Record of the privately-held land within both Analysis Areas is:

Name: Resolution Copper Company
Mailing Address: 102 Magma Heights
City/State/Zip Code: Superior, Arizona 85273
Telephone Number: 520-689-3313

ACCESS AUTHORIZATION:

I hereby authorize the Army Corps of Engineers and other federal employees the right to access the private property to conduct field investigations for preliminary jurisdictional delineation and for 404 Clean Water Act permitting purposes.

If you have any questions or require additional information, please do not hesitate to contact me.

Respectfully,

Signature of Property Owner	7/26/2011 Date
Ms. Victoria Peacey Typed/Printed Name of Property Owner	(520)689-3313 Phone Number

Manager - Environmental Assessments
Title of Property Owner

cc: Mr. Brian Lindenlaub, WestLand Resources, Inc.

ATTACHMENT 2

DIRECTIONS TO SITE

Google maps

Directions to N Magma Ave
67.4 mi – about **1 hour 20 mins** – up to 1 hour 50 mins in traffic

3636 N Central Ave, Phoenix, AZ 85012

1.	Head **south** on **N Central Ave** toward **W Columbus Ave** About 4 mins	go 1.7 mi total 1.7 mi
2.	Turn left onto **E McDowell Rd** About 1 min	go 0.3 mi total 2.0 mi
3.	Take the 3rd right onto **N 3rd St** About 1 min	go 0.2 mi total 2.2 mi
4.	Turn left to merge onto **I-10 E** About 10 mins	go 9.2 mi total 11.4 mi
5.	Take exit **154** to merge onto **US-60 E** toward **Mesa - Globe** About 1 hour 1 min	go 55.2 mi total 66.6 mi
6.	Take the **AZ-177** exit	go 0.2 mi total 66.8 mi
7.	Turn left onto **AZ-177 N/Ray Rd** Continue to follow Ray Rd About 2 mins	go 0.2 mi total 67.0 mi
8.	Continue onto **N Magma Ave** About 1 min	go 0.3 mi total 67.4 mi

N Magma Ave

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

ATTACHMENT 3

CWA SECTION 404 JURISDICTIONAL DETERMINATION

ATTACHMENT 3a

CWA SECTION 404 JURISDICTIONAL DETERMINATION

EAST PLANT

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T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: RCML Aerial Flight 2010, High Res Imagery

WestLand Resources, Inc.
Engineering and Environmental Consultants

0 225 450 Feet
0 112.5 225 Meters

N

1 inch = 225 feet

Legend

Analysis Area Boundary

Wetlands (See Attachment 6)

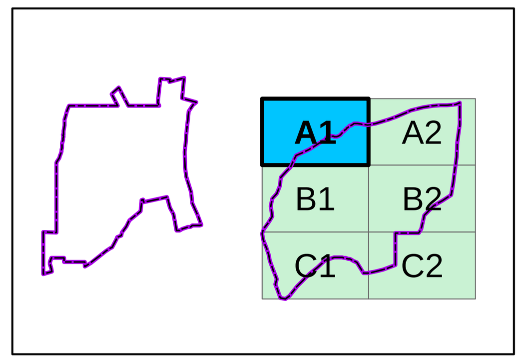
OHWM

Non-Channel Flow

Photo Location and Direction

DP #
#'
Data Point Number

****PRELIMINARY (RGL 08-02)****
SECTION 404 JURISDICTIONAL DELINEATION
U.S. Army Corps of Engineers, Los Angeles District
Application No. SPL -____-____-____
Boundary of area surveyed for jurisdictional waters of the United States (Project Area/Analysis Area)
Ordinary High Water
Potential Waters of the United States
Wetland Boundary (If legend is blank no wetlands occur in survey area)
____ Site Visit(Y/N) Date:____
225' Scale 2010 Date of Photograph
____ Corps Project Manager
Sheet 1 of 6
****PRELIMINARY (RGL 08-02)****



RESOLUTION COPPER MINING
Jurisdictional Delineation
EAST PLANT ANALYSIS AREA
Sheet A1

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T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: RCML Aerial Flight 2010, High Res Imagery

WestLand Resources, Inc.
Engineering and Environmental Consultants

0 225 450 Feet
0 112.5 225 Meters

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1 inch = 225 feet

Legend

- Analysis Area Boundary
- Wetlands (See Attachment 6)
- OHWM
- Non-Channel Flow
- Photo Location and Direction
- DP # / #' Data Point Number

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U.S. Army Corps of Engineers, Los Angeles District
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- Wetland Boundary (If legend is blank no wetlands occur in survey area)

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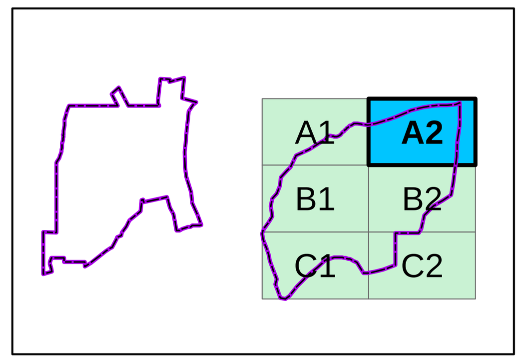
225' Scale 2010 Date of Photograph
__________ Corps Project Manager
Sheet 2 of 6
****PRELIMINARY (RGL 08-02)****



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Jurisdictional Delineation
EAST PLANT ANALYSIS AREA
Sheet A2

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T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: RCML Aerial Flight 2010, High Res Imagery

WestLand Resources, Inc.
Engineering and Environmental Consultants

0 225 450 Feet
0 112.5 225 Meters

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1 inch = 225 feet

Legend

- Analysis Area Boundary
- Wetlands (See Attachment 6)
- OHWM
- Non-Channel Flow
- Photo Location and Direction
- DP # / #' Data Point Number

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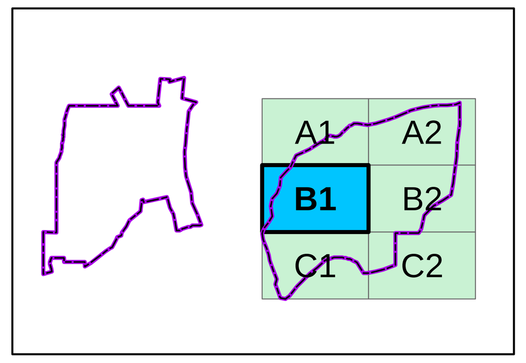
SECTION 404 JURISDICTIONAL DELINEATION
U.S. Army Corps of Engineers, Los Angeles District
Application No. SPL-
Site Visit (Y/N) Date:
225' Scale 2010 Date of Photograph
Corps Project Manager
Sheet 3 of 6
****PRELIMINARY (RGL 08-02)****



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Jurisdictional Delineation
EAST PLANT ANALYSIS AREA
Sheet B1

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Pinal County, Arizona,
Photo Source: RCML Aerial Flight 2010, High Res Imagery

WestLand Resources, Inc.
Engineering and Environmental Consultants

0 225 450 Feet
0 112.5 225 Meters

N

1 inch = 225 feet

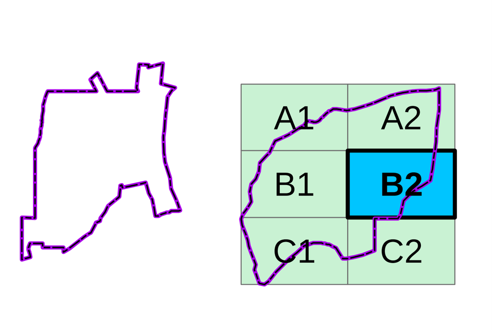
Legend

- Analysis Area Boundary
- Wetlands (See Attachment 6)
- OHWM
- Non-Channel Flow
- Photo Location and Direction
- DP # / #' Data Point Number

****PRELIMINARY (RGL 08-02)****
SECTION 404 JURISDICTIONAL DELINEATION
U.S. Army Corps of Engineers, Los Angeles District
Application No. SPL-_____-_____-_____

- Boundary of area surveyed for jurisdictional waters of the United States (Project Area/Analysis Area)
- Ordinary High Water
- Potential Waters of the United States
- Wetland Boundary (If legend is blank no wetlands occur in survey area)

_____ Site Visit(Y/N) Date:________
225' Scale 2010 Date of Photograph
__________ Corps Project Manager
Sheet 4 of 6
****PRELIMINARY (RGL 08-02)****



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Jurisdictional Delineation
EAST PLANT ANALYSIS AREA
Sheet B2

Date: 8/2/2011 User: davido

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T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: RCML Aerial Flight 2010, High Res Imagery

WestLand Resources, Inc.
Engineering and Environmental Consultants

0 225 450 Feet
0 112.5 225 Meters

N

1 inch = 225 feet

Legend

Analysis Area Boundary
Wetlands (See Attachment 6)
OHWM
Non-Channel Flow
Photo Location and Direction
DP # / "#" Data Point Number

****PRELIMINARY (RGL 08-02)****
SECTION 404 JURISDICTIONAL DELINEATION
U.S. Army Corps of Engineers, Los Angeles District
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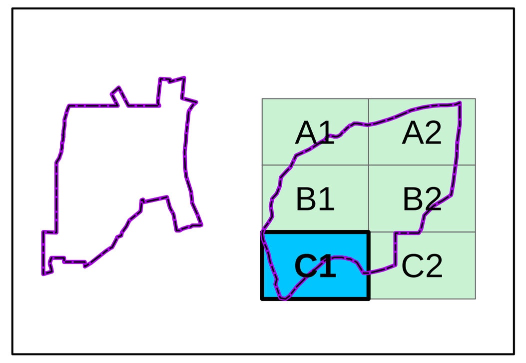
_____ Site Visit(Y/N) Date:__________
225' Scale 2010 Date of Photograph
__________ Corps Project Manager
Sheet 5 of 6
****PRELIMINARY (RGL 08-02)****



RESOLUTION COPPER MINING
Jurisdictional Delineation
EAST PLANT ANALYSIS AREA
Sheet C1

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T1S, R13E, Portion of Sections 28, 29, 31-33,
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T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: RCML Aerial Flight 2010, High Res Imagery

WestLand Resources, Inc.
Engineering and Environmental Consultants

0 225 450 Feet
0 112.5 225 Meters

N

1 inch = 225 feet

Legend

- Analysis Area Boundary
- Wetlands (See Attachment 6)
- OHWM
- Non-Channel Flow
- Photo Location and Direction
- DP # / #' — Data Point Number

****PRELIMINARY (RGL 08-02)****
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U.S. Army Corps of Engineers, Los Angeles District
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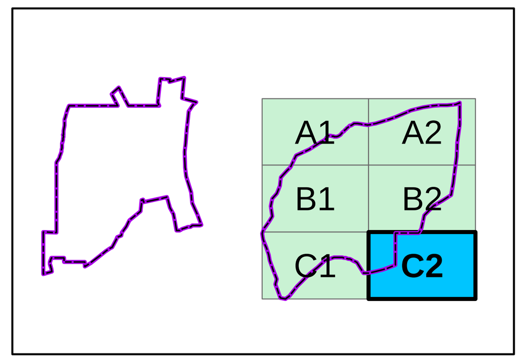
225' Scale 2010 Date of Photograph
________ Corps Project Manager
Sheet 6 of 6
****PRELIMINARY (RGL 08-02)****



RESOLUTION COPPER MINING
Jurisdictional Delineation
EAST PLANT ANALYSIS AREA
Sheet C2

ATTACHMENT 3b

CWA SECTION 404 JURISDICTIONAL DETERMINATION

WEST PLANT

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T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: RCML Aerial Flight 2010, High Res Imagery

WestLand Resources, Inc.
Engineering and Environmental Consultants

0 225 450 Feet
0 112.5 225 Meters

N

1 inch = 225 feet

Legend

- Analysis Area Boundary
- Wetlands (See Attachment 6)
- OHWM
- Non-Channel Flow
- Photo Location and Direction
- DP # / #' Data Point Number

****PRELIMINARY (RGL 08-02)****
SECTION 404 JURISDICTIONAL DELINEATION
U.S. Army Corps of Engineers, Los Angeles District
Application No. SPL-____-____-____

- Boundary of area surveyed for jurisdictional waters of the United States (Project Area/Analysis Area)
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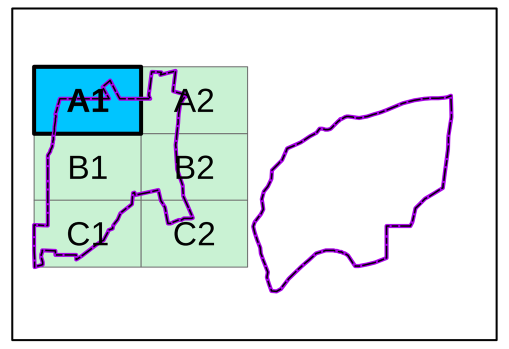
____ Corps Project Manager
Sheet 1 of 6
****PRELIMINARY (RGL 08-02)****



RESOLUTION COPPER MINING
Jurisdictional Delineation
WEST PLANT ANALYSIS AREA
Sheet A1

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Date: 8/1/2011 User: davido

T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: RCML Aerial Flight 2010, High Res Imagery

WestLand Resources, Inc.
Engineering and Environmental Consultants

0 225 450 Feet
0 112.5 225 Meters

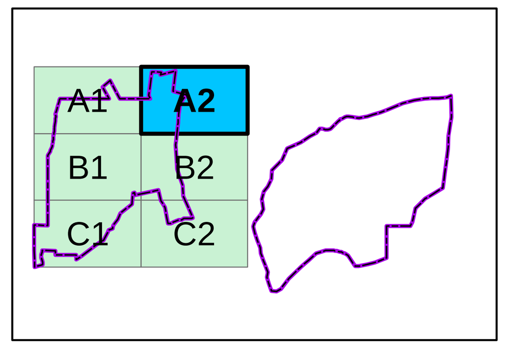
N

1 inch = 225 feet

Legend

- Analysis Area Boundary
- Wetlands (See Attachment 6)
- OHWM
- Non-Channel Flow
- Photo Location and Direction
- DP # / #' Data Point Number

****PRELIMINARY (RGL 08-02)****
SECTION 404 JURISDICTIONAL DELINEATION
U.S. Army Corps of Engineers, Los Angeles District
Application No. SPL -____-____-____
Boundary of area surveyed for jurisdictional waters of the United States (Project Area/Analysis Area)
Ordinary High Water
Potential Waters of the United States
Wetland Boundary
(If legend is blank no wetlands occur in survey area)
____ Site Visit(Y/N) Date:____
225' Scale 2010 Date of Photograph
____ Corps Project Manager
Sheet 2 of 6
****PRELIMINARY (RGL 08-02)****



RESOLUTION COPPER MINING
Jurisdictional Delineation
WEST PLANT ANALYSIS AREA
Sheet A2

T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
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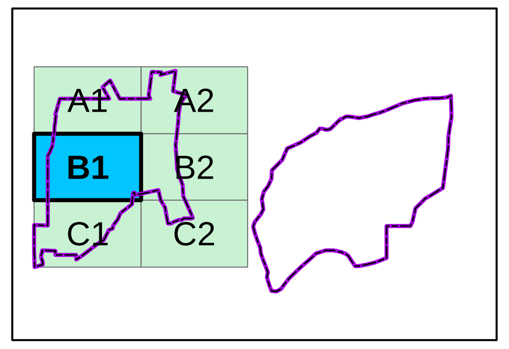
____ Site Visit(Y/N) Date:____
225' Scale 2010 Date of Photograph
____ Corps Project Manager
Sheet 3 of 6
****PRELIMINARY (RGL 08-02)****



RESOLUTION COPPER MINING
Jurisdictional Delineation
WEST PLANT ANALYSIS AREA
Sheet B1

T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
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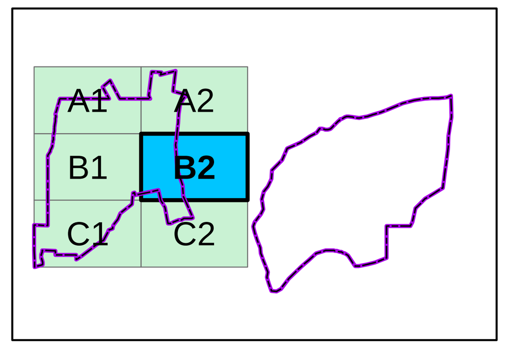
225' Scale 2010 Date of Photograph
____ Corps Project Manager
Sheet 4 of 6
****PRELIMINARY (RGL 08-02)****



RESOLUTION COPPER MINING
Jurisdictional Delineation
WEST PLANT ANALYSIS AREA
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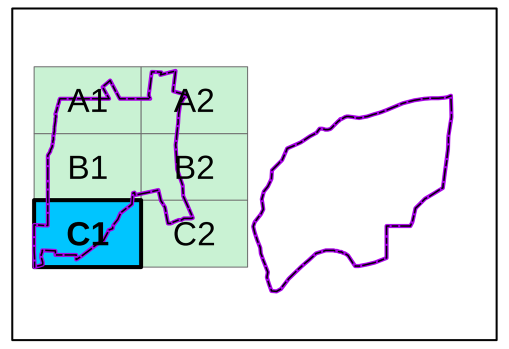
________ Corps Project Manager
Sheet 5 of 6
****PRELIMINARY (RGL 08-02)****



RESOLUTION COPPER MINING
Jurisdictional Delineation
WEST PLANT ANALYSIS AREA
Sheet C1

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Date: 8/1/2011 User: davido

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Analysis Area Boundary

Wetlands (See Attachment 6)

OHWM

Non-Channel Flow

Photo Location and Direction

DP #
#'

Data Point Number

****PRELIMINARY (RGL 08-02)****
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Sheet 6 of 6
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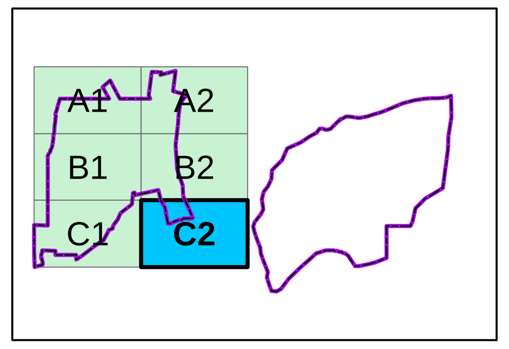

RESOLUTION COPPER MINING
Jurisdictional Delineation
WEST PLANT ANALYSIS AREA
Sheet C2

ATTACHMENT 4

APPROVED JURISDICTIONAL FORMS

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 07/28/2011

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District, File No. Pending

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Drainage EP1
State:AZ County/parish/borough: Pinal City: Superior
Center coordinates of site (lat/long in degree decimal format): Lat. 33.299165° **N**, Long. -111.057152 ° **W**.
Universal Transverse Mercator:
Name of nearest waterbody: Queen Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Gila River from Powers Butte to Gillespie Dam
Name of watershed or Hydrologic Unit Code (HUC): 15050100
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: 07/28/2011
☒ Field Determination. Date(s): 06/27 through 07/01/2011, 07/07 ,07/08, 07/19 and 07/20/2011

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **Drainages within the review area are ephemeral, and do not qualify as TNW's or RPW's. Therefore, these drainages would only be considered jurisdictional if they possessed a significant nexus with a TNW. None of the drainages in the review area possess a significant nexus with a TNW.**.

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) General Area Conditions:
   Watershed size: 49,650 **square miles**
   Drainage area: 2.52 **square miles**
   Average annual rainfall: 18 inches
   Average annual snowfall: 1.4 inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☒ Tributary flows through **5** tributaries before entering TNW.

   Project waters are **30 (or more)** river miles from TNW.
   Project waters are **30 (or more)** river miles from RPW.
   Project waters are **30 (or more)** aerial (straight) miles from TNW.
   Project waters are **30 (or more)** aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Identify flow route to TNW[5]: Drainage EP1 discharges directly to Queen Creek. The remainder of the flow route to the TNW is Queen Creek to the East Maricopa Floodway to the Gila River, and approximately 74 river miles along the Gila to the TNW at Powers Butte.

.

Tributary stream order, if known: .

(b) General Tributary Characteristics (check all that apply):

Tributary is:
- ☒ Natural
- ☐ Artificial (man-made). Explain: .
- ☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: 7 feet
Average depth: less than 0.5 feet
Average side slopes: **Vertical (1:1 or less).**

Primary tributary substrate composition (check all that apply):
- ☐ Silts
- ☒ Sands
- ☐ Concrete
- ☐ Cobbles
- ☐ Gravel
- ☐ Muck
- ☒ Bedrock
- ☐ Vegetation. Type/% cover:
- ☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: Stable.
Presence of run/riffle/pool complexes. Explain: Not present.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 5 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Ephemeral.
Other information on duration and volume: .

Surface flow is: **Confined.** Characteristics: .

Subsurface flow: **No**. Explain findings: .
- ☐ Dye (or other) test performed: .

Tributary has (check all that apply):
- ☐ Bed and banks
- ☒ OHWM[6] (check all indicators that apply):
  - ☐ clear, natural line impressed on the bank
  - ☐ changes in the character of soil
  - ☐ shelving
  - ☐ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☒ sediment deposition
  - ☒ water staining
  - ☐ other (list):
  - ☐ the presence of litter and debris
  - ☒ destruction of terrestrial vegetation
  - ☐ the presence of wrack line
  - ☒ sediment sorting
  - ☐ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community
- ☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
- ☐ High Tide Line indicated by:
  - ☐ oil or scum line along shore objects
  - ☐ fine shell or debris deposits (foreshore)
  - ☐ physical markings/characteristics
  - ☐ tidal gauges
  - ☐ other (list):
- ☐ Mean High Water Mark indicated by:
  - ☐ survey to available datum;
  - ☐ physical markings;
  - ☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Unknown.
Identify specific pollutants, if known: None.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N) Size (in acres) Directly abuts? (Y/N) Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Drainage EP1 is located approximately 125 river miles from the nearest TNW, the Gila River between Powers Butte and Gillespie Dam. Evaluation of potential stormwater discharges from the Analysis Area, the hydrological characteristics of the downstream flowpath, the presence of significant impoundments in this flowpath, and the distance to the TNW suggests that no hydrologic connection exists between these Analysis Area drainages and the TNW. Although historic mining activities in the Analysis Area may have contributed to the impairment of Queen Creek for copper, reclamation activities and stormwater controls have significantly reduced or eliminated the discharge of pollutants to downstream receiving waters from this area. However, the reach of the Gila River between the Salt River and Waterman Wash has been sampled for copper, and no exceedances of copper concentrations were identified as part of this sampling effort. As no sources of those pollutants causing the impairment of the downstream TNW reach of the Gila River (which are tied to agricultural runoff) have been identified in the Analysis Area, there does not appear to be a chemical nexus between these drainages and the TNW. Additionally, the Analysis Area drainages do not provide lifecycle support functions, nutrients, or organic carbon to species within the TNW. These drainages, in conjunction with their adjacent wetlands, do not have a more than speculative or insubstantial effect on the physical, chemical, and/or biological integrity of the TNW. Therefore the Analysis Area surface water features do not possess a significant nexus to the TNW reach of the Gila River between Powers Butte and Gillespie Dam, and are not jursidicational under Section 404 of the Clean Water Act.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☒ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: **As described in Section III C 1 above, an evaluation of the surface water features within the review area found that they do not possess a significant nexus with the TNW.**
☐ Other: (explain, if not covered above): **.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☒ Non-wetland waters (i.e., rivers, streams): **2,645** linear feet, **7'** width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:WestLand Resources, Inc..
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:Superior 7.5 Quad.

[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Cooper Aerial Imagery; 2010.
or ☒ Other (Name & Date):Ground Photos; June 27 through July 20, 2011.
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 07/28/2011

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District, File No. Pending

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Drainages EP1C2, EP1D, EP1D2, EP1D3, EP2, Wetland 6, Wetland 7, Wetland 8

State:AZ County/parish/borough: Pinal City: Superior
Center coordinates of site (lat/long in degree decimal format): Lat. 33.299165° **N**, Long. - 111.057152° **W**.
Universal Transverse Mercator:
Name of nearest waterbody: Queen Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Gila River from Powers Butte to Gillespie Dam
Name of watershed or Hydrologic Unit Code (HUC): 15050100

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: 07/28/2011
☒ Field Determination. Date(s): 06/27 through 07/01/2011, 07/07 ,07/08, 07/19 and 07/20/2011

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **Drainages within the review area are ephemeral, and do not qualify as TNW's or RPW's. Therefore, these drainages would only be considered jurisdictional if they possessed a significant nexus with a TNW. Adjacent wetlands**

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

would only be considered jurisdictional if they possessed a significant nexus with a TNW. None of the drainages in the review area, nor their associated adjacent wetlands, possess a significant nexus with a TNW. Therefore, the drainages and their associated wetlands are not jurisdictional waters.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: 49,650 **square miles**
Drainage area: 1.70 **square miles**
Average annual rainfall: 18 inches
Average annual snowfall: 1.4 inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☒ Tributary flows through **5** tributaries before entering TNW.

Project waters are **30 (or more)** river miles from TNW.
Project waters are **30 (or more)** river miles from RPW.
Project waters are **30 (or more)** aerial (straight) miles from TNW.
Project waters are **30 (or more)** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Identify flow route to TNW[5]: All subject drainages except EP2 discharge to Drainage EP1. Drainages EP1 and EP2 discharge directly to Queen Creek. The remainder of the flow route to the TNW is Queen Creek to the East Maricopa Floodway to the Gila River, and approximately 74 river miles along the Gila to the TNW at Powers Butte.
Tributary stream order, if known: .

(b) General Tributary Characteristics (check all that apply):
Tributary is: ☒ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: 3.8 feet
Average depth: Less than 0.5 feet
Average side slopes: **Vertical (1:1 or less).**

Primary tributary substrate composition (check all that apply):
☐ Silts ☒ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☒ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: Stable.
Presence of run/riffle/pool complexes. Explain: Not present.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 1 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Ephemeral.
Other information on duration and volume: .

Surface flow is: **Confined.** Characteristics: .

Subsurface flow: **No**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☒ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank ☐ the presence of litter and debris
☐ changes in the character of soil ☒ destruction of terrestrial vegetation
☐ shelving ☐ the presence of wrack line
☐ vegetation matted down, bent, or absent ☒ sediment sorting
☐ leaf litter disturbed or washed away ☐ scour
☒ sediment deposition ☐ multiple observed or predicted flow events
☒ water staining ☐ abrupt change in plant community
☐ other (list):
☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by: ☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects ☐ survey to available datum;
☐ fine shell or debris deposits (foreshore) ☐ physical markings;
☐ physical markings/characteristics ☐ vegetation lines/changes in vegetation types.
☐ tidal gauges
☐ other (list):

(iii) Chemical Characteristics:

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).

Explain: Unknown.

Identify specific pollutants, if known: None.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: 2.16 acres

Wetland type. Explain: Generally, wetlands were dominated by herbaceous vegetation with some woody species.

Wetland quality. Explain: Quality was generally poor due to heavy use by cattle (grazing and watering). Species diversity was low.

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **No Flow** . Explain: .

Surface flow is**: Discrete and confined**

Characteristics: .

Subsurface flow: **Unknown**. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☒ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **30 (or more)** river miles from TNW.

Project waters are **30 (or more)** aerial (straight) miles from TNW.

Flow is from: **No Flow.**

Estimate approximate location of wetland as within the **500-year or greater** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: unknown.

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☒ Vegetation type/percent cover. Explain: Herbaceous, some woody species. Percent cover varies.
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **3**

Approximately (2.16) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
Y	2.07		
Y	0.03		
Y	0.06		

Summarize overall biological, chemical and physical functions being performed: Unknown.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Drainages EP1C2, EP1D, EP1D2, EP1D3, EP2, Wetland 6, 7 and 8 are located approximately 125 river miles from the nearest TNW, the Gila River between Powers Butte and Gillespie Dam. Evaluation of potential stormwater discharges from the Analysis Area, the hydrological characteristics of the downstream flowpath, the presence of significant impoundments in this flowpath, and the distance to the TNW suggests that no hydrologic connection exists between these Analysis Area drainages and the TNW. Although historic mining activities in the Analysis Area may have contributed to the impairment of Queen Creek for copper, reclamation activities and stormwater controls have significantly reduced or eliminated the discharge of pollutants to downstream receiving waters from this area. However, the reach of the Gila River between the Salt River and Waterman Wash has been sampled for copper, and no exceedances of copper concentrations were identified as part of this sampling effort. As no sources of those pollutants causing the impairment of the downstream TNW reach of the Gila River (which are tied to agricultural runoff) have been identified in the Analysis Area, there does not appear to be a chemical nexus between these drainages and the TNW. Additionally, the Analysis Area drainages do not provide lifecycle support functions, nutrients, or organic carbon to species within the TNW. These drainages, in conjunction with their adjacent wetlands, do not have a more than speculative or insubstantial effect on the physical, chemical, and/or biological integrity of the TNW. Therefore the Analysis Area surface water features do not possess a significant nexus to the TNW reach of the Gila River between Powers Butte and Gillespie Dam, and are not jursidicational under Section 404 of the Clean Water Act.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   ☐ TNWs: linear feet width (ft), Or, acres.
   ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   ☐ Tributary waters: linear feet width (ft).
   ☐ Other non-wetland waters: acres.
   Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   ☐ Tributary waters: linear feet width (ft).
   ☐ Other non-wetland waters: acres.
   Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
   ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

   ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):

- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: **.**
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☒ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: **As described in Section III C 1 above, an evaluation of the surface water features within the review area found that they do not possess a significant nexus with the TNW.**
- ☐ Other: (explain, if not covered above): **.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

- ☒ Non-wetland waters (i.e., rivers, streams): **23,860** linear feet, **3.8'** width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☒ Wetlands: 2.16 acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:WestLand Resources, Inc..
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters' study: .
- ☐ U.S. Geological Survey Hydrologic Atlas: .
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name:Superior 7.5 Quad.

[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Cooper Aerial Imagery; 2010.
or ☒ Other (Name & Date):Ground Photos; June 27 through July 20, 2011.
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 07/28/2011

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District, File No. Pending

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Drainages EP1A, EP1C2a, EP1C2b, EP1C2c, EP1D1, EP1D2a, EP1D3a, EP1D3b, EP1D3b1, EP1D3b2, EP1D3b3, EP1D3b4, EP1D3c, EP2A, EP2B

State:AZ County/parish/borough: Pinal City: Superior

Center coordinates of site (lat/long in degree decimal format): Lat. 33.299165° **N**, Long. - 111.057152° **W**.

Universal Transverse Mercator:

Name of nearest waterbody: Queen Creek

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Gila River from Powers Butte to Gillespie Dam

Name of watershed or Hydrologic Unit Code (HUC): 15050100

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: 07/28/2011

☒ Field Determination. Date(s): 06/27 through 07/01/2011, 07/07 ,07/08, 07/19 and 07/20/2011

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply): [1]**
      - ☐ TNWs, including territorial seas
      - ☐ Wetlands adjacent to TNWs
      - ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      - ☐ Non-RPWs that flow directly or indirectly into TNWs
      - ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      - ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      - ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      - ☐ Impoundments of jurisdictional waters
      - ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):[3]**
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **Drainages within the review area are ephemeral, and do not qualify as TNW's or RPW's. Therefore, these**

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

drainages would only be considered jurisdictional if they possessed a significant nexus with a TNW. None of the drainages in the review area possess a significant nexus with a TNW..

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) General Area Conditions:
   Watershed size: 49,650**square miles**
   Drainage area: 1.70 **square miles**
   Average annual rainfall: 18 inches
   Average annual snowfall: 1.4 inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☒ Tributary flows through **5** tributaries before entering TNW.

   Project waters are **30 (or more)** river miles from TNW.
   Project waters are **30 (or more)** river miles from RPW.
   Project waters are **30 (or more)** aerial (straight) miles from TNW.
   Project waters are **30 (or more)** aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Identify flow route to TNW[5]: All subject drainages discharge to Drainage EP1 and EP2. Drainages EP1 and EP2 discharge directly to Queen Creek. The remainder of the flow route to the TNW is Queen Creek to the East Maricopa Floodway to the Gila River, and approximately 74 river miles along the Gila to the TNW at Powers Butte.
Tributary stream order, if known: .

(b) General Tributary Characteristics (check all that apply):
Tributary is: ☒ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: 2.3 feet
Average depth: Less than 0.5 feet
Average side slopes: **Vertical (1:1 or less).**

Primary tributary substrate composition (check all that apply):
☐ Silts ☒ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☒ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: Stable.
Presence of run/riffle/pool complexes. Explain: Not present.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 1 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Ephemeral.
Other information on duration and volume: .

Surface flow is: **Confined.** Characteristics: .

Subsurface flow: **No**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☒ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank
☐ changes in the character of soil
☐ shelving
☐ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☒ sediment deposition
☒ water staining
☐ other (list):
☐ the presence of litter and debris
☒ destruction of terrestrial vegetation
☐ the presence of wrack line
☒ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community
☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):
☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Unknown.
Identify specific pollutants, if known: None.

(iv) Biological Characteristics. Channel supports (check all that apply):

☐ Riparian corridor. Characteristics (type, average width): .

☐ Wetland fringe. Characteristics: .

☐ Habitat for:

☐ Federally Listed species. Explain findings: .

☐ Fish/spawn areas. Explain findings: .

☐ Other environmentally-sensitive species. Explain findings: .

☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

☐ Directly abutting

☐ Not directly abutting

☐ Discrete wetland hydrologic connection. Explain: .

☐ Ecological connection. Explain: .

☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

☐ Riparian buffer. Characteristics (type, average width): .

☐ Vegetation type/percent cover. Explain: .

☐ Habitat for:

☐ Federally Listed species. Explain findings: .

☐ Fish/spawn areas. Explain findings: .

☐ Other environmentally-sensitive species. Explain findings: .

☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Drainages EP1A, EP1C2a, EP1C2b, EP1C2c, EP1D1, EP1D2a, EP1D3a, EP1D3b, EP1D3b1, EP1D3b2, EP1D3b3, EP1D3b4, EP1D3c, EP2A, and EP2B are located approximately 125 river miles from the nearest TNW, the Gila River between Powers Butte and Gillespie Dam. Evaluation of potential stormwater discharges from the Analysis Area, the hydrological characteristics of the downstream flowpath, the presence of significant impoundments in this flowpath, and the distance to the TNW suggests that no hydrologic connection exists between these Analysis Area drainages and the TNW. Although historic mining activities in the Analysis Area may have contributed to the impairment of Queen Creek for copper, reclamation activities and stormwater controls have significantly reduced or eliminated the discharge of pollutants to downstream receiving waters from this area. However, the reach of the Gila River between the Salt River and Waterman Wash has been sampled for copper, and no exceedances of copper concentrations were identified as part of this sampling effort. As no sources of those pollutants causing the impairment of the downstream TNW reach of the Gila River (which are tied to agricultural runoff) have been identified in the Analysis Area, there does not appear to be a chemical nexus between these drainages and the TNW. Additionally, the Analysis Area drainages do not provide lifecycle support functions, nutrients, or organic carbon to species within the TNW. These drainages, in conjunction with their adjacent wetlands, do not have a more than speculative or insubstantial effect on the physical, chemical, and/or biological integrity of the TNW. Therefore the Analysis Area surface water features do not possess a significant nexus to the TNW reach of the Gila River between Powers Butte and Gillespie Dam, and are not jursidicational under Section 404 of the Clean Water Act.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☒ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: **As described in Section III C 1 above, an evaluation of the surface water features within the review area found that they do not possess a significant nexus with the TNW.**
☐ Other: (explain, if not covered above): **.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☒ Non-wetland waters (i.e., rivers, streams): **11,171** linear feet, **2.3'** width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:WestLand Resources, Inc..
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.

[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:Superior 7.5 Quad.
☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Cooper Aerial Imagery; 2010.
or ☒ Other (Name & Date):Ground Photos; June 27 through July 20, 2011.
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

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SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 07/28/2011

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District, File No. Pending

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Drainages EP1B, EP1B1, EP1B2, EP1C, EP1C4, EP1C1, EP1C3, Wetland 1, Wetland 2, Wetland 3, Wetland 4, Wetland 5

State:AZ County/parish/borough: Pinal City: Superior

Center coordinates of site (lat/long in degree decimal format): Lat. 33.299165° **N**, Long. - 111.057152° **W**.

Universal Transverse Mercator:

Name of nearest waterbody: Queen Creek

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Gila River from Powers Butte to Gillespie Dam

Name of watershed or Hydrologic Unit Code (HUC): 15050100

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: 07/28/2011
☒ Field Determination. Date(s): 06/27 through 07/01/2011, 07/07 ,07/08, 07/19 and 07/20/2011

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **Drainages within the review area are ephemeral, and do not qualify as TNW's or RPW's. Therefore, these drainages would only be considered jurisdictional if they possessed a significant nexus with a TNW. Adjacent wetlands**

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

would only be considered jurisdictional if they possessed a significant nexus with a TNW.None of the drainages in the review area possess a significant nexus with a TNW..

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: 49,650 **square miles**
Drainage area: 1.29 **square miles**
Average annual rainfall: 18 inches
Average annual snowfall: 1.4 inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☒ Tributary flows through **5** tributaries before entering TNW.

Project waters are **30 (or more)** river miles from TNW.
Project waters are **30 (or more)** river miles from RPW.
Project waters are **30 (or more)** aerial (straight) miles from TNW.
Project waters are **30 (or more)** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Identify flow route to TNW[5]: All subject drainages discharge to Drainage EP1. Drainages EP1 discharges directly to Queen Creek. The remainder of the flow route to the TNW is Queen Creek to the East Maricopa Floodway to the Gila River, and approximately 74 river miles along the Gila to the TNW at Powers Butte.
Tributary stream order, if known: .

(b) General Tributary Characteristics (check all that apply):

Tributary is:
☒ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: 3 feet
Average depth: Less than 0.5 feet
Average side slopes: **Vertical (1:1 or less).**

Primary tributary substrate composition (check all that apply):
☐ Silts
☒ Sands
☐ Concrete
☐ Cobbles
☐ Gravel
☐ Muck
☒ Bedrock
☐ Vegetation. Type/% cover:
☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: Stable.
Presence of run/riffle/pool complexes. Explain: Not present.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 3 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Ephemeral.
Other information on duration and volume: .

Surface flow is: **Confined.** Characteristics: .

Subsurface flow: **No**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☒ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank
☐ changes in the character of soil
☐ shelving
☐ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☒ sediment deposition
☒ water staining
☐ other (list):
☐ the presence of litter and debris
☒ destruction of terrestrial vegetation
☐ the presence of wrack line
☒ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):

☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Unknown.
Identify specific pollutants, if known: None.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size:1.39 acres

Wetland type. Explain: Generally, wetlands were dominated by herbaceous vegetation with some woody species.

Wetland quality. Explain: Quality was generally poor due to heavy use by cattle (grazing and watering). Species diversity was low.

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **No Flow** . Explain: .

Surface flow is**: Discrete and confined**

Characteristics: .

Subsurface flow: **Unknown**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☒ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **30 (or more)** river miles from TNW.

Project waters are **30 (or more)** aerial (straight) miles from TNW.

Flow is from: **No Flow.**

Estimate approximate location of wetland as within the **500-year or greater** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: Unknown.

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☒ Vegetation type/percent cover. Explain: Herbaceous, some woody species. Percent cover varies.
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **5**

Approximately (1.39) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
Y	0.19	Y	0.17
Y	0.06	Y	0.86
Y	0.11		

Summarize overall biological, chemical and physical functions being performed: Unknown.

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Drainages EP1B, EP1B1, EP1B2, EP1C, EP1C4, EP1C1, EP1C3, Wetlands 1, 2, 3, 4 and 5 are located approximately 125 river miles from the nearest TNW, the Gila River between Powers Butte and Gillespie Dam. Evaluation of potential stormwater discharges from the Analysis Area, the hydrological characteristics of the downstream flowpath, the presence of significant impoundments in this flowpath, and the distance to the TNW suggests that no hydrologic connection exists between these Analysis Area drainages and the TNW. Although historic mining activities in the Analysis Area may have contributed to the impairment of Queen Creek for copper, reclamation activities and stormwater controls have significantly reduced or eliminated the discharge of pollutants to downstream receiving waters from this area. However, the reach of the Gila River between the Salt River and Waterman Wash has been sampled for copper, and no exceedances of copper concentrations were identified as part of this sampling effort. As no sources of those pollutants causing the impairment of the downstream TNW reach of the Gila River (which are tied to agricultural runoff) have been identified in the Analysis Area, there does not appear to be a chemical nexus between these drainages and the TNW. Additionally, the Analysis Area drainages do not provide lifecycle support functions, nutrients, or organic carbon to species within the TNW. These drainages, in conjunction with their adjacent wetlands, do not have a more than speculative or insubstantial effect on the physical, chemical, and/or biological integrity of the TNW. Therefore the Analysis Area surface water features do not possess a significant nexus to the TNW reach of the Gila River between Powers Butte and Gillespie Dam, and are not jursidicational under Section 404 of the Clean Water Act.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   ☐ TNWs: linear feet width (ft), Or, acres.
   ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   ☐ Tributary waters: linear feet width (ft).
   ☐ Other non-wetland waters: acres.
   Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   ☐ Tributary waters: linear feet width (ft).
   ☐ Other non-wetland waters: acres.
   Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
   ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

   ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☒ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: **As described in Section III C 1 above, an evaluation of the surface water features within the review area found that they do not possess a significant nexus with the TNW.**
☐ Other: (explain, if not covered above): **.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet **,** width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☒ Non-wetland waters (i.e., rivers, streams): **24,306** linear feet, **3'** width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☒ Wetlands: 1.39acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:WestLand Resources, Inc..
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:Superior 7.5 Quad.

[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Cooper Aerial Imagery; 2010.
or ☒ Other (Name & Date):Ground Photos; June 27 through July 20, 2011.
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 07/28/2011

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District, File No. Pending

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Drainages EP1B1a, EP1C4a, EP1C1a, EP1C1b
State:AZ County/parish/borough: Pinal City: Superior
Center coordinates of site (lat/long in degree decimal format): Lat. 33.299165° N, Long. - 111.057152° W.
Universal Transverse Mercator:
Name of nearest waterbody: Queen Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Gila River from Powers Butte to Gillespie Dam
Name of watershed or Hydrologic Unit Code (HUC): 15050100
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: 07/28/2011
☒ Field Determination. Date(s): 06/27 through 07/01/2011, 07/07 ,07/08, 07/19 and 07/20/2011

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **Drainages within the review area are ephemeral, and do not qualify as TNW's or RPW's. Therefore, these drainages would only be considered jurisdictional if they possessed a significant nexus with a TNW. None of the drainages in the review area possess a significant nexus with a TNW.**.

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: 49,650 **square miles**
Drainage area: 1.29 **square miles**
Average annual rainfall: 18 inches
Average annual snowfall: 1.4 inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☒ Tributary flows through **5** tributaries before entering TNW.

Project waters are **30 (or more)** river miles from TNW.
Project waters are **30 (or more)** river miles from RPW.
Project waters are **30 (or more)** aerial (straight) miles from TNW.
Project waters are **30 (or more)** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Identify flow route to TNW[5]: All subject drainages discharge to Drainage EP1. Drainage EP1 discharges directly to Queen Creek. The remainder of the flow route to the TNW is Queen Creek to the East Maricopa Floodway to the Gila River, and approximately 74 river miles along the Gila to the TNW at Powers Butte..
Tributary stream order, if known: .

(b) General Tributary Characteristics (check all that apply):
Tributary is: ☒ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: 2.5 feet
Average depth: Less than 0.5 feet
Average side slopes: **Vertical (1:1 or less).**

Primary tributary substrate composition (check all that apply):
☐ Silts ☒ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☒ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: Stable.
Presence of run/riffle/pool complexes. Explain: Not present.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 3 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Ephemeral.
Other information on duration and volume: .

Surface flow is: **Confined.** Characteristics: .

Subsurface flow: **No**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☒ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank
☐ changes in the character of soil
☐ shelving
☐ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☒ sediment deposition
☒ water staining
☐ other (list):
☐ the presence of litter and debris
☒ destruction of terrestrial vegetation
☐ the presence of wrack line
☒ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community
☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):
☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Unknown.
Identify specific pollutants, if known: None.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately (   ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Drainages EP1B1a, EP1C4a, EP1C1a, EP1C1b are located approximately 125 river miles from the nearest TNW, the Gila River between Powers Butte and Gillespie Dam. Evaluation of potential stormwater discharges from the Analysis Area, the hydrological characteristics of the downstream flowpath, the presence of significant impoundments in this flowpath, and the distance to the TNW suggests that no hydrologic connection exists between these Analysis Area drainages and the TNW. Although historic mining activities in the Analysis Area may have contributed to the impairment of Queen Creek for copper, reclamation activities and stormwater controls have significantly reduced or eliminated the discharge of pollutants to downstream receiving waters from this area. However, the reach of the Gila River between the Salt River and Waterman Wash has been sampled for copper, and no exceedances of copper concentrations were identified as part of this sampling effort. As no sources of those pollutants causing the impairment of the downstream TNW reach of the Gila River (which are tied to agricultural runoff) have been identified in the Analysis Area, there does not appear to be a chemical nexus between these drainages and the TNW. Additionally, the Analysis Area drainages do not provide lifecycle support functions, nutrients, or organic carbon to species within the TNW. These drainages, in conjunction with their adjacent wetlands, do not have a more than speculative or insubstantial effect on the physical, chemical, and/or biological integrity of the TNW. Therefore the Analysis Area surface water features do not possess a significant nexus to the TNW reach of the Gila River between Powers Butte and Gillespie Dam, and are not jursidicational under Section 404 of the Clean Water Act.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   ☐ TNWs: linear feet width (ft), Or, acres.
   ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   ☐ Tributary waters: linear feet width (ft).
   ☐ Other non-wetland waters: acres.
   Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   ☐ Tributary waters: linear feet width (ft).
   ☐ Other non-wetland waters: acres.
   Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
   ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

   ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):

- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  Identify type(s) of waters: **.**
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☒ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: **As described in Section III C 1 above, an evaluation of the surface water features within the review area found that they do not possess a significant nexus with the TNW.**
- ☐ Other: (explain, if not covered above): **.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

- ☒ Non-wetland waters (i.e., rivers, streams): **1,930** linear feet, **2.5'** width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:WestLand Resources, Inc..
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters' study: .
- ☐ U.S. Geological Survey Hydrologic Atlas: .
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name:Superior 7.5 Quad.

[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Cooper Aerial Imagery; 2010.
or ☒ Other (Name & Date):Ground Photos; June 27 through July 20, 2011.
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 07/28/2011

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District, File No. Pending

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Drainages WP1A, WP1A1, WP1A2, WP1A2a, WP1A2b, WP1A3, WP1A4, WP1A4a

State:AZ County/parish/borough: Pinal City: Superior
Center coordinates of site (lat/long in degree decimal format): Lat. 33.302994° **N**, Long. -111.10701° **W**.
Universal Transverse Mercator:
Name of nearest waterbody: Queen Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Gila River from Powers Butte to Gillespie Dam
Name of watershed or Hydrologic Unit Code (HUC): 15050100

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: 07/28/2011
☒ Field Determination. Date(s): 06/27 through 07/01/2011, 07/07 ,07/08, 07/19 and 07/20/2011

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **Drainages within the review area are ephemeral, and do not qualify as TNW's or RPW's. Therefore, these**

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

drainages would only be considered jurisdictional if they possessed a significant nexus with a TNW. None of the drainages in the review area possess a significant nexus with a TNW..

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: 49,650 **square miles**
Drainage area: 0.58 **square miles**
Average annual rainfall: 18 inches
Average annual snowfall: 1.4 inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☒ Tributary flows through **5** tributaries before entering TNW.

Project waters are **30 (or more)** river miles from TNW.
Project waters are **30 (or more)** river miles from RPW.
Project waters are **30 (or more)** aerial (straight) miles from TNW.
Project waters are **30 (or more)** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Identify flow route to TNW[5]: All subject drainages discharge to Silver King Wash and thence to Queen Creek. The remainder of the flow route to the TNW is Queen Creek to the East Maricopa Floodway to the Gila River, and approximately 74 river miles along the Gila to the TNW at Powers Butte..
Tributary stream order, if known: .

(b) General Tributary Characteristics (check all that apply):

Tributary is:
- ☒ Natural
- ☐ Artificial (man-made). Explain: .
- ☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: 2.3 feet
Average depth: Less than 0.5 feet
Average side slopes: **Vertical (1:1 or less).**

Primary tributary substrate composition (check all that apply):
- ☐ Silts
- ☒ Sands
- ☐ Concrete
- ☐ Cobbles
- ☐ Gravel
- ☐ Muck
- ☒ Bedrock
- ☐ Vegetation. Type/% cover:
- ☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: Stable.
Presence of run/riffle/pool complexes. Explain: Not present.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 2 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Ephemeral.
Other information on duration and volume: .

Surface flow is: **Confined.** Characteristics: .

Subsurface flow: **No**. Explain findings: .
- ☐ Dye (or other) test performed: .

Tributary has (check all that apply):
- ☐ Bed and banks
- ☒ OHWM[6] (check all indicators that apply):
  - ☐ clear, natural line impressed on the bank
  - ☐ changes in the character of soil
  - ☐ shelving
  - ☐ vegetation matted down, bent, or absent
  - ☐ leaf litter disturbed or washed away
  - ☒ sediment deposition
  - ☒ water staining
  - ☐ other (list):
  - ☐ the presence of litter and debris
  - ☒ destruction of terrestrial vegetation
  - ☐ the presence of wrack line
  - ☒ sediment sorting
  - ☐ scour
  - ☐ multiple observed or predicted flow events
  - ☐ abrupt change in plant community
- ☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
- ☐ High Tide Line indicated by:
  - ☐ oil or scum line along shore objects
  - ☐ fine shell or debris deposits (foreshore)
  - ☐ physical markings/characteristics
  - ☐ tidal gauges
  - ☐ other (list):
- ☐ Mean High Water Mark indicated by:
  - ☐ survey to available datum;
  - ☐ physical markings;
  - ☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Unknown.
Identify specific pollutants, if known: None.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: WP1A, WP1A1, WP1A2, WP1A2a, WP1A2b, WP1A3, WP1A4 and WP1A4a are located approximately 125 river miles from the nearest TNW, the Gila River between Powers Butte and Gillespie Dam. Evaluation of potential stormwater discharges from the Analysis Area, the hydrological characteristics of the downstream flowpath, the presence of significant impoundments in this flowpath, and the distance to the TNW suggests that no hydrologic connection exists between these Analysis Area drainages and the TNW. Although historic mining activities in the Analysis Area may have contributed to the impairment of Queen Creek for copper, reclamation activities and stormwater controls have significantly reduced or eliminated the discharge of pollutants to downstream receiving waters from this area. However, the reach of the Gila River between the Salt River and Waterman Wash has been sampled for copper, and no exceedances of copper concentrations were identified as part of this sampling effort. As no sources of those pollutants causing the impairment of the downstream TNW reach of the Gila River (which are tied to agricultural runoff) have been identified in the Analysis Area, there does not appear to be a chemical nexus between these drainages and the TNW. Additionally, the Analysis Area drainages do not provide lifecycle support functions, nutrients, or organic carbon to species within the TNW. These drainages, in conjunction with their adjacent wetlands, do not have a more than speculative or insubstantial effect on the physical, chemical, and/or biological integrity of the TNW. Therefore the Analysis Area surface water features do not possess a significant nexus to the TNW reach of the Gila River between Powers Butte and Gillespie Dam, and are not jursidicational under Section 404 of the Clean Water Act.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   ☐ TNWs: linear feet width (ft), Or, acres.
   ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   ☐ Tributary waters: linear feet width (ft).
   ☐ Other non-wetland waters: acres.
   Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   ☐ Tributary waters: linear feet width (ft).
   ☐ Other non-wetland waters: acres.
   Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
   ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

   ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☒ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: **As described in Section III C 1 above, an evaluation of the surface water features within the review area found that they do not possess a significant nexus with the TNW.**
☐ Other: (explain, if not covered above): **.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☒ Non-wetland waters (i.e., rivers, streams): **8,703** linear feet, **2.3'** width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:WestLand Resources, Inc..
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:Superior 7.5 Quad.

[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Cooper Aerial Imagery; 2010.
or ☒ Other (Name & Date):Ground Photos; June 27 through July 20, 2011.
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 07/28/2011

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District, File No. Pending

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Drainages WP2, WP3, WP3A, WP4, WP4A, WP2A
State:AZ County/parish/borough: Pinal City: Superior
Center coordinates of site (lat/long in degree decimal format): Lat. 33.302994° **N**, Long. -111.10701° **W**.
Universal Transverse Mercator:
Name of nearest waterbody: Queen Creek
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Gila River from Powers Butte to Gillespie Dam
Name of watershed or Hydrologic Unit Code (HUC): 15050100
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):
☒ Office (Desk) Determination. Date: 07/28/2011
☒ Field Determination. Date(s): 06/27 through 07/01/2011, 07/07 ,07/08, 07/19 and 07/20/2011

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]
☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
   ☐ TNWs, including territorial seas
   ☐ Wetlands adjacent to TNWs
   ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   ☐ Non-RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   ☐ Impoundments of jurisdictional waters
   ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: linear feet: width (ft) and/or acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
   Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]
   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **Drainages within the review area are ephemeral, and do not qualify as TNW's or RPW's. Therefore, these drainages would only be considered jurisdictional if they possessed a significant nexus with a TNW. None of the drainages in the review area possess a significant nexus with a TNW.**.

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW

Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW

Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:

Watershed size: 49,650 **square miles**
Drainage area: 0.29 **square miles**
Average annual rainfall: 18 inches
Average annual snowfall: 1.4 inches

(ii) Physical Characteristics:

(a) Relationship with TNW:

☐ Tributary flows directly into TNW.
☒ Tributary flows through **5** tributaries before entering TNW.

Project waters are **30 (or more)** river miles from TNW.
Project waters are **30 (or more)** river miles from RPW.
Project waters are **30 (or more)** aerial (straight) miles from TNW.
Project waters are **30 (or more)** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.

Identify flow route to TNW[5]: All subject drainages discharge to unnamed tributaries of Queen Creek and thence to Queen Creek. The remainder of the flow route to the TNW is Queen Creek to the East Maricopa Floodway to the Gila River, and approximately 74 river miles along the Gila to the TNW at Powers Butte.
Tributary stream order, if known: .

(b) General Tributary Characteristics (check all that apply):

Tributary is:
☒ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: 2.43 feet
Average depth: Less than 0.5 feet
Average side slopes: **Vertical (1:1 or less).**

Primary tributary substrate composition (check all that apply):
☐ Silts ☒ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☒ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: Stable.
Presence of run/riffle/pool complexes. Explain: Not present.
Tributary geometry: **Meandering**
Tributary gradient (approximate average slope): 2 %

(c) Flow:
Tributary provides for: **Ephemeral flow**
Estimate average number of flow events in review area/year: **2-5**
Describe flow regime: Ephemeral.
Other information on duration and volume: .

Surface flow is: **Confined.** Characteristics: .

Subsurface flow: **No**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☒ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank
☐ changes in the character of soil
☐ shelving
☐ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☒ sediment deposition
☒ water staining
☐ other (list):
☐ the presence of litter and debris
☒ destruction of terrestrial vegetation
☐ the presence of wrack line
☒ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community
☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):
☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.
[6] A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7] Ibid.

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Unknown.
Identify specific pollutants, if known: None.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Drainages WP2, WP2A, WP3, WP3A, WP4 and WP4A are located approximately 125 river miles from the nearest TNW, the Gila River between Powers Butte and Gillespie Dam. Evaluation of potential stormwater discharges from the Analysis Area, the hydrological characteristics of the downstream flowpath, the presence of significant impoundments in this flowpath, and the distance to the TNW suggests that no hydrologic connection exists between these Analysis Area drainages and the TNW. Although historic mining activities in the Analysis Area may have contributed to the impairment of Queen Creek for copper, reclamation activities and stormwater controls have significantly reduced or eliminated the discharge of pollutants to downstream receiving waters from this area. However, the reach of the Gila River between the Salt River and Waterman Wash has been sampled for copper, and no exceedances of copper concentrations were identified as part of this sampling effort. As no sources of those pollutants causing the impairment of the downstream TNW reach of the Gila River (which are tied to agricultural runoff) have been identified in the Analysis Area, there does not appear to be a chemical nexus between these drainages and the TNW. Additionally, the Analysis Area drainages do not provide lifecycle support functions, nutrients, or organic carbon to species within the TNW. These drainages, in conjunction with their adjacent wetlands, do not have a more than speculative or insubstantial effect on the physical, chemical, and/or biological integrity of the TNW. Therefore the Analysis Area surface water features do not possess a significant nexus to the TNW reach of the Gila River between Powers Butte and Gillespie Dam, and are not jursidicational under Section 404 of the Clean Water Act.

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

   Provide estimates for jurisdictional waters in the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
   - ☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional waters within the review area (check all that apply):
   - ☐ Tributary waters: linear feet width (ft).
   - ☐ Other non-wetland waters: acres.
     Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**
     - ☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
   - ☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

   Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
   - ☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

   Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
   As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
   - ☐ Demonstrate that impoundment was created from "waters of the U.S.," or
   - ☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
   - ☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

- ☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
- ☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- ☐ which are or could be used for industrial purposes by industries in interstate commerce.
- ☐ Interstate isolated waters. Explain: .
- ☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):

- ☐ Tributary waters: linear feet width (ft).
- ☐ Other non-wetland waters: acres.
  - Identify type(s) of waters: **.**
- ☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

- ☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
- ☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  - ☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
- ☒ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: **As described in Section III C 1 above, an evaluation of the surface water features within the review area found that they do not possess a significant nexus with the TNW.**
- ☐ Other: (explain, if not covered above): **.**

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

- ☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

- ☒ Non-wetland waters (i.e., rivers, streams): **9,879** linear feet, **2.43'** width (ft).
- ☐ Lakes/ponds: acres.
- ☐ Other non-wetland waters: acres. List type of aquatic resource: .
- ☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:WestLand Resources, Inc..
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☐ Office concurs with data sheets/delineation report.
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps: .
- ☐ Corps navigable waters' study: .
- ☐ U.S. Geological Survey Hydrologic Atlas: .
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name:Superior 7.5 Quad.

[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Cooper Aerial Imagery; 2010.
or ☒ Other (Name & Date):Ground Photos; June 27 through July 20, 2011.
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 07/28/2011

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District, File No. Pending

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Wetland 9

State:AZ County/parish/borough: Pinal City: Superior

Center coordinates of site (lat/long in degree decimal format): Lat. 33.299165° **N**, Long. -111.057152° **W**.

Universal Transverse Mercator:

Name of nearest waterbody: Queen Creek

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Gila River from Powers Butte to Gillespie Dam

Name of watershed or Hydrologic Unit Code (HUC): 15050100

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: 07/28/2011

☒ Field Determination. Date(s): 06/27 through 07/01/2011, 07/07 ,07/08, 07/19 and 07/20/2011

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**

   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]

   ☐ TNWs, including territorial seas
   ☐ Wetlands adjacent to TNWs
   ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   ☐ Non-RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   ☐ Impoundments of jurisdictional waters
   ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: linear feet: width (ft) and/or acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
   Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]

   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **The wetlands considered here are isolated with no nexus to interstate commerce, and are therfore non-jurisdictional**.

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: **square miles**
Drainage area: **square miles**
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW[5]: .
Tributary stream order, if known: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain: .		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: Ephemeral.
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):

☐ clear, natural line impressed on the bank	☐ the presence of litter and debris
☐ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Unknown.
Identify specific pollutants, if known: None.

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: Unknown.

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow “seasonally” (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

Provide estimates for jurisdictional waters in the review area (check all that apply):

☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
  Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
  ☒ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):

☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☒ Wetlands: 0.19 acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):

☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):

☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:WestLand Resources, Inc..
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  ☐ Office concurs with data sheets/delineation report.
  ☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
  ☐ USGS NHD data.
  ☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:Superior 7.5 Quad.
☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Cooper Aerial Imagery; 2010.
  or ☒ Other (Name & Date):Ground Photos; June 27 through July 20, 2011.
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): 07/28/2011

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: Los Angeles District, File No. Pending

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Wetland 10, Wetland 11, Wetland 12

State:AZ County/parish/borough: Pinal City: Superior

Center coordinates of site (lat/long in degree decimal format): Lat. 33.302994° **N**, Long. - 111.10701° **W**.

Universal Transverse Mercator:

Name of nearest waterbody: Queen Creek

Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Gila River from Powers Butte to Gillespie Dam

Name of watershed or Hydrologic Unit Code (HUC): 15050100

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.

☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: 07/28/2011

☒ Field Determination. Date(s): 06/27 through 07/01/2011, 07/07 ,07/08, 07/19 and 07/20/2011

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.

☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce. Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**

   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]

   ☐ TNWs, including territorial seas
   ☐ Wetlands adjacent to TNWs
   ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
   ☐ Non-RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
   ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
   ☐ Impoundments of jurisdictional waters
   ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
   Non-wetland waters: linear feet: width (ft) and/or acres.
   Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
   Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]

   ☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **The wetlands considered here are isolated with no nexus to interstate commerce, and are therfore non-jurisdictional**.

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. **TNW**
   Identify TNW: .

   Summarize rationale supporting determination: .

2. **Wetland adjacent to TNW**
   Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. **Characteristics of non-TNWs that flow directly or indirectly into TNW**

   (i) General Area Conditions:
   Watershed size: **square miles**
   Drainage area: **square miles**
   Average annual rainfall: inches
   Average annual snowfall: inches

   (ii) Physical Characteristics:
   (a) Relationship with TNW:
   ☐ Tributary flows directly into TNW.
   ☐ Tributary flows through **Pick List** tributaries before entering TNW.

   Project waters are **Pick List** river miles from TNW.
   Project waters are **Pick List** river miles from RPW.
   Project waters are **Pick List** aerial (straight) miles from TNW.
   Project waters are **Pick List** aerial (straight) miles from RPW.
   Project waters cross or serve as state boundaries. Explain: .

   Identify flow route to TNW[5]: .
   Tributary stream order, if known: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):
☐ Silts ☐ Sands ☐ Concrete
☐ Cobbles ☐ Gravel ☐ Muck
☐ Bedrock ☐ Vegetation. Type/% cover:
☐ Other. Explain: .

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:

Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: Ephemeral.
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):
☐ clear, natural line impressed on the bank
☐ changes in the character of soil
☐ shelving
☐ vegetation matted down, bent, or absent
☐ leaf litter disturbed or washed away
☐ sediment deposition
☐ water staining
☐ other (list):
☐ the presence of litter and debris
☐ destruction of terrestrial vegetation
☐ the presence of wrack line
☐ sediment sorting
☐ scour
☐ multiple observed or predicted flow events
☐ abrupt change in plant community
☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):
☐ High Tide Line indicated by:
☐ oil or scum line along shore objects
☐ fine shell or debris deposits (foreshore)
☐ physical markings/characteristics
☐ tidal gauges
☐ other (list):
☐ Mean High Water Mark indicated by:
☐ survey to available datum;
☐ physical markings;
☐ vegetation lines/changes in vegetation types.

(iii) Chemical Characteristics:

Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: Unknown.
Identify specific pollutants, if known: None.

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

☐ Riparian corridor. Characteristics (type, average width): .
☐ Wetland fringe. Characteristics: .
☐ Habitat for:
- ☐ Federally Listed species. Explain findings: .
- ☐ Fish/spawn areas. Explain findings: .
- ☐ Other environmentally-sensitive species. Explain findings: .
- ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:
Properties:
Wetland size: acres
Wetland type. Explain: .
Wetland quality. Explain: .
Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:
Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**
Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:
☐ Directly abutting
☐ Not directly abutting
- ☐ Discrete wetland hydrologic connection. Explain: .
- ☐ Ecological connection. Explain: .
- ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW
Project wetlands are **Pick List** river miles from TNW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Flow is from: **Pick List.**
Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: Unknown.
Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

☐ Riparian buffer. Characteristics (type, average width): .
☐ Vegetation type/percent cover. Explain: .
☐ Habitat for:
- ☐ Federally Listed species. Explain findings: .
- ☐ Fish/spawn areas. Explain findings: .
- ☐ Other environmentally-sensitive species. Explain findings: .
- ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**
Approximately (   ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   ☐ TNWs: linear feet width (ft), Or, acres.
   ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. Non-RPWs[8] that flow directly or indirectly into TNWs.

☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: **.**

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.

☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: **.**

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.

☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.

☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.[9]

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):

☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☒ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☒ Wetlands: 0.59 acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:WestLand Resources, Inc..
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:Superior 7.5 Quad.
☐ USDA Natural Resources Conservation Service Soil Survey. Citation: .
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):Cooper Aerial Imagery; 2010.
or ☒ Other (Name & Date):Ground Photos; June 27 through July 20, 2011 .
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

B. ADDITIONAL COMMENTS TO SUPPORT JD: .

ATTACHMENT 5

REPRESENTATIVE GROUND PHOTOS

ATTACHMENT 5a

REPRESENTATIVE GROUND PHOTOS

EAST PLANT

Data Point: EP1-1
Width: 10 Feet
View: Upstream
Sheet: East Plant A1

Data Point: EP1-1
Width: 10 Feet
View: Downstream
Sheet: East Plant A1

WestLand Resources, Inc.
Engineering and Environmental Consultants

Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

PHOTOSHEET 1

Data Point: EP1-2
Width: 10 Feet
View: Upstream
Sheet: East Plant A1

Data Point: EP1-2
Width: 10 Feet
View: Downstream
Sheet: East Plant A1

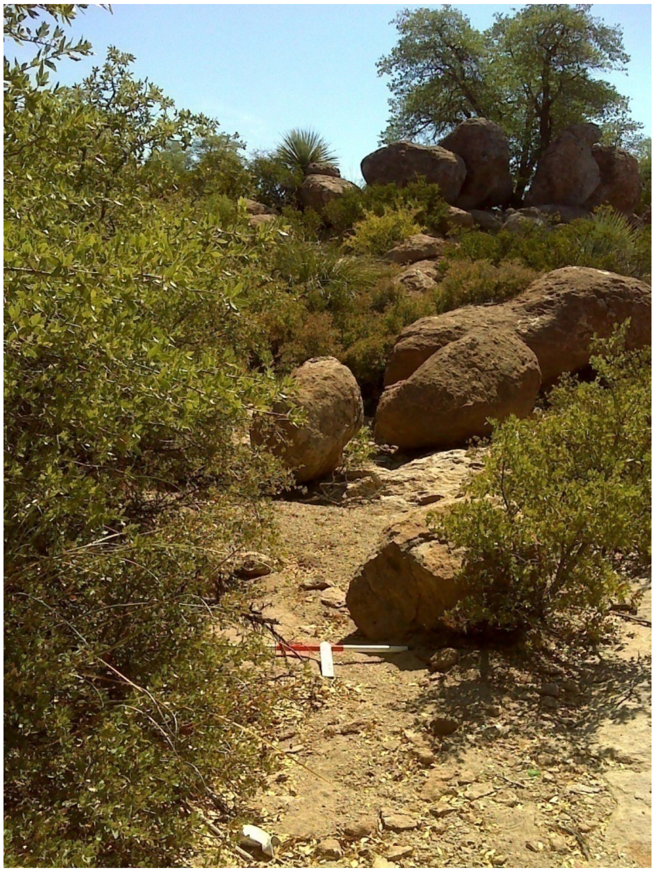
Data Point: EP1A-1
Width: 2 Feet
View: Upstream
Sheet: East Plant A1

Data Point: EP1A-1
Width: 2 Feet
View: Downstream
Sheet: East Plant A1

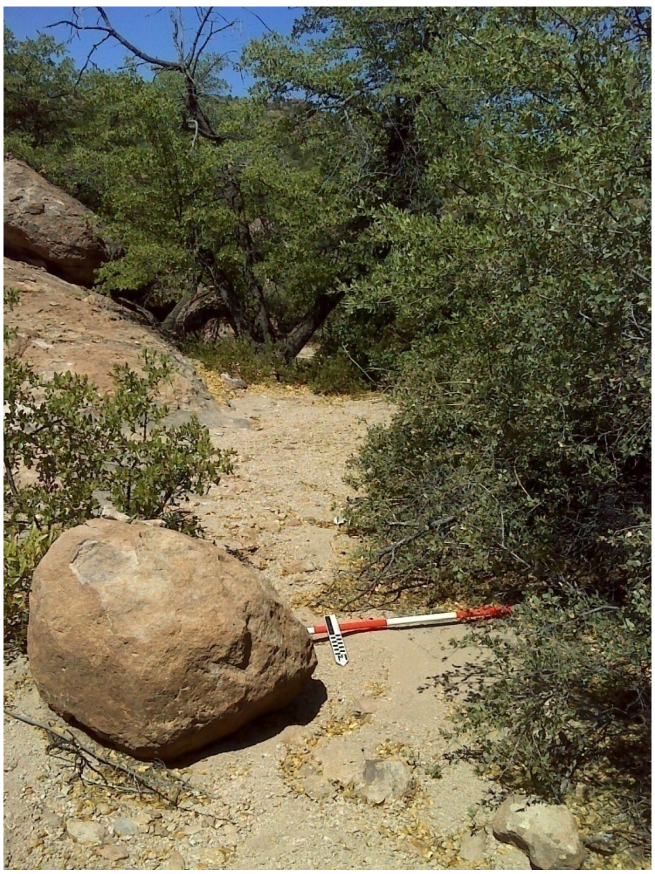
Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

PHOTOSHEET 3

WestLand Resources, Inc.
Engineering and Environmental Consultants



Data Point: EP1A-2
Width: 2 Feet
View: Upstream
Sheet: East Plant A1



Data Point: EP1A-2
Width: 2 Feet
View: Downstream
Sheet: East Plant A1

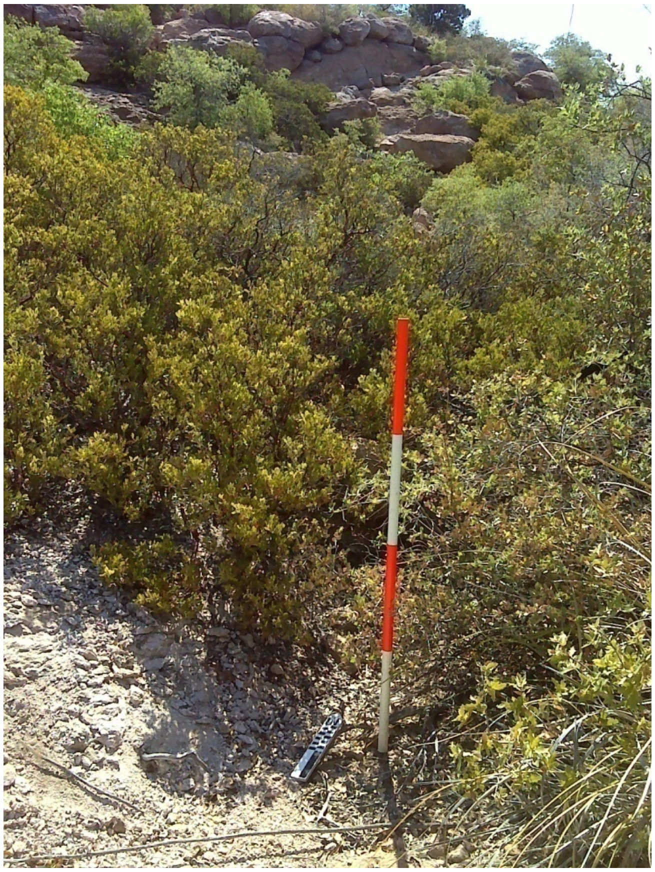
Data Point: EP1A-3
Width: 2.5 Feet
View: Upstream
Sheet: East Plant A1

Data Point: EP1A-3
Width: 2.5 Feet
View: Downstream
Sheet: East Plant A1

Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

PHOTOSHEET 5

WestLand Resources, Inc.
Engineering and Environmental Consultants



Data Point: EP1A-4
Width: N/A
View: Upland
Sheet: East Plant A1

Data Point: EP1B-1
Width: 4 Feet
View: Upstream
Sheet: East Plant A1

Data Point: EP1B-1
Width: 4 Feet
View: Downstream
Sheet: East Plant A1

Data Point: EP1B-2
Width: 5 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1B-2
Width: 5 Feet
View: Downstream
Sheet: East Plant B

Data Point: EP1B-3
Feature: Tinaja
Sheet: East Plant B1

Data Point: EP1B-4
Feature: Wetland Area 1
Sheet: East Plant B1

Data Point: EP1B1-1
Width: 3.5 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1B1-1
Width: 3.5 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1B1-2
Width: 2 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1B1-2
Width: 2 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1B1-3
Width: 2 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1B1-3
Width: 2 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1B1-4
Width: N/A
View: Upland
Sheet: East Plant B1

Data Point: EP1B1a-1
Width: N/A
View: Upland
Sheet: East Plant B1

Data Point: EP1B2-1
Width: 4 Feet
View: Upstream
Sheet: East Plant B1

Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

PHOTOSHEET 13

WestLand Resources, Inc.
Engineering and Environmental Consultants

Data Point: EP1B2-1
Width: 4 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1B2-2
Width: 3 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1B2-2
Width: 3 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1B2-3
Width: 3 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1B2-3
Width: 3 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C-1
Width: 3 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C-1
Width: 3 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C-2
Width: 5 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C-2
Width: 5 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C-3
Width: 4 Feet
View: Upstream
Sheet: East Plant B1

Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

PHOTOSHEET 18

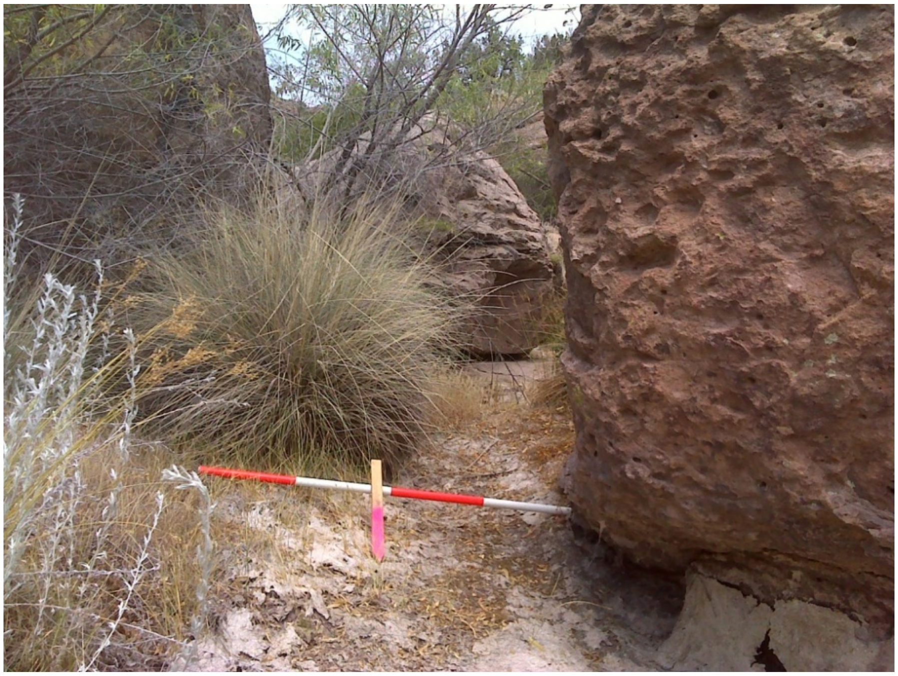
WestLand Resources, Inc.
Engineering and Environmental Consultants

Data Point: EP1C-3
Width: 4 Feet
View: Downstream
Sheet: East Plant C1

Data Point: EP1C-4
Width: 3 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C-4
Width: 3 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C-5
Width: 2.5 Feet
View: Upstream
Sheet: East Plant B1



Data Point: EP1C-5
Width: 2.5 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C-6
Width: 4 Feet
View: Upstream
Sheet: East Plant C1

Data Point: EP1C-6
Width: 4 Feet
View: Downstream
Sheet: East Plant C1

Data Point: EP1C-7
Width: N/A
View: Upland
Sheet: East Plant C1

Photo shows that OHWM indicators not present above this point.

Data Point: EP1C-7
Width: 1 Feet
View: Downstream
Sheet: East Plant C1

Data Point: EP1C1-1
Width: 4 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C1-1
Width: 4 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C1-2
Width: 4 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C1-3
Width: 5 Feet
View: Upstream
Sheet: East Plant B1

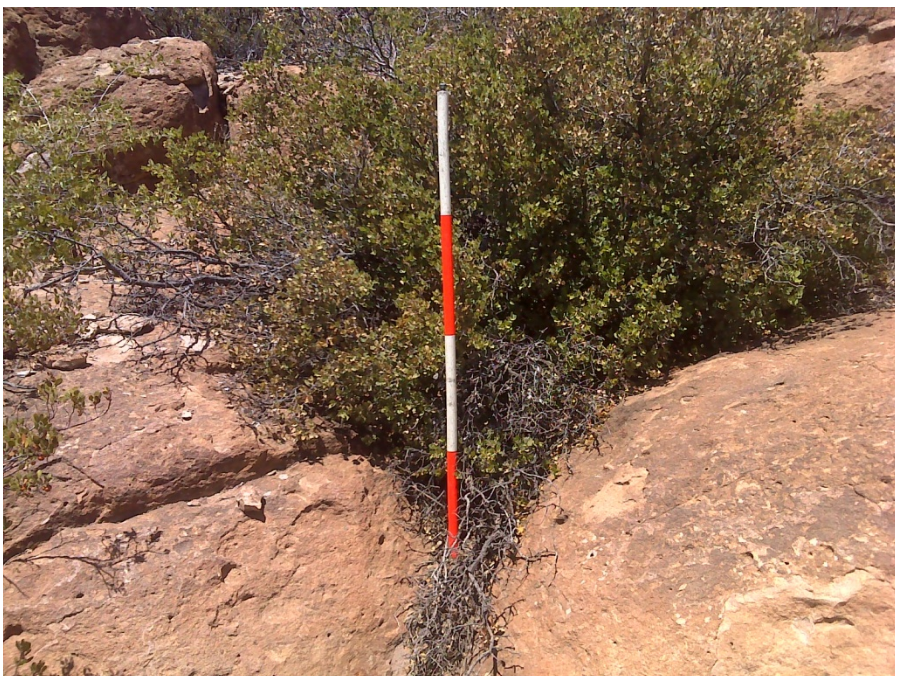
Data Point: EP1C1-3
Width: 5 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C1-4
Width: N/A
View: Upland
Sheet: East Plant B1

Photo shows that OHWM indicators are not present above this point.

Data Point: EP1C1a-1
Width: 3 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C1a-1
Width: 3 Feet
View: Downstream
Sheet: East Plant B1



Data Point: EP1C1a-2
Width: N/A
View: Upland
Sheet: East Plant B1

Data Point: EP1C1b-1
Width: 3 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C2-1
Width: 12 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C2-1
Width: 12 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C2-2
Width: 9 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C2-2
Width: 9 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1C2-3
Width: 4 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1C2-3
Width: 4 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1C2-4
Feature: Tinaja
Sheet: East Plant B2

Data Point: EP1C2-5
Width: 3 Feet
View: Upstream
Sheet: East Plant C2

Data Point: EP1C2-5
Width: 3 Feet
View: Downstream
Sheet: East Plant C2

Data Point: EP1C2-6
Width: 3 Feet
View: Upstream
Sheet: East Plant C2

Data Point: EP1C2-6
Width: 3 Feet
View: Downstream
Sheet: East Plant C2

Data Point: EP1C2-7
Width: 3 Feet
View: Upstream
Sheet: East Plant C2

Photo shows that OHWM indicators are minimal above this point.

Data Point: EP1C2-7
Width: 3 Feet
View: Downstream
Sheet: East Plant C2

Data Point: EP1C2a-1
Width: 2 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C2a-1
Width: 2 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C2a-2
Width: N/A
View: Upland
Sheet: East Plant B1

Data Point: EP1C2b-1
Width: 2 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1C2b-1
Width: 2 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1C2c-1
Width: 2 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1C2c-1
Width: 2 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1C2c-2
Width: N/A
View: Upland
Sheet: East Plant C2

Data Point: EP1C2c-2
Width: N/A
View: Upland
Sheet: East Plant C2

Data Point: EP1C3-1
Width: 5 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C3-1
Width: 5 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C3-2
Width: 4 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C3-2
Width: 4 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C3-3
Width: 4.5 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C3-3
Width: 4.5 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C3-4
Width: 4 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C3-4
Width: 4 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C3-5
Width: 4 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C3-6
Width: N/A
View: Upland
Sheet: East Plant B1

Photo shows that OHWM indicators are not present above this point.

Data Point: EP1C4-1
Width: 3 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1C4-1
Width: 3 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C4-2
Width: N/A
View: Top of drainage
Sheet: East Plant C1

Data Point: EP1C4-2
Width: 1 Feet
View: Downstream
Sheet: East Plant C1

Data Point: EP1C4a-1
Width: N/A
View: Upland
Sheet: East Plant B1

Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

PHOTOSHEET 46

WestLand Resources, Inc.
Engineering and Environmental Consultants

Data Point: EP1C4a-1
Width: 2 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1C5-1
Width: N/A
View: Upland
Sheet: East Plant C1

Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

PHOTOSHEET 47

WestLand Resources, Inc.
Engineering and Environmental Consultants

Data Point: EP1D-1
Width: Culvert is 5 Feet in diameter
View: Upstream
Sheet: East Plant B1

Data Point: EP1D-1
Width: 8 Feet
View: Downstream
Sheet: East Plant B1

Data Point: EP1D-2
Width: 7 Feet
View: Upstream
Sheet: East Plant B1

Data Point: EP1D-2
Width: 7 Feet
View: Downstream
Sheet: East Plant B1

WestLand Resources, Inc.
Engineering and Environmental Consultants

Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

Data Point: EP1D-3
Width: 9 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1D-3
Width: 9 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1D1-1
Width: 5 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1D1-1
Width: 5 Feet
View: Downstream
Sheet: East Plant B2

WestLand Resources, Inc.
Engineering and Environmental Consultants

Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

Data Point: EP1D1-2
Width: N/A
View: Upland
Sheet: East Plant B2

Data Point: EP1D1-2
Width: 2.5 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1D2-1
Width: 4 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1D2-1
Width: 4 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1D2-2
Width: 4 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1D2-2
Width: 4 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1D2-3
Width: 9 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1D2-4
Width: 6 feet
View: Upland
Sheet: East Plant B2

Top of drainage

Data Point: EP1D2a-1
Width: 2.5 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1D2a-1
Width: 2.5 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1D2a-2
Width: 3 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1D2a-2
Width: 3 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1D3-1
Width: 3 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1D3-1
Width: 3 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1D3a-1
Width: 4 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1D3a-1
Width: 4 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1D3b-1
Width: 6 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1D3b-1
Width: 6 Feet
View: Downstream
Sheet: East Plant B2

Photo shows dirt road crossing drainage.

Data Point: EP1D3b-2
Width: 2 Feet
View: Upstream
Sheet: East Plant B2

Photo shows poor OHWM development.

Data Point: EP1D3b-2
Width: 2 Feet
View: Downstream
Sheet: East Plant B2

Photo shows poor OHWM development.

Data Point: EP1D3b1-1
Width: N/A
View: Upland
Sheet: East Plant B2

Data Point: EP1D3b2-1
Width: 3 Feet
View: Upstream
Sheet: East Plant B2

WestLand Resources, Inc.
Engineering and Environmental Consultants

Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

Data Point: EP1D3b2-1
Width: 3 Feet
View: Downstream
Sheet: East Plant B2

Data Point: EP1D3b2-2
Width: N/A
View: Upland
Sheet: East Plant B2

Data Point: EP1D3b3-1
Width: N/A
View: Upland
Sheet: East Plant B2

Data Point: EP1D3b3-1
Width: N/A
View: Upland
Sheet: East Plant B2

Data Point: EP1D3b4-1
Width: N/A
View: Upstream
Sheet: East Plant B2

Historic check dam visible in photo.

Data Point: EP1D3c-1
Width: 3 Feet
View: Upstream
Sheet: East Plant B2

Data Point: EP1D3c-2
Width: 3 Feet
View: Upstream
Sheet: East Plant A2

Data Point: EP1D3c-2
Width: 3 Feet
View: Downstream
Sheet: East Plant A2

Data Point: EP1D3c-3
Width: N/A
View: Upland
Sheet: East Plant A2

Road crossing in background. No OHWM development above this point.

Data Point: EP2-1
Width: 3 Feet
View: Upstream
Sheet: East Plant A1

Data Point: EP2-1
Width: 3 Feet
View: Downstream
Sheet: East Plant A1

Data Point: EP2-2
Width: 3 Feet
View: Upstream
Sheet: East Plant A1

Data Point: EP2-2
Width: 3 Feet
View: Downstream
Sheet: East Plant A1

Data Point: EP2-3
Width: 12 Feet
View: Upstream
Sheet: East Plant A2

Data Point: EP2-3
Width: 12 Feet
View: Downstream
Sheet: East Plant A2

Data Point: EP2-4
Width: 6 Feet
View: Upstream
Sheet: East Plant A2

WestLand Resources, Inc.
Engineering and Environmental Consultants

Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

PHOTOSHEET 70

Data Point: EP2-4
Width: 6 Feet
View: Downstream
Sheet: East Plant A2

Data Point: EP2-5
Width: 6 Feet
View: Upstream
Sheet: East Plant A2

Drainages affected by campground use in Oak Flat area.

Data Point: EP2-5
Width: 6 Feet
View: Downstream
Sheet: East Plant A2

Drainages affected by campground use in Oak Flat area.

Data Point: EP2-6
Width: 4 Feet
View: Upstream
Sheet: East Plant A2

WestLand Resources, Inc.
Engineering and Environmental Consultants

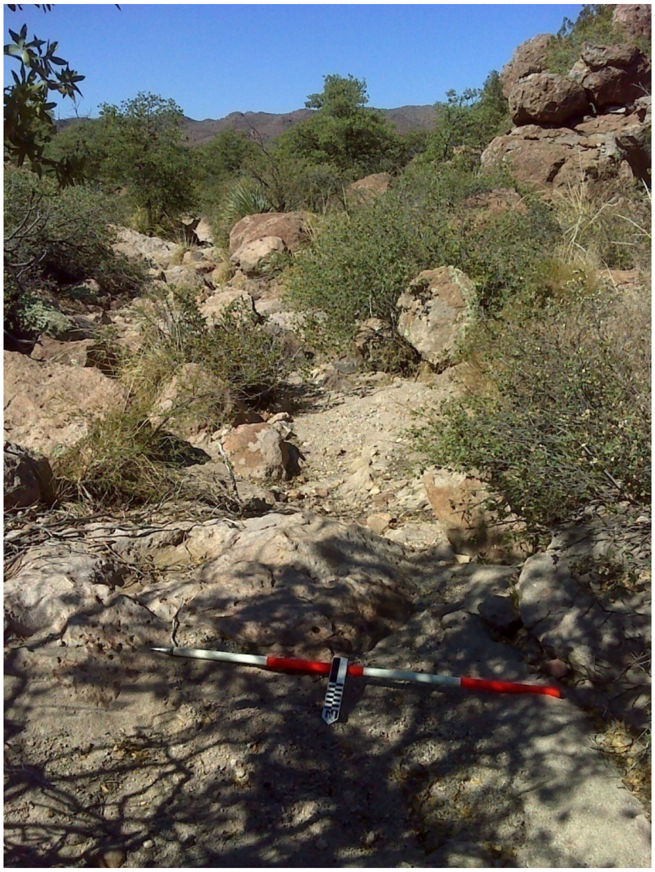
Data Point: EP2-6
Width: 4 Feet
View: Downstream
Sheet: East Plant A2

Data Point: EP2-7
Width: 4 Feet
View: Upstream
Sheet: East Plant A2

Resolution Copper Mining
Jurisdictional Delineation
East Plant Analysis Area

PHOTOSHEET 73

WestLand Resources, Inc.
Engineering and Environmental Consultants

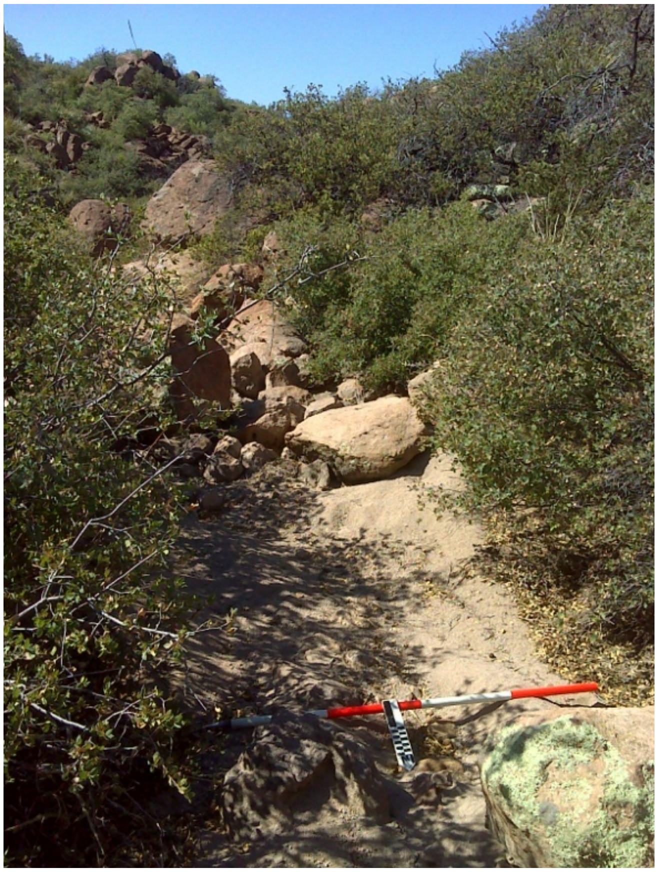


Data Point: EP2-7
Width: 4 Feet
View: Downstream
Sheet: East Plant A2

Data Point: EP2-8
Width: 5 Feet
View: Upstream
Sheet: East Plant A2

Data Point: EP2-8
Width: 5 Feet
View: Downstream
Sheet: East Plant A2

Data Point: EP2-9
Width: 4 Feet
View: Upstream
Sheet: East Plant A2



Data Point: EP2-9
Width: 4 Feet
View: Downstream
Sheet: East Plant A2

Data Point: EP2A-1
Width: 2 Feet
View: Upstream
Sheet: East Plant A1

Data Point: EP2A-1
Width: 2 Feet
View: Downstream
Sheet: East Plant A1

Data Point: EP2B-1
Width: 4 Feet
View: Upstream
Sheet: East Plant A1

Photo shows box culvert under U.S. Highway 60

ATTACHMENT 5b

REPRESENTATIVE GROUND PHOTOS

WEST PLANT

Data Point: WP1A-1
Width: N/A
View: Upstream
Sheet: West Plant A1

Photo shows view of pond.

Data Point: WP1A-1
Width: N/A
View: Upstream
Sheet: West Plant A1

Data Point: WP1A-2
Width: 2 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A-2
Width: 2 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP1A-3
Width: 2 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A-3
Width: 2 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP1A-4
Width: 2 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A-4
Width: 2 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP1A-5
Width: 1 Foot
View: Upstream
Sheet: West Plant A1

Photo shows outfall of Apex Tunnel.

Data Point: WP1A-5
Width: 1 Foot
View: Downstream
Sheet: West Plant A1

Data Point: WP1A1-1
Width: N/A
View: Upland
Sheet: West Plant A1

Data Point: WP1A2-1
Width: N/A
View: Downstream view of Apex Tunnel entrance
Sheet: West Plant A1

No identifiable channel. Sheetflow only.

Data Point: WP1A2a-1
Width: 2.5 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A2a-1
Width: 2.5 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP1A2b-1
Width: 1.5 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A2b-1
Width: 1.5 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP1A2b-2
Width: N/A
View: Upland
Sheet: West Plant A1

Photo shows that OHWM indicators are not present above this point.

Data Point: WP1A3-1
Width: N/A
View: Upstream
Sheet: West Plant A1

No identifiable channel. Sheetflow only.

Data Point: WP1A3-1
Width: N/A
View: Downstream
Sheet: West Plant A1

No identifiable channel. Sheetflow only.

Data Point: WP1A3-2
Width: 2 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A3-2
Width: 2 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP1A3-3
Width: N/A
View: Upland
Sheet: West Plant A1

No OHWM indicators above this point.

Data Point: WP1A4-1
Width: 3 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A4-1
Width: 3 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP1A4-2
Width: 5 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A4-2
Width: 5 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP1A4-3
Width: N/A
View: Downstream
Sheet: West Plant A1

Photo shows a blockage at the road.

Data Point: WP1A4-4
Width: 2 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A4-4
Width: 2 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP1A4-5
Width: N/A
View: Upland
Sheet: West Plant A1

Data Point: WP1A4a-1
Width: 3 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A4a-1
Width: 3 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP1A4a-2
Width: 3 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A4a-2
Width: 3 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP1A4a-3
Width: 2.5 Feet
View: Upstream
Sheet: West Plant A1

Data Point: WP1A4a-3
Width: 2.5 Feet
View: Downstream
Sheet: West Plant A1

Data Point: WP2-1
Width: 3 Feet
View: Upstream
Sheet: West Plant B1

Data Point: WP2-1
Width: 3 Feet
View: Downstream
Sheet: West Plant B1

Data Point: WP2-2
Width: 3 Feet
View: Upstream
Sheet: West Plant B1

Data Point: WP2-2
Width: 3 Feet
View: Downstream
Sheet: West Plant B1

Data Point: WP2-3
Width: 2.5 Feet
View: Upstream
Sheet: West Plant B1

Data Point: WP2-3
Width: 2.5 Feet
View: Downstream
Sheet: West Plant B1

Data Point: WP2-4
Width: 2.5 Feet
View: Upstream
Sheet: West Plant B1

Data Point: WP2-4
Width: 2.5 Feet
View: Downstream
Sheet: West Plant B1

Data Point: WP2-5
Width: 3.5 Feet
View: Upland
Sheet: West Plant B1

Photo shows no OHWM indicators beyond this point.

Data Point: WP2-5
Width: 3.5 Feet
View: Downstream
Sheet: West Plant B1

Data Point: WP2-6
Width: N/A
View: Upland
Sheet: West Plant B1

Photo shows that OHWM indicators are not present.

Data Point: WP2A-1
Width: 2 Feet
View: Upstream
Sheet: West Plant B1

Data Point: WP2A-1
Width: 2 Feet
View: Downstream
Sheet: West Plant B1

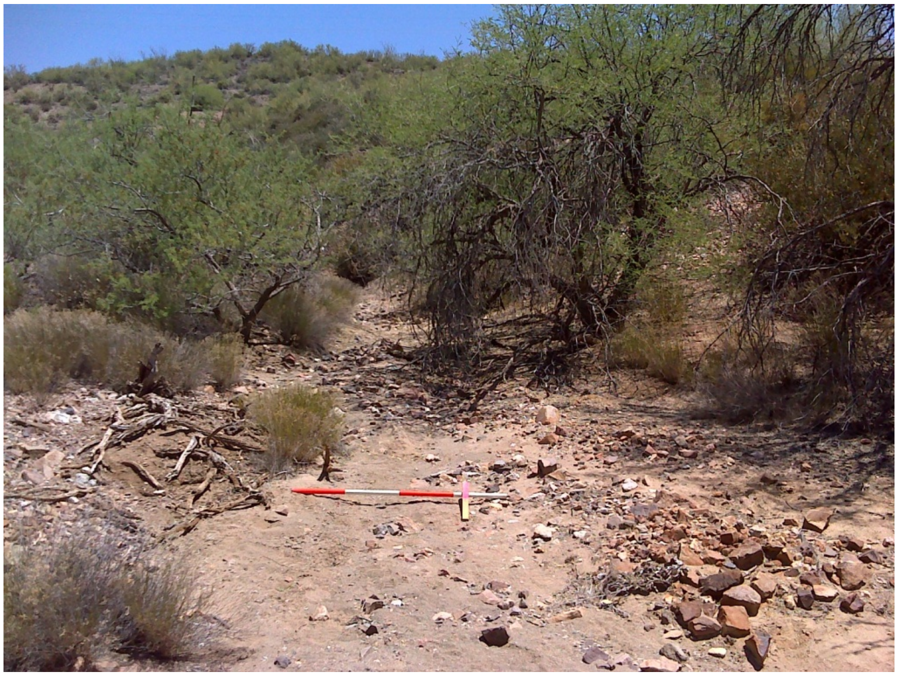
Data Point: WP2A-2
Width: N/A
View: Upland
Sheet: West Plant B1

Data Point: WP3-1
Width: N/A
View: Upstream
Sheet: West Plant C1

Photo shows overview of ponding area. No channel with OHWM leaving the area.

Data Point: WP3-2
Width: 2 Feet
View: Downstream
Sheet: West Plant C1

Photo shows culvert underneath the railroad.

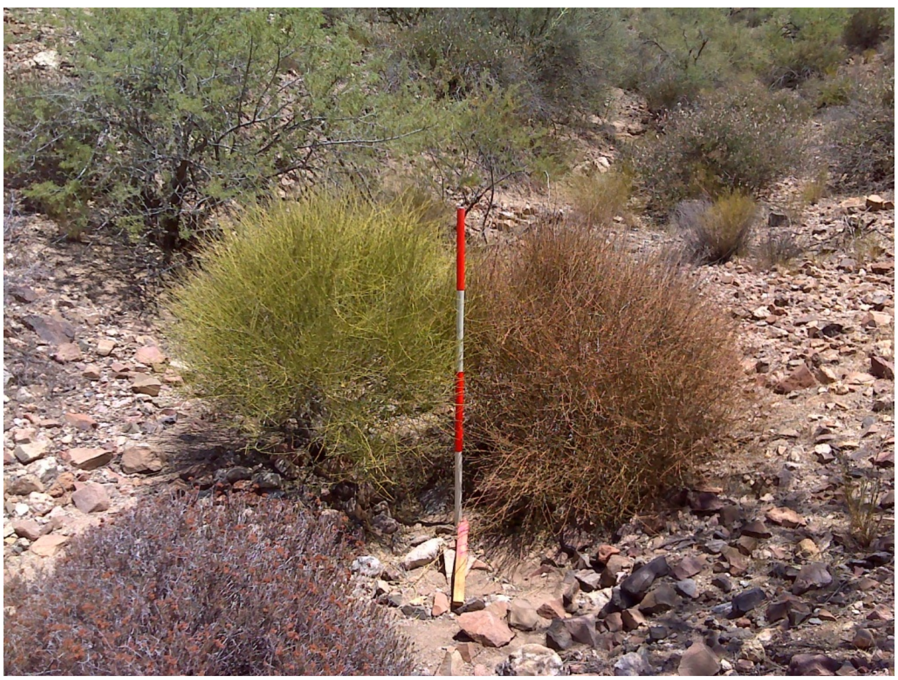


Data Point: WP3-3
Width: 2 Feet
View: Upstream
Sheet: West Plant C1

Data Point: WP3-3
Width: 2 Feet
View: Downstream
Sheet: West Plant C1

No identifiable channel.
Sheetflow only.

Data Point: WP3-4
Width: N/A
View: Upland
Sheet: West Plant C1



Data Point: WP3a-1
Width: N/A
View: Upland
Sheet: West Plant C1

Data Point: WP4-1
Width: 5 Feet
View: Upstream
Sheet: West Plant C1

Data Point: WP4-1
Width: 5 Feet
View: Downstream
Sheet: West Plant C1

Data Point: WP4-2
Width: 6 Feet
View: Upstream
Sheet: West Plant C1

Data Point: WP4-2
Width: 6 Feet
View: Downstream
Sheet: West Plant C1

Data Point: WP4-3
Width: 4 Feet
View: Upstream
Sheet: West Plant C1

Data Point: WP4-3
Width: 4 Feet
View: Downstream
Sheet: West Plant C1

Data Point: WP4-4
Width: 3 Feet
View: Upstream
Sheet: West Plant C1

Data Point: WP4-4
Width: 3 Feet
View: Downstream
Sheet: West Plant C1

Data Point: WP4-5
Width: 3 Feet
View: Upstream
Sheet: West Plant C1

Data Point: WP4-5
Width: 3 Feet
View: Downstream
Sheet: West Plant C1

Data Point: WP4-6
Width: 3 Feet
View: Upstream
Sheet: West Plant C1

Data Point: WP4-6
Width: 3 Feet
View: Downstream
Sheet: West Plant C1

Data Point: WP4-7
Width: N/A
View: Upland
Sheet: West Plant B1

Data Point: WP4a-1
Width: N/A
View: Upland
Sheet: West Plant C1

Data Point: SC1
Width: N/A
View: Downgradient
Sheet: West Plant B2

Stormwater control feature.

Data Point: SC2
Width: N/A
View: Downgradient
Sheet: West Plant B2

Stormwater control feature.

ATTACHMENT 6

WETLAND DATA

ATTACHMENT 6a

WETLAND PHOTOS AND FIGURES

Feature ID: Wetland 1
Photo Point: W1-1
Notes: Wetland dominated by broadleaf cattail (*Typha latifolia)*

Feature ID: Wetland 1
Photo Point: W1-2
Notes: Near wetland boundary; upland vegetation on both sides of photograph

Feature ID: Upland
Photo Point: U-1
Notes: Upland on west side of Wetland 1

Feature ID: Upland
Photo Point: U-2
Notes: Upland north of dirt-surfaced mine road; road berm appears to promote short term ponding in this area

Feature ID: Wetland 2
Photo Point: W2-1
Notes: Water marks on rocks, evidence of extended inundation

Feature ID: Wetland 2
Photo Point: W2-2
Notes: Looking south at culvert conveying water from Wetland 3 to Wetland 2

Feature ID: Wetland 2
Photo Point: W2-3
Notes: Overview of Wetland 2; water marks visible on rocks in background

Feature ID: Upland
Photo Point: U-3
Notes: Upland west of Wetland 2

Feature ID: Wetland 3
Photo Point: W3-1
Notes: Boundary of Wetland 3; upland in background

Feature ID: Wetland 3
Photo Point: W3-2
Notes: Looking north from Wetland 3 at culvert conveying water to Wetland 2

Feature ID: Wetland 3
Photo Point: W3-3
Notes: Mature Goodding's willow (*Salix gooddingii*) in Wetland 3; berm separating Wetland 3 from Wetland 4 in background

Feature ID: Wetland 4
Photo Point: W4-1
Notes: Looking north at Wetland 4 dominated by common spikerush (*Eleocharis palustrus*)

Feature ID: Wetland 4
Photo Point: W4-2
Notes: Wetland 4 with upland boundary visible in background

Feature ID: Wetland 4
Photo Point: W4-3
Notes: Upland boundary at northern edge of Wetland 4; berm separating Wetland 4 and Wetland 3 in right background

Feature ID: Wetland 5
Photo Point: W5-1
Notes: Looking south at Wetland 5; this immediate area is heavily grazed by cattle

Feature ID: Wetland 5
Photo Point: W5-2
Notes: Sediment fan from a drainage at the edge of Wetland 5

Feature ID: Wetland 5
Photo Point: W5-3
Notes: North-facing panorama of wetland complex; Wetland 5 in foreground and Wetland 4 in background

Feature ID: Upland
Photo Point: U-4
Notes: Community of red brome (*Bromus rubens*) in a well drained area adjacent to a drainage feature

Feature ID: Upland
Photo Point: U-5
Notes: Well drained grassy flat dominated by red brome adjacent to Magma Mine Road

Feature ID: Upland
Photo Point: U-6
Notes: Grassy flat dominated by red brome looking at culvert under Magma Mine Road

Feature ID: Wetland 6
Photo Point: W6-1
Notes: Looking northward at Wetland 6

Feature ID: Wetland 6
Photo Point: W6-2
Notes: Looking southward at edge of Wetland 6; upland in background

Feature ID: Wetland 6
Photo Point: W6-3
Notes: Mature Goodding’s willow, the dominant tree in Wetland 6

Feature ID: Wetland 6
Photo Point: W6-4
Notes: Wetland boundary on west side of Wetland 6

Feature ID: Upland
Photo Point: U-7
Notes: Typical upland with protruding bedrock adjacent to Wetland 6

Feature ID: Wetland 6
Photo Point: W6-5
Notes: Water marks on west side of Wetland 6; upland in background

Feature ID: Upland
Photo Point: U-8
Notes: Manmade dam separating Wetlands 6 and 7; Wetland 6 on left

Feature ID: Upland
Photo Point: U-9
Notes: Looking southeastward at grassy flat upslope of Wetland 6

Feature ID: Wetland 7
Photo Point: W7-1
Notes: Culvert conveying water under Magma Mine Road from Wetland 7

Feature ID: Wetland 7
Photo Point: W7-2
Notes: Common spikerush and cocklebur (*Xanthium strumarium*) dominating herbaceous groundcover in Wetland 7

Feature ID: Upland
Photo Point: U-10
Notes: Upland on the west side of Wetland 7, south of Magma Mine Road

Feature ID: Upland
Photo Point: U-11
Notes: Grassy, well-drained flat north of Magma Mine Road

Feature ID: Upland
Photo Point: U-12
Notes: Looking north at an upland dominated by annual marsh elder (*Iva annua*) and Bermuda grass (*Cynodon dactylon*)

Feature ID: Upland
Photo Point: U-13
Notes: Herbaceous and mesquite (*Prosopis velutina*) dominated upland

Feature ID: Upland
Photo Point: U-14
Notes: Red brome and bermuda grass dominated flat

Feature ID: Wetland 8
Photo Point: W8-1
Notes: Mature Goodding's willow growing in a concave depression in Wetland 8

Feature ID: Wetland 8
Photo Point: W8-2
Notes: Water-stained leaves within Wetland 8, a primary wetland hydrology indicator

Feature ID: Wetland 8
Photo Point: W8-3
Notes: Linear extension of Wetland 8; only herbaceous vegetation present in this immediate area

Feature ID: Upland
Photo Point: U-15
Notes: Upland dominated by red brome adjacent to Wetland 8

Feature ID: Upland
Photo Point: U-16
Notes: Sediment fan slightly upstream of manmade dam in background; Wetland 8 on right

Feature ID: Upland
Photo Point: U-17
Notes: Cleared, well drained area devoid of woody vegetation

Feature ID: Upland
Photo Point: U-18
Notes: Well drained area sloping slightly to the southwest

Feature ID: Wetland 9
Photo Point: W9-1
Notes: Monoculture of common spikerush present within Wetland 9

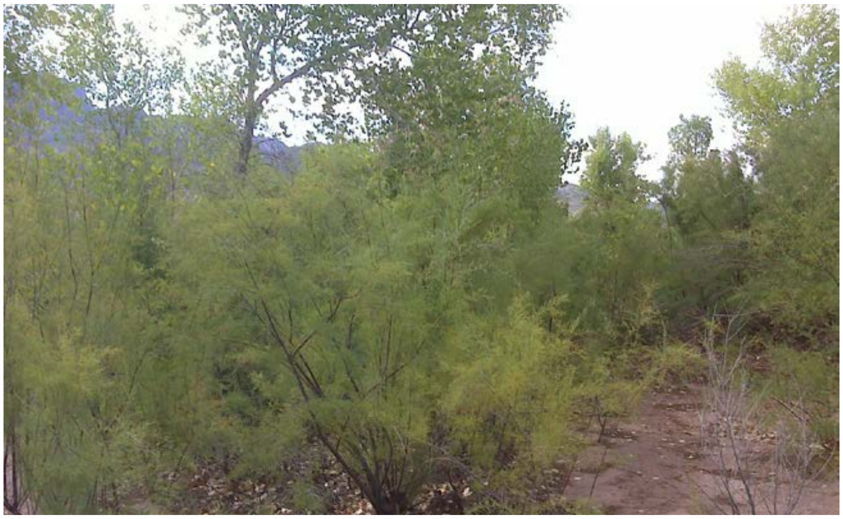
Feature ID: Wetland 9
Photo Point: W9-2
Notes: Southern boundary of Wetland 9; upland on left

Feature ID: Upland
Photo Point: U-19
Notes: Herbaceous vegetation growing within deposited sediment upstream of culvert

Feature ID: Upland
Photo Point: U-20
Notes: Bermuda grass and fountaingrass (*Pennisetum setaceum*) community near culvert

Feature ID: Upland
Photo Point: U-21
Notes: Disturbed, well drained upland area dominated by salt cedar (*Tamarisk* spp.)

Feature ID: Upland
Photo Point: U-22
Notes: Well drained area with berm at northern edge of borrow area



Feature ID: Upland
Photo Point: U-23
Notes: Well drained upland area potentially used historically as a borrow area

Feature ID: Upland
Photo Point: U-24
Notes: Desert broom (*Baccharis sarothroides)* community within upland area

Feature ID: Upland
Photo Point: U-25
Notes: Upland area largely devoid of herbaceous vegetation

Feature ID: Upland
Photo Point: U-26
Notes: Upland area with large berm in background

Feature ID: Upland
Photo Point: U-27
Notes: Historic roadbed in southern portion appearing well drained

Feature ID: Upland
Photo Point: U-28
Notes: Road leading to a well dominated by tamarisk and bermuda grass

Feature ID: Upland
Photo Point: U-29
Notes: Well drained swale adjacent to a berm canopied by palm trees (*Washingtonia* spp.)

Feature ID: Upland
Photo Point: U-30
Notes: Maintained upland area near historic rail tracks (background)

Feature ID: Upland
Photo Point: U-31
Notes: Upland area canopied by palm trees with a dense ground cover of Bermuda grass

Feature ID: Wetland 10
Photo Point: W10-1
Notes: Wetland at the base of historic slag pile (left background)

Feature ID: Wetland 10
Photo Point: W10-2
Notes: Wetland 10 dominated by cattail, tamarisk, and umbrella plant (*Cyperus involucratus*)

Feature ID: Wetland 10
Photo Point: W10-3
Notes: Southern view of Wetland 10; historic slag pile in background

Feature ID: Upland
Photo Point: U-32
Notes: Dirt-surfaced road at the southern end of Wetland 1

Feature ID: Wetland 11
Photo Point: W11-1
Notes: Surface cracks in Wetland 11, a primary wetland hydrology indicator

Feature ID: Wetland 11
Photo Point: W11-2
Notes: Umbrella plant community dominating a portion of Wetland 11

Feature ID: Wetland 11
Photo Point: W11-3
Notes: Tamarisk the dominant shrub in this portion of Wetland 11

Feature ID: Wetland 11
Photo Point: W11-4
Notes: Heavily canopied northern portion of Wetland 11; dominant vegetation is palm and cattail

Feature ID: Wetland 11
Photo Point: W11-5
Notes: Culvert under dirt-surfaced mine road at northernmost extent of Wetland 11

Feature ID: Wetland 12
Photo Point: W12-1
Notes: Cattail is the dominant vegetation of Wetland 12

Feature ID: Wetland 12
Photo Point: W12-2
Notes: Dirt-surfaced mine road; the southern boundary of Wetland 12

Feature ID: Upland
Photo Point: U-33
Notes: Well drained upland slopes adjacent to Wetland 12

Feature ID: Upland
Photo Point: U-34
Notes: Intermittent ponding area not exhibiting wetland characteristics

Feature ID: Upland
Photo Point: U-35
Notes: Berm surrounding intermittent ponding area dominated by red brome and cocklebur

Feature ID: Upland
Photo Point: U-36
Notes: Heavily canopied area adjacent to and downslope of tailings pond

Feature ID: Upland
Photo Point: U-37
Notes: Sparsely covered herbaceous layer; visible grass is bermuda grass

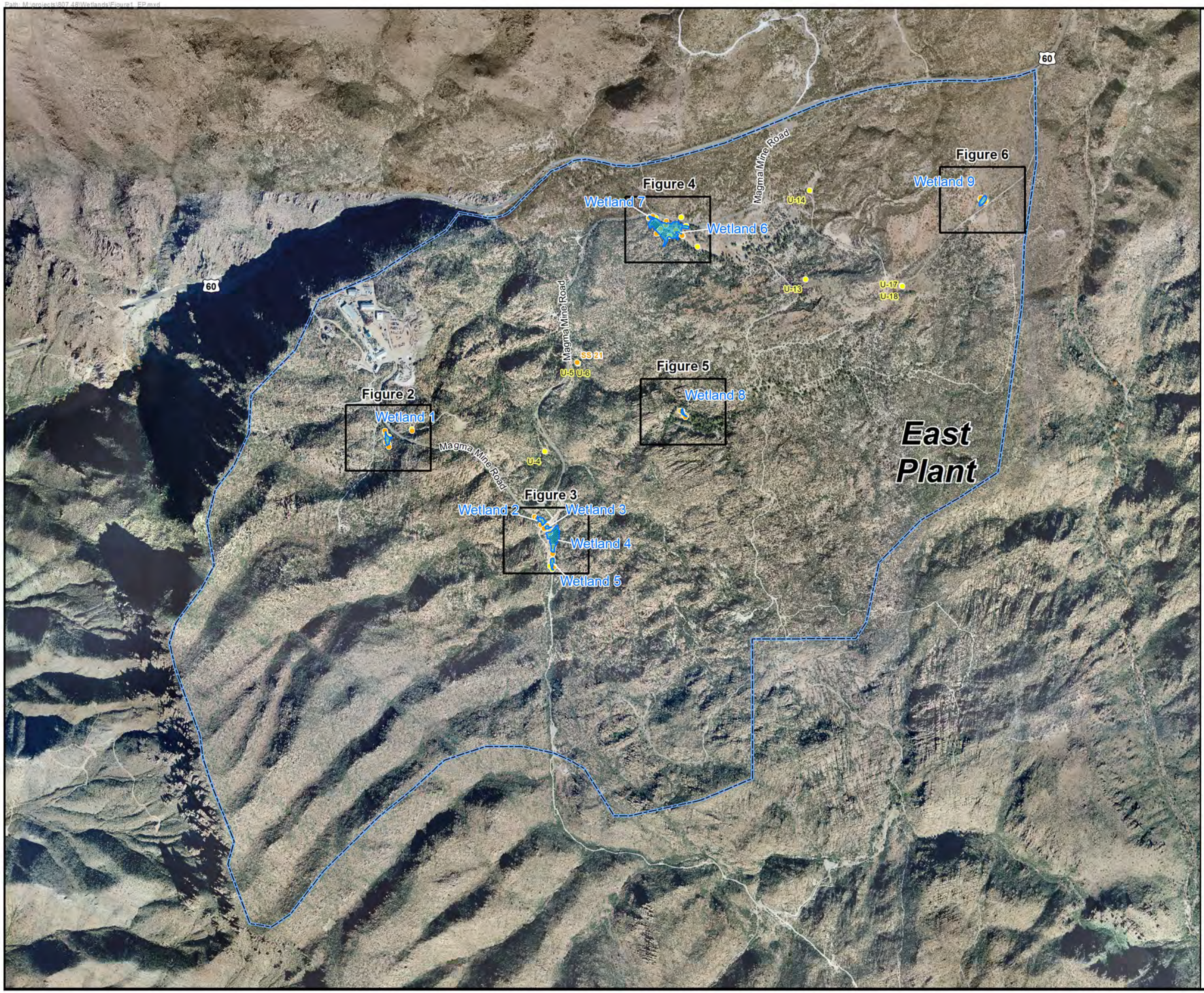
Feature ID: Upland
Photo Point: U-38
Notes: Well drained truncated channel sloping away from the tailings pond

Feature ID: Upland
Photo Point: U-39
Notes: Well drained area with no indications of hydric soils or wetland hydrology

Feature ID: Upland
Photo Point: U-40
Notes: Upland area dominated by tamarisk and desert broom

Feature ID: Upland
Photo Point: U-41
Notes: Panorama of heavily canopied area south of tailings pond

Feature ID: Upland
Photo Point: U-42
Notes: Panorama of heavily canopied area south of tailings pond



LEGEND

- Soil Station/Wetland Determination Data Form (SS 41)
- Photo Location (U-30)
- Wetland
- Analysis Area Boundary

T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: NAIP, 2010

N

0 1,400 2,800 Feet

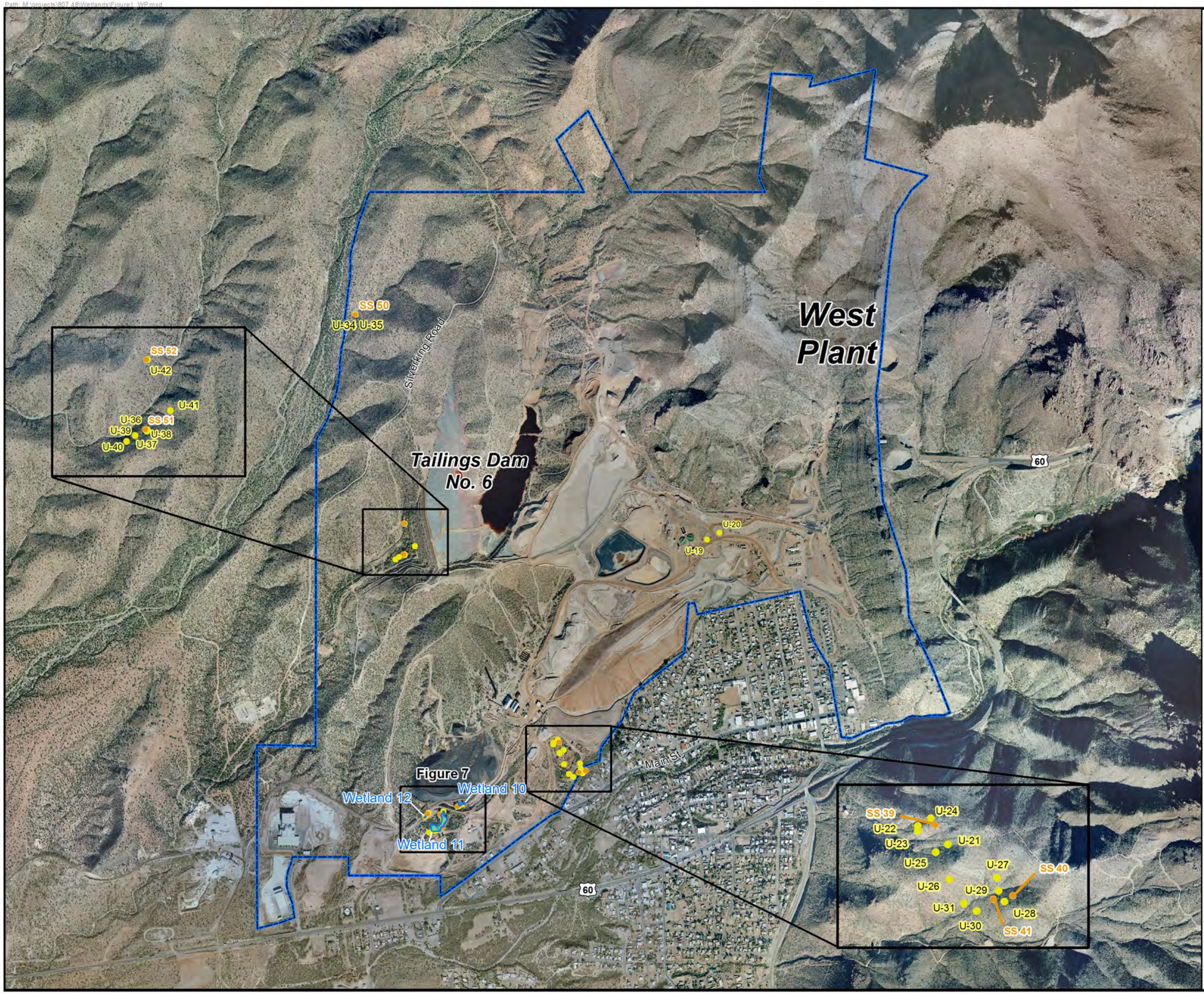
RESOLUTION COPPER MINING

Jurisdictional Waters Determination
For The Resolution West Plant And East Plant
Analysis Areas

WETLAND ANALYSIS

Figure 1A - East Plant

WestLand Resources, Inc.
Engineering and Environmental Consultants



LEGEND

- Soil Station/Wetland Determination Data Form (SS 41)
- Photo Location (U-30)
- Wetland
- Analysis Area Boundary

T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: NAIP, 2010

N

0 1,400 2,800 Feet

RESOLUTION COPPER MINING

Jurisdictional Waters Determination
For The Resolution West Plant And East Plant
Analysis Areas

WETLAND ANALYSIS
Figure 1B - West Plant

WestLand Resources, Inc.
Engineering and Environmental Consultants

Path: M:\projects\807.48\Wetlands\Figure2.mxd Date: 8/1/2011 User: tomh

LEGEND

- Soil Station/Wetland Determination Data Form (SS 03)
- Photo Location (W1-1)
- Potentially Jurisdictional Waters
- Wetland
- Analysis Area Boundary

T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: NAIP, 2010

N

0 100 200 Feet

RESOLUTION COPPER MINING

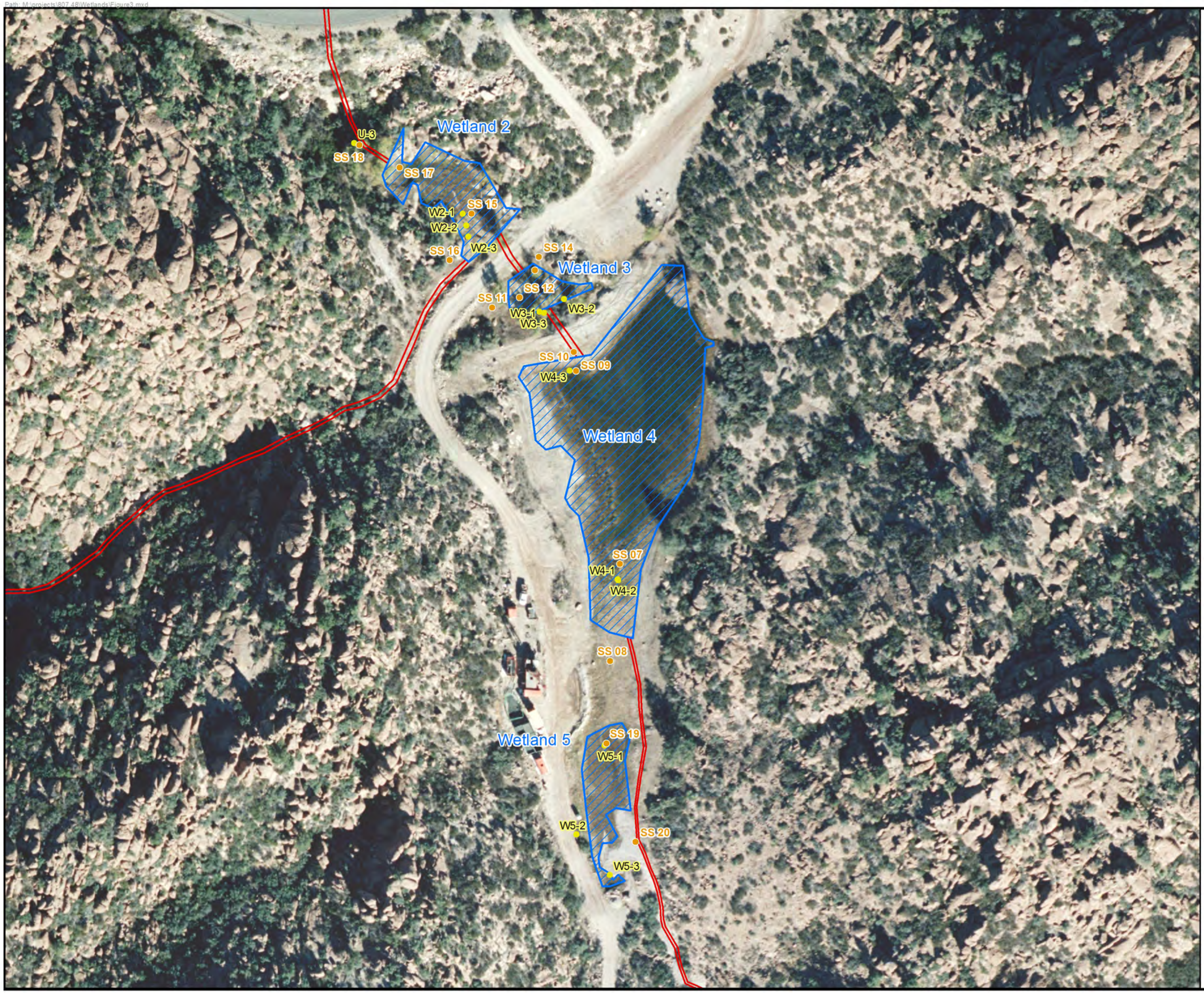
Jurisdictional Waters Determination
For The Resolution West Plant And East Plant
Analysis Areas

WETLAND ANALYSIS
Figure 2

WestLand Resources, Inc.
Engineering and Environmental Consultants

Path: M:\projects\807.48\Wetlands\Figure3.mxd

Date: 8/1/2011 User: tomh



LEGEND

- Soil Station/Wetland Determination Data Form (SS 41)
- Photo Location (W2-1)
- Potentially Jurisdictional Waters
- Wetland
- Analysis Area Boundary

T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: NAIP, 2010

N

0 100 200 Feet

RESOLUTION COPPER MINING

Jurisdictional Waters Determination
For The Resolution West Plant And East Plant
Analysis Areas

WETLAND ANALYSIS
Figure 3

WestLand Resources, Inc.
Engineering and Environmental Consultants

Path: M:\projects\807.48\Wetlands\Figure4.mxd

Date: 8/1/2011 User: tomh

LEGEND

- Soil Station/Wetland Determination Data Form (SS 30)
- Photo Location (W7-1)
- Potentially Jurisdictional Waters
- Wetland
- Analysis Area Boundary

T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: NAIP, 2010

N

0 100 200 Feet

RESOLUTION COPPER MINING

Jurisdictional Waters Determination
For The Resolution West Plant And East Plant
Analysis Areas

WETLAND ANALYSIS

Figure 4

WestLand Resources, Inc.
Engineering and Environmental Consultants

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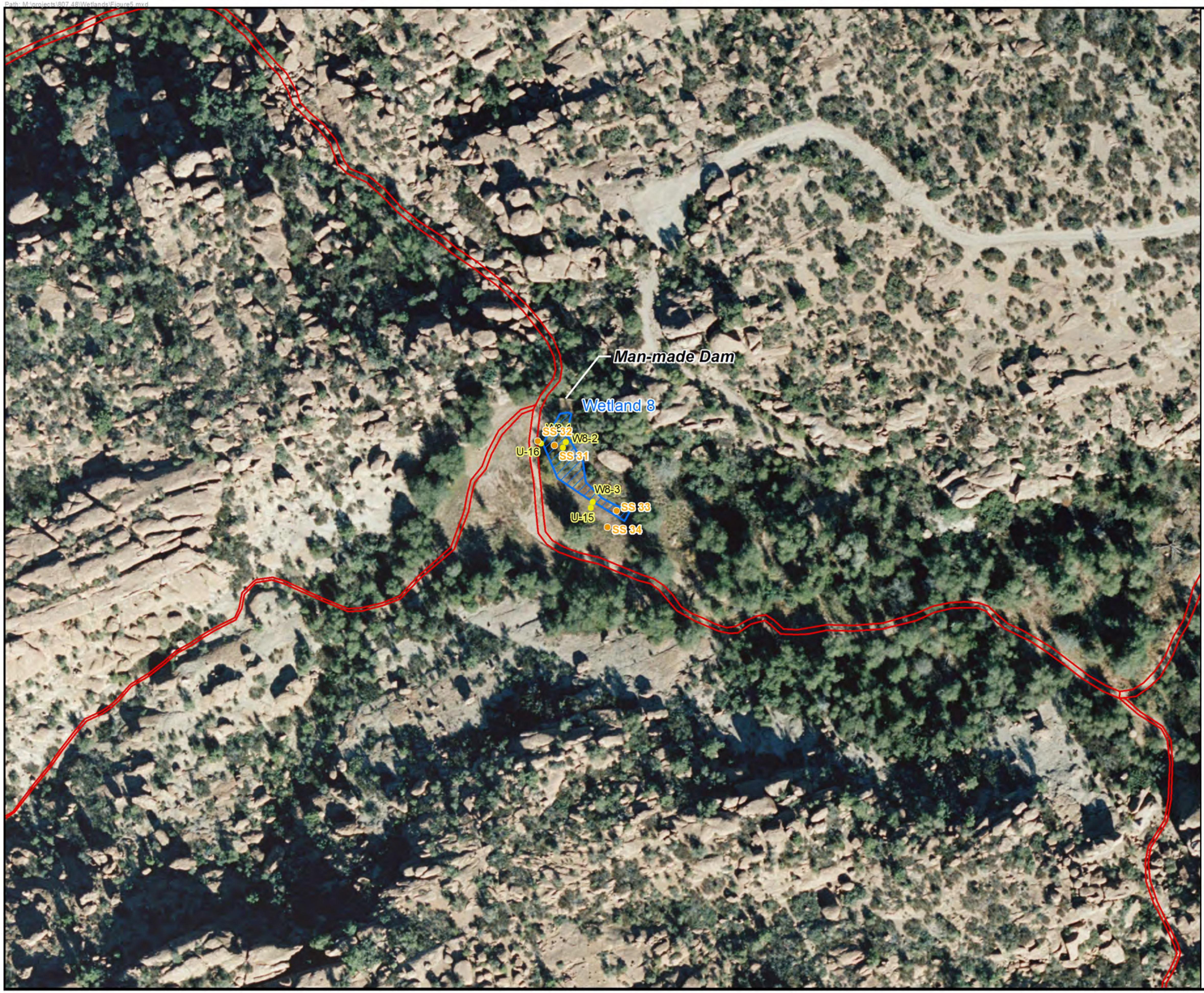
Date: 8/1/2011 User: tomh



LEGEND

- Soil Station/Wetland Determination Data Form (SS 33)
- Photo Location (W8-1)
- Potentially Jurisdictional Waters
- Wetland
- Analysis Area Boundary

T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: NAIP, 2010

N

0 100 200 Feet

RESOLUTION COPPER MINING

Jurisdictional Waters Determination
For The Resolution West Plant And East Plant
Analysis Areas

WETLAND ANALYSIS

Figure 5

WestLand Resources, Inc.
Engineering and Environmental Consultants

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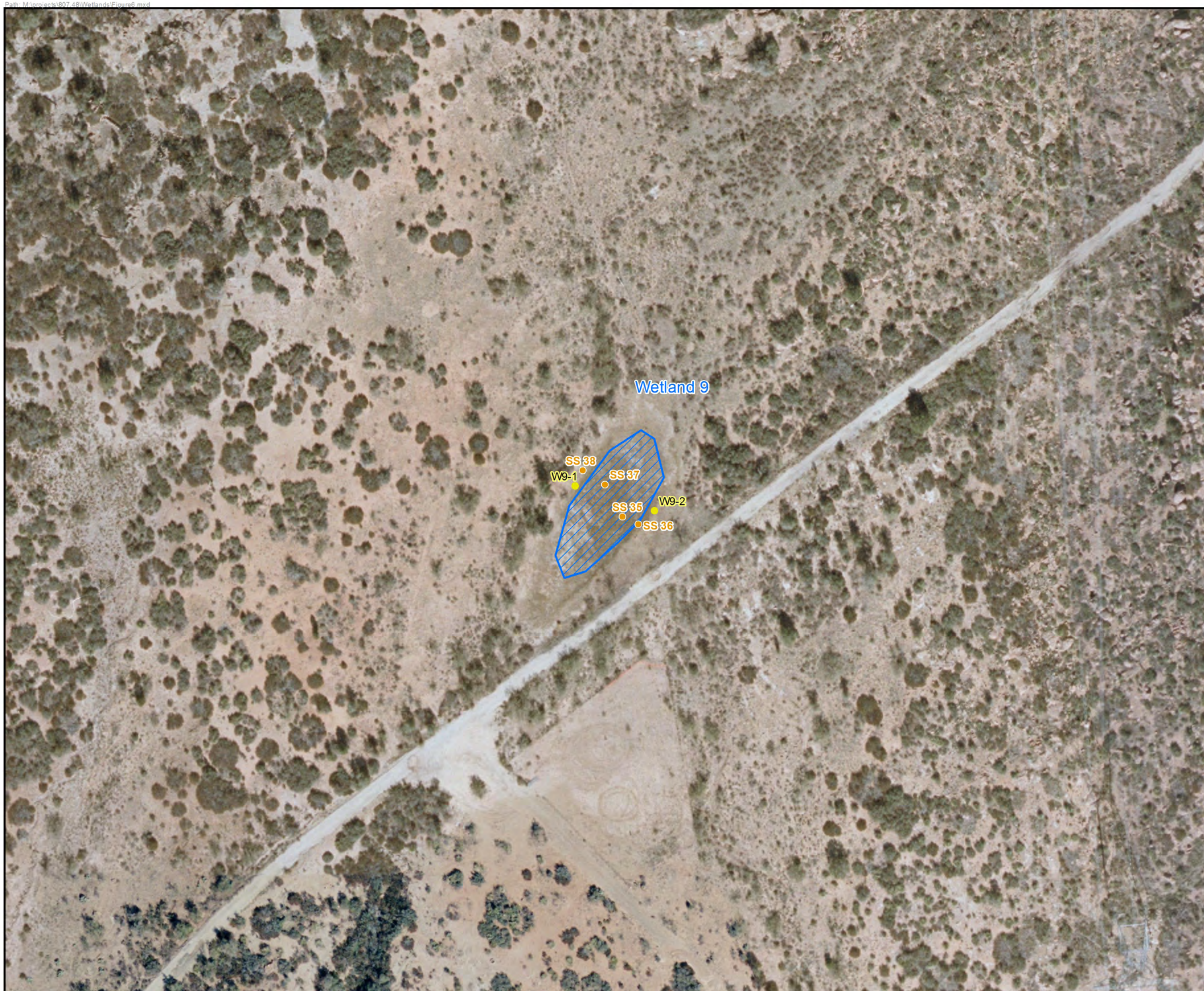
Date: 8/1/2011 User: tomh



LEGEND

- Soil Station/Wetland Determination Data Form (SS 38)
- Photo Location (W9-1)
- Potentially Jurisdictional Waters
- Wetland
- Analysis Area Boundary

T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: NAIP, 2010

N

0 100 200 Feet

RESOLUTION COPPER MINING

Jurisdictional Waters Determination
For The Resolution West Plant And East Plant
Analysis Areas

WETLAND ANALYSIS

Figure 6

WestLand Resources, Inc.
Engineering and Environmental Consultants

Path: M:\projects\807.48\Wetlands\Figure7.mxd

Date: 8/1/2011 User: tomh

LEGEND

- Soil Station/Wetland Determination Data Form (SS 42)
- Photo Location (W12-1)
- Potentially Jurisdictional Waters
- Wetland
- Analysis Area Boundary

T1S, R12E, Portion of Sections 25-27, 34-36,
T1S, R13E, Portion of Sections 28, 29, 31-33,
T2S, R12E, Portion of Sections 1, 3 & 4,
T2S, R13E, Portion of Sections 5 & 6,
Pinal County, Arizona,
Photo Source: NAIP, 2010

N

0 100 200 Feet

RESOLUTION COPPER MINING

Jurisdictional Waters Determination
For The Resolution West Plant And East Plant
Analysis Areas

WETLAND ANALYSIS

Figure 7

WestLand Resources, Inc.
Engineering and Environmental Consultants

ATTACHMENT 6b

WETLAND DETERMINATION DATA FORMS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 01

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR D Lat: 33.30045613030 Long: -111.06747569000 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

Remarks:

Soil Station 01 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	1	N	FACW
2.			
3. *(less than 5% cover)*			
4.			
	1	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Typha latifolia*	30	Y	OBL
2. *Eleocharis palustrus*	15	Y	OBL
3. *Setaria parviflora*	5	N	FAC
4. *Juncus marginatus*	1	N	FACW
5.			
6.			
7.			
8.			
	51	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 01 is within a ponded depression west of Magma Mine Road appearing to hold water for extended periods after rain events. Multiple drainage features convey water into this ponding area and when capacity is reached, drainage is southeastward through a culvert under Magma Mine Road.

SOIL

Sampling Point: SS 01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 3/1	97	7.5YR 3/4	3	RM	PL	Loam	Some organic material
8-18	7.5YR 3/1	92	7.5YR 3/4	8	RM	PL	Clay Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Bedrock

Depth (inches): 18

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F6, Redox Dark Surface, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ✓ No ______ Depth (inches): 13

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 9

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Three primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant　City/County: Pinal　Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine　State: AZ　Sampling Point: SS 02

Investigator(s): G. Williams; L. Forrest　Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): slight depression　Local relief (concave, convex, none): concave　Slope (%): 1

Subregion (LRR): LRR D　Lat: 33.30065680170　Long: -111.06757662400　Datum: NAD 83

Soil Map Unit Name: No data available　NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed?　Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic?　(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____
Hydric Soil Present?	Yes ✓	No ____
Wetland Hydrology Present?	Yes ✓	No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

Remarks:

Soil Station 02 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus deltoides*	5	Y	FACW
2.			
3.			
4.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Eleocharis palustrus*	20	Y	OBL
2. *Juncus marginatus*	5	N	FACW
3. *Muhlenbergia rigens*	1	N	FACU
4.			
5.			
6.			
7.			
8.			
	26 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 80　% Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 02 is within a small extension of a ponded depression near the convergence of an ephemeral drainage feeding into the ponding area. Sphagnum moss was observed on the edges of the investigated area at this location.

SOIL

Sampling Point: SS 02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 3/2	99	7.5YR 3/4	1	RM	PL	Sandy Loam	Organic material present
4-9	7.5YR 4/2	80	7.5YR 3/4	20	RM	PL	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Bedrock

Depth (inches): 9

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________

Water Table Present? Yes ______ No ✓ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Two primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 03

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): drainage bottom Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR D Lat: 33.30073937970 Long: -111.06759177400 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 03 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus emoryi*	10	Y	UPL
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Quercus turbinella*	15	Y	UPL
2. *Quercus emoryi*	7	Y	UPL
3. *Arctostaphylos pungens*	7	Y	UPL
4. *Mimosa biuncerifa*	3	N	UPL
5. *Baccharis sarothroides*	1	N	FAC
	33 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Muhlenbergia rigens*	10	Y	FACU
2. *Bromus rubens*	8	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	18 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 85 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	0	(A)
Total Number of Dominant Species Across All Strata:	6	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	0	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	1	x 3 = 3
FACU species	10	x 4 = 40
UPL species	50	x 5 = 250
Column Totals:	61 (A)	293 (B)

Prevalence Index = B/A = 4.80

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 03 is within a small drainage feature upslope of the ponding area encompassing SS's 01 and 02.

SOIL

Sampling Point: SS 03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	7.5YR 4/3	100	N/A				Sand	
14-20	7.5YR 3/2	97	7.5YR 3/4	3	RM	PL	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 04

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): slight depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR D Lat: 33.30028872260 Long: -111.06753113700 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____
Hydric Soil Present?	Yes ✓	No ____
Wetland Hydrology Present?	Yes ✓	No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

Remarks:

Soil Station 04 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2.			
3. *N/A*			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: shaped to feature)			
1. *Eleocharias palustrus*	55	Y	OBL
2. *Setaria parviflora*	15	Y	FAC
3. *Typha latifolia*	5	N	OBL
4.			
5.			
6.			
7.			
8.			
= Total Cover	75		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
= Total Cover	0		

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 04 is within a depression appearing to hold water for extended periods.

SOIL

Sampling Point: SS 04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 4/2	93	7.5YR 3/4	7	RM	PL	Clay Loam	
5-20	7.5YR 3/2	85	7.5YR 3/4	15	RMD	PL/M	Loam	Small depleted pockets; also mixed gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Two primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 05

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): drainage bottom Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR D Lat: 33.30011005670 Long: -111.06740828000 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 05 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus emoryi*	15	Y	UPL
2. *Salix gooddingii*	10	Y	OBL
3.			
4.			
	25 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Arctostaphylos pungens*	15	Y	UPL
2. *Quercus turbinella*	5	Y	UPL
3. *Juniperus monosperma*	2	N	UPL
4. *Baccharis sarothroides*	2	N	FAC
5.			
	24 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Muhlenbergia rigens*	5	Y	FACU
2. *Bromus rubens*	2	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	7 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1. *Lonicera utahensis*	5	Y	FACU
2.			
	5 = Total Cover		

% Bare Ground in Herb Stratum 95 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 17 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	39	x 5 =	195
Column Totals:	59 (A)		245 (B)

Prevalence Index = B/A = 4.15

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 05 is within a small drainage feature upslope of the ponding area encompassing SS's 01, 02, and 04. The mature *Salix gooddingii* present is likely tapped into the water table associated with the ponding area.

SOIL

Sampling Point: SS 05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	7.5YR 4/3	100	N/A				Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______

Water Table Present? Yes ___ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? **Yes** ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 06

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): slight micro-depresssion Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR D Lat: 33.30074477230 Long: -111.06632940700 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	✓	
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓

Remarks:
Soil Station 06 is within an upland. Even with the presence of a restrictive layer at 6", hydric soil is not present nor are indicators of wetland hydrology. The hydrophytic vegetation present appears stressed. The presence of hydrophytic vegetation is likely a response to a small area upslope of a dirt mine road puddling water for short periods after a rain event caused by a small berm lining the mine road. If this slight berm was removed, it is likely water would not puddle in this area and the vegetation would transition to a more facultative community. It does not puddle water long enough to encourage wetland development.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: shaped to feature)			
1. *Quercus emoryi*	10	Y	UPL
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Baccharis sarothroides*	5	Y	FAC
2. *Tamarix ramosissima*	3	Y	FACW
3. *Mimosa biuncerifa*	1	N	UPL
4. *Baccharis salicifolia*	1	N	FACW
5. *Salix gooddingii*	1	N	OBL
	11 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Muhlenbergia rigens*	40	Y	FACU
2. *Juncus marginatus*	30	Y	FACW
3. *Cynodon dactylon*	10	N	FACU
4. *Bromus rubens*	5	N	UPL
5. *Rumex crispis*	1	N	FACW
6. *Eleocharis palustrus*	1	N	OBL
7.			
8.			
	87 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:
Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 06 is slightly upslope of a dirt mine road east of Magma Mine Road. A small roadside berm appears to allow water to puddle in this small area for short periods of time allowing some hydrophytic species to germinate.

SOIL

Sampling Point: SS 06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 4/3	99	7.5YR 3/2	1	RM	PL	Loam	Large to medium cobble common

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock/cobble roadbase

Depth (inches): 6

Hydric Soil Present? Yes ______ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 07

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): ponded depresssion Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR D Lat: 33.29619353810 Long: -111.05973124800 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	**Is the Sampled Area within a Wetland?**	**Yes ✓ No ___**
Hydric Soil Present?	Yes ✓ No ___		
Wetland Hydrology Present?	Yes ✓ No ___		

Remarks:

Soil Station 07 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Eleocharis palustrus*	85	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.	85		
8.			
	85 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 15 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No ___**

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 07 is within a ponded depression appearing to hold water for extended periods. A drainage feature feeds this ponded area from the south and a man-made berm is present on the north side. A monoculture of *Eleocharis palustrus* composes the vegetation community.

SOIL

Sampling Point: SS 07

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/2	85	7.5YR 3/4	15	RM	PL	Clay loam	
5-7	10YR 3/1	75	10YR 4/4	25	RM	PL	Clay loam	
7-20	10YR 4/2	95	7.5YR 3/4	5	RM	PL	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________

Water Table Present? Yes ______ No ✓ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Three primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 08

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): LRR D Lat: 33.29592195140 Long: -111.05976348500 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?	✓	
Hydric Soil Present?	✓	
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 08 is on a slight slope south of a large ponding area. The vegetation community, although meeting hydrophytic criteria, has responded to the well drained conditions. Due to the lack of wetland hydrology, the definition of a wetland is not met.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. N/A			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. N/A			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: shaped to feature)			
1. *Juncus interior*	25	Y	FAC
2. *Cynodon dactylon*	15	Y	FACU
3. *Eleocharis montana*	10	N	OBL
4. *Juncus marginatus*	5	N	FACW
5. *Setaria parviflora*	5	N	FAC
6. *Iva annua*	1	N	FAC
7.			
8.			
= Total Cover	61		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. N/A			
= Total Cover	0		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 08 is upslope of and sloped towards a ponding area to the north. Area appears well drained.

SOIL

Sampling Point: SS 08

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/2	90	7.5YR 3/4	10	RM	PL	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F6, Redox Dark Surface, is met. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 09

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): ponded depression Local relief (concave, convex, none): concave Slope (%): 4

Subregion (LRR): LRR D Lat: 33.29673452170 Long: -111.05987841000 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

Remarks:

Soil Station 09 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Salix gooddingii*	1		OBL
2.			
3. *(less than 5% cover)*			
4.			
5.			
= Total Cover	1		
Herb Stratum (Plot size: shaped to feature)			
1. *Eleocharis palustrus*	55	Y	FACW
2. *Potamogeton gramineus*	20	Y	OBL
3. *Ludwigia palustrus*	3	N	OBL
4.			
5.			
6.			
7.			
8.			
= Total Cover	78		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
= Total Cover	0		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 08 is within a ponded depression appearing to hold water for extended periods. SS 08 is at the base of a man-made berm within the wetland boundary. Grazing is heavy in this area.

SOIL

Sampling Point: SS 09

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 2.5/1	75	7.5YR 3/3	25	RM	PL	Clay loam	Interspersed gravel and rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Mixed cobble and large rock

Depth (inches): 12

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F6, Redox Dark Surface, is present. Hydric soil criterion is met. Profile appears disturbed, likely during construction of the man-made berm.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ______ Depth (inches): 1

Water Table Present? Yes ✓ No ______ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes ✓ No ______ Depth (inches): 0

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Four primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 10

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): LRR D Lat: 33.29678789020 Long: -111.05988524400 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 10 is within an upland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Prosopis velutina*	1		UPL
2.			
3. *(less than 5% cover)*			
4.			
5.			
	1 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Juncus interior*	30	Y	FAC
2. *Hymenoxys cooperi*	15	Y	NI*
3. *Circium arizonicum*	10	N	FAC
4. *Cynodon dactylon*	7	N	FACU
5. *Setaria parviflora*	5	N	FAC
6. *Bromus rubens*	1	N	UPL
7.			
8.			
	53 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	45	x 3 = 135
FACU species	7	x 4 = 28
UPL species	2	x 5 = 10
Column Totals:	54 (A)	173 (B)

Prevalence Index = B/A = 3.20

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

* Not calculated in hydrophytic vegetation indicators
Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 10 is on a man-made berm north of a large ponding area. Grazing is heavy in this area.

SOIL

Sampling Point: SS 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	99	7.5YR 3/4	1	RM	PL	Loam	cobble and rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Cobble and large rock

Depth (inches): 6

Hydric Soil Present? Yes ______ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________
Water Table Present? Yes ______ No ✓ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 11

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): LRR D Lat: 33.29691243190 Long: -111.06015815700 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 11 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix gooddingii*	15	Y	OBL
2. *Quercus turbinella*	5	Y	UPL
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Arbutus arizonica*	3	Y	UPL
2. *Mimosa biuncifera*	2	Y	UPL
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Setaria parviflora*	25	Y	FAC
2. *Juncus interior*	15	Y	FAC
3. *Cynodon dactylon*	15	Y	FACU
4. *Eleocharis montana*	5	N	FACW
5. *Verbascum thapsis*	3	N	NI*
6. *Rumex crispis*	1	N	FACW
7. *Opuntia versacolor*	1	N	UPL
8.			
	62 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 43 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	6	x 2 =	12
FAC species	40	x 3 =	120
FACU species	15	x 4 =	60
UPL species	11	x 5 =	55
Column Totals:	87 (A)		262 (B)

Prevalence Index = B/A = 3.01

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

* Not calculated in hydrophytic vegetation indicators
Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 11 is on a slight slope west of Wetland 3 and south of a dirt-surfaced mine road. Grazing is heavy in this area.

SOIL

Sampling Point: SS 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 3/2	98	7.5YR 3/4	2	RM	PL	Loamy sand	
4-20	7.5YR 3/3	100	N/A				Sand	Disturbed; likely imported fill

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: ______
Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:
Hydric Soil Indicators are not present. Hydric soil criterion is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 12

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): ponded depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR D Lat: 33.29694023390 Long: -111.06006650600 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

Remarks:

Soil Station 12 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix gooddingii*	15	Y	OBL
2.			
3.			
4.			
	15	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Setaria parviflora*	35	Y	FAC
2. *Eleocharis palustrus*	20	Y	FACW
3. *Ludwigia palustrus*	5	N	OBL
4.			
5.			
6.			
7.			
8.			
	60	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 12 is south of a dirt mine road within a ponded depression appearing to hold water for extended periods. Excessive ponding of the depression overflows northward through a culvert under the mine road and into Wetland 2. Grazing is heavy in this area.

SOIL

Sampling Point: SS 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 4/2	70	7.5YR 4/6	30	RM	PL	Clay loam	
6-20	7.5YR 3/1	85	7.5YR 3/4	15	RM	PL	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? **Yes** ✓ **No** ______

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? **Yes** ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Four primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-7-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 13

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): ponded depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR D Lat: 33.29701687680 Long: -111.06001560700 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

Remarks:

Soil Station 13 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix gooddingii*	20	Y	OBL
2.			
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Setaria parviflora*	30	Y	FAC
2. *Eleocharis palustrus*	15	Y	FACW
3. *Ludwigia palustrus*	10	N	OBL
4. *Rumex crispis*	1	N	FACW
5.			
6.			
7.			
8.			
	56 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 13 is south of a dirt-surfaced mine road within the eastern portion of a ponded depression appearing to hold water for extended periods. Excessive ponding of the depression overflows northward through a culvert under the mine road and into Wetland 2. Grazing is heavy in this area.

SOIL

Sampling Point: SS 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 4/2	80	7.5YR 4/6	20	RM	PL	Clay loam	
8-20	7.5YR 3/1	90	7.5YR 3/4	8	RM	PL	Clay loam	Mixed sand and gravel
			7.5YR 2.5/3	2	RM	PL	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ___

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______

Water Table Present? Yes ___ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Four primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant   City/County: Pinal   Sampling Date: 7-7-2011
Applicant/Owner: Resolution Copper Mine   State: AZ   Sampling Point: SS 14
Investigator(s): G. Williams; L. Forrest   Section, Township, Range: Section 32, Township 1 South Range 13 East
Landform (hillslope, terrace, etc.): slight slope   Local relief (concave, convex, none): none   Slope (%): 1
Subregion (LRR): LRR D   Lat: 33.29705395120   Long: -111.06000282700   Datum: NAD 83
Soil Map Unit Name: No data available   NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)
Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___
Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:
Soil Station 14 is within an upland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: shaped to feature)			
1. *Quercus turbinella*	5	Y	UPL
2.			
3.			
4.			
= Total Cover	5		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Ziziphus obtusifolia*	10	Y	UPL
2. *Mimosa biuncifera*	5	Y	UPL
3. *Celtis reticulata*	5	Y	UPL
4. *Arctostaphylos pungens*	5	Y	UPL
5.			
= Total Cover	25		
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus rubens*	5	Y	UPL
2. *Hymenoxys cooperi*	5	Y	NI*
3. *Malva neglecta*	3	N	UPL
4. *Opuntia engelmannii*	2	N	UPL
5. *Cynodon dactylon*	2	N	FACU
6. *Muhlenbergia rigens*	2	N	FACU
7. *Iva annua*	1	N	FAC
8.			
= Total Cover	15		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
= Total Cover	0		

% Bare Ground in Herb Stratum 85   % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	1	x 3 = 3
FACU species	4	x 4 = 16
UPL species	40	x 5 = 200
Column Totals:	45 (A)	219 (B)

Prevalence Index = B/A = 4.87

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:
* Not calculated in hydrophytic vegetation indicators
Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 14 is south of a dirt-surfaced mine road upslope from a ponded depression. The area is well drained. Grazing is heavy in this area.

SOIL

Sampling Point: SS 14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 3/2	100	N/A				Loam	Cobble and gravel

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: large, dense, cobble and gravel

Depth (inches): 8

Hydric Soil Present? Yes ____ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ____	No ✓	Depth (inches): ____
Water Table Present?	Yes ____	No ✓	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No ✓	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 15

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): ponded depression Local relief (concave, convex, none): concave Slope (%): 6

Subregion (LRR): LRR D Lat: 33.29717537370 Long: -111.06022795300 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

Remarks:

Soil Station 15 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix gooddingii*	5	Y	OBL
2.			
3.			
4.			
	5	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Eleocharis palustrus*	25	Y	FACW
2. *Setaria parviflora*	15	Y	FAC
3. *Juncus interior*	12	Y	FAC
4. *Cynodon dactylon*	6	N	FACU
5. *Verbascum thapsis*	1	N	NI*
6.			
7.			
8.			
	59	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

✓ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

* Not calculated in hydrophytic vegetation indicators
[1]Adventitious roots present on *Salix gooddingii,* evidence of extended inundation.
Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 15 is north of a dirt mine road on a slight knoll sloping to the north. This area appears to be inundated for extended periods even though it is higher on the landscape than the lowest point within this wetland (see SS 17). Grazing is heavy in this area.

SOIL

Sampling Point: SS 15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 4/2	80	7.5YR 4/6	20	RM	PL	Loam	
5-8	7.5YR 4/2	70	7.5YR 3/3	20	RM	PL	Loam	
			7.5YR 4/6	10	RM	PL	Loam	
8-20	7.5YR 3/2	90	7.5YR 4/6	10	RM	PL	Sand	Some organic duff present

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ✓ Other (Explain in Remarks)*

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______
Water Table Present?	Yes ______	No ✓	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No ✓	Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

*Adventitious roots on *Salix gooddingii,* evidence of extended inundation.
Three primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution - East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 16

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South Range 13 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): LRR D Lat: 33.29704483380 Long: -111.06030007500 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 16 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Quercus turbinella*	25	Y	UPL
2. *Mimosa biuncifera*	15	Y	UPL
3. *Arctostaphylos pungens*	7	N	UPL
4. *Rhus trilobata*	3	N	UPL
5. *Berberis haematocarpa*	1	N	UPL
	51	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus rubens*	20	Y	UPL
2. *Cynodon dactylon*	10	Y	FACU
3. *Verbascum thapsis*	10		NI*
4.			
5.			
6.			
7.			
8.			
	30	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	10	x 4 =	40
UPL species	71	x 5 =	355
Column Totals:	81 (A)		395 (B)

Prevalence Index = B/A = 4.88

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

* Not calculated in hydrophytic vegetation indicators
Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 16 is on a small upland bench draining east into the wetland area and south into a small roadside ditch paralleling the dirt-surfaced mine road slightly to the south of SS 16. This area is well drained. Grazing is heavy in this area.

SOIL

Sampling Point: SS 16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-13	10YR 3/2	100	N/A				Loam	
13-15	10YR 3/2	99	7.5YR 4/6	1	RM	PL	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)*

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 17

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): ponded depression Local relief (concave, convex, none): concave Slope (%): 6

Subregion (LRR): LRR D Lat: 33.29730402530 Long: -111.06046771600 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

Remarks:

Soil Station 17 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. N/A			
3.			
4.			
= Total Cover	0		

Sapling/Shrub Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. N/A			
3.			
4.			
5.			
= Total Cover	0		

Herb Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Eleocharis palustrus*	20	Y	FACW
2. *Setaria parviflora*	15	Y	FAC
3. *Ludwigia palustrus*	15	Y	OBL
4. *Iva annua*	2	N	FAC
5.			
6.			
7.			
8.			
= Total Cover	52		

Woody Vine Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. N/A			
= Total Cover	0		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 17 is within a deep, ponded depression appearing to hold water for extended periods. Grazing is heavy in this area. An unidentified, dead floating pondweed is present on the dry soil surface, evidence of recent and long-term ponding.

SOIL

Sampling Point: SS 17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-13	7.5YR 4/2	80	7.5YR 3/4	20	RM	PL	Loam	Many large cobble and rock
13-20	7.5YR 3/2	85	7.5YR 2.5/3	15	RM	PL	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ___

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ✓ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ✓ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Five primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 18

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): LRR D Lat: 33.29736754480 Long: -111.06060225500 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓
Hydric Soil Present?	Yes ____	No ✓
Wetland Hydrology Present?	Yes ____	No ✓

Is the Sampled Area within a Wetland? **Yes** ____ **No** ✓

Remarks:

Soil Station 18 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix gooddingii*	30	Y	OBL
2.			
3.			
4.			
	30 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Arctostaphylos pungens*	25	Y	UPL
2. *Quercus turbinella*	5	N	UPL
3. *Baccharis sarothroides*	5	N	FAC
4. *Mimosa biuncerifera*	2	N	UPL
5. *Lonicera utahensis*	1	N	FACU
	38 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Verbascum thapsis*	3		NI*
2. *Bromus rubens*	2	Y	UPL
3. *Cynodon dactylon*	1	N	FACU
4.			
5.			
6.			
7.			
8.			
	6 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 95 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	30	x 1 =	30
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	2	x 4 =	8
UPL species	34	x 5 =	170
Column Totals:	71 (A)		223 (B)

Prevalence Index = B/A = 3.14

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** ✓

Remarks:

* Not calculated in hydrophytic vegetation indicators
Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 18 is between a large culvert conveying stormwater under Magma Mine Road and a wetland area to the south. The area is well drained. Grazing is heavy in this area.

SOIL

Sampling Point: SS 18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	100	N/A				Loam	cobble

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: large, dense cobble

Depth (inches): 6

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 19

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): ponded depression Local relief (concave, convex, none): concave Slope (%): 6

Subregion (LRR): LRR D Lat: 33.29569095580 Long: -111.05977566500 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	Is the Sampled Area within a Wetland? Yes ✓ No ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks:

Soil Station 19 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Eleocharis acicularis*	15	Y	OBL
2. *Eleocharis palustrus*	15	Y	OBL
3. *Potamogeton gramineus*	5	N	OBL
4. *Ludwigia palustrus*	1	N	OBL
5.			
6.			
7.			
8.			
	36 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 19 is within a ponded depression appearing to hold water for extended periods. Grazing is heavy in this area. This wetland is east of a dirt-surfaced mine road and is fed by an ephemeral stream at the southeast corner that is depositing a heavy sediment load on top of this wetland.

SOIL

Sampling Point: SS 19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 4/2	96	7.5YR 4/6	4	RM	PL	Loamy sand	
6-9	Duff layer	100	N/A					see remarks below
9-13	7.5YR 4/2	80	7.5YR 4/6	15	RM	PL	Loamy sand	cobble and rock
			7.5YR 3/4	5	RM	PL		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rocks and cobble

Depth (inches): 13

Hydric Soil Present? Yes ✓ No ___

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met. A layer of leaves, sticks, and other organic matter is present between 6 and 9 inches in depth.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ✓ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Three primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 20

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): LRR D Lat: 33.29541489020 Long: -111.05967818100 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

Soil Station 20 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Quercus turbinella*	5	Y	UPL
2. *Mimosa biuncerifera*	5	Y	UPL
3. *Arctostaphylos pungens*	5	Y	UPL
4.			
5.			
= Total Cover	15		
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus rubens*	5	Y	UPL
2. *Iva annua*	1	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	6		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
= Total Cover	0		

% Bare Ground in Herb Stratum 95 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	1	x 3 =	3
FACU species	0	x 4 =	0
UPL species	20	x 5 =	100
Column Totals:	21 (A)		103 (B)

Prevalence Index = B/A = 4.90

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 20 is within a sediment fan deposited by a drainage feeding into the adjacent wetland area. The immediate area is well drained. This area is heavily grazed.

SOIL

Sampling Point: SS 20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	7.5YR 3/3	100	N/A				Sand	Rock and cobble

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 21

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 32, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): LRR D Lat: 33.30342223330 Long: -111.05861712300 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 21 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus tectorum*	50	Y	UPL
2. *Bromus rubens*	40	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	90		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
= Total Cover	0		

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	90	x 5 =	450
Column Totals:	90 (A)		450 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 21 is south of Magma Mine Road in a grassy, flat meadow. SS 21 is within the lowest part of the meadow adjacent to a culvert conveying runoff under Magma Mine Road. This area is heavily grazed and well drained.

SOIL

Sampling Point: SS 21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	7.5YR 3/2	100	N/A				Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-8-2011
Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 22
Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 29, Township 1 South, Range 13 East
Landform (hillslope, terrace, etc.): ponded depression Local relief (concave, convex, none): concave Slope (%): 6
Subregion (LRR): LRR D Lat: 33.30865639530 Long: -111.05472851000 Datum: NAD 83
Soil Map Unit Name: No data available NWI classification: none
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____
Hydric Soil Present?	Yes ✓	No ____
Wetland Hydrology Present?	Yes ✓	No ____

Is the Sampled Area within a Wetland? **Yes ✓** **No ____**

Remarks:
Soil Station 22 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix gooddingii*	10	Y	OBL
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Ludwigia palustrus*	40	Y	OBL
2. *Xanthium strumarium*	20	Y	FAC
3. *Polanisia dodecandra*	2	N	FACU
4. *Ambrosia psilostachya*	1	N	FAC
5.			
6.			
7.			
8.			
	63 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 45 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓** **No ____**

Remarks:
Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 22 is within a large ponded depression appearing to hold water for extended periods. The ponding is caused by a man-made dam constructed to the north of SS 22 and south of Magma Mine Road. An ephemeral stream deposits runoff into this area. Grazing is heavy in this immediate area.

SOIL

Sampling Point: SS 22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 4/2	85	10YR 3/4	15	RM	PL	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rocks and cobble

Depth (inches): 5

Hydric Soil Present? Yes ✓ No ___

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ✓ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ✓ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

* Adventitious roots present on *Salix gooddingii.*
Five primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 23

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 29, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): hill slope Local relief (concave, convex, none): none Slope (%): 8

Subregion (LRR): LRR D Lat: 33.30848581480 Long: -111.05491219500 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 23 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus arizonica*	10	Y	UPL
2. *Quercus emoryii*	5	Y	UPL
3.			
4.			
	15 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Arctostaphylos pungens*	20	Y	UPL
2. *Nolina microcarpa*	2	N	UPL
3. *Quercus emoryii*	1	N	UPL
4.			
5.			
	23 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Cynodon dactylon*	3	Y	FACU
2. *Ambrosia deltoidea*	2	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	5 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 98 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	3	x 4 =	12
UPL species	40	x 5 =	200
Column Totals:	43 (A)		212 (B)

Prevalence Index = B/A = 4.93

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 23 is on a sloped hillside with little herbaceous vegetation. The ground surface is entirely composed of bedrock and appears to drain eastward towards Wetland 6.

SOIL

Sampling Point: SS 23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0	Bedrock	100	N/A				Rock	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: bedrock

Depth (inches): 0

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Ground surface is composed entirely of bedrock. Soil profile does not exist in the immediate area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 24

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 28, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): hill slope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): LRR D Lat: 33.30896884150 Long: -111.05445130600 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 24 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus arizonica*	10	Y	UPL
2. *Quercus emoryii*	10	Y	UPL
3.			
4.			
	20 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Quercus turbinella*	7	Y	UPL
2. *Nolina microcarpa*	7	Y	UPL
3. *Mimosa biuncifera*	7	Y	UPL
4. *Arctostaphylos pungens*	5	N	UPL
5.			
	26 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus rubens*	7	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	7 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 95 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	0	x 4 = 0
UPL species	53	x 5 = 265
Column Totals:	53 (A)	265 (B)

Prevalence Index = B/A = 5

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 24 is on a sloped hillside with little herbaceous vegetation cover located south of Magma Mine Road. The ground surface is almost entirely covered with bedrock and appears to drain southward towards the Wetland 6.

SOIL

Sampling Point: SS 24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0	Bedrock	100	N/A				Rock	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: bedrock

Depth (inches): 0

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Ground surface is composed entirely of bedrock. Soil profile does not exist in the immediate area.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 25

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 28, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): ponded depression Local relief (concave, convex, none): concave Slope (%): <1

Subregion (LRR): LRR D Lat: 33.30881981300 Long: -111.05447898200 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

Remarks:

Soil Station 25 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix gooddingii*	25	Y	OBL
2.			
3.			
4.			
	25	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Ludwigia palustrus*	15	Y	OBL
2. *Xanthium strumarium*	3	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	18	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 85 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	2	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 25 is within a large ponded depression appearing to hold water for extended periods. The ponding is caused by a man-made dam constructed to the north of SS 25 and south of Magma Mine Road. An ephemeral stream deposits runoff into this area. Grazing is heavy in this immediate area.

SOIL

Sampling Point: SS 25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-20	7.5YR 4/2	85	7.5YR 3/4	15	RM	PL	Loam	some organic material between 1" and 2"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ✓ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______________

Water Table Present? Yes ______ No ✓ Depth (inches): ______________

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______________

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Five primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 26

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 28, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): ponded depression Local relief (concave, convex, none): concave Slope (%): <1

Subregion (LRR): LRR D Lat: 33.30861738940 Long: -111.05400289800 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes ✓** **No ___**

Remarks:

Soil Station 26 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix gooddingii*	10	Y	OBL
2.			
3.			
4.			
	10	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Setaria parviflora*	5	Y	FAC
2. *Xanthium strumarium*	5	Y	FAC
3. *Rumex crispis*	5	Y	FACW
4.			
5.			
6.			
7.			
8.			
	15	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 85 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓** **No ___**

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 26 is within a large ponded depression appearing to hold water for extended periods. The ponding is caused by a man-made dam constructed to the north of SS 25 and south of Magma Mine Road. An ephemeral stream deposits runoff into this area. Grazing is heavy in this immediate location.

SOIL

Sampling Point: SS 26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/2	100	N/A				Sand	
2-20	7.5YR 4/2	80	7.5YR 3/4	20	RM	PL	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ✓ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Three primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-8-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 27

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 28, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): sediment fan Local relief (concave, convex, none): none Slope (%): <1

Subregion (LRR): LRR D Lat: 33.30840126790 Long: -111.05370681100 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

Soil Station 27 is within an upland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus rubens*	15	Y	UPL
2. *Cynodon dactylon*	10	Y	FACU
3. *Xanthium strumarium*	7	N	FAC
4. *Iva annua*	5	N	FAC
5.			
6.			
7.			
8.			
= Total Cover	37		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
= Total Cover	0		

% Bare Ground in Herb Stratum 65 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	12	x 3 =	36
FACU species	10	x 4 =	40
UPL species	15	x 5 =	75
Column Totals:	37 (A)		141 (B)

Prevalence Index = B/A = 4.08

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 27 is on a flat, sandy area sloping slightly northwestward towards the ponding area. This immediate area appears well drained.

SOIL

Sampling Point: SS 27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	7.5YR 3/3	100	N/A				Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-19-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 28

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 29, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): ponded depression Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR D Lat: 33.30911690020 Long: -111.05517253700 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____
Hydric Soil Present?	Yes ✓	No ____
Wetland Hydrology Present?	Yes ✓	No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

Remarks:

Soil Station 28 is within a wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: shaped to feature)			
1. *Populus fremontii*	10	Y	FACW
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Salix gooddingii*	8	Y	OBL
2. *Quercus emoryi*	1	N	UPL
3. *Celtis laevigata var. reticulata*	1	N	FACU
4.			
5.			
	10 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Eleocharis palustrus*	40	Y	OBL
2. *Xanthium strumarium*	25	Y	FAC
3. *Iva annua*	5	N	FAC
4. *Helianthus ciliarus*	5	N	FAC
5. *Rumex crispus*	4	N	FACW
6. *Juncus marginatus*	4	N	FACW
7.			
8.			
	83 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 28 is between (downstream of) a man-made dam and a large culvert (upstream of) conveying runoff under Magma Mine Road. This area receives overflow from the man-made dam and likely receives some seepage from under the dam evident by presence of hydrophytic vegetation growing at the base of the dam and in the bottom of the depression. Grazing is heavy in this immediate location.

SOIL

Sampling Point: SS 28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/2	95	10YR 3/6	5	RM	PL	Sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock fill

Depth (inches): 4

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F6, Redox Dark Surface, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ✓ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ✓ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________

Water Table Present? Yes ______ No ✓ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Three primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-19-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 29

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 29, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 30

Subregion (LRR): LRR D Lat: 33.30915801920 Long: -111.05509503200 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 29 is within an upland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Quercus emoryi*	8	Y	UPL
2. *Rhus trilobata*	3	Y	UPL
3. *Mimosa biuncifera*	2	N	UPL
4.			
5.			
	13 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Ambrosia artemisiifolia*	18	Y	FACU
2. *Bromus rubens*	10	Y	FACU
3. *Iva annua*	2	N	FAC
4. *Datura meteloides*	1	N	UPL
5.			
6.			
7.			
8.			
	31 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	2	x 3 =	6
FACU species	28	x 4 =	112
UPL species	14	x 5 =	70
Column Totals:	44 (A)		178 (B)

Prevalence Index = B/A = 4.05

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 29 is on a steep slope, resulting from the stabilization of Magma Mine Road, directly adjacent to Wetland 7. This immediate area slopes towards the wetland (westward) and appears well drained.

SOIL

Sampling Point: SS 29

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	10YR 3/2	100	N/A				Sandy loam	Cobble and rock present

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock and cobble

Depth (inches): 10

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Soil profile is likely composed of imported road base.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-19-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 30

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 29, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 10

Subregion (LRR): LRR D Lat: 33.30910881230 Long: -111.05526365900 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 30 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Quercus turbinella*	7	Y	UPL
2. *Quercus emoryi*	5	Y	UPL
3. *Mimosa biuncifera*	1	N	UPL
4. *Baccharis sarothroides*	1	N	FAC
5.			
= Total Cover	14		
Herb Stratum (Plot size: shaped to feature)			
1. *Helianthus ciliarus*	15	Y	FAC
2. *Iva annua*	2	N	FAC
3. *Datura meteloides*	2	N	UPL
4. *Bromus rubens*	1	N	FACU
5. *Ambrosia artemisiifolia*	1	N	FACU
6.			
7.			
8.			
= Total Cover	21		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
= Total Cover	0		

% Bare Ground in Herb Stratum 90 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	18	x 3 =	54
FACU species	2	x 4 =	8
UPL species	15	x 5 =	75
Column Totals:	35 (A)		137 (B)

Prevalence Index = B/A = 3.91

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 30 is on a steep slope, resulting from the stabilization of Magma Mine Road, directly adjacent to Wetland 7. This immediate area slopes towards the wetland (eastward) and appears well drained.

SOIL

Sampling Point: SS 30

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR 3/1	100	N/A				Sandy loam	Cobble and rock present

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock and cobble

Depth (inches): 5

Hydric Soil Present? Yes ______ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Soil profile is likely composed of imported road base.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________

Water Table Present? Yes ______ No ✓ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-19-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 31

Investigator(s): G. Williams; L. Forrest Section, Township, Range: Section 33, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): slight depression Local relief (concave, convex, none): concave Slope (%): >1

Subregion (LRR): LRR D Lat: 33.30151492360 Long: -111.05373771400 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? Yes ✓ No ___

Remarks:

Soil Station 31 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix gooddingii*	80	Y	OBL
2. *Celtis laevigata var. reticulata*	5	N	FACU
3.			
4.			
	85 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Quercus emoryi*	10	Y	UPL
2. *Celtis laevigata var. reticulata*	5	Y	FACU
3.			
4.			
5.			
	15 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Eleocharis palustrus*	8	Y	OBL
2. *Iva annua*	5	Y	FAC
3. *Bromus rubens*	5	Y	UPL
4. *Muhlenbergia rigens*	3	N	FACU
5. *Xanthium strumarium*	1	N	FAC
6.			
7.			
8.			
	22 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	88	x 1 =	88
FACW species	0	x 2 =	0
FAC species	6	x 3 =	18
FACU species	13	x 4 =	52
UPL species	15	x 5 =	75
Column Totals:	122 (A)		233 (B)

Prevalence Index = B/A = 1.91

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Prevalence Index Test. Soil Station (SS) 31 is a small depressed area appearing to pond water for extended periods. SS 31 is upstream of a man-made dam and east of a drainage feature. This area appears to hold water after the immediate area is drained by the man-made dam due to its depressed landscape position. Additionally, some hydrology may come from a small amount of seepage from the adjacent rocky slopes immediately after rain events.

SOIL

Sampling Point: SS 31

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-10	7.5YR 3/2	90	7.5YR 3/4	8	RM	PL	Clay Loam	some organic matter near surface
			7.5YR 4/6	2	RM	PL		
10-19	7.5YR 3/2+	80	7.5YR 2.5/3	15	RM	PL	Clay Loam	
			7.5YR 3/4	5	RM	PL		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F6, Redox Dark Surface, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ✓ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Three primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-19-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 32

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 33, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): sandy bottom Local relief (concave, convex, none): none Slope (%): >1

Subregion (LRR): LRR D Lat: 33.30151492360 Long: -111.05373771400 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

Soil Station 32 is within an upland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: shaped to feature)			
1. *Iva annua*	13	Y	FAC
2. *Cynodon dactylon*	10	Y	FACU
3. *Bromus rubens*	5	N	UPL
4. *Datura wrightii*	2	N	UPL
5. *Xanthium strumarium*	1	N	FAC
6.			
7.			
8.			
= Total Cover	31		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
= Total Cover	0		

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	14	x 3 =	42
FACU species	10	x 4 =	40
UPL species	7	x 5 =	35
Column Totals:	31 (A)		117 (B)

Prevalence Index = B/A = 3.77

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 32 is between to a drainage feature and a depression. This immediate area is well drained.

SOIL

Sampling Point: SS 32

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 4/3	100	N/A				Sand	
7-21	10YR 4/4	95	10YR 5/8	5	RM	M	Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant   City/County: Pinal   Sampling Date: 7-19-2011

Applicant/Owner: Resolution Copper Mine   State: AZ   Sampling Point: SS 33

Investigator(s): G. Williams; G. Diamond   Section, Township, Range: Section 33, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): linear depression   Local relief (concave, convex, none): concave   Slope (%): 6

Subregion (LRR): LRR D   Lat: 33.30133177660   Long: -111.05353100900   Datum: NAD 83

Soil Map Unit Name: No data available   NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed?   Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

Remarks:

Soil Station 33 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix gooddingii*	2		OBL
2.			
3. *(less than 5% cover)*			
4.			
	2	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Juncus interior*	20	Y	FAC
2. *Iva annua*	15	Y	FAC
3. *Bromus rubens*	2	N	UPL
4. *Cynodon dactylon*	2	N	FACU
5.			
6.			
7.			
8.			
	39	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 65   % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 33 is within a linear depression adjacent to a drainage feature exhibiting wetland characteristics. Grazing is heavy in this immediate area.

SOIL

Sampling Point: SS 33

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-11	7.5YR 3/2	95	7.5YR 3/4	5	RM	PL	Loam	
11-15	7.5YR 3/2	75	10YR 2/2	15	RM	PL	Loam	
			10YR 3/3	10	RM	PL		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F6, Redox Dark Surface, is present. Hydric soil criterion is met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ✓ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Three primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-19-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 34

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 33, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): LRR D Lat: 33.30128591820 Long: -111.05356115800 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 34 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus emoryi*	5	Y	UPL
2.			
3.			
4.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Prunus virginiana*	3	Y	FAC
2. *Quercus turbinella*	3	Y	UPL
3. *Frangula californica*	3	Y	FACU
4.			
5.			
	9 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Bromus tectorum*	40	Y	FAC
2. *Bromus rubens*	30	Y	UPL
3. *Iva annua*	5	N	FAC
4. *Cynodon dactylon*	3	N	FACU
5.			
6.			
7.			
8.			
	78 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 25 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	48	x 3 = 144
FACU species	6	x 4 = 24
UPL species	38	x 5 = 190
Column Totals:	92 (A)	358 (B)

Prevalence Index = B/A = 3.89

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 34 is on a well drained slope between a linear wetland and a drainage feature. This immediate area is well drained.

SOIL

Sampling Point: SS 34

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	10YR 3/3	100	N/A				Loam	
7-21	10YR 4/3	90	10YR 3/6	10	RM	PL	Loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ___

Depth (inches): ___

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-19-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 35

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 28, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): >1

Subregion (LRR): LRR D Lat: 33.30975338730 Long: -111.03961646200 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	Is the Sampled Area within a Wetland? Yes ✓ No ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks:

Soil Station 35 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Eleocharis palustrus*	50	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	50 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 35 is within a ponded depression appearing to hold water for extended periods. A monoculture of common spikerush is the only vegetation present.

SOIL

Sampling Point: SS 35

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-17	10YR 3/1	75	5YR 3/4	23	RM	PL	Clay	
			10YR 4/1	2	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ **No** ______

Remarks:

Hydric Soil Indicator F6, Redox Dark Surface, is present. Hydric soil criterion is met. The clay-textured soil is likely imported fill used to promote ponding for livestock watering.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ✓ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

	Yes	No	Depth (inches)
Surface Water Present?	✓		1
Water Table Present?		✓	
Saturation Present? (includes capillary fringe)	✓		0

Wetland Hydrology Present? Yes ✓ **No** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Five primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-19-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 36

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 28, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): LRR D Lat: 33.30973237990 Long: -111.03956395400 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 36 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: shaped to feature)			
1. *Cynodon dactylon*	75	Y	FACU
2. *Sporobolus compositus var. compositus*	5	N	UPL
3. *Ambrosia artemisiifolia*	3	N	FACU
4.			
5.			
6.			
7.			
8.			
= Total Cover	83		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
= Total Cover	0		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	0	x 3 = 0
FACU species	78	x 4 = 312
UPL species	5	x 5 = 25
Column Totals:	83 (A)	337 (B)

Prevalence Index = B/A = 4.06

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 36 is on a well drained slope adjacent to an isolated depression holding water for extended periods. This immediate area is heavily grazed.

SOIL

Sampling Point: SS 36

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/2	100	N/A				Clay loam	disturbed

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? **Yes** ____ **No** ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed and is likely imported fill.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ______
Water Table Present? Yes ____ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ______

Wetland Hydrology Present? **Yes** ____ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-19-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 37

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 28, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): >1

Subregion (LRR): LRR D Lat: 33.30984274780 Long: -111.03967436900 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes ✓ No ___**

Remarks:
Soil Station 37 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
3.			
4.			
5.			
= Total Cover	0		
Herb Stratum (Plot size: shaped to feature)			
1. *Eleocharis palustrus*	40	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	40		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
= Total Cover	0		

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	100	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes ✓ No ___**

Remarks:
Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 37 is within a ponded depression appearing to hold water for extended periods. A monoculture of common spikerush is the only vegetation present.

SOIL

Sampling Point: SS 37

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/1	70	5YR 3/4	25	RM	PL	Clay	
			10YR 4/1	5	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ✓ **No** ___

Remarks:

Hydric Soil Indicator F6, Redox Dark Surface, is present. Hydric soil criterion is met. The clay-textured soil is likely imported fill used to promote ponding for livestock watering.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ✓ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ✓ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No ___	Depth (inches): 1
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ✓	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** ✓ **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Four primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – East Plant City/County: Pinal Sampling Date: 7-19-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 38

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 28, Township 1 South, Range 13 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): LRR D Lat: 33.30988164520 Long: -111.03974799800 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 38 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Mimosa biuncifera*	15	Y	UPL
2. *Baccharis sarothroides*	10	Y	FAC
3.			
4.			
5.			
	25 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Cynodon dactylon*	15	Y	FACU
2. *Bromus rubens*	5	Y	UPL
3. *Verbena officinalis*	5		NI*
4.			
5.			
6.			
7.			
8.			
	20 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 75 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	20	x 4 =	80
UPL species	20	x 5 =	200
Column Totals:	50 (A)		210 (B)

Prevalence Index = B/A = 4.20

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

* Not counted during dominance calculations
Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 38 is on a well drained slope adjacent to an isolated depression holding water for extended periods. This immediate area is heavily grazed.

SOIL

Sampling Point: SS 38

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/2	100	N/A				Clay loam	disturbed

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ____ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed and is likely imported fill.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 39

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 35, Township 1 South, Range 12 East

Landform (hillslope, terrace, etc.): slight depression Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): LRR D Lat: 33.29279239650 Long: -111.10832309000 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

Soil Station 39 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. N/A			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Tamarix parviflora*	20	Y	FACW
2. *Baccharis sarothroides*	4	N	FAC
3. *Populus fremontii*	3	N	FACW
4.			
5.			
= Total Cover	27		
Herb Stratum (Plot size: shaped to feature)			
1. *Isocoma pluriflora*	40	Y	UPL
2. *Cynodon dactylon*	8	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	48		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. N/A			
= Total Cover	0		

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	23	x 2 =	46
FAC species	4	x 3 =	12
FACU species	8	x 4 =	32
UPL species	40	x 5 =	200
Column Totals:	75 (A)		290 (B)

Prevalence Index = B/A = 3.87

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 39 is on a well drained slope within a large depression, potentially a historic borrow area. The facultative wetland species present in the shrub layer also tend to prefer disturbed areas which likely explains their presence within the area rather than a hydrology source.

SOIL

Sampling Point: SS 39

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	5YR 3/4	100	N/A				Loam	disturbed with cobble
5-12	7.5YR 3/3	100	N/A				Loam	possible ash present; cobble

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______

Water Table Present? Yes ___ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 40

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 3, Township 1 South, Range 12 East

Landform (hillslope, terrace, etc.): flat mowed area Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR D Lat: 33.29167793440 Long: -111.10709334200 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 40 is within an upland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: shaped to feature)			
1. *Tamarix parviflora*	10	Y	FACW
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Tamarix parviflora*	20	Y	FACW
2.			
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Cynodon dactylon*	105	Y	FACU
2. *Bromus rubens*	5	N	UPL
3. *Ambrosia trifida*	5	N	FACW
4.			
5.			
6.			
7.			
8.			
	115 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 40 is on a well drained flat adjacent to a salt cedar thicket. The herbaceous vegetation cover is very dense in this immediate area likely in response to mowing and a large amount of shade.

SOIL

Sampling Point: SS 40

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR 3/2	100	N/A				Loam	disturbed with cobble and rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? **Yes** ___ **No** ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed with the presence of rock and cobble.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ______

Water Table Present? Yes ___ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ______

Wetland Hydrology Present? **Yes** ___ **No** ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 41

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 3, Township 2 South, Range 12 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): LRR D Lat: 33.29161842000 Long: -111.10740078600 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	Is the Sampled Area within a Wetland? Yes ___ No ✓
Hydric Soil Present?	Yes ___ No ✓	
Wetland Hydrology Present?	Yes ___ No ✓	

Remarks:

Soil Station 41 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Tamarix parviflora*	40	Y	FACW
2. *Washingtonia filafera*	20	Y	FACW
3.			
4.			
	60 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Tamarix parviflora*	30	Y	FACW
2. *Salix goodiingii*	10	Y	OBL
3.			
4.			
5.			
	40 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Setaria parviflora*	15	Y	FAC
2. *Cynodon dactylon*	5	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	20 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 85 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 41 is on a slope appearing to be a shallow man-made swale. A large berm is directly to the west. Since the palm trees are growing in a linear row, they were likely planted to support the soil of the berm or for aesthetic reasons. This area is highly disturbed.

SOIL

Sampling Point: SS 41

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	5YR 3/3	100	N/A				Loam	disturbed with cobble and rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock/cobble

Depth (inches): 2

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed. Restrictive layer of cobble and rock at 2" in depth likely present to serve as a stabilization measure for the berm adjacent to SS 41.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 42

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 4, Township 2 South, Range 12 East

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR D Lat: 33.28987671890 Long: -111.11459596600 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ✓	No ___
Wetland Hydrology Present?	Yes ✓	No ___

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ___

Remarks:

Soil Station 42 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Tamarisk parviflora*	45	Y	FACW
2.			
3.			
4.			
5.			
	45 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Typha latifolia*	30	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 42 is within a small depression adjacent to a dirt-surfaced mine road. Water appears to pond for extended periods in this small area and does not flow through the culvert running underneath the adjacent road.

SOIL

Sampling Point: SS 42

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	7.5YR 5/2	90	7.5YR 5/6	10	RM	PL	Loamy clay	Disturbed profile

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock and cobble

Depth (inches): 4

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met. This soil profile is adjacent to a historic slag pile and precautions were taken in handling this material. Cobble and rock, likely from the adjacent road construction were restrictions in the profile.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________

Water Table Present? Yes ______ No ✓ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Three primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 43

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 4, Township 2 South, Range 12 East

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 40

Subregion (LRR): LRR D Lat: 33.28997708930 Long: -111.11446087000 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓
Hydric Soil Present?	Yes ____	No ✓
Wetland Hydrology Present?	Yes ____	No ✓

Is the Sampled Area within a Wetland? **Yes** ____ **No** ✓

Remarks:

Soil Station 43 is within an upland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: shaped to feature)			
1. *Prosopis velutina*	20	Y	FACU
2. *Parkinsonia microphylla*	10	Y	UPL
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Parkinsonia microphylla*	15	Y	UPL
2. *Baccharis sarothroides*	10	Y	FAC
3. *Simmondsia chinensis*	8	N	UPL
4. *Mimosa biuncifera*	5	N	UPL
5. *Ephedra viridis*	3	N	UPL
	41	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Ambrosia dumosa*	25		UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	25	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 75 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	4	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	25	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	20	x 4 =	80
UPL species	66	x 5 =	330
Column Totals:	96 (A)		440 (B)

Prevalence Index = B/A = 4.58

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 43 is on a well drained slope adjacent to a dirt-surfaced mine road.

SOIL

Sampling Point: SS 43

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-1	7.5YR 3/2	100	N/A				Loam	disturbed with cobble and rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock/cobble

Depth (inches): 1

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed. This soil profile is adjacent to a historic slag pile and precautions were taken in handling soil material. Area is almost entirely composed of rock and cobble.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 44

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 3, Township 2 South, Range 12 East

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): LRR D Lat: 33.28990706060 Long: -111.11383806300 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ___	Is the Sampled Area within a Wetland? Yes ✓ No ___
Hydric Soil Present?	Yes ✓ No ___	
Wetland Hydrology Present?	Yes ✓ No ___	

Remarks:

Soil Station 44 is within a wetland.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: shaped to feature)			
1. *Populus fremontii*	70	Y	FACW
2.			
3.			
4.			
	70 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Tamarisk parviflora*	60	Y	FACW
2.			
3.			
4.			
5.			
	60 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Typha latifolia*	70	Y	OBL
2. *Cynodon dactylon*	2	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	72 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 44 is within a large depression (Wetland 11) beginning south of a dirt-surfaced mine road appearing to pond water for extended periods. This portion of Wetland 11 is heavily canopied.

SOIL

Sampling Point: SS 44

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	5YR 5/2	75	7.5YR 3/6	25	RM	PL	Loamy clay	Disturbed profile

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met. This soil profile is adjacent to a historic slag pile and precautions were taken in handling soil material.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Three primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 45

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 3, Township 2 South, Range 12 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 15

Subregion (LRR): LRR D Lat: 33.28994935890 Long: -111.11386992200 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No
Hydric Soil Present?	Yes	No ✓
Wetland Hydrology Present?	Yes	No ✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓

Remarks:

Soil Station 45 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus fremontii*	60	Y	FACW
2. *Washingtonia filafera*	20	Y	FACW
3. *Prosopis velutina*	5	N	FACU
4.			
	85	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Tamarix parviflora*	60	Y	FACW
2.			
3.			
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Isocoma tenuisecta*	10	Y	UPL
2. *Cynodon dactylon*	10	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	20	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	3	(A)
Total Number of Dominant Species Across All Strata:	5	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	60	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- __ Prevalence Index is ≤3.0[1]
- __ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- __ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 45 is on a slope draining towards Wetland 11. Ground surface is covered with palm tree detritus.

SOIL

Sampling Point: SS 45

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 3/2	100	N/A				Loam	disturbed with cobble and rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock/cobble

Depth (inches): 8

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed. Restrictive layer of cobble and rock at 8" in depth likely from the adjacent mine roads.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ___	No ✓	Depth (inches): ___
Water Table Present?	Yes ___	No ✓	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No ✓	Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 46

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 3, Township 2 South, Range 12 East

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR D Lat: 33.28949651950 Long: -111.11384935900 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____
Hydric Soil Present?	Yes ✓	No ____
Wetland Hydrology Present?	Yes ✓	No ____

Is the Sampled Area within a Wetland? **Yes** ✓ **No** ____

Remarks:

Soil Station 46 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
= Total Cover	0		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Tamarisk parvoflora*	45	Y	FACW
2. *Populus fremontii*	40	Y	FACW
3.			
4.			
5.			
= Total Cover	85		
Herb Stratum (Plot size: shaped to feature)			
1. *Cyperus involucratis**	40	Y	FACW
2. *Typha latifolia*	3	N	OBL
3. *Setaria parviflora*	3	N	FAC
4.			
5.			
6.			
7.			
8.			
= Total Cover	46		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
= Total Cover	0		

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ____

Remarks:

* Listed as NI for Region 7. Therefore, the indicator status of the nearest region, Region 0 (California), is used. Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 46 is within a large depression appearing to hold water for extended periods due to a slight berm downslope on a dirt-surfaced mine road impeding surface drainage.

SOIL

Sampling Point: SS 46

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5YR 5/2	85	7.5YR 3/6	15	RM	PL	Loamy clay	Disturbed profile

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met. This soil profile is adjacent to a historic slag pile and precautions were taken in handling this material.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______
Water Table Present?	Yes ______	No ✓	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No ✓	Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Three primary indicators of wetland hydrology are present. Wetland hydrology criterion is met. Very large surface cracks present.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 47

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 3, Township 2 South, Range 12 East

Landform (hillslope, terrace, etc.): slight slope Local relief (concave, convex, none): none Slope (%): 2

Subregion (LRR): LRR D Lat: 33.28943888090 Long: -111.11377742300 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? **Yes** ___ **No** ✓

Remarks:

Soil Station 47 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. *N/A*			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Tamarix parviflora*	5	Y	FACW
2. *Populus fremontii*	5	Y	FACW
3. *Salix gooddingii*	1	N	OBL
4.			
5.			
	11 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Cynodon dactylon*	25	Y	FACU
2. *Iva annua*	3	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
	28 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 75 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ✓ **No** ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 47 is on a slight slope between Wetland 11 and a drainage feature. This immediate area is well drained.

SOIL

Sampling Point: SS 47

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-18	5YR 3/2	100	N/A				Sandy loam	disturbed with cobble and rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed. This soil profile is adjacent to a historic slag pile and precautions were taken in handling soil material.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______
Water Table Present? Yes ______ No ✓ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 48

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 3, Township 2 South, Range 12 East

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR D Lat: 33.29035812890 Long: -111.11292987300 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___ Hydric Soil Present? Yes ✓ No ___ Wetland Hydrology Present? Yes ✓ No ___	**Is the Sampled Area within a Wetland?** Yes ✓ No ___

Remarks:

Soil Station 48 is within a wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus fremontii*	20	Y	FACW
2. *Salix gooddingii*	20	Y	OBL
3. *Washingtonia filafera*	20	Y	FACW
4. *Rhus glabra*	10	N	UPL
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Tamarisk parviflora*	15	Y	FACW
2.			
3.			
4.			
5.			
	15	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Typha latifolia*	40	Y	OBL
2. *Cynodon dactylon*	20	Y	FACU
3. *Cyperus involucratis**	5	N	FACW
4. *Setaris parviflora*	5	N	FAC
5. *Iva annua*	3	N	FAC
6.			
7.			
8.			
	73	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

* Listed as NI for Region 7. Therefore, the indicator status of the nearest region, Region 0 (California), is used. Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 48 is within a slight depression appearing to hold water for extended periods. This depression is at the base of a large, historic slag pile.

SOIL

Sampling Point: SS 48

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 5/2	95	7.5YR 3/6	5	RM	PL	Loamy clay	rock and cobble

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock and cobble

Depth (inches): 5

Hydric Soil Present? Yes ✓ No ______

Remarks:

Hydric Soil Indicator F3, Depleted Matrix, is present. Hydric soil criterion is met. This soil profile is adjacent to a historic slag pile and precautions were taken in handling soil material.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ✓ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ______

Water Table Present? Yes ______ No ✓ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ______

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Two primary indicators of wetland hydrology are present. Wetland hydrology criterion is met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant   City/County: Pinal   Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine   State: AZ   Sampling Point: SS 49

Investigator(s): G. Williams; G. Diamond   Section, Township, Range: Section 3, Township 2 South, Range 12 East

Landform (hillslope, terrace, etc.): slight slope   Local relief (concave, convex, none): none   Slope (%): 1

Subregion (LRR): LRR D   Lat: 33.29027790610   Long: -111.11307799100   Datum: NAD 83

Soil Map Unit Name: No data available   NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed?   Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic?   (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 49 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus fremontii*	60	Y	FACW
2.			
3.			
4.			
	60 = Total Cover		
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Rhus glabra*	10	Y	UPL
2. *Populus fremontii*	8	Y	FACW
3. *Prosopis velutina*	5	N	FACU
4. *Tamarisk parvoflora*	5	N	FACW
5. *Celtis laevigata var. reticulata*	5	N	FACU
	33 = Total Cover		
Herb Stratum (Plot size: shaped to feature)			
1. *Cynodon dactylon*	60	Y	FACU
2. *Cyperus involucratis**	5	N	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	65 = Total Cover		
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0 = Total Cover		

% Bare Ground in Herb Stratum 35   % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	78	x 2 =	156
FAC species	0	x 3 =	0
FACU species	70	x 4 =	280
UPL species	10	x 5 =	50
Column Totals:	158 (A)		486 (B)

Prevalence Index = B/A = 3.08

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

* Listed as NI for Region 7. Therefore, the indicator status of the nearest region, Region 0 (California), is used. Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 49 is on a slight slope between Wetland 10 and a drainage feature. This immediate area is well drained.

SOIL

Sampling Point: SS 49

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
N/A	N/A							disturbed with cobble and rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock and cobble

Depth (inches): surface

Hydric Soil Present? Yes ______ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile appears disturbed. This soil profile is adjacent to a historic slag pile. Rock and cobble is present starting o the soil surface. Soil profile does not exist at this immediate location.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________
Water Table Present? Yes ______ No ✓ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 50

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 27, Township 1 South, Range 12 East

Landform (hillslope, terrace, etc.): dry pond Local relief (concave, convex, none): none Slope (%): <1

Subregion (LRR): LRR D Lat: 33.30954724740 Long: -111.11786760100 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No ✓
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 50 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. N/A			
3.			
4.			
= Total Cover	0		

Sapling/Shrub Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. N/A			
3.			
4.			
5.			
= Total Cover	0		

Herb Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Xanthium strumarium*	6	Y	FAC
2. *Cynodon dactylon*	3	Y	FACU
3. *Datura meteloides*	1	N	UPL
4.			
5.			
6.			
7.			
8.			
= Total Cover	10		

Woody Vine Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2. N/A			
= Total Cover	0		

% Bare Ground in Herb Stratum 90 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	0	x 2 = 0
FAC species	6	x 3 = 18
FACU species	3	x 4 = 12
UPL species	1	x 5 = 5
Column Totals:	10 (A)	35 (B)

Prevalence Index = B/A = 3.50

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to failure of the Dominance Test and Prevalence Index Test. Soil Station (SS) 50 is within a dry cattle pond appearing to pond water after large storm events for a short period of time. However, there is no OHWM present and non-hydrophytic terrestrial vegetation is growing in the bottom, indications of dry conditions. This area does not pond water for the period of time necessary for wetland development.

SOIL

Sampling Point: SS 50

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-11	7.5YR 3/3	75	5YR 4/6	5	RM	PL	Clay loam	
			5YR 3/1	20	RM	PL		
11-16	5YR 3/3	90	5YR 4/6	10	RM	PL	Clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):
Type: rock and cobble
Depth (inches): surface

Hydric Soil Present? Yes ______ No ✓

Remarks:
Hydric Soil Indicators are not present. Hydric soil criterion is not met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________
Water Table Present? Yes ______ No ✓ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met. Area appears to be a cattle pond. However, it does not appear to pond water any extended periods by the absence of hydrology indicators.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 51

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 34, Township 1 South, Range 12 East

Landform (hillslope, terrace, etc.): slope Local relief (concave, convex, none): none Slope (%): 4

Subregion (LRR): LRR D Lat: 33.30015594660 Long: -111.11558825800 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ___
Hydric Soil Present?	Yes ___	No ✓
Wetland Hydrology Present?	Yes ___	No ✓

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil Station 51 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus fremontii*	40	Y	FACW
2. *Washingtonia filafera*	15	Y	FACW
3. *Tamarisk parviflora*	10	N	FACW
4. *Salix gooddingii*	10	N	OBL
	75	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Tamarisk parviflora*	50	Y	FACW
2. *Washingtonia filafera*	30	Y	FACW
3. *Populus fremonti*	5	N	FACW
4. *Salix gooddingii*	3	N	OBL
5. *Baccharis sarothroides*	1	N	FAC
	89	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Cynodon dactylon*	5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	5	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 95 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 80 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

Hydrophytic vegetation criterion is met due to passage of the Dominance Test. Soil Station (SS) 51 is within a heavily canopied area sloping westward. This area appears to receive subsurface hydrology from leakage of the adjacent tailings pond. A large berm separates this area from the tailings pond impoundment. The surface is well drained and the soils are not hydric. The soil profile is very disturbed with a large amount of organic material within the profile.

SOIL

Sampling Point: SS 51

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	N/A							organic duff
3-18	5YR 3/3	100	N/A					cobble and rock

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. Profile is composed of a layer of dry, organic duff. The remainder of the soil profile is a very red color mixed with rock and cobble. The red color is likely influenced by the adjacent tailings impoundment and contains some metallic components. The profile is disturbed and is well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ______	No ✓	Depth (inches): ______
Water Table Present?	Yes ______	No ✓	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No ✓	Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met. Subsurface hydrology appears to be present due to the presence of large mature, hydrophytic vegetation species.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Resolution – West Plant City/County: Pinal Sampling Date: 7-20-2011

Applicant/Owner: Resolution Copper Mine State: AZ Sampling Point: SS 52

Investigator(s): G. Williams; G. Diamond Section, Township, Range: Section 34, Township 1 South, Range 12 East

Landform (hillslope, terrace, etc.): slight swale Local relief (concave, convex, none): none Slope (%): 3

Subregion (LRR): LRR D Lat: 33.30135773870 Long: -111.11556766100 Datum: NAD 83

Soil Map Unit Name: No data available NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

	Yes	No
Hydrophytic Vegetation Present?		✓
Hydric Soil Present?		✓
Wetland Hydrology Present?		✓
Is the Sampled Area within a Wetland?		✓

Remarks:

Soil Station 52 is within an upland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: shaped to feature)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus fremontii*	15	Y	FACW
2. *Prosopis velutina*	15	Y	FACU
3. *Tamarisk parviflora*	5	N	FACW
4.			
	35	= Total Cover	
Sapling/Shrub Stratum (Plot size: shaped to feature)			
1. *Tamarisk parviflora*	45	Y	FACW
2. *Prosopis velutina*	10	N	FACU
3. *Baccharis sarothroides*	5	N	FAC
4.			
5.			
	60	= Total Cover	
Herb Stratum (Plot size: shaped to feature)			
1. *Ambrosia dumosa*	25	Y	UPL
2. *Bromus rubens*	25	Y	UPL
3. *Circium arizonicum*	15	Y	FAC
4. *Solanum carolinense*	3	N	UPL
5.			
6.			
7.			
8.			
	68	= Total Cover	
Woody Vine Stratum (Plot size: shaped to feature)			
1.			
2. *N/A*			
	0	= Total Cover	

% Bare Ground in Herb Stratum 35 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	0	x 1 = 0
FACW species	65	x 2 = 130
FAC species	20	x 3 = 60
FACU species	25	x 4 = 100
UPL species	53	x 5 = 265
Column Totals:	163 (A)	555 (B)

Prevalence Index = B/A = 3.40

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

Hydrophytic vegetation criterion is not met due to passage of the Dominance Test and Prevalence Index Test. Soil Station (SS) 52 is within a heavily canopied area sloping southward paralleling the large tailings pond berm. This area appears well drained.

SOIL

Sampling Point: SS 52

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-3	5YR 3/5	100	N/A				Loam	rock and cobble

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock and cobble

Depth (inches): 3

Hydric Soil Present? Yes ___ No ✓

Remarks:

Hydric Soil Indicators are not present. Hydric soil criterion is not met. The soil profile is a very red color mixed with rock and cobble. The red color is likely influenced by the adjacent tailings impoundment and contains some metallic components. The profile is disturbed and is well drained.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks) *

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Indicators of wetland hydrology are not present. Wetland hydrology criterion is not met.

ATTACHMENT 7

JE FULLER
HYDROLOGY &
GEOMORPHOLOGY
INC.
TECHNICAL
MEMORANDUM

Resolution Copper: Significant Nexus Evaluation

Prepared by:

JE FULLER
HYDROLOGY & GEOMORPHOLOGY, INC.

A sub-consultant to:

Westland Resources, Inc.

Engineering and Environmental Consultants

July 2011

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Section 1 INTRODUCTION

This Technical Memorandum is prepared by JE Fuller Hydrology & Geomorphology (JEF), Inc for Westland Resources, Inc. for the task of Significant Nexus Evaluation. Presented in this Technical Memorandum is a description of the physical system, data sources, the methodology and the finding.

Section 2 DESCRIPTION OF THE PHYSICAL SYSTEM

Resolution Copper Mining's East and West Plants, herein collectively called the "site" are situated to the north and northeast of the town of Superior, in Pinal County Arizona as shown in Figure 1. The drainage areas of both the East and West Plants are shown below in Table 1. Figure 2 shows the site, labeled as the Area of Interest, in relation to the major drainages in Pinal and Maricopa Counties. The site is the upstream end of the analysis area and is near the headwaters of Queen Creek. The nearest Traditional Navigable Water (TNW) is on the Gila River just north of Gillespie Dam, and serves as the downstream extent of the analysis area. Also shown on Figure 2 are all the stream gages that lay on a direct path between the site and the TNW. These gages are numbered for purposes of this Technical Memorandum in increasing numerical order starting at the upstream end near the site. The nearest tributary stream gages are also shown lettered a) though f).

Following Figure 1 is Table 2 which displays the distance between the site and each gage as well as an estimate of the travel time, in hours. Travel time was computed using two assumed rates, a slower rate of 3 feet/second and a faster rate of 7 feet/second to bracket a possible range of flow conditions, yielding a total travel time from the site to the TNW of between 28 and 66 Hours.

Table 1. Drainage Areas

Drainage Area			Plant Area (3.10 Sq Mi) as a % of Gage Drainage Area
	Location	(Sq. Miles)	
	East Plant	2.52	
	West Plant	0.58	
	Sum:	3.10	
	Gage	(Sq. Miles)	(%)
1.	Whitlow Ranch Dam	144	2.15%
2.	Queen Creek at CAP	256	1.21%
3.	Queen Creek at Ironwood Rd.	undetermined	undetermined
4.	Queen Creek at Rittenhouse Rd.	undetermined	undetermined
5.	EMF at Arizona Ave.	214*	1.45%
6.	Gila at Maricopa Rd.	19,915	0.02%
7.	Gila River Near Laveen	20,615	0.02%
8.	Gila River at 116th Ave.	43,300	0.007%
9.	Gila at Estrella Pkwy.	45,585	0.007%
10.	Gila R Blw Gillespie Dam, AZ	49,650	0.006%

*at Hunt Hwy

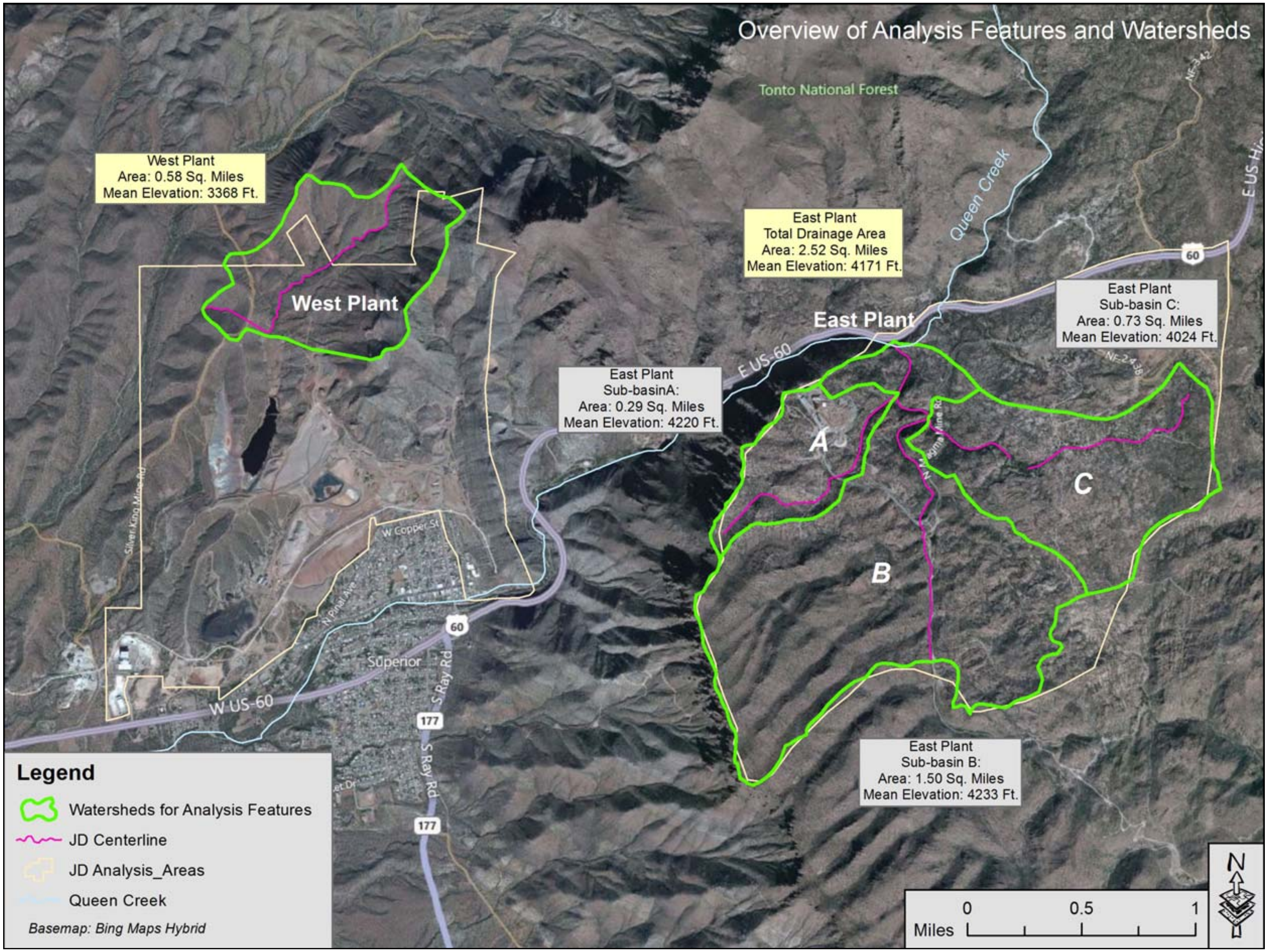


Figure 1. Overview of Analysis Features and Watersheds

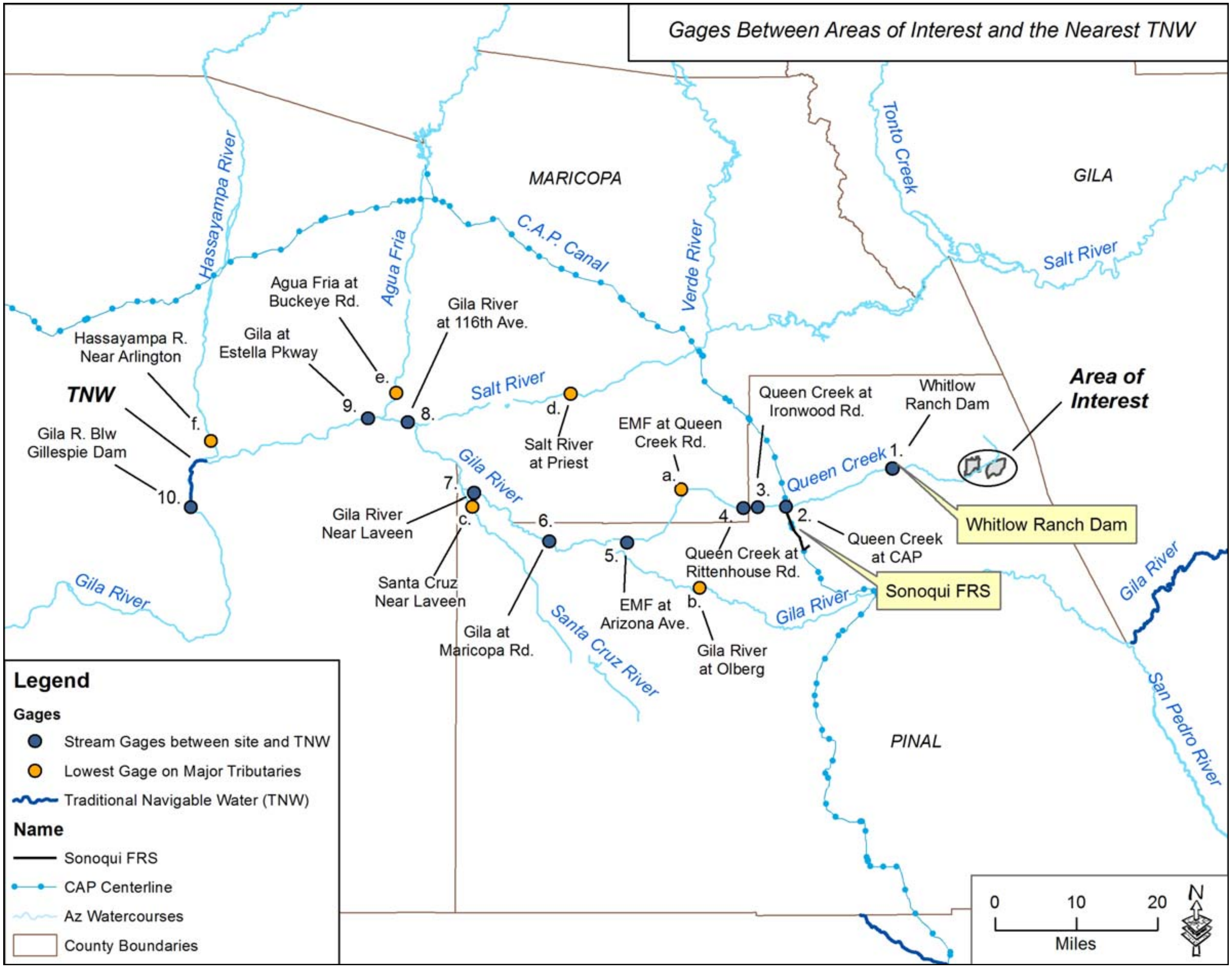


Figure 2. Gages between Areas of Interest and the Nearest TNW

Table 2. Travel Time between Gages

Travel Time										
				Distance		3 ft/s Travel Time		7 ft/s Travel Time	
				Segment (Miles)	Cumulative (Miles)	Segment (Hours)	Cumulative (Hours)	Segment (Hours)	Cumulative (Hours)
	From		To						
	West Plant		Queen Creek	3.7	na	1.8	na	0.8	na
	East Plant	1.	Whitlow Ranch Dam	15.6	15.6	7.6	7.6	3.3	3.3
1.	Whitlow Ranch Dam	2.	Queen Creek at CAP	15.1	30.7	7.4	15.0	3.2	6.4
2.	Queen Creek at CAP	3.	Queen Creek at Ironwood (Gantzel)	3.6	34.2	1.7	16.7	0.7	7.2
3.	Queen Creek at Ironwood (Gantzel)	4.	Queen Creek at Rittenhouse Rd.	1.8	36.0	0.9	17.6	0.4	7.5
4.	Queen Creek at Rittenhouse Rd.	5.	EMF at Arizona Ave.	20.0	56.0	9.8	27.4	4.2	11.7
5.	EMF at Arizona Ave.	6.	Gila at Maricopa Rd	12.6	68.6	6.2	33.5	2.7	14.4
6.	Gila at Maricopa	7	Gila River Near Laveen	14.8	83.4	7.3	40.8	3.1	17.5
7.	Gila River Near Laveen	8.	Gila at 116th	15.1	98.5	7.4	48.2	3.2	20.7
8.	Gila at 116th	9.	Gila at Estrella Prkwy	5.3	103.9	2.6	50.9	1.1	21.8
9.	Gila at Estrella Prkwy	10.	Gila River Blw Gillespie Dam	31.5	135.3	15.4	66.2	6.6	28.4

Section 3 DATA SOURCES

The data collected for this analysis has been gathered from various sources, including the US Geologic Survey (USGS), the Flood Control District of Maricopa County (FCDMC), Pinal County, and the US Army Corps of Engineers (USACE). All data collected for this analysis have been included in the attached Data CD.

3.1 Regression Equations

USGS Regression Equations provide a "simple method of estimating flood-peak discharges."[1] Regression equations computed for this analysis have been taken from the USGS Fact Sheet 111-98 "The National Flood-Frequency Program – Methods for Estimating Flood Magnitude and Frequency in Rural Areas in Arizona." A copy of this publication has been included in the attached Data CD.

3.2 Gage Data

A large component of the analysis relies on mean daily flow stream gage data. Those data, as listed above, comes from many different sources. Where applicable gages have been identified by owner and ID. At three locations within our study reach (Whitlow Ranch Dam, Gila at Maricopa, and Gila at Estrella Pkwy) multiple agencies own and operate different gages at the same location. When this occurs the data is displayed for all the gages. Listed below are the entities that own gages within the study reach as well as a brief description of the gages' purpose and limitations.

3.2.1 USGS

The "USGS surface-water data includes…data that describes stream levels, streamflow (discharge), reservoir and lake levels, surface-water quality, and rainfall. The data are collected by automatic recorders and manual field measurements at installations across the Nation."[2] The USGS field verifies the flow information with direct measurements and makes this data available via the internet as well. The USGS gage data is considered very high quality, and is deferred to in this analysis as the most correct set of data in instance when two gages at the same location record dissimilar information for the same period. There are five USGS gages on the main study reach and two USGS gages on contributing tributaries that have been used in the analysis.

3.2.2 FCDMC

"The Flood Control District of Maricopa County operates a 24-hour rain, stream and weather gage network which provides 'real-time' information to the county and many other agencies about rainfall, floods and water conditions in Maricopa County." FCDMC gage data is considered high quality; it is routinely used by the National Weather Service (NWS) to report local weather conditions and provide flood warning. There are seven FCDMC gages on the main study reach and four FCDMC gages on contributing tributaries that have been used in the analysis.

3.2.3 Pinal County

Pinal County owns and operates a network of stream gages purely for the purpose of flood-warning. Pinal County's flood warning network is maintained by JE Fuller Hydrology & Geomorphology, Inc. (JEF) staff. Pinal County's gage data has been extracted and processed by JEF for the purposes of this study. Pinal County gage data has never been field verified and users of this data should be aware that the purpose of the Pinal County

[1] USGS Fact Sheet: 111-98 page 1.

[2] http://waterdata.usgs.gov/az/nwis/sw

stream gage network solely for flood warning and not for data collection. There is only one Pinal County gage on the main study reach that have been used in the analysis. There are no Pinal County gages on any of the contributing tributaries.

3.2.4 USACE

The US Army Corp of Engineers Los Angeles district Reservoir Regulation Section operates a gage at Whitlow Ranch Dam. The gage reports storage behind the dam, average inflow in cubic-feet/second (cfs) and instantaneous outflow (cfs) every 15 minutes. "Continuous low flows, (less than 10 cfs) pass though Whitlow Ranch Dam's outlet works. Large discharges occur following heavy rains in the area above the dam."[3] The USACE gage at Whitlow Ranch Dam is the only USACE gage operated on the study reach.

Section 4 METHODOLOGY

4.1 Regression Equations

USGS Regression Equations have been computed for the West Plant, the East Plant, and for the drainage area above Whitlow Ranch Dam. The results of the regression equations can be seen in Table 3. Peak discharges were computed for the 2, 5, 10, 25, 50 and 100 year recurrence intervals. For each frequency a percentage was also computed to indicate what percentage of the peak discharge at Whitlow Ranch Dam that discharge represents.

Separate USGS Regression Equations have been constructed for various physio-geographic regions of Arizona. The site, both the East Plant and the West Plant, are located in USGS Regression Equation Region 13, but the site is close to the border of Region 12. For that reason results are included in Table 3 for both Region 13 and Region 12. It should be noted that although the USGS Regression Equations provide a peak discharge estimate to the nearest CFS the average standard error of prediction in percent for the frequencies computed is between 37% and 105%.[4]

4.2 Gage Data

Stream gage data on the study reach between the site and the nearest TNW were collected. The location of these gages are displayed in Figure 2. These gages have been listed by name, owner, ID and dates of operation in Table 4. It was found after comparing the dates of operation of all the gages side by side that the time period in which most gages have been operating concurrently was from approximately year 2000 until present, it is this time period that was the focus of the analysis.

The mean daily flow rate in cubic feet per second was collected for all the gages, if the data were available. The mean daily flow rate data for each gage was organized chronologically starting with the present. Each gage's daily data was then compared to every other gages data for the same day. By arranging the gages from upstream to downstream it was possible to pick out a several dates in the last 10 years where there has been concurrence of flow through part, or all, of the study reach.

Gage data from significant contributing tributaries to the study reach was also collected and analyzed in order to assess whether flow seen on the lower portion of the study reach could be attributed to a different drainage portion of the larger drainage area.

[3] http://www.spl.usace.army.mil/resreg/htdocs/whtl_2.html

[4] USGS Fact Sheet: 111-98 page 2.

Table 3. USGS Regression Equations for West Plant, East Plant and Whitlow Ranch Dam

USGS Regression Equations															
West Plant															
USGS Region	Drainage Area		Elevation	2-yr		5-yr		10-yr		25-yr		50-yr		100-yr	
	(Sq. Miles)	*(%)[1]*	(Feet)	(cfs)	*(%)[1]*	(cfs)	*(%)[1]*	(cfs)	*(%)[1]*	(cfs)	*(%)[1]*	(cfs)	*(%)[1]*	(cfs)	*(%)[1]*
Region 13	0.58	*0%*	N/A	89	*6%*	210	*6%*	322	*6%*	506	*6%*	661	*6%*	864	*6%*
Region 12	0.58	*0%*	3,368	29	*3%*	106	*2%*	206	*3%*	420	*3%*	592	*3%*	881	*3%*
East Plant															
Total Drainage Area (A+B+C)															
Region 13	2.52	*1.8%*	N/A	210	*13%*	508	*14%*	796	*14%*	1,275	*14%*	1,700	*14%*	2,260	*15%*
Region 12	2.52	*1.8%*	4171	74	*8%*	269	*6%*	500	*6%*	976	*7%*	1,638	*8%*	2,540	*8%*
Sub-basin A															
Region 13	0.29	*0.2%*	N/A	57	*4%*	133	*4%*	201	*4%*	312	*4%*	400	*3%*	516	*3%*
Region 12	0.29	*0.2%*	4220	19	*2%*	61	*1%*	119	*1%*	249	*2%*	303	*1%*	430	*1%*
Sub-basin B															
Region 13	1.50	*1.0%*	N/A	156	*10%*	376	*10%*	586	*10%*	934	*11%*	1,239	*11%*	1,640	*11%*
Region 12	1.50	*1.0%*	4233	53	*6%*	188	*4%*	353	*4%*	700	*5%*	1,115	*5%*	1,713	*6%*
Sub-basin C															
Region 13	0.73	*0.5%*	N/A	102	*6%*	243	*7%*	374	*7%*	590	*7%*	774	*7%*	1,016	*7%*
Region 12	0.73	*0.5%*	4024	34	*4%*	116	*2%*	224	*3%*	453	*3%*	657	*3%*	986	*3%*
Whitlow Ranch Dam															
Region 13	144	*100%*	N/A	1,571	*100%*	3,596	*100%*	5,612	*100%*	8,887	*100%*	11,769	*100%*	15,384	*100%*
Region 12	144	*100%*	3180	936	*100%*	4,781	*100%*	8,073	*100%*	13,848	*100%*	21,724	*100%*	30,682	*100%*

Footnote

1. Percentage compares value to Whitlow Ranch Dam, for Region 13 and 12 respectively

Notes

a. USGS Regression Equations from: USGS Fact Sheet 111-98, USGS The National Flood Frequency Program-- Methods for Estimating Flood Magnitude and Frequency in Rural Arizona. January 1999.

b. Drainage Area calculated in ArcGIS using Watersheds_for_Analysis Features.shp

c. Elevation represents the Average Basin Elevation and was calculated using Spatial Analyst tools in ArcGIS using the USGS 10M Digital Elevation Model for the Superior, Arizona Quadrangle, except where noted below.

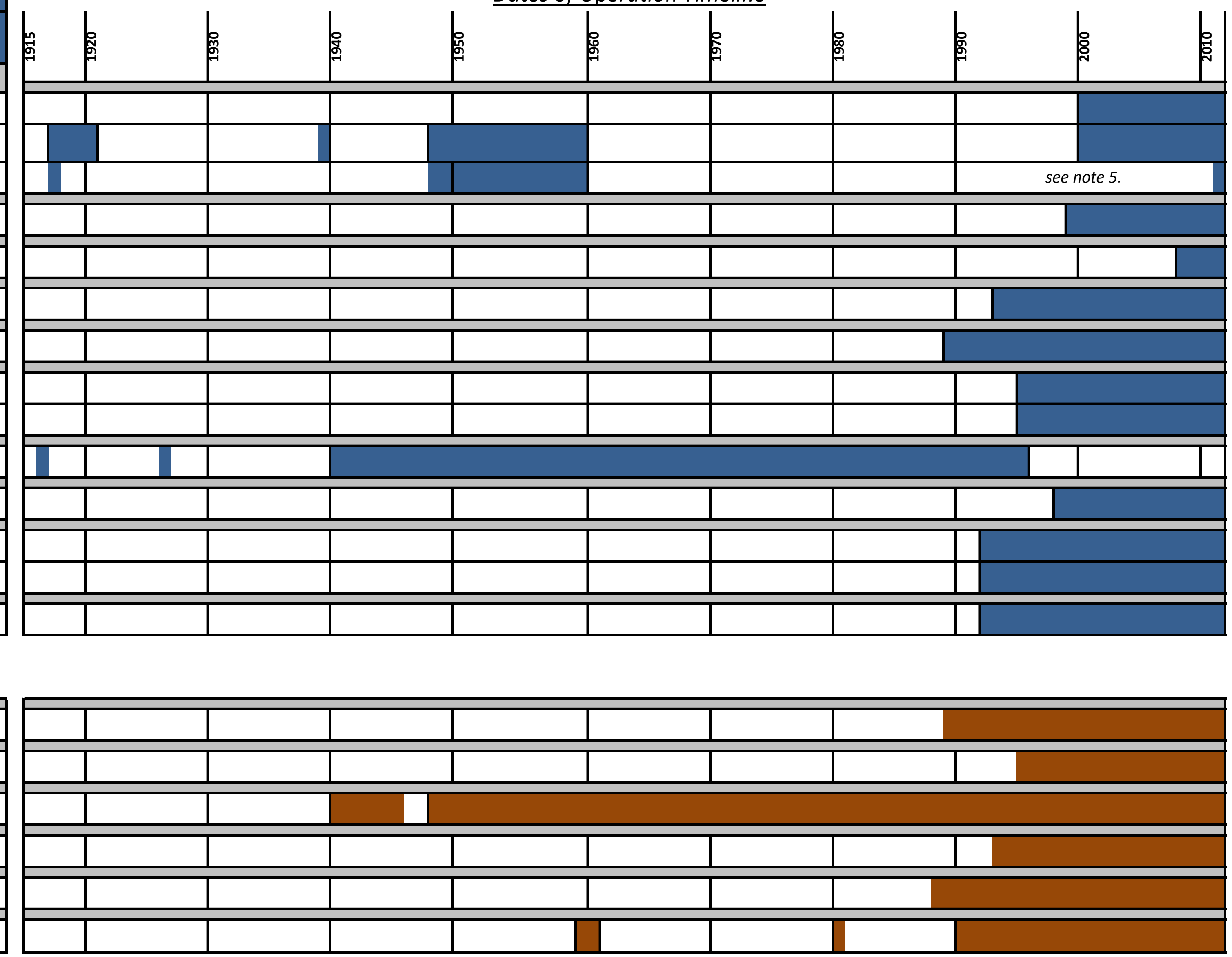
d. Whitlow Ranch Dam basin area and average basin elevation taken from USGS WRIR 98-4225 by Pope and Others, p. 381

Table 4. Dates of Operation

Dates of Operation

	Gage Name [1]	Owner [2]	ID	Dates of operation Beginning	end
1	Whitlow Ranch Dam	FCDMC	6739	8/2/2000	current
	Queen Creek Below Whitlow Dam NR Superior, AZ	USGS	09478500	1917-59 [4] and 2001- current	
	Whitlow Ranch Dam	USACE		1917, 1948-59	current
2	Queen Creek at CAP	FCDMC	6723	1/14/1999	current
3	Queen Creek at Ironwood Rd.	Pinal Co.	719	5/22/2008	current
4	Queen Creek at Rittenhouse Rd.	FCDMC	6707	9/14/1993	current
5	Eastern Maricopa Floodway (EMF) at Arizona Ave.	FCDMC	6598	2/10/1989	current
6	Gila at Maricopa Rd.	FCDMC	778	4/9/1995	current
	Gila River Near Maricopa, AZ	USGS	09479350	5/19/1995	current
7	Gila River Near Laveen, AZ	USGS	09479500	1916, 1926, 1940-95	
8	Gila River at 116th Ave.	FCDMC	6848	12/16/1998	current
9	Gila at Estella Pkway	FCDMC	6853	12/2/1992	current
	Gila River at Estella Parkway, Near Goodyear, AZ	USGS	09514100	10/1/1992	current
10	Gila R Blw Gillespie Dam, AZ (Low-Water-Gage)	USGS	09519501	10/1/1992	current
	Tributary Gages				
a	EMF at Queen Creek Rd	FCDMC	6580	1/18/1989	current
b	Gila River at Olberg Road	FCDMC	783	4/12/1995	current
c	Santa Cruz River Near Laveen	UGGS	09489000	1940 (pope)	current
d	Salt River at Priest	FCDMC	4523	12/7/1993	current
e	Agua Fria at Buckeye Road	FCDMC	5403	10/12/1988	current
f	Hassayampa River near Arlington, AZ	USGS	09517000	11/1/1959 [3]	current

Dates of Operation Timeline



Notes

1. Gages are listed from upstream to downstream

2. FCDMC = Flood Control District of Maricopa County

USGS = U.S. Geological Survey

USACE = U.S. Army Corps of Engineers

Pinal Co. = Pinal County Department of Public Works, Flood Control District

3. Water years 1961-77 (annual maximums only), October 1977 to September 1990 discharge above 500 ft3/s only, October 1990 to current year.

4. Water years 1917-1920, 1939, 1948-1959 (annual maximums only), 2001 to current.

5. Last 120 days record is available on the USACE Los Angeles District Reservoir Regulation Section website.

Section 5 FINDINGS

Five different two week periods were selected and included in the findings. These five periods were selected from intervals of time when large portions of central Arizona received enough precipitation to generate a runoff events that could be seen at several gages within the study reach.

The study reach, from Queen Creek near Superior Arizona to the Gila River at Gillespie dam is not perennial. In fact depending on the location, a stream gage within the study reach may only receive flow a few times a year. Table 5 quantifies what percentage of the year each gage on the study reach receives flow. A ten year time span 2001 through 2010 was used, encompassing 3652 days. The data were processed in MS Excel to count the number of non-zero daily flow values that occurred over that ten year period. These values are displayed as both 'percent time of flow' and 'percent time of no flow', for each gage over that period. As can be seen from Table 5 from gage 1 (Whitlow Ranch Dam) though gage 6 (Gila River at Maricopa) roughly 96% to nearly 100% of the time there is no flow. As a result the time periods that our analysis focused on were from the roughly 4% of the time from 2000 to present where there was flow somewhere on the study reach.

Although the entire period of record was for all of the gages were analyzed for this investigation, an emphasis was placed on analyzing the period year 2000 to present because by that time most of the gages were operational. The five times periods selected for this analysis include March 2010, January 2010, January 2008, February 2005, and January 2005. The gage data for these dates are shown in Table 6 though Table 10. On these tables selected gages and dates have been circled for emphasis. January 2010 is the only period within this period that shows flow at all gages on the study reach within a few day window.

The other four time periods show flow concurrency from Whitlow Ranch Dam to the Eastern Maricopa Floodway (EMF) at Arizona Ave, but the flow is lost once it joins the Gila River at Maricopa. Flow continuity may be lost upon confluence with the Gila River due to high infiltration rates of the wide sandy bottom channel of the Gila River in that reach.

Table 5. Number of Days of Flow in a 10-Year Span (2001 - 2010)

Number of Days of Flow in a 10- Year Span (2001 - 2010)

			Days of Flow	*% Time of flow in 10 year period*	*Days of No Flow*	*% Time of no flow in 10 year period*
	Gage Name	**Owner**	**(Days)**	**(%)**	**(Days)**	**(%)**
1	Whitlow Ranch Dam	FCDMC	87	2%	3565	98%
1	Queen Creek Below Whitlow Dam NR Superior, AZ	USGS	na[1]	na[1]	na[1]	na[1]
1	Whitlow Ranch Dam	USACE	na[2]	na[2]	na[2]	na[2]
2	Queen Creek at CAP	FCDMC	120	3%	3532	97%
3	Queen Creek at Ironwood Rd.	Pinal Co.	na[3]	na[3]	na[3]	na[3]
4	Queen Creek at Rittenhouse Rd.	FCDMC	17	0.5%	3635	99.5%
5	Eastern Maricopa Floodway (EMF) at Arizona Ave.	FCDMC	129	4%	3523	96%
6	Gila at Maricopa Rd.	FCDMC	138	4%	3514	96%
6	Gila River Near Maricopa, AZ	USGS	132	4%	3520	96%
7	Gila River Near Laveen, AZ	USGS	na[4]	na[4]	na[4]	na[4]
8	Gila River at 116th Ave.	FCDMC	94	3%	3558	97%
9	Gila at Estella Pkwy	FCDMC	453	12%	3199	88%
9	Gila River at Estella Parkway, Near Goodyear, AZ	USGS	1570	43%	2082	57%
10	Gila R Blw Gillespie Dam, AZ (Low-Water-Gage)	USGS	3318	91%	334	9%

Note

a) 3652 days in the 10 year span 2001 to 2010

Footnotes

1. Complete daily record for Whitlow Ranch Dam unavailable

2. USACE daily records for Whitlow Ranch Dam unavailable

3. Gage not installed until 2008

4. Gage discontinued in 1995

Table 6. March 2010

March 2010

	Gages between Area of Interest and TNW												*Tributary Gages*				
Gage No.	*1.*		*2.*	*3.*	*4.*	*5.*	*6.*		*8.*	*9.*		*10.*	*a.*	*b.*	*d.*	*e.*	*f.*
Name	Queen Creek Below Whitlow Dam NR Superior	Whitlow Ranch Dam	Queen Creek at CAP	Queen Creek at Ironwood (Gantzel)	Queen Creek at Rittenhouse Rd	EMF at Arizona Ave	Gila River at Maricopa	Gila River at Maricopa	Gila At 116th	Gila River at Estrella Pkwy. Discharge	Gila River at Estrella Parkway	Gila R. Below Gillespie Dam	EMF @ Queen Creek Rd.	Gila River at Olberg	Salt R. @ Priest Dr.	Agua Fria R. @ Buckeye Rd.	Hassayampa River NR Arlington, AZ
Owner	**USGS**	**FCDMC**	**FCDMC**	**PINAL**	**FCDMC**	**FCDMC**	**FCDMC**	**USGS**	**FCDMC**	**FCDMC**	**USGS**	**USGS**	**FCDMC**	**FCDMC**	**FCDMC**	**FCDMC**	**USGS**
ID	9478500	6739	6723	722	6707	6598	778	9479350	6848	6853	9514100	9519501	6583	783	4523	5403	9517000
Units	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs
3/12/2010	58	58	0	_____	0	12	0	0	5606	6513	8260	8160	0	0	8220	0	59
3/11/2010	83	58	71	4	0	72	0	0	5266	6239	7940	7700	0	14	7879	0	50
3/10/2010	146	63	212	42	0	92	0	0	5856	6060	7820	4890	0	4	8465	0	49
3/9/2010	190	70	223	36	0	115	0	0	3319	3423	5130	3090	28	2	7112	0	59
3/8/2010	255	95	190	_____	0	31	0	0	1778	1958	3380	2640	0	0	4633	0	65
3/7/2010	52	58	0	_____	_____	26	0	0	1339	1609	2880	2500	0	0	3329	0	105
3/6/2010	27	58	0	_____	_____	19	0	0	1171	1539	2780	2880	0	0	3096	0	105
3/5/2010	35	58	0	_____	0	26	0	0	1294	1740	2960	3810	0	0	3097	0	59
3/4/2010	48	58	0	_____	0	38	0	0	1827	2328	3680	4460	0	0	3706	0	57
3/3/2010	75	0	18	3.5	0	90	0	0	2457	2926	4440	4540	0	0	5061	0	69
3/2/2010	129	_____	183	103.5	14	232	0	0	2661	3010	4510	4620	0	0	5386	0	78
3/1/2010	458	_____	487	322	141	143	0	0	2802	3126	4670	4420	41	0	5676	0	79
2/28/2010	358	0	329	123.5	0	42	0	0	3020	3077	4660	3850	9	0	5574	0	51
2/27/2010	18	0	0	_____	0	14	0	0	2451	2677	4180	3220	0	0	5278	0	56

Notes

1. Value reported is mean daily discharge
2. Solid line (--------) indicates missing data

Table 7. January 2010

January 2010

	Gages between Area of Interest and TNW												*Tributary Gages*				
Gage No.	*1.*		*2.*	*3.*	*4.*	*5.*	*6.*		*8.*	*9.*		*10.*	*a.*	*b.*	*d.*	*e.*	*f.*
Name	Queen Creek Below Whitlow Dam NR Superior	Whitlow Ranch Dam	Queen Creek at CAP	Queen Creek at Ironwood (Gantzel)	Queen Creek at Rittenhouse Rd	EMF at Arizona Ave	Gila River at Maricopa	Gila River at Maricopa	Gila At 116th	Gila River at Estrella Pkwy. Discharge	Gila River at Estrella Parkway	Gila R. Below Gillespie Dam	EMF @ Queen Creek Rd.	Gila River at Olberg	Salt R. @ Priest Dr.	Agua Fria R. @ Buckeye Rd.	Hassayampa River NR Arlington, AZ
Owner	**USGS**	**FCDMC**	**FCDMC**	**PINAL**	**FCDMC**	**FCDMC**	**FCDMC**	**USGS**	**FCDMC**	**FCDMC**	**USGS**	**USGS**	**FCDMC**	**FCDMC**	**FCDMC**	**FCDMC**	**USGS**
ID	9478500	6739	6723	722	6707	6598	778	9479350	6848	6853	9514100	9519501	6583	783	4523	5403	9517000
Units	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs
1/30/2010	20	0	0	_____	0	71	0	0	0	_____	216	484	0	9	0	0	20
1/29/2010	35	0	0	_____	0	54	0	0	0	35	469	675	4	15	0	0	0
1/28/2010	34	0	0	_____	0	83	0	0	0	150	760	1090	0	5	9	0	0
1/27/2010	22	0	7	9	0	71	0	0	0	365	978	1840	12	0	57	4	0
1/26/2010	275	19	325	155	82	0	0	0	0	959	1580	2890	57	0	145	41	0
1/25/2010	695	_____	500	_____	134	11	0	0	3	1897	2580	4190	92	247	651	139	0
1/24/2010	789	_____	571	389	149	122	0	0	730	2886	3670	8810	172	1742	2329	229	0
1/23/2010	825	_____	707	474	221	412	0	0	6317	10739	11700	1630	351	1986	5076	629	5
1/22/2010	795	_____	827	306	94	567	0	1.9**	4011	3730	4580	3990	1182	286	14187	927	2580
1/21/2010	261	28	146	_____	0	219	2500*	0.14	0	0	100	432	587	0	961	0	1510
1/20/2010	11	0	0	_____	0	86	0	0	0	0	37	433	336	0	756	0	130
1/19/2010	0.95	0	0	_____	0	0	0	0	0	0	0	40	0	0	51	0	71
1/18/2010	0.9	0	0	_____	0	0	0	0	0	0	0	9.1	0	0	0	0	41
1/17/2010	0.89	0	0	_____	0	0	0	0	0	0	0	6.6	0	0	0	0	30

Notes

1. Value reported is mean daily discharge
2. Solid line (--------) indicates missing data

* Time of peak as well as runoff start and runoff end data unavailable for FCDMC Gila River at Maricopa gage for the January 2010 event

** Peak discharge was 12 cfs for the USGS Gila River at Maricopa Gage reported on 1/22/2010

Table 8. January 2008

January 2008

Gages between Area of Interest and TNW													*Tributary Gages*				
Gage No.	*1.*		*2.*	*3.*	*4.*	*5.*	*6.*		*8.*	*9.*		*10.*	*a.*	*b.*	*d.*	*e.*	*f.*
Name	Queen Creek Below Whitlow Dam NR Superior	Whitlow Ranch Dam	Queen Creek at CAP	Queen Creek at Ironwood (Gantzel)	Queen Creek at Rittenhouse Rd	EMF at Arizona Ave	Gila River at Maricopa	Gila River at Maricopa	Gila At 116th	Gila River at Estrella Parkway	Gila River at Estrella Parkway	Gila R. Below Gillespie Dam	EMF @ Queen Creek Rd.	Gila River at Olberg	Salt R. @ Priest Dr.	Agua Fria R. @ Buckeye Rd.	Hassayampa River NR Arlington, AZ
Owner	**USGS**	**FCDMC**	**FCDMC**	**PINAL**	**FCDMC**	**FCDMC**	**FCDMC**	**USGS**	**FCDMC**	**FCDMC**	**USGS**	**USGS**	**FCDMC**	**FCDMC**	**FCDMC**	**FCDMC**	**USGS**
ID	9478500	6739	6723	722	6707	6598	778	9479350	6848	6853	9514100	9519501	6583	783	4523	5403	9517000
Units	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs
2/8/2008	*see note 3*	0	7	*not installed*	0	5	0	0	0	543	930	1310	0	56	1600	0	101
2/7/2008	*see note 3*	0	105	*not installed*	0	27	0	0	299	832	1280	1230	0	45	2480	0	142
2/6/2008	*see note 3*	0	182	*not installed*	0	63	0	0	743	895	1380	890	0	59	3306	0	57
2/5/2008	*see note 3*	30	297	*not installed*	0	54	0	0	160	599	1160	811	3	807	3419	0	36
2/4/2008	*see note 3*	49	128	*not installed*	0	2	0	0	0	322	877	1010	1	160	2669	0	23
2/3/2008	*see note 3*	0	0	*not installed*	0	0	0	0	0	393	896	1550	0	51	1966	0	51
2/2/2008	*see note 3*	0	0	*not installed*	0	4	0	0	135	783	1210	2010	0	42	1961	0	27
2/1/2008	*see note 3*	0	0	*not installed*	0	20	0	0	1977	1473	1950	1620	0	0	3686	0	215
1/31/2008	*see note 3*	0	14	*not installed*	0	81	0	0	129	580	1120	2080	0	197	4482	0	45
1/30/2008	*see note 3*	67	280	*not installed*	31	183	0	0	0	944	1370	517	0	2216	2429	0	35
1/29/2008	*see note 3*	457	524	*not installed*	97	139	0	0	437	875	1470	474	6	2706	3445	0	37
1/28/2008	*see note 3*	511	615	*not installed*	3	60	0	0	0	40	527	529	94	53	6444	0	365
1/27/2008	*see note 3*	154	0	*not installed*	0	0	0	0	0	0	46	270	0	149	0	0	141
1/26/2008	*see note 3*	0	0	*not installed*	0	0	0	0	0	0	6.6	262	0	0	0	0	143

Notes
1. Value reported is mean daily discharge
2. Queen Creek Gage at Ironwood (Gantzel) not installed until May 2008
3. Mean Daily Discharge exists for USGS Gage Queen Creek Below Whitlow Dam, but it was not available on USGS website.

Table 9. February 2005

February 2005

	Gages between Area of Interest and TNW												*Tributary Gages*				
Gage No.	*1.*		*2.*	*3.*	*4.*	*5.*	*6.*		*8.*	*9.*		*10.*	*a.*	*b.*	*d.*	*e.*	*f.*
Name	Queen Creek Below Whitlow dam NR Superior	Whitlow Ranch Dam	Queen Creek at CAP	Queen Creek at Ironwood (Gantzel)	Queen Creek at Rittenhouse Rd	EMF at Arizona Ave	Gila River at Maricopa	Gila River at Maricopa	Gila At 116th	Gila River at Estrella Pkwy. Discharge	Gila River at Estrella Parkway	Gila R. Below Gillespie Dam	EMF @ Queen Creek Rd.	Gila River at Olberg	Salt R. @ Priest Dr.	Agua Fria R. @ Buckeye Rd.	Hassayampa River NR Arlington, AZ
Owner	**USGS**	**FCDMC**	**FCDMC**	**PINAL**	**FCDMC**	**FCDMC**	**FCDMC**	**USGS**	**FCDMC**	**FCDMC**	**USGS**	**USGS**	**FCDMC**	**FCDMC**	**FCDMC**	**FCDMC**	**USGS**
ID	9478500	6739	6723	722	6707	6598	778	9479350	6848	6853	9514100	9519501	6583	783	4523	5403	9517000
Units	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs
2/23/2005	152	0	199	*not installed*	0	41	0	0	5154	12050	14000	14300	103	8	11961	0	7.9
2/22/2005	289	65	266	*not installed*	0	44	0	0	6832	14353	17100	14500	131	106	13428	0	8.8
2/21/2005	104	0	159	*not installed*	0	96	0	0	6079	12995	14800	9560	196	178	13876	1	8.3
2/20/2005	258	31	296	*not installed*	0	199	0	0	3078	9313	11900	9110	404	165	10086	5	24
2/19/2005	122	0	119	*not installed*	0	262	0	0	4542	11041	13200	12000	870	153	9595	17	18
2/18/2005	337	194	318	*not installed*	2	139	0	0	8242	15892	16700	11200	110	148	14075	0	15
2/17/2005	708	499	450	*not installed*	41	182	0	0	8354	15853	16800	11400	131	189	15004	0	16
2/16/2005	778	325	513	*not installed*	90	214	0	0	4002	18435	18400	13200	169	87	15833	0	20
2/15/2005	807	0	568	*not installed*	104	259	0	0	14394	22135	24200	15300	199	180	18831	2	11
2/14/2005	817	0	648	*not installed*	116	360	0	0	17471	26289	23600	16600	257	1269	20125	17	31
2/13/2005	820	0	809	*not installed*	223	350	0	0	31662	35834	29900	15100	453	1015	21734	41	1130
2/12/2005	748	0	741	*not installed*	0	106	0	0	11591	13722	15200	2030	751	133	17544	7	5400
2/11/2005	16	0	0	*not installed*	0	0	0	0	578	1832	2680	830	0	0	7145	0	21
2/10/2005	3.1	0	0	*not installed*	0	0	0	0	0	464	700	775	0	0	1127	0	24

Notes

1. Value reported is mean daily discharge
2. Queen Creek Gage at Ironwood (Gantzel) not installed until May 2008
3. FCMDC Data for Gage 6739 is incompatible with USGS Gage 09478500 for the dates 2/12/05 through 2/15/05, indicates probable FCDMC gage malfunction

Table 10. January 2005

January 2005

Gages between Area of Interest and TNW													Tributary Gages					
Gage No.	*1.*		*2.*	*3.*	*4.*	*5.*	*6.*		*8.*	*9.*		*10.*	*a.*	*b.*	*d.*	*e.*	*f.*
Name	Queen Creek Below Whitlow dam NR Superior	Whitlow Ranch Dam	Queen Creek at CAP	Queen Creek at Ironwood (Gantzel)	Queen Creek at Rittenhouse Rd	EMF at Arizona Ave	Gila River at Maricopa	Gila River at Maricopa	Gila At 116th	Gila River at Estrella Pkwy. Discharge	Gila River at Estrella Parkway	Gila R. Below Gillespie Dam	EMF @ Queen Creek Rd.	Gila River at Olberg	Salt R. @ Priest Dr.	Agua Fria R. @ Buckeye Rd.	Hassayampa River NR Arlington, AZ
Owner	**USGS**	**FCDMC**	**FCDMC**	**PINAL**	**FCDMC**	**FCDMC**	**FCDMC**	**USGS**	**FCDMC**	**FCDMC**	**USGS**	**USGS**	**FCDMC**	**FCDMC**	**FCDMC**	**FCDMC**	**USGS**
ID	9478500	6739	6723	722	6707	6598	778	9479350	6848	6853	9514100	9519501	6583	783	4523	5403	9517000
Units	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs	cfs
1/12/2005	3.2	0	0	*not installed*	0	0	0	0	351	1860	2180	1910	9	0	6774	0	37
1/11/2005	3.2	0	0	*not installed*	0	0	0	0	0	1715	1970	2330	39	123	2840	0	44
1/10/2005	3.2	0	0	*not installed*	0	13	0	0	578	2708	2990	3360	54	128	3399	0	39
1/9/2005	3.2	0	0	*not installed*	0	37	0	0	2002	5260	5650	3180	70	131	5809	0	41
1/8/2005	2.9	0	0	*not installed*	0	52	0	0	1742	4093	4610	2760	89	108	8590	0	45
1/7/2005	2.8	0	2	*not installed*	0	84	0	0	1362	3305	3670	3790	108	36	5779	0	59
1/6/2005	7.8	0	46	*not installed*	33	141	0	0	2122	5500	5790	15000	154	32	6080	0	76
1/5/2005	427	0	523	*not installed*	0	271	0	0	13582	19090	15300	16000	403	13	13307	1	562
1/4/2005	437	0	567	*not installed*	0	77	0	0	11142	15940	16200	6060	551	14	17540	0	825
1/3/2005	62	0	14	*not installed*	0	0	0	0	10220	14486	15400	121	0	4	9949	0	73
1/2/2005	2.1	0	0	*not installed*	0	0	0	0	8730	10553	7760	83	0	27	369	0	152
1/1/2005	1.9	_____	0	*not installed*	0	0	0	0	2526	1989	320	38	11	96	451	0	179
12/31/2004	1.7	0	0	*not installed*	0	0	0	0	0	21	214	16	39	7	318	0	278
12/30/2004	3.9	0	0	*not installed*	0	0	0	0	0	18	126	76	0	57	0	0	2190

Notes

1. Value reported is mean daily discharge
2. Queen Creek Gage at Ironwood (Gantzel) not installed until May 2008
3. Solid line (-----------) indicates missing data
3. FCMDC Data for Gage 6739 is incompatible with USGS Gage 09478500 for the dates 1/4/05 through 1/6/05, indicates probable FCDMC gage malfunction.

Section 6 REFERENCES

United States Geologic Survey, 1999. USGS Fact Sheet 111-98. The National Flood-Frequency Program – Methods for Estimating Flood Magnitude and Frequency in Rural Areas in Arizona.

6.1.1 Websites

US Army Corps of Engineers, Los Angeles District, Reservoir Regulations webpage:
http://www.spl.usace.army.mil/resreg/index.html

US Geologic Survey, Real-Time Water Data for Arizona: Select gage of interest from map → select link named "Summary of all available data for this site" to view data available for download.
http://waterdata.usgs.gov/az/nwis/rt/

Flood Control District of Maricopa County, Streaflow and Storage Information webpage:
http://www.fcd.maricopa.gov/Rainfall/Streamflow/streamflow.aspx

DATA CD

CONTENTS:

Gage data and website links for:

- Agua Fria at Buckeye Rd
- EMF at Arizona Avenue
- EMF at Queen Creek
- Enterprise Canal at Gillespie Dam
- Fila R Blw Gillespie Dam, AZ
- Gila river at 116th Avenue
- Gila River at Estrella Parkway
- Gila River at Maricopa Road
- Gila river at Olberg Road
- Gila River Near Laveen
- Hassayampa River near Arlington
- Queen Creek at CAP
- Queen Creek at Ironwood
- Queen Creek at Rittenhouse Road
- Queen Creek Tributary No. 3 at Whitlow Dam, AZ
- Salt River at Priest
- Santa Cruz near Laveen
- Whitlow Ranch Dam

APPENDIX

CONTENTS:

1. Memo: Routing Analysis of Runoff for Resolution Copper Significant Nexus Assessment for East and West Plant areas of interest.

Memorandum JE Fuller/ Hydrology & Geomorphology, Inc.

DATE: July 21, 2011

TO: Pat Quinn, P.E.

FROM: Ted Lehman, P.E.

RE: routing analysis of runoff for Resolution Copper significant nexus assessment for East and West Plant areas of interest

CC: file

Pat,

This memo briefly describes the methods and results of the routing analysis to determine the point at which flows from the East and West Plants have fully been lost into the ground beneath Queen Creek. The intent of the analysis was to demonstrate how far downstream runoff events emanating from just the project watersheds could make it before percolation into the alluvium beneath Queen Creek 'sucks up' the entire runoff hydrograph. This may provide one line of evidence in the demonstration of disconnection of these watersheds from the Traditionally Navigable Waters downstream.

Methods

Hydrographs for two flood events were generated using the National Streamflow Statistics (NSS) computer software version 5.1. The software calculates peak discharges for various return periods using the USGS regional regression equations. Hydrographs can be generated for the resulting peak discharges by entering a lag time for the basins of interest.

USGS regression equations used for this analysis were taken for Region 12 since it produced slightly higher discharges than Region 13 and our two basins of interest sit on the border of Regions 12 and 13. For this analysis, the 10-year and 100-year runoff events were identified as the events of concern to bracket one more frequent type of event and one infrequent event and compare the results.

For this project, watershed lag times were computed for the two basins (East Plant and West Plant areas) using 0.6 times the time of concentration (Tc) as computed using the desert/mountain Tc equation from the ADOT Hydrology Manual (1993). Table 1 summarizes the Tc and lag time computations. The resulting hydrographs for the 100-year flood are shown in Figures 1 and 2.

Table 1. Lag Time Calculations

Area of Interest	L (miles)	Lca (miles)	Area (sq.mi.)	High Elev (ft)	Low Elev (ft	Slope (ft/mile)	Tc (hrs_	Lag = 0.6 * Tc (hrs)
West Plant	1.386	0.693	0.577	3560	2960	433	0.67	0.40
East Plant	2.630	1.315	2.525	4760	3760	380	1.09	0.66

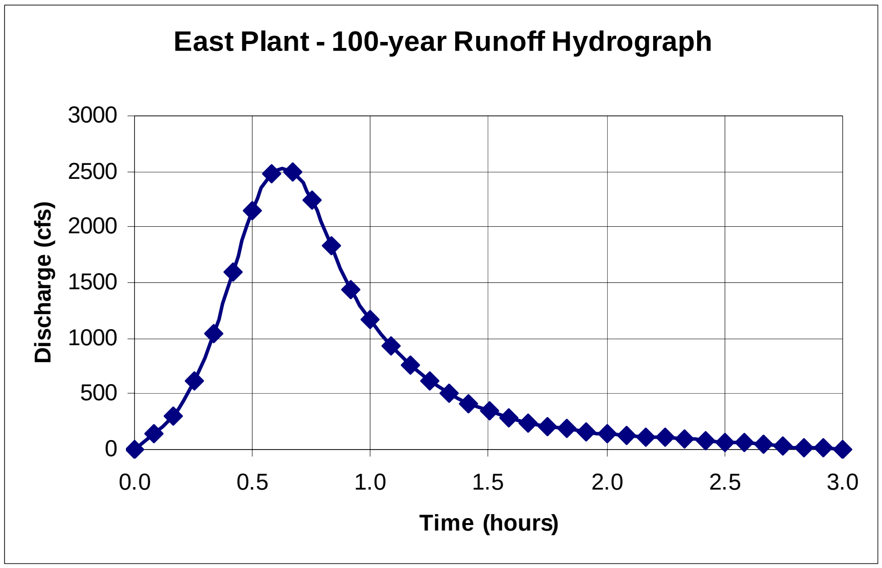


Figure 1. East Plant 100-year Runoff Hydrograph

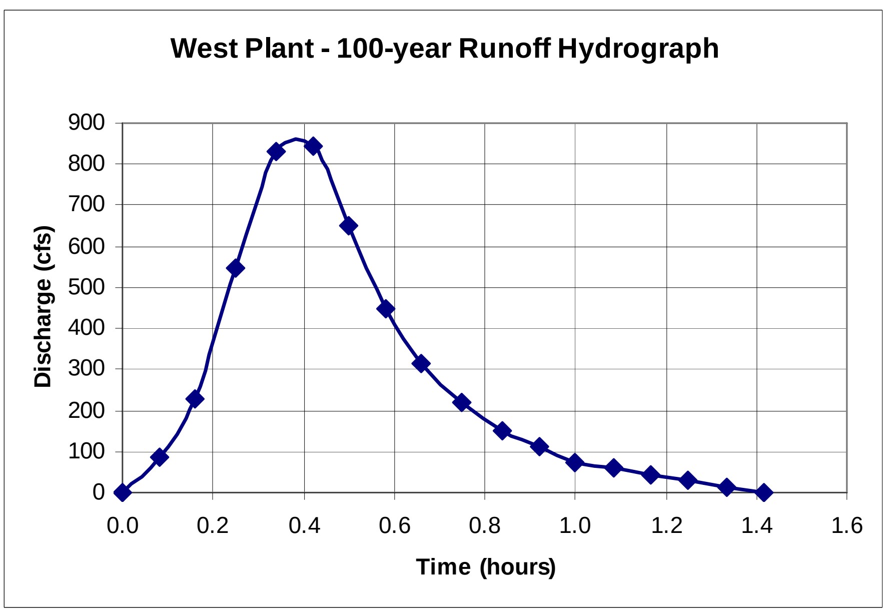


Figure 2. West Plant 100-year Runoff Hydrograph

The resulting hydrographs for the 10-year and 100-year flood events were then manually input into HEC-1 models at a five minute time step and routed downstream into and along Queen Creek. Due to the discretization at five minute intervals the peak discharges do not match the regression equation peaks exactly.

Geometric information (slopes and cross sections) for the HEC-1 normal-depth routing reaches were estimated from examination of aerial photographs and USGS topographic quadrangles.

Percolation rates (or transmission losses) were estimated from review of NRCS and National Forest soil survey data for the area. Table 2 below summarizes the soil data and transmission loss rates assigned to each routing reach.

The models were then run and the length of the downstream-most reach with flows shortened until flow ‘reappeared’. The reach was then lengthened to designate the point were flow disappeared. This was determined to be the downstream limit of flow from the two watersheds of interested for each return period event. Note that both the East and West Plant watersheds were assumed to have the same flood event occur simultaneously. That is, the hydrographs from both the East Plant and West Plant watersheds drained into Queen Creek and were routed downstream.

Table 2. Watercourse Soils and Percolation Rates

Reach ID	Description	Soil Type	Capacity of the most limiting layer to transmit water	Percolation Rate Used in HEC-1
QC1	Queen Creek Canyon from East Plant to Superior	--	--	0
QC2	Queen Creek from Superior to Silver King Wash	Soil Survey AZ687, Map Unit 547 Oxyaquic Torrifluvents-Riverwash-Water complex, 0-5% slopes Soil Survey AZ687, Map Unit 400 Tenneco-Bodecker complex, 0-3% slopes	Moderately High – 0.20 to 0.57 in/hr Moderately High to High – 0.57 to 1.98 in/hr	0.6 cfs/acre
SK1	Silver King Wash from West Plant to Queen Creek	Soil Survey AZ687, Map Unit 655 Bodecker soils and Riverwash, 0-5% slopes	High – 1.98 to 5.95 in/hr	4 cfs/acre
QC3	Queen Creek from confluence with Silver King Wash to Whitlow Ranch Dam	General Soil Survey, Map Unit s490 Nakai-Monue-Blackston complex	Moderately High to High – 0.56 to 1.67 in/hr	1 cfs/acre
QC4	Queen Creek from Whitlow Ranch Dam to Sonoqui FRS	Soil Survey AZ661, Map Unit 11 Carrizo-Brios-Riverwash, 0-5% slopes	High – 1.98 to 5.95 in/hr	4 cfs/acre

Results

The resulting routed flows and distances at which flows disappear into the bed of Queen Creek are presented in Table 3 & 4. For the 100-year flood the total runoff volume for the two areas of interest of 191 ac-ft travels 23.7 miles downstream from the East Plant and 20.08 miles from the West Plant. This location is about half way between the US 60 crossing of Queen Creek near Florence Junction and the CAP Canal. For the 10-year flood, the flows disappear within the flood pool of Whitlow Ranch Dam about 14 miles downstream of the East Plant and never exit through its outlet.

Table 3. Routing results for 100-year hydrographs

Location	Distance Downstream	Peak Discharge (cfs)	Time (hrs)	Volume (ac-ft)
East Plant	0	2,502	0.67	159
QC1	13,154[1]	2,501	0.75	159
QC2	25,545[1]	1,639	1.83	148
West Plant	0	842	0.42	32
SK1	19,570[1]	514	0.92	22
CP1	7.33 / 3.71[2]	1,697	1.75	170
QC3	43,437[1]	734	4.17	100
Whitlow Ranch Dam	15.56 / 11.93[2]	352	5.25	100
QC4	43,000[1]	0	9.00	0
Total	23.70 / 20.08[2]			

[1] Incremental reach distance for each routing reach in feet.

[2] Cumulative distance downstream from East Plant / West Plant in miles.

Table 4. Routing results for 10-year hydrographs

Location	Distance Downstream	Peak Discharge (cfs)	Time (hrs)	Volume (ac-ft)
East Plant	0	492	0.67	31
QC1	13,154[1]	414	0.83	31
QC2	25,545[1]	228	2.50	24
West Plant	0	197	0.42	8
SK1	19,570[1]	32	1.25	1
CP1	7.33 / 3.71[2]	228	2.50	25
QC3	37,000[1]	0	7.42	0
Total	14.34 / 10.72[2]			

[1] Incremental reach distance for each routing reach in feet.

[2] Cumulative distance downstream from East Plant / West Plant in miles.

Conclusions

Transmission losses into the alluvium in the Queen Creek channel prevent the 10-year and 100-year runoff events from the areas of interest at the East and West Plants from reaching the CAP Canal. The CAP Canal crosses Queen Creek about 27 miles upstream from the Gila River.

References

Arizona Department of Transportation, 1993, Highway Drainage Design Manual Hydrology, ADOT Report No. FHWA-AZ93-281, prepared by George V. Sabol Consulting Engineers & NBS/Lowry Engineers & Planners

```
1****************************************                                                    ***************************************
 *                                       *                                                   *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                   *    U.S. ARMY CORPS OF ENGINEERS     *
 *              JUN   1998               *                                                   *    HYDROLOGIC ENGINEERING CENTER    *
 *           VERSION 4.1                 *                                                   *          609 SECOND STREET          *
 *                                       *                                                   *       DAVIS, CALIFORNIA 95616       *
 *  RUN DATE   20JUL11  TIME  14:46:56   *                                                   *           (916) 756-1104            *
 *                                       *                                                   *                                     *
 ****************************************                                                    ***************************************


                                                    X     X  XXXXXXX   XXXXX          X
                                                    X     X  X        X     X        XX
                                                    X     X  X        X               X
                                                    XXXXXXX  XXXX     X        XXXXX  X
                                                    X     X  X        X               X
                                                    X     X  X        X     X         X
                                                    X     X  XXXXXXX   XXXXX         XXX


           THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

           THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
           THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
           NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
           DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
           KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                                       HEC-1 INPUT                                                   PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            1           ID     Routing of runoff hydrographs from areas of interest downstream
            2           ID     to investigate distance before flows disappear
            3           ID
            4           ID     Resolution Copper 404 investigation
            5           ID     East & West Plant Areas of Interest
            6           ID
            7           ID     10 Year Flow Hydrographs
            8           ID     From USGS Regression Equations for Region 12 (since they are slightly
            9           ID     higher discharges than Region 13 - i.e. more conservative)
           10           ID     with hydrographs generated based on ADOT Tc*0.6 to compute lag time
           11           ID     for use with National Streamflow Statistics (NSS) software version 5.1.2
           12           ID     to generate runoff hydrograph consistent with regression equation peak
           13           ID
           14           ID     Routing downstream using modified Puls with RL records for transmission
           15           ID     losses based on NRCS soils types for channel areas downstream
           16           ID
           17           ID        07/19/2011
           18           IT       5 19JUL11    0000    2000                    2000
           19           IO       3
                        *DIAGRAM
                        *

           20           KK    EAST
           21           KM        10-year hydrograph from NSS based on ADOT Tc = 1.09*0.6 = 0.66 hrs
           22           KM        from NSS software using Region 12 equations
           23           BA   2.525
           24           IN       5
           25           QI       0      29      59     122     205     315     420     487     492     440
           26           QI     360     283     228     183     148     120      98      81      68      55
           27           QI      47      43      38      34      30      28      25      23      20      18
           28           QI      15      13      10       8       5       3     0.0     0.0     0.0     0.0
           29           QI     0.0
                        *

           30           KK     QC1
           31           KM        Route East Plant 10-year runoff downstream in through Queen Creek
           32           KM        Canyon to base of canyon at Superior
           33           KM        Slope = (3760 - 2820) / 13154 = 0.0715
           34           KM        Zero transmission loss assumed through canyon reach
           35           RS       2    FLOW      -1
           36           RC    0.06    0.04    0.06   13154  0.0715
           37           RX    1000    1020    1030    1040    1090    1110    1120    1130
           38           RY     140     120     110     100     100     110     120     140
           39           RL                     0.0     100
                        *
```

```
            40           KK     QC2
            41           KM        Route East Plant 100-year runoff downstream in Queen Creek
            42           KM        from base of canyon at Superior to confluence with Silver King Wash
            43           KM        Slope = (2820 - 2400) / 25545 = 0.0164
            44           KM        Transmission loss assumed based on Tonto NF soil survey (AZ687)
            45           KM        map unit 547 - Oxyaquic Torrifluvents-Riverwash-Water complex,
            46           KM        0-5% slopes
            47           KM        capacity of most limiting layer to transmit water (Ksat):
            48           KM        Moderately High - 0.20 to 0.57 in/hr
1                                            HEC-1 INPUT                                             PAGE  2

          LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            49           KM        and
            50           KM        map unit 400- Tenneco-Bodecker complex, 0-3% slopes
            51           KM        capacity of most limiting layer to transmit water (Ksat):
            52           KM        Moderately High to High - 0.57 to 1.98 in/hr
            53           KM
            54           RS      20    FLOW      -1
            55           RC    0.06    0.04    0.06   25545  0.0164
            56           RX    1000    1020    1040    1195    1245    1400    1420    1440
            57           RY     110     106     105     100     100     105     106     110
            58           RL                     0.6     100
                         *

            59           KK    WEST
            60           KM        100-year hydrograph from NSS based on ADOT Tc = 0.67*0.6 = 0.40 hrs
            61           KM        from NSS software using Region 12 equations
            62           BA   0.577
            63           QI       0      21      53     129     195     197     152     105      74      51
            64           QI      35      27      19      15      11       8       4     0.0     0.0     0.0
            65           QI     0.0
                         *

            66           KK     SK1
            67           KM        Route West Plant 100-year runoff downstream through Silver King Wash
            68           KM        to confluence with Queen Creek at Boyce Thompson Arboretum
            69           KM        Slope = (2960 - 2400) / 19570 = 0.0286
            70           KM        Transmission loss assumed based on Tonto NF soil survey (AZ687)
            71           KM        map unit 655 - Bodecker soils and Riverwash, 0-5% slopes
            72           KM        capacity of most limiting layer to transmit water (Ksat): High
            73           KM        1.98 to 5.95 in/hr
            74           RS      10    FLOW      -1
            75           RC    0.06    0.04    0.06   19570  0.0286
            76           RX    1000    1030    1170    1180    1220    1230    1370    1400
            77           RY     120     110     105     100     100     105     110     120
            78           RL                       4     100
                         *

            79           KK     CP1
            80           KM       Combine routed flows from East and West Plant areas of interest
            81           HC       2
                         *

            82           KK     QC3
            83           KM        Route combined flows downstream in Queen Creek
            84           KM        from confluence with Silver King Wash to point of zero flow
            85           KM        Slope = (2400 - 2056) / 43437 = 0.0079
            86           KM        Transmission loss assumed based on GSM soil survey (STATSGO)
            87           KM        map unit s490 - Nakai-Monue-Blackston complex
            88           KM        capacity of most limiting layer to transmit water (Ksat):
            89           KM        Moderately High to High - 0.56 to 1.67 in/hr
            90           KM
            91           RS      64    FLOW      -1
            92           RC    0.06    0.04    0.06   37000  0.0079
            93           RX    1000    1040    1165    1175    1325    1335    1460    1500
            94           RY     110     106     105     100     100     105     106     110
            95           RL                     1.0     100
                         *
1                                            HEC-1 INPUT                                             PAGE  3

          LINE           ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            96           ZZ
1
                 SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    20        EAST
```

```
              V
              V
   30        QC1
              V
              V
   40        QC2
              .
              .
   59         .        WEST
              .           V
              .           V
   66         .         SK1
              .           .
              .           .
   79        CP1...........
              V
              V
   82        QC3

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                                                   ***************************************
 *                                        *                                                   *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *                                                   *   U.S. ARMY CORPS OF ENGINEERS      *
 *             JUN   1998                 *                                                   *   HYDROLOGIC ENGINEERING CENTER     *
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 *                                        *                                                   *      DAVIS, CALIFORNIA 95616        *
 *  RUN DATE   20JUL11  TIME  14:46:56    *                                                   *          (916) 756-1104             *
 *                                        *                                                   *                                     *
 *****************************************                                                   ***************************************


                              Routing of runoff hydrographs from areas of interest downstream
                              to investigate distance before flows disappear

                              Resolution Copper 404 investigation
                              East & West Plant Areas of Interest

                              10 Year Flow Hydrographs
                              From USGS Regression Equations for Region 12 (since they are slightly
                              higher discharges than Region 13 - i.e. more conservative)
                              with hydrographs generated based on ADOT Tc*0.6 to compute lag time
                              for use with National Streamflow Statistics (NSS) software version 5.1.2
                              to generate runoff hydrograph consistent with regression equation peak

                              Routing downstream using modified Puls with RL records for transmission
                              losses based on NRCS soils types for channel areas downstream

                                 07/19/2011

   19 IO         OUTPUT CONTROL VARIABLES
                       IPRNT           3  PRINT CONTROL
                       IPLOT           0  PLOT CONTROL
                       QSCAL          0.  HYDROGRAPH PLOT SCALE

      IT         HYDROGRAPH TIME DATA
                        NMIN           5  MINUTES IN COMPUTATION INTERVAL
                       IDATE     19JUL11  STARTING DATE
                       ITIME        0000  STARTING TIME
                          NQ        2000  NUMBER OF HYDROGRAPH ORDINATES
                      NDDATE     25JUL11  ENDING DATE
                      NDTIME        2235  ENDING TIME
                      ICENT           20  CENTURY MARK

                   COMPUTATION INTERVAL     .08 HOURS
                        TOTAL TIME BASE  166.58 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***
```

```
          **************
          *            *
   20 KK  *      EAST  *
          *            *
          **************
                              10-year hydrograph from NSS based on ADOT Tc = 1.09*0.6 = 0.66 hrs
                              from NSS software using Region 12 equations

   24 IN          TIME DATA FOR INPUT TIME SERIES
                        JXMIN           5  TIME INTERVAL IN MINUTES
                       JXDATE     19JUL11  STARTING DATE
                       JXTIME           0  STARTING TIME

                SUBBASIN RUNOFF DATA

   23 BA          SUBBASIN CHARACTERISTICS
                        TAREA        2.53  SUBBASIN AREA

                                                                        ***

       ***             ***             ***             ***             ***

                           HYDROGRAPH AT STATION     EAST

  PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                             (CFS)
+     492.       .67                  63.         16.          5.           2.
                        (INCHES)      .233        .233        .233         .233
                         (AC-FT)       31.         31.         31.          31.

                         CUMULATIVE AREA =    2.53 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


          **************
          *            *
   30 KK  *       QC1  *
          *            *
          **************
                              Route East Plant 10-year runoff downstream in through Queen Creek
                              Canyon to base of canyon at Superior
                              Slope = (3760 - 2820) / 13154 = 0.0715
                              Zero transmission loss assumed through canyon reach

                HYDROGRAPH ROUTING DATA

   39 RL          ROUTING LOSSES
                        QLOSS         .00  INITIAL LOSS
                        CLOSS         .00  ADDITIONAL FRACTION LOST

   35 RS          STORAGE ROUTING
                        NSTPS           2  NUMBER OF SUBREACHES
                         ITYP        FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC       -1.00  INITIAL CONDITION
                            X         .00 WORKING R AND D COEFFICIENT

   36 RC          NORMAL DEPTH CHANNEL
                          ANL        .060  LEFT OVERBANK N-VALUE
                         ANCH        .040  MAIN CHANNEL N-VALUE
                          ANR        .060  RIGHT OVERBANK N-VALUE
                        RLNTH      13154.  REACH LENGTH
                          SEL       .0715  ENERGY SLOPE
                        ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                                CROSS-SECTION DATA
                            --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
   38 RY        ELEVATION    140.00    120.00    110.00    100.00    100.00    110.00    120.00    140.00
   37 RX        DISTANCE    1000.00   1020.00   1030.00   1040.00   1090.00   1110.00   1120.00   1130.00

                                                                        ***

                                                  COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00     33.79     71.60    113.43    159.27    209.08    261.95    317.49    375.71    436.61
          OUTFLOW        .00   1733.92   5575.79  11145.57  18357.88  27577.53  39689.82  53614.99  69315.35  86763.58
        ELEVATION     100.00    102.11    104.21    106.32    108.42    110.53    112.63    114.74    116.84    118.95
```

```
           STORAGE     500.10    565.68    633.27    702.86    774.47    848.08    923.70   1001.33   1080.96   1162.60
           OUTFLOW  105946.70 126811.80 149316.30 173440.30 199169.00 226491.00 255397.80 285882.80 317942.00 351572.20
         ELEVATION     121.05    123.16    125.26    127.37    129.47    131.58    133.68    135.79    137.89    140.00


 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN    11146. TO   351572.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

       ***              ***              ***              ***              ***

                                  HYDROGRAPH AT STATION      QC1

  PEAK FLOW     TIME                               MAXIMUM AVERAGE FLOW
                                          6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                                 (CFS)
+     414.       .83                       63.         16.          5.           2.
                              (INCHES)      .233        .233        .233         .233
                               (AC-FT)       31.         31.         31.          31.

 PEAK STORAGE   TIME                              MAXIMUM AVERAGE STORAGE
                                          6-HR       24-HR       72-HR    166.58-HR
+  (AC-FT)      (HR)
       4.        .83                        1.          0.          0.           0.

  PEAK STAGE    TIME                               MAXIMUM AVERAGE STAGE
                                          6-HR       24-HR       72-HR    166.58-HR
+   (FEET)      (HR)
    100.50       .83                    100.08      100.02      100.01       100.00

                                CUMULATIVE AREA =    2.53 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


           **************
           *            *
   40 KK   *       QC2  *
           *            *
           **************
                                        Route East Plant 100-year runoff downstream in Queen Creek
                                        from base of canyon at Superior to confluence with Silver King Wash
                                        Slope = (2820 - 2400) / 25545 = 0.0164
                                        Transmission loss assumed based on Tonto NF soil survey (AZ687)
                                        map unit 547 - Oxyaquic Torrifluvents-Riverwash-Water complex,
                                        0-5% slopes
                                        capacity of most limiting layer to transmit water (Ksat):
                                        Moderately High - 0.20 to 0.57 in/hr
                                        and
                                        map unit 400- Tenneco-Bodecker complex, 0-3% slopes
                                        capacity of most limiting layer to transmit water (Ksat):
                                        Moderately High to High - 0.57 to 1.98 in/hr


              HYDROGRAPH ROUTING DATA

   58 RL         ROUTING LOSSES
                       QLOSS         .00  INITIAL LOSS
                       CLOSS         .00  ADDITIONAL FRACTION LOST
                      PERCRT         .60  CHANNEL PERCOLATION RATE
                      ELVINV      100.00  INVERT ELEVATION

   54 RS         STORAGE ROUTING
                       NSTPS          20  NUMBER OF SUBREACHES
                        ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC       -1.00  INITIAL CONDITION
                           X         .00 WORKING R AND D COEFFICIENT

   55 RC         NORMAL DEPTH CHANNEL
                         ANL        .060  LEFT OVERBANK N-VALUE
                        ANCH        .040  MAIN CHANNEL N-VALUE
                         ANR        .060  RIGHT OVERBANK N-VALUE
                       RLNTH      25545.  REACH LENGTH
                         SEL       .0164  ENERGY SLOPE
                       ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                                 CROSS-SECTION DATA
                                    --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
   57 RY       ELEVATION    110.00    106.00    105.00    100.00    100.00    105.00    106.00    110.00
```

```
  56 RX        DISTANCE    1000.00   1020.00   1040.00   1195.00   1245.00   1400.00   1420.00   1440.00
                                                                          ***

                                                       COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE        .00     20.47     51.01     91.62    142.30    203.06    273.88    354.78    445.75    546.79
            OUTFLOW        .00     93.72    343.85    772.85   1409.52   2281.92   3416.91   4840.18   6576.43   8649.43
          ELEVATION     100.00    100.53    101.05    101.58    102.11    102.63    103.16    103.68    104.21    104.74

            STORAGE     657.46    775.07    898.30   1023.55   1150.42   1278.91   1409.03   1540.77   1674.14   1809.13
            OUTFLOW   11379.30  14786.14  18583.54  22757.42  27288.94  32167.41  37384.35  42932.79  48806.82  55001.45
          ELEVATION     105.26    105.79    106.32    106.84    107.37    107.89    108.42    108.95    109.47    110.00

 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     2282. TO    55001.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

       ***             ***             ***             ***             ***

                                 HYDROGRAPH AT STATION      QC2

  PEAK FLOW     TIME                                   MAXIMUM AVERAGE FLOW
                                              6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                                 (CFS)
+     228.      2.50                           49.         12.          4.           2.
                              (INCHES)        .179        .179        .179         .179
                               (AC-FT)         24.         24.         24.          24.

 PEAK STORAGE   TIME                                  MAXIMUM AVERAGE STORAGE
                                              6-HR       24-HR       72-HR    166.58-HR
+  (AC-FT)      (HR)
        2.      2.50                            0.          0.          0.           0.

  PEAK STAGE    TIME                                   MAXIMUM AVERAGE STAGE
                                              6-HR       24-HR       72-HR    166.58-HR
+   (FEET)      (HR)
    100.81      2.50                        100.23      100.06      100.02       100.01

                               CUMULATIVE AREA =    2.53 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

            **************
            *            *
  59 KK     *      WEST  *
            *            *
            **************
                                     100-year hydrograph from NSS based on ADOT Tc = 0.67*0.6 = 0.40 hrs
                                     from NSS software using Region 12 equations

  24 IN          TIME DATA FOR INPUT TIME SERIES
                       JXMIN           5  TIME INTERVAL IN MINUTES
                      JXDATE     19JUL11  STARTING DATE
                      JXTIME           0  STARTING TIME

               SUBBASIN RUNOFF DATA

  62 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .58  SUBBASIN AREA
                                                                          ***

       ***             ***             ***             ***             ***

                                 HYDROGRAPH AT STATION     WEST

  PEAK FLOW     TIME                                   MAXIMUM AVERAGE FLOW
                                              6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                                 (CFS)
+     197.       .42                           15.          4.          1.           1.
                              (INCHES)        .245        .245        .245         .245
                               (AC-FT)          8.          8.          8.           8.

                               CUMULATIVE AREA =     .58 SQ MI
```

```
*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

          **************
          *            *
  66 KK   *       SK1  *
          *            *
          **************
                    Route West Plant 100-year runoff downstream through Silver King Wash
                    to confluence with Queen Creek at Boyce Thompson Arboretum
                    Slope = (2960 - 2400) / 19570 = 0.0286
                    Transmission loss assumed based on Tonto NF soil survey (AZ687)
                    map unit 655 - Bodecker soils and Riverwash, 0-5% slopes
                    capacity of most limiting layer to transmit water (Ksat): High
                    1.98 to 5.95 in/hr

            HYDROGRAPH ROUTING DATA

  78 RL       ROUTING LOSSES
                   QLOSS        .00  INITIAL LOSS
                   CLOSS        .00  ADDITIONAL FRACTION LOST
                  PERCRT       4.00  CHANNEL PERCOLATION RATE
                  ELVINV     100.00  INVERT ELEVATION

  74 RS       STORAGE ROUTING
                   NSTPS         10  NUMBER OF SUBREACHES
                    ITYP       FLOW  TYPE OF INITIAL CONDITION
                  RSVRIC      -1.00  INITIAL CONDITION
                       X        .00 WORKING R AND D COEFFICIENT

  75 RC       NORMAL DEPTH CHANNEL
                     ANL       .060  LEFT OVERBANK N-VALUE
                    ANCH       .040  MAIN CHANNEL N-VALUE
                     ANR       .060  RIGHT OVERBANK N-VALUE
                   RLNTH     19570.  REACH LENGTH
                     SEL      .0286  ENERGY SLOPE
                   ELMAX         .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                      CROSS-SECTION DATA
                         --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  77 RY     ELEVATION    120.00    110.00    105.00    100.00    100.00    105.00    110.00    120.00
  76 RX     DISTANCE    1000.00   1030.00   1170.00   1180.00   1220.00   1230.00   1370.00   1400.00

                                                                          ***

                                        COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00     19.91     41.82     65.71     91.60    120.28    169.56    246.72    351.76    484.68
          OUTFLOW        .00    277.60    894.25   1787.60   2941.24   4403.61   6433.31   9152.81  12760.62  17425.85
        ELEVATION     100.00    101.05    102.11    103.16    104.21    105.26    106.32    107.37    108.42    109.47

          STORAGE     642.36    806.13    972.90   1142.65   1315.39   1491.11   1669.82   1851.52   2036.20   2223.88
          OUTFLOW   23628.81  31363.90  40210.49  50110.24  61020.59  72909.20  85750.85  99525.51 114217.10 129812.60
        ELEVATION     110.53    111.58    112.63    113.68    114.74    115.79    116.84    117.89    118.95    120.00


*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      894. TO   129813.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

      ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      SK1

  PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                            (CFS)
+      32.      1.25                   2.          1.          0.           0.
                         (INCHES)    .033        .033        .033         .033
                          (AC-FT)      1.          1.          1.           1.

 PEAK STORAGE   TIME                        MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR    166.58-HR
+  (AC-FT)      (HR)
        0.      1.25                   0.          0.          0.           0.

  PEAK STAGE    TIME                         MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR    166.58-HR
+   (FEET)      (HR)
```

```
   100.15      1.25               100.01      100.00      100.00       100.00

                         CUMULATIVE AREA =     .58 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
   79 KK     *       CP1  *
             *            *
             **************
                                Combine routed flows from East and West Plant areas of interest

   81 HC          HYDROGRAPH COMBINATION
                        ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                         ***

       ***              ***              ***              ***              ***

                           HYDROGRAPH AT STATION      CP1

   PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR    166.58-HR
 +   (CFS)       (HR)
                            (CFS)
 +     228.      2.50                   51.         13.          4.           2.
                        (INCHES)      .152        .152        .152         .152
                         (AC-FT)       25.         25.         25.          25.

                         CUMULATIVE AREA =    3.10 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


             **************
             *            *
   82 KK     *       QC3  *
             *            *
             **************
                                 Route combined flows downstream in Queen Creek
                                 from confluence with Silver King Wash to point of zero flow
                                 Slope = (2400 - 2056) / 43437 = 0.0079
                                 Transmission loss assumed based on GSM soil survey (STATSGO)
                                 map unit s490 - Nakai-Monue-Blackston complex
                                 capacity of most limiting layer to transmit water (Ksat):
                                 Moderately High to High - 0.56 to 1.67 in/hr


                HYDROGRAPH ROUTING DATA

   95 RL          ROUTING LOSSES
                        QLOSS         .00  INITIAL LOSS
                        CLOSS         .00  ADDITIONAL FRACTION LOST
                       PERCRT        1.00  CHANNEL PERCOLATION RATE
                       ELVINV      100.00  INVERT ELEVATION

   91 RS          STORAGE ROUTING
                        NSTPS          64  NUMBER OF SUBREACHES
                         ITYP        FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC       -1.00  INITIAL CONDITION
                            X         .00 WORKING R AND D COEFFICIENT

   92 RC          NORMAL DEPTH CHANNEL
                          ANL        .060  LEFT OVERBANK N-VALUE
                         ANCH        .040  MAIN CHANNEL N-VALUE
                          ANR        .060  RIGHT OVERBANK N-VALUE
                        RLNTH      37000.  REACH LENGTH
                          SEL       .0079  ENERGY SLOPE
                        ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                                CROSS-SECTION DATA
                             --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
   94 RY        ELEVATION    110.00    106.00    105.00    100.00    100.00    105.00    106.00    110.00
   93 RX        DISTANCE    1000.00   1040.00   1165.00   1175.00   1325.00   1335.00   1460.00   1500.00
```

***

COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

STORAGE	.00	67.53	136.00	205.41	275.76	347.05	419.29	492.46	566.58	641.64
OUTFLOW	.00	170.61	542.37	1067.59	1726.97	2508.89	3405.33	4410.34	5519.33	6728.61
ELEVATION	100.00	100.53	101.05	101.58	102.11	102.63	103.16	103.68	104.21	104.74
STORAGE	724.87	859.69	1043.59	1236.53	1434.17	1636.52	1843.58	2055.34	2271.81	2492.98
OUTFLOW	8074.45	9636.28	11504.94	13674.36	16096.54	18757.26	21647.59	24761.41	28094.42	31643.52
ELEVATION	105.26	105.79	106.32	106.84	107.37	107.89	108.42	108.95	109.47	110.00

*** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN 171. TO 31644.
THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

*** *** *** *** ***

HYDROGRAPH AT STATION QC3

PEAK FLOW	TIME		MAXIMUM AVERAGE FLOW			
			6-HR	24-HR	72-HR	166.58-HR
+ (CFS)	(HR)					
		(CFS)				
+ 0.	.00		0.	0.	0.	0.
		(INCHES)	.000	.000	.000	.000
		(AC-FT)	0.	0.	0.	0.

PEAK STORAGE	TIME	MAXIMUM AVERAGE STORAGE			
		6-HR	24-HR	72-HR	166.58-HR
+ (AC-FT)	(HR)				
0.	7.42	0.	0.	0.	0.

PEAK STAGE	TIME	MAXIMUM AVERAGE STAGE			
		6-HR	24-HR	72-HR	166.58-HR
+ (FEET)	(HR)				
100.00	7.42	100.00	100.00	100.00	100.00

CUMULATIVE AREA = 3.10 SQ MI

1

RUNOFF SUMMARY
FLOW IN CUBIC FEET PER SECOND
TIME IN HOURS, AREA IN SQUARE MILES

+	OPERATION	STATION	PEAK FLOW	TIME OF PEAK	AVERAGE FLOW FOR MAXIMUM PERIOD 6-HOUR	24-HOUR	72-HOUR	BASIN AREA	MAXIMUM STAGE	TIME OF MAX STAGE
	HYDROGRAPH AT									
+		EAST	492.	.67	63.	16.	5.	2.53		
	ROUTED TO									
+		QC1	414.	.83	63.	16.	5.	2.53		
+									100.50	.83
	ROUTED TO									
+		QC2	228.	2.50	49.	12.	4.	2.53		
+									100.81	2.50
	HYDROGRAPH AT									
+		WEST	197.	.42	15.	4.	1.	.58		
	ROUTED TO									
+		SK1	32.	1.25	2.	1.	0.	.58		
+									100.15	1.25
	2 COMBINED AT									
+		CP1	228.	2.50	51.	13.	4.	3.10		
	ROUTED TO									
+		QC3	0.	.00	0.	0.	0.	3.10		
+									100.00	7.42

*** NORMAL END OF HEC-1 ***

```
1***************************************                                                         ***************************************
 *                                     *                                                         *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                       *    U.S. ARMY CORPS OF ENGINEERS     *
 *              JUN   1998             *                                                         *    HYDROLOGIC ENGINEERING CENTER    *
 *            VERSION 4.1              *                                                         *          609 SECOND STREET          *
 *                                     *                                                         *       DAVIS, CALIFORNIA 95616       *
 *  RUN DATE   20JUL11  TIME  13:30:36   *                                                       *           (916) 756-1104            *
 *                                     *                                                         *                                     *
 ***************************************                                                         ***************************************


                                                       X     X  XXXXXXX   XXXXX          X
                                                       X     X  X        X     X        XX
                                                       X     X  X        X               X
                                                       XXXXXXX  XXXX     X        XXXXX  X
                                                       X     X  X        X               X
                                                       X     X  X        X     X         X
                                                       X     X  XXXXXXX   XXXXX         XXX


           THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

           THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
           THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
           NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
           DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
           KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM
```

```
1                                                  HEC-1 INPUT                                             PAGE  1

          LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

            1           ID     Routing of runoff hydrographs from areas of interest downstream
            2           ID     to investigate distance before flows disappear
            3           ID
            4           ID     Resolution Copper 404 investigation
            5           ID     East & West Plant Areas of Interest
            6           ID
            7           ID     100 Year Flow Hydrographs
            8           ID     From USGS Regression Equations for Region 12 (since they are slightly
            9           ID     higher discharges than Region 13 - i.e. more conservative)
           10           ID     with hydrographs generated based on ADOT Tc*0.6 to compute lag time
           11           ID     for use with National Streamflow Statistics (NSS) software version 5.1.2
           12           ID     to generate runoff hydrograph consistent with regression equation peak
           13           ID
           14           ID     Routing downstream using modified Puls with RL records for transmission
           15           ID     losses based on NRCS soils types for channel areas downstream
           16           ID
           17           ID        07/19/2011
           18           IT       5 19JUL11    0000    2000                    2000
           19           IO       3
                        *DIAGRAM
                        *

           20           KK    EAST
           21           KM        100-year hydrograph from NSS based on ADOT Tc = 1.09*0.6 = 0.66 hrs
           22           KM        from NSS software using Region 12 equations
           23           BA   2.525
           24           IN       5
           25           QI       0     150     299     619    1046    1602    2140    2474    2502    2240
           26           QI    1830    1438    1163     933     752     611     497     410     344     278
           27           QI     234     207     184     162     140     128     117     105      93      82
           28           QI      70      58      47      35      23      12     0.0     0.0     0.0     0.0
           29           QI     0.0
                        *

           30           KK     QC1
           31           KM        Route East Plant 100-year runoff downstream in through Queen Creek
           32           KM        Canyon to base of canyon at Superior
           33           KM        Slope = (3760 - 2820) / 13154 = 0.0715
           34           KM        Zero transmission loss assumed through canyon reach
           35           RS       4    FLOW      -1
           36           RC    0.06    0.04    0.06   13154  0.0715
           37           RX    1000    1020    1030    1040    1090    1110    1120    1130
           38           RY     140     120     110     100     100     110     120     140
           39           RL                     0.0     100
                        *
```

```
      40          KK     QC2
      41          KM        Route East Plant 100-year runoff downstream in Queen Creek
      42          KM        from base of canyon at Superior to confluence with Silver King Wash
      43          KM        Slope = (2820 - 2400) / 25545 = 0.0164
      44          KM        Transmission loss assumed based on Tonto NF soil survey (AZ687)
      45          KM        map unit 547 - Oxyaquic Torrifluvents-Riverwash-Water complex,
      46          KM        0-5% slopes
      47          KM        capacity of most limiting layer to transmit water (Ksat):
      48          KM        Moderately High - 0.20 to 0.57 in/hr
1                                      HEC-1 INPUT                                            PAGE  2

    LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

      49          KM        and
      50          KM        map unit 400- Tenneco-Bodecker complex, 0-3% slopes
      51          KM        capacity of most limiting layer to transmit water (Ksat):
      52          KM        Moderately High to High - 0.57 to 1.98 in/hr
      53          KM
      54          RS      17    FLOW      -1
      55          RC    0.06    0.04    0.06   25545  0.0164
      56          RX    1000    1020    1040    1195    1245    1400    1420    1440
      57          RY     110     106     105     100     100     105     106     110
      58          RL                     0.6     100
                  *

      59          KK    WEST
      60          KM        100-year hydrograph from NSS based on ADOT Tc = 0.67*0.6 = 0.40 hrs
      61          KM        from NSS software using Region 12 equations
      62          BA   0.577
      63          QI       0      88     228     548     833     842     649     447     316     219
      64          QI     149     114      74      59      44      30      15     0.0     0.0     0.0
      65          QI     0.0
                  *

      66          KK     SK1
      67          KM        Route West Plant 100-year runoff downstream through Silver King Wash
      68          KM        to confluence with Queen Creek at Boyce Thompson Arboretum
      69          KM        Slope = (2960 - 2400) / 19570 = 0.0286
      70          KM        Transmission loss assumed based on Tonto NF soil survey (AZ687)
      71          KM        map unit 655 - Bodecker soils and Riverwash, 0-5% slopes
      72          KM        capacity of most limiting layer to transmit water (Ksat): High
      73          KM        1.98 to 5.95 in/hr
      74          RS      11    FLOW      -1
      75          RC    0.06    0.04    0.06   19570  0.0286
      76          RX    1000    1030    1170    1180    1220    1230    1370    1400
      77          RY     120     110     105     100     100     105     110     120
      78          RL                       4     100
                  *

      79          KK     CP1
      80          KM       Combine routed flows from East and West Plant areas of interest
      81          HC       2
                  *

      82          KK     QC3
      83          KM        Route combined flows downstream in Queen Creek
      84          KM        from confluence with Silver King Wash to Whitlow Ranch Dam
      85          KM        Slope = (2400 - 2056) / 43437 = 0.0079
      86          KM        Transmission loss assumed based on GSM soil survey (STATSGO)
      87          KM        map unit s490 - Nakai-Monue-Blackston complex
      88          KM        capacity of most limiting layer to transmit water (Ksat):
      89          KM        Moderately High to High - 0.56 to 1.67 in/hr
      90          KM
      91          RS      30    FLOW      -1
      92          RC    0.06    0.04    0.06   43437  0.0079
      93          RX    1000    1040    1165    1175    1325    1335    1460    1500
      94          RY     110     106     105     100     100     105     106     110
      95          RL                     1.0     100
                  *
1                                      HEC-1 INPUT                                            PAGE  3

    LINE          ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10


      96          KK  WHITLO
      97          KM    Route flows thru level pool routing for Whitlow Ranch Dam
      98          KM    Stage-storage-discharge data from USACE Water Control Manual for Whitlow Dam
      99          RS       1    ELEV    2056
     100          SV       0      29     172     454     879    1454    2197    3129
     101          SE    2056    2070    2075    2080    2085    2090    2095    2100
     102          SQ       0     350     420     470     520     560     595     630
     103          ST    2199     837     2.8     1.5
```

```
          104           SS    2166     355     2.8     1.5
                        *

          105           KK     QC4
          106           KM        Route combined flows downstream in Queen Creek
          107           KM        from Whitlow Ranch Dam to point of zero discharge
          108           KM        Slope = (2050 - 1560) / 44164 = 0.0066
          109           KM        Transmission loss assumed based on NRCS soil survey (AZ661)
          110           KM        map unit 11 - Carrizo-Brios-Riverwash complex
          111           KM        capacity of most limiting layer to transmit water (Ksat):
          112           KM        High - 1.98 to 5.95 in/hr
          113           KM
          114           RS      45    FLOW      -1
          115           RC    0.06    0.04    0.06   43000  0.0066
          116           RX    1000    1040    1650    1660    1740    1750    2360    2400
          117           RY     120     106     105     100     100     105     106     120
          118           RL                       4     100
          119           ZZ
1
               SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING          (--->) DIVERSION OR PUMP FLOW

   NO.      (.) CONNECTOR        (<---) RETURN OF DIVERTED OR PUMPED FLOW

    20        EAST
                 V
                 V
    30         QC1
                 V
                 V
    40         QC2
                 .
                 .
    59           .        WEST
                 .           V
                 .           V
    66           .         SK1
                 .           .
                 .           .
    79         CP1............
                 V
                 V
    82         QC3
                 V
                 V
    96      WHITLO
                 V
                 V
   105         QC4

 (***) RUNOFF ALSO COMPUTED AT THIS LOCATION
1*****************************************                                                   ***************************************
 *                                       *                                                   *                                     *
 *   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *                                                   *    U.S. ARMY CORPS OF ENGINEERS     *
 *             JUN   1998                *                                                   *    HYDROLOGIC ENGINEERING CENTER    *
 *          VERSION 4.1                  *                                                   *          609 SECOND STREET          *
 *                                       *                                                   *       DAVIS, CALIFORNIA 95616       *
 *  RUN DATE   20JUL11  TIME  13:30:36   *                                                   *           (916) 756-1104            *
 *                                       *                                                   *                                     *
 *****************************************                                                   ***************************************



                               Routing of runoff hydrographs from areas of interest downstream
                               to investigate distance before flows disappear

                               Resolution Copper 404 investigation
                               East & West Plant Areas of Interest

                               100 Year Flow Hydrographs
                               From USGS Regression Equations for Region 12 (since they are slightly
                               higher discharges than Region 13 - i.e. more conservative)
                               with hydrographs generated based on ADOT Tc*0.6 to compute lag time
                               for use with National Streamflow Statistics (NSS) software version 5.1.2
                               to generate runoff hydrograph consistent with regression equation peak

                               Routing downstream using modified Puls with RL records for transmission
                               losses based on NRCS soils types for channel areas downstream

                                  07/19/2011
```

```
 19 IO         OUTPUT CONTROL VARIABLES
                     IPRNT          3  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL         0.  HYDROGRAPH PLOT SCALE

    IT         HYDROGRAPH TIME DATA
                      NMIN          5  MINUTES IN COMPUTATION INTERVAL
                     IDATE    19JUL11  STARTING DATE
                     ITIME       0000  STARTING TIME
                        NQ       2000  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE    25JUL11  ENDING DATE
                    NDTIME       2235  ENDING TIME
                    ICENT          20  CENTURY MARK

                COMPUTATION INTERVAL     .08 HOURS
                     TOTAL TIME BASE  166.58 HOURS

          ENGLISH UNITS
               DRAINAGE AREA         SQUARE MILES
               PRECIPITATION DEPTH   INCHES
               LENGTH, ELEVATION     FEET
               FLOW                  CUBIC FEET PER SECOND
               STORAGE VOLUME        ACRE-FEET
               SURFACE AREA          ACRES
               TEMPERATURE           DEGREES FAHRENHEIT


*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

             **************
             *            *
 20 KK       *     EAST   *
             *            *
             **************
                            100-year hydrograph from NSS based on ADOT Tc = 1.09*0.6 = 0.66 hrs
                            from NSS software using Region 12 equations

 24 IN         TIME DATA FOR INPUT TIME SERIES
                     JXMIN          5  TIME INTERVAL IN MINUTES
                    JXDATE    19JUL11  STARTING DATE
                    JXTIME          0  STARTING TIME

               SUBBASIN RUNOFF DATA

 23 BA         SUBBASIN CHARACTERISTICS
                     TAREA       2.53  SUBBASIN AREA

                                                                         ***

     ***              ***              ***              ***              ***

                      HYDROGRAPH AT STATION     EAST

  PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                       6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                         (CFS)
+    2502.       .67                   320.         80.         27.         12.
                       (INCHES)       1.178       1.178       1.178       1.178
                        (AC-FT)        159.        159.        159.        159.

                        CUMULATIVE AREA =    2.53 SQ MI



*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

             **************
             *            *
 30 KK       *      QC1   *
             *            *
             **************
                            Route East Plant 100-year runoff downstream in through Queen Creek
                            Canyon to base of canyon at Superior
                            Slope = (3760 - 2820) / 13154 = 0.0715
                            Zero transmission loss assumed through canyon reach

               HYDROGRAPH ROUTING DATA
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  39 RL         ROUTING LOSSES
                      QLOSS         .00  INITIAL LOSS
                      CLOSS         .00  ADDITIONAL FRACTION LOST

  35 RS         STORAGE ROUTING
                      NSTPS           4  NUMBER OF SUBREACHES
                       ITYP        FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC       -1.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

  36 RC         NORMAL DEPTH CHANNEL
                        ANL        .060  LEFT OVERBANK N-VALUE
                       ANCH        .040  MAIN CHANNEL N-VALUE
                        ANR        .060  RIGHT OVERBANK N-VALUE
                      RLNTH      13154.  REACH LENGTH
                        SEL       .0715  ENERGY SLOPE
                      ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                          CROSS-SECTION DATA
                               --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  38 RY       ELEVATION    140.00    120.00    110.00    100.00    100.00    110.00    120.00    140.00
  37 RX       DISTANCE    1000.00   1020.00   1030.00   1040.00   1090.00   1110.00   1120.00   1130.00

                                                                          ***

                                            COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

           STORAGE       .00     33.79     71.60    113.43    159.27    209.08    261.95    317.49    375.71    436.61
           OUTFLOW       .00   1733.92   5575.79  11145.57  18357.88  27577.53  39689.82  53614.99  69315.35  86763.58
         ELEVATION    100.00    102.11    104.21    106.32    108.42    110.53    112.63    114.74    116.84    118.95

           STORAGE    500.10    565.68    633.27    702.86    774.47    848.08    923.70   1001.33   1080.96   1162.60
           OUTFLOW 105946.70 126811.80 149316.30 173440.30 199169.00 226491.00 255397.80 285882.80 317942.00 351572.20
         ELEVATION    121.05    123.16    125.26    127.37    129.47    131.58    133.68    135.79    137.89    140.00


 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     1734. TO   351572.
                THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

       ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      QC1

   PEAK FLOW     TIME                            MAXIMUM AVERAGE FLOW
                                         6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                           (CFS)
+    2501.       .75                     320.         80.         27.          12.
                        (INCHES)        1.178       1.178       1.178        1.178
                         (AC-FT)         159.        159.        159.         159.

  PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                         6-HR       24-HR       72-HR    166.58-HR
+  (AC-FT)      (HR)
       10.       .75                       1.          0.          0.           0.

   PEAK STAGE    TIME                           MAXIMUM AVERAGE STAGE
                                         6-HR       24-HR       72-HR    166.58-HR
+   (FEET)      (HR)
    102.53       .75                   100.37      100.09      100.03       100.01

                          CUMULATIVE AREA =    2.53 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


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           *            *
  40 KK    *       QC2  *
           *            *
           **************
                                 Route East Plant 100-year runoff downstream in Queen Creek
                                 from base of canyon at Superior to confluence with Silver King Wash
                                 Slope = (2820 - 2400) / 25545 = 0.0164
                                 Transmission loss assumed based on Tonto NF soil survey (AZ687)
                                 map unit 547 - Oxyaquic Torrifluvents-Riverwash-Water complex,
                                 0-5% slopes
                                 capacity of most limiting layer to transmit water (Ksat):
```

```
                          Moderately High - 0.20 to 0.57 in/hr
                          and
                          map unit 400- Tenneco-Bodecker complex, 0-3% slopes
                          capacity of most limiting layer to transmit water (Ksat):
                          Moderately High to High - 0.57 to 1.98 in/hr


             HYDROGRAPH ROUTING DATA

  58 RL         ROUTING LOSSES
                      QLOSS         .00  INITIAL LOSS
                      CLOSS         .00  ADDITIONAL FRACTION LOST
                     PERCRT         .60  CHANNEL PERCOLATION RATE
                     ELVINV      100.00  INVERT ELEVATION

  54 RS         STORAGE ROUTING
                      NSTPS          17  NUMBER OF SUBREACHES
                       ITYP        FLOW  TYPE OF INITIAL CONDITION
                     RSVRIC       -1.00  INITIAL CONDITION
                          X         .00 WORKING R AND D COEFFICIENT

  55 RC         NORMAL DEPTH CHANNEL
                        ANL        .060  LEFT OVERBANK N-VALUE
                       ANCH        .040  MAIN CHANNEL N-VALUE
                        ANR        .060  RIGHT OVERBANK N-VALUE
                      RLNTH      25545.  REACH LENGTH
                        SEL       .0164  ENERGY SLOPE
                      ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                               CROSS-SECTION DATA
                           --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  57 RY       ELEVATION    110.00    106.00    105.00    100.00    100.00    105.00    106.00    110.00
  56 RX       DISTANCE    1000.00   1020.00   1040.00   1195.00   1245.00   1400.00   1420.00   1440.00

                                                                      ***

                                                 COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

          STORAGE        .00     20.47     51.01     91.62    142.30    203.06    273.88    354.78    445.75    546.79
          OUTFLOW        .00     93.72    343.85    772.85   1409.52   2281.92   3416.91   4840.18   6576.43   8649.43
        ELEVATION     100.00    100.53    101.05    101.58    102.11    102.63    103.16    103.68    104.21    104.74

          STORAGE     657.46    775.07    898.30   1023.55   1150.42   1278.91   1409.03   1540.77   1674.14   1809.13
          OUTFLOW   11379.30  14786.14  18583.54  22757.42  27288.94  32167.41  37384.35  42932.79  48806.82  55001.45
        ELEVATION     105.26    105.79    106.32    106.84    107.37    107.89    108.42    108.95    109.47    110.00


 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     3417. TO    55001.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

      ***             ***             ***             ***             ***

                              HYDROGRAPH AT STATION      QC2

  PEAK FLOW     TIME                         MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                               (CFS)
+    1639.      1.83                  298.         75.         25.          11.
                            (INCHES)  1.099       1.099       1.099        1.099
                             (AC-FT)   148.        148.        148.         148.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                      6-HR       24-HR       72-HR    166.58-HR
+  (AC-FT)      (HR)
        9.      1.83                    2.          1.          0.           0.

  PEAK STAGE    TIME                         MAXIMUM AVERAGE STAGE
                                      6-HR       24-HR       72-HR    166.58-HR
+   (FEET)      (HR)
    102.25      1.83                100.67      100.17      100.06       100.02

                             CUMULATIVE AREA =    2.53 SQ MI



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  59 KK     *      WEST  *
            *            *
            **************
                              100-year hydrograph from NSS based on ADOT Tc = 0.67*0.6 = 0.40 hrs
                              from NSS software using Region 12 equations

  24 IN          TIME DATA FOR INPUT TIME SERIES
                       JXMIN           5  TIME INTERVAL IN MINUTES
                      JXDATE     19JUL11  STARTING DATE
                      JXTIME           0  STARTING TIME

               SUBBASIN RUNOFF DATA

  62 BA          SUBBASIN CHARACTERISTICS
                       TAREA         .58  SUBBASIN AREA

                                                                         ***

      ***             ***             ***             ***             ***

                         HYDROGRAPH AT STATION      WEST

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                      6-HR       24-HR       72-HR    166.58-HR
+   (CFS)      (HR)
                            (CFS)
+     842.       .42                   65.         16.          5.           2.
                         (INCHES)    1.042       1.042       1.042        1.042
                          (AC-FT)      32.         32.         32.          32.

                          CUMULATIVE AREA =     .58 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


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            *            *
  66 KK     *       SK1  *
            *            *
            **************
                              Route West Plant 100-year runoff downstream through Silver King Wash
                              to confluence with Queen Creek at Boyce Thompson Arboretum
                              Slope = (2960 - 2400) / 19570 = 0.0286
                              Transmission loss assumed based on Tonto NF soil survey (AZ687)
                              map unit 655 - Bodecker soils and Riverwash, 0-5% slopes
                              capacity of most limiting layer to transmit water (Ksat): High
                              1.98 to 5.95 in/hr

               HYDROGRAPH ROUTING DATA

  78 RL          ROUTING LOSSES
                       QLOSS         .00  INITIAL LOSS
                       CLOSS         .00  ADDITIONAL FRACTION LOST
                      PERCRT        4.00  CHANNEL PERCOLATION RATE
                      ELVINV      100.00  INVERT ELEVATION

  74 RS          STORAGE ROUTING
                       NSTPS          11  NUMBER OF SUBREACHES
                        ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC       -1.00  INITIAL CONDITION
                           X         .00 WORKING R AND D COEFFICIENT

  75 RC          NORMAL DEPTH CHANNEL
                         ANL        .060  LEFT OVERBANK N-VALUE
                        ANCH        .040  MAIN CHANNEL N-VALUE
                         ANR        .060  RIGHT OVERBANK N-VALUE
                       RLNTH      19570.  REACH LENGTH
                         SEL       .0286  ENERGY SLOPE
                       ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                               CROSS-SECTION DATA
                                 --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  77 RY        ELEVATION    120.00    110.00    105.00    100.00    100.00    105.00    110.00    120.00
  76 RX        DISTANCE    1000.00   1030.00   1170.00   1180.00   1220.00   1230.00   1370.00   1400.00

                                                                         ***

                                                 COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

            STORAGE         .00     19.91     41.82     65.71     91.60    120.28    169.56    246.72    351.76    484.68
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           OUTFLOW       .00    277.60    894.25   1787.60   2941.24   4403.61   6433.31   9152.81  12760.62  17425.85
         ELEVATION    100.00    101.05    102.11    103.16    104.21    105.26    106.32    107.37    108.42    109.47

           STORAGE    642.36    806.13    972.90   1142.65   1315.39   1491.11   1669.82   1851.52   2036.20   2223.88
           OUTFLOW  23628.81  31363.90  40210.49  50110.24  61020.59  72909.20  85750.85  99525.51 114217.10 129812.60
         ELEVATION    110.53    111.58    112.63    113.68    114.74    115.79    116.84    117.89    118.95    120.00


 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      278. TO   129813.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      SK1

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                           (CFS)
+     514.       .92                  45.         11.          4.           2.
                        (INCHES)     .731        .731        .731         .731
                         (AC-FT)      22.         22.         22.          22.

 PEAK STORAGE   TIME                         MAXIMUM AVERAGE STORAGE
                                     6-HR       24-HR       72-HR    166.58-HR
+  (AC-FT)      (HR)
        3.       .92                   0.          0.          0.           0.

  PEAK STAGE    TIME                          MAXIMUM AVERAGE STAGE
                                     6-HR       24-HR       72-HR    166.58-HR
+   (FEET)      (HR)
    101.47       .92               100.16      100.04      100.01       100.01

                         CUMULATIVE AREA =     .58 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
   79 KK    *       CP1  *
            *            *
            **************
                               Combine routed flows from East and West Plant areas of interest

   81 HC         HYDROGRAPH COMBINATION
                       ICOMP           2  NUMBER OF HYDROGRAPHS TO COMBINE

                                                                         ***

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      CP1

  PEAK FLOW     TIME                          MAXIMUM AVERAGE FLOW
                                     6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                           (CFS)
+    1697.      1.75                 344.         86.         29.          12.
                        (INCHES)    1.030       1.030       1.030        1.030
                         (AC-FT)     170.        170.        170.         170.

                         CUMULATIVE AREA =    3.10 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


            **************
            *            *
   82 KK    *       QC3  *
            *            *
            **************
                                Route combined flows downstream in Queen Creek
                                from confluence with Silver King Wash to Whitlow Ranch Dam
                                Slope = (2400 - 2056) / 43437 = 0.0079
                                Transmission loss assumed based on GSM soil survey (STATSGO)
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                              map unit s490 - Nakai-Monue-Blackston complex
                              capacity of most limiting layer to transmit water (Ksat):
                              Moderately High to High - 0.56 to 1.67 in/hr


                HYDROGRAPH ROUTING DATA

  95 RL          ROUTING LOSSES
                       QLOSS         .00  INITIAL LOSS
                       CLOSS         .00  ADDITIONAL FRACTION LOST
                      PERCRT        1.00  CHANNEL PERCOLATION RATE
                      ELVINV      100.00  INVERT ELEVATION

  91 RS          STORAGE ROUTING
                       NSTPS          30  NUMBER OF SUBREACHES
                        ITYP        FLOW  TYPE OF INITIAL CONDITION
                      RSVRIC       -1.00  INITIAL CONDITION
                           X         .00 WORKING R AND D COEFFICIENT

  92 RC          NORMAL DEPTH CHANNEL
                         ANL        .060  LEFT OVERBANK N-VALUE
                        ANCH        .040  MAIN CHANNEL N-VALUE
                         ANR        .060  RIGHT OVERBANK N-VALUE
                       RLNTH      43437.  REACH LENGTH
                         SEL       .0079  ENERGY SLOPE
                       ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                        CROSS-SECTION DATA
                             --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  94 RY        ELEVATION    110.00    106.00    105.00    100.00    100.00    105.00    106.00    110.00
  93 RX        DISTANCE    1000.00   1040.00   1165.00   1175.00   1325.00   1335.00   1460.00   1500.00

                                                                          ***

                                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

           STORAGE        .00     79.28    159.66    241.14    323.74    407.43    492.23    578.14    665.15    753.27
           OUTFLOW        .00    170.61    542.37   1067.59   1726.97   2508.89   3405.33   4410.34   5519.33   6728.61
         ELEVATION     100.00    100.53    101.05    101.58    102.11    102.63    103.16    103.68    104.21    104.74

           STORAGE     850.98   1009.25   1225.15   1451.65   1683.68   1921.24   2164.31   2412.92   2667.04   2926.69
           OUTFLOW    8074.45   9636.28  11504.94  13674.36  16096.54  18757.26  21647.59  24761.41  28094.42  31643.52
         ELEVATION     105.26    105.79    106.32    106.84    107.37    107.89    108.42    108.95    109.47    110.00


 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN     2509. TO    31644.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

       ***             ***             ***             ***             ***

                          HYDROGRAPH AT STATION      QC3

  PEAK FLOW     TIME                             MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                           (CFS)
+     734.      4.17                    201.         50.         17.           7.
                        (INCHES)        .603        .603        .603         .603
                         (AC-FT)        100.        100.        100.         100.

 PEAK STORAGE   TIME                           MAXIMUM AVERAGE STORAGE
                                        6-HR       24-HR       72-HR    166.58-HR
+  (AC-FT)      (HR)
        6.      4.17                      2.          1.          0.           0.

  PEAK STAGE    TIME                             MAXIMUM AVERAGE STAGE
                                        6-HR       24-HR       72-HR    166.58-HR
+   (FEET)      (HR)
    101.25      4.17                  100.47      100.12      100.04       100.02

                         CUMULATIVE AREA =    3.10 SQ MI



 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


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           *            *
  96 KK    *    WHITLO  *
           *            *
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          **************
                    Route flows thru level pool routing for Whitlow Ranch Dam
                    Stage-storage-discharge data from USACE Water Control Manual for Whitlow Dam

             HYDROGRAPH ROUTING DATA

  95 RL          ROUTING LOSSES
                       QLOSS         .00  INITIAL LOSS
                       CLOSS         .00  ADDITIONAL FRACTION LOST

  99 RS          STORAGE ROUTING
                       NSTPS           1  NUMBER OF SUBREACHES
                        ITYP        ELEV  TYPE OF INITIAL CONDITION
                      RSVRIC     2056.00  INITIAL CONDITION
                           X         .00 WORKING R AND D COEFFICIENT

 100 SV            STORAGE          .0      29.0     172.0     454.0     879.0    1454.0    2197.0    3129.0

 101 SE          ELEVATION     2056.00   2070.00   2075.00   2080.00   2085.00   2090.00   2095.00   2100.00

 102 SQ          DISCHARGE          0.      350.      420.      470.      520.      560.      595.      630.

 104 SS          SPILLWAY
                        CREL     2166.00  SPILLWAY CREST ELEVATION
                       SPWID      355.00  SPILLWAY WIDTH
                        COQW        2.80  WEIR COEFFICIENT
                        EXPW        1.50  EXPONENT OF HEAD

 103 ST          TOP OF DAM
                       TOPEL     2199.00  ELEVATION AT TOP OF DAM
                      DAMWID      837.00  DAM WIDTH
                        COQD        2.80  WEIR COEFFICIENT
                        EXPD        1.50  EXPONENT OF HEAD

                                                                           ***

                                                       COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

                                                             (INCLUDING FLOW OVER DAM)

          STORAGE        .00     29.00    172.00    454.00    879.00   1454.00   2197.00   3129.00
          OUTFLOW        .00    350.00    420.00    470.00    520.00    560.00    595.00    630.00
        ELEVATION    2056.00   2070.00   2075.00   2080.00   2085.00   2090.00   2095.00   2100.00

      ***             ***             ***             ***             ***

                              HYDROGRAPH AT STATION   WHITLO

 PEAK OUTFLOW IS      352. AT TIME   5.25 HOURS


  PEAK FLOW     TIME                           MAXIMUM AVERAGE FLOW
                                        6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                               (CFS)
+     352.      5.25                    196.         50.         17.           7.
                            (INCHES)    .588        .604        .604         .606
                             (AC-FT)     97.        100.        100.         100.

 PEAK STORAGE   TIME                          MAXIMUM AVERAGE STORAGE
                                        6-HR       24-HR       72-HR    166.58-HR
+  (AC-FT)      (HR)
       32.      5.25                     17.          4.          1.           1.

  PEAK STAGE    TIME                           MAXIMUM AVERAGE STAGE
                                        6-HR       24-HR       72-HR    166.58-HR
+   (FEET)      (HR)
   2070.11      5.25                 2063.85     2058.01     2056.67      2056.29

                              CUMULATIVE AREA =    3.10 SQ MI


 *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***


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          *            *
 105 KK   *       QC4  *
          *            *
          **************
                                  Route combined flows downstream in Queen Creek
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                                 from Whitlow Ranch Dam to point of zero discharge
                                 Slope = (2050 - 1560) / 44164 = 0.0066
                                 Transmission loss assumed based on NRCS soil survey (AZ661)
                                 map unit 11 - Carrizo-Brios-Riverwash complex
                                 capacity of most limiting layer to transmit water (Ksat):
                                 High - 1.98 to 5.95 in/hr


                 HYDROGRAPH ROUTING DATA

  118 RL           ROUTING LOSSES
                        QLOSS         .00  INITIAL LOSS
                        CLOSS         .00  ADDITIONAL FRACTION LOST
                       PERCRT        4.00  CHANNEL PERCOLATION RATE
                       ELVINV      100.00  INVERT ELEVATION

  114 RS           STORAGE ROUTING
                        NSTPS          45  NUMBER OF SUBREACHES
                         ITYP        FLOW  TYPE OF INITIAL CONDITION
                       RSVRIC       -1.00  INITIAL CONDITION
                            X         .00 WORKING R AND D COEFFICIENT

  115 RC           NORMAL DEPTH CHANNEL
                          ANL        .060  LEFT OVERBANK N-VALUE
                         ANCH        .040  MAIN CHANNEL N-VALUE
                          ANR        .060  RIGHT OVERBANK N-VALUE
                        RLNTH      43000.  REACH LENGTH
                          SEL       .0066  ENERGY SLOPE
                        ELMAX          .0  MAX. ELEV. FOR STORAGE/OUTFLOW CALCULATION

                                                   CROSS-SECTION DATA
                             --- LEFT OVERBANK --- + ------ MAIN CHANNEL ------- + --- RIGHT OVERBANK ---
  117 RY         ELEVATION    120.00    106.00    105.00    100.00    100.00    105.00    106.00    120.00
  116 RX         DISTANCE    1000.00   1040.00   1650.00   1660.00   1740.00   1750.00   2360.00   2400.00

                                                                        ***

                                                     COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

             STORAGE         .00     85.32    175.01    269.07    367.51    511.90   1556.88   2933.50   4316.36   5705.48
             OUTFLOW         .00    265.07    846.74   1675.91   2727.69   4039.69   7356.08  14366.70  24067.69  36093.55
           ELEVATION      100.00    101.05    102.11    103.16    104.21    105.26    106.32    107.37    108.42    109.47

             STORAGE     7100.85   8502.46   9910.33  11324.45  12744.81  14171.43  15604.30  17043.42  18488.79  19940.41
             OUTFLOW    50228.86  66324.78  84269.70 103975.50 125370.30 148393.60 172994.00 199126.80 226752.70 255836.80
           ELEVATION      110.53    111.58    112.63    113.68    114.74    115.79    116.84    117.89    118.95    120.00


 *** WARNING *** MODIFIED PULS ROUTING MAY BE NUMERICALLY UNSTABLE FOR OUTFLOWS BETWEEN      265. TO   255837.
                 THE ROUTED HYDROGRAPH SHOULD BE EXAMINED FOR OSCILLATIONS OR OUTFLOWS GREATER THAN PEAK INFLOWS.
                 THIS CAN BE CORRECTED BY DECREASING THE TIME INTERVAL OR INCREASING STORAGE (USE A LONGER REACH.)

       ***             ***             ***             ***             ***

                        HYDROGRAPH AT STATION      QC4

  PEAK FLOW     TIME                             MAXIMUM AVERAGE FLOW
                                         6-HR       24-HR       72-HR    166.58-HR
+   (CFS)       (HR)
                             (CFS)
+       0.       .00                       0.          0.          0.           0.
                          (INCHES)       .000        .000        .000         .000
                           (AC-FT)         0.          0.          0.           0.

 PEAK STORAGE   TIME                            MAXIMUM AVERAGE STORAGE
                                         6-HR       24-HR       72-HR    166.58-HR
+  (AC-FT)      (HR)
        0.      9.08                       0.          0.          0.           0.

  PEAK STAGE    TIME                             MAXIMUM AVERAGE STAGE
                                         6-HR       24-HR       72-HR    166.58-HR
+   (FEET)      (HR)
    100.02      9.08                   100.00      100.00      100.00       100.00

                           CUMULATIVE AREA =    3.10 SQ MI

1
                                                                    RUNOFF SUMMARY
                                                            FLOW IN CUBIC FEET PER SECOND
                                                         TIME IN HOURS,  AREA IN SQUARE MILES

                                              PEAK   TIME OF     AVERAGE FLOW FOR MAXIMUM PERIOD       BASIN      MAXIMUM     TIME OF
          OPERATION        STATION            FLOW     PEAK                                            AREA       STAGE     MAX STAGE
```

```
+                                                                  6-HOUR      24-HOUR      72-HOUR

         HYDROGRAPH AT
+                                EAST       2502.      .67          320.          80.          27.        2.53

         ROUTED TO
+                                 QC1       2501.      .75          320.          80.          27.        2.53
+                                                                                                                    102.53          .75

         ROUTED TO
+                                 QC2       1639.     1.83          298.          75.          25.        2.53
+                                                                                                                    102.25         1.83

         HYDROGRAPH AT
+                                WEST        842.      .42           65.          16.           5.         .58

         ROUTED TO
+                                 SK1        514.      .92           45.          11.           4.         .58
+                                                                                                                    101.47          .92

         2 COMBINED AT
+                                 CP1       1697.     1.75          344.          86.          29.        3.10

         ROUTED TO
+                                 QC3        734.     4.17          201.          50.          17.        3.10
+                                                                                                                    101.25         4.17

         ROUTED TO
+                              WHITLO        352.     5.25          196.          50.          17.        3.10
+                                                                                                                   2070.11         5.25

         ROUTED TO
+                                 QC4          0.      .00            0.           0.           0.        3.10
+                                                                                                                    100.02         9.08
1                                      SUMMARY OF DAM OVERTOPPING/BREACH ANALYSIS FOR STATION   WHITLO
                                  (PEAKS SHOWN ARE FOR INTERNAL TIME STEP USED  DURING BREACH FORMATION)

     PLAN  1 ..............                  INITIAL VALUE     SPILLWAY CREST     TOP OF DAM
                                 ELEVATION      2056.00            2166.00          2199.00
                                 STORAGE             0.             15431.           21583.
                                 OUTFLOW             0.              1092.            1323.

                   RATIO     MAXIMUM      MAXIMUM    MAXIMUM    MAXIMUM    DURATION     TIME OF    TIME OF
                    OF      RESERVOIR      DEPTH     STORAGE    OUTFLOW    OVER TOP   MAX OUTFLOW  FAILURE
                   PMF       W.S.ELEV    OVER DAM     AC-FT       CFS        HOURS       HOURS      HOURS

                   1.00      2070.11        .00         32.        352.        .00         5.25        .00


 *** NORMAL END OF HEC-1 ***
```

National Streamflow Statistics Program
Version 5
Based on Techniques and Methods Book 4-A6
Equations from database Y:\library\usgs\NFF\NSS_v5_2011-03-24.mdb
Updated by tkoenig 5/2/2011 at 2:38:45 PM Corrections to min/max values for OK Reg2 precip

Site: East Plant, Arizona
User:
Date: Thursday, July 21, 2011 03:10 PM

Equations for Arizona developed using English units

Rural Estimate: Rural 1
Basin Drainage Area: 2.53 square miles
1 Region
Region: Central_Arizona_Region_12
Drainage_Area = 2.53 square miles
Mean_Basin_Elevation = 4170 feet

Results for: Rural 1

Equations used:
PK2 = 41.1* (DRNAREA)^(0.629)
PK5 = 238* (DRNAREA)^(0.687)* (0.001*(ELEV))^(-0.358)
PK10 = 479* (DRNAREA)^(0.661)* (0.001*(ELEV))^(-0.398)
PK25 = 942* (DRNAREA)^(0.63)* (0.001*(ELEV))^(-0.383)
PK50 = (+10)^(7.36)* (0.001*(ELEV))^(-0.44)* (+10)^(-4.17*(DRNAREA)^(-0.08))
PK100 = (+10)^(6.55)* (0.001*(ELEV))^(-0.454)* (+10)^(-3.17*(DRNAREA)^(-0.11))
PK500 = 0

Statistic	Value, cfs	Standard Error, %	Equivalent Years
PK2	73.6	110	0.2
PK5	270	68	1.9
PK10	500	52	6.2
PK25	977	40	18
PK50	1640	37	28
PK100	2540	39	32
PK500	5930 *		

*Extrapolated value

National Streamflow Statistics Program
Version 5
Based on Techniques and Methods Book 4-A6
Equations from database Y:\library\usgs\NFF\NSS_v5_2011-03-24.mdb
Updated by tkoenig 5/2/2011 at 2:38:45 PM Corrections to min/max values for OK Reg2 precip

Site: West Plant, Arizona
User:
Date: Thursday, July 21, 2011 03:10 PM

Equations for Arizona developed using English units

Rural Estimate: Rural 1
Basin Drainage Area: 0.58 square miles
1 Region
Region: Central_Arizona_Region_12
Drainage_Area = 0.58 square miles (below min value 0.6)
Mean_Basin_Elevation = 3370 feet

Results for: Rural 1

Equations used:
PK2 = 41.1* (DRNAREA)^(0.629)
PK5 = 238* (DRNAREA)^(0.687)* (0.001*(ELEV))^(-0.358)
PK10 = 479* (DRNAREA)^(0.661)* (0.001*(ELEV))^(-0.398)
PK25 = 942* (DRNAREA)^(0.63)* (0.001*(ELEV))^(-0.383)
PK50 = (+10)^(7.36)* (0.001*(ELEV))^(-0.44)* (+10)^(-4.17*(DRNAREA)^(-0.08))
PK100 = (+10)^(6.55)* (0.001*(ELEV))^(-0.454)* (+10)^(-3.17*(DRNAREA)^(-0.11))
PK500 = 0

Statistic	Value, cfs
PK2	29.1
PK5	106
PK10	205
PK25	418
PK50	589
PK100	877
PK500	1790 *

*Extrapolated value

ATTACHMENT 8

SPECIAL STATUS SPECIES SCREENING

Attachment 8. Special status species screening analysis for Resolution East and West Plant Analysis Areas Jurisdictional Determination.

Species and Status	Suitable Habitat and Known Occurrence	Potential for Occurrence
Arizona hedgehog cactus *Echinocereus triglochidiatus* var. *arizonicus* Endangered	**Habitat Requirements:** Open slopes and cracks and crevices between boulders in Interior Chaparral and Madrean evergreen woodland habitats (Brown 1994). Associated with Tertiary Apache Leap tuff (dacite), Cretaceous or Tertiary Schultze granite, Precambrian Apache Group Pioneer quartzites, and Precambrian Pinal schist. Elevation range of 3,300 to 5,700 ft (TNF 1996). **Known Occurrence/Records:** Restricted to the highlands of Pinal and Gila counties (AGFD 2011; TNF 1996).	**Potential to Occur in Proposed Action Area:** This species occurs within the East Plant Analysis Area. Unlikely to occur within the West Plant Analysis Area.
Chiricahua leopard frog *Lithobates [Rana] chiricahuensis* Threatened	**Habitat Requirements:** Permanent waters (ponds, cienegas, tanks, wet meadows) and small streams typically surrounded by complex vegetation communities and overall structure (USFWS 2011). Elevations of central and eastern populations range from 3,050 to 8,890 ft (AGFD 2011). **Known Occurrence/Records:** Northern populations extend through montane central Arizona east and south along the Mogollon Rim to montane portions of New Mexico. Remaining populations occur in mountains and valleys south of the Gila River in southeastern Arizona and southwestern New Mexico and into portions of Mexico (AGFD 2011).	**Potential to Occur in Proposed Action Area:** None. Analysis Areas are outside of the known geographic range for this species.
Desert pupfish *Cyprinodon macularius* Endangered	**Habitat Requirements:** Desert springs, small streams, and marshes. Can tolerate warm saline waters (USFWS 2011). Elevations below 4,920 ft (AGFD 2011). **Known Occurrence/Records:** Restricted to three natural populations in California and the non-natural irrigation drains around the Salton Sea. Also found in Sonora and Baja California, Mexico. One natural population still occurs in Quitobaquito Spring and Pond in Pima County and reintroductions have been made in Pima, Pinal, Maricopa, Graham, Cochise, La Paz, and Yavapai counties, Arizona (Mark Taylor, TNF, pers. Comm.).	**Potential to Occur in Proposed Action Area:** None. Analysis Areas are outside of the known geographic range for this species.

Attachment 8. Special status species screening analysis for Resolution East and West Plant Analysis Areas Jurisdictional Determination.

Species and Status	Suitable Habitat and Known Occurrence	Potential for Occurrence
Gila chub *Gila intermedia* Endangered	**Habitat Requirements:** Pools in small streams, marshes, cienegas, and other quite waters. It may have occurred in large and more complex habitats (TNF 2000). **Known Occurrence/Records:** Nearest populations historically occurred in Fish and Mineral creeks (TNF 2000).	**Potential to Occur in Proposed Action Area:** None. The Analysis Areas do not support suitable aquatic habitat for this species and are outside of this species' known geographic range for this species.
Lesser long-nosed bat *Leptonycteris yerbabuenae* Endangered	**Habitat Requirements:** Desertscrub habitats containing agave and columnar cacti. Roost in caves and abandoned mines. Elevations below 6,000 ft (AGFD 2011). **Known Occurrence/Records:** Majority of records are south of Pinal County. Migratory species. Present in southern Arizona from April to September and south of the border the remainder of the year (AGFD 2011).	**Potential to Occur in Proposed Action Area:** Very low potential to occur. The Analysis Areas occur outside of the geographic ranges mapped by Hoffmeister (1986) and Cockrum (1991) for this species, and over 67 miles from the nearest known maternity roost.
Nichol's turk's head cactus *Echinocactus horizonthalonius var. nicholii* Endangered	**Habitat Requirements:** Sonoran desertscrub, either within unshaded sites on dissected alluvial fans at the foot of limestone mountains or on inclined terraces and saddles on limestone mountainsides (USFWS 2011). **Known Occurrence/Records:** Found in the Waterman Mountains in north-central Pima County and the Vekol Mountains in southwestern Pinal County. Elevation range is 2,400 to 4,100 feet (USFWS 2011).	**Potential to Occur in Proposed Action Area:** None. The Analysis Areas are well outside the known, extremely limited distribution of this species.
Razorback sucker *Xyrauchen texanus* Endangered	**Habitat Requirements:** River and lacustrine areas, in areas outside of fast-moving water (USFWS 2011). Tend to occupy strong uniform currents over sandy bottoms, eddies, and backwaters lateral to river channels and sometimes in deep places near cut banks and fallen trees (TNF 2000). **Known Occurrence/Records:** Endemic to Colorado River basin. Only remaining natural populations are in and near lakes Mohave, Mead, and Havasu (USFWS 2011).	**Potential to Occur in Proposed Action Area:** None. The Analysis Areas do not support suitable aquatic habitat for this species.

Attachment 8. Special status species screening analysis for Resolution East and West Plant Analysis Areas Jurisdictional Determination.

Species and Status	Suitable Habitat and Known Occurrence	Potential for Occurrence
Southwestern willow flycatcher *Empidonax traillii extimus* Endangered	**Habitat Requirements:** Dense stands of cottonwood, willow, and tamarisk vegetation communities along rivers and streams. Elevations below 8,500 ft (USFWS 2011). **Known Occurrence/Records:** Locally distributed throughout suitable habitat throughout Arizona (USFWS 2011).	**Potential to Occur in Proposed Action Area:** None. No suitable riparian habitat occurs within the Analysis Areas.
Yuma clapper rail *Rallus longirostris yumanensis* Endangered	**Habitat Requirements:** Fresh water and brackish marshes with dense emergent riparian vegetation. Requires wet substrates (eg., mudflats and sandbars) with dense herbaceous or woody vegetation for nesting and foraging. Elevations below 4,500 ft (USFWS 2011). **Known Occurrence/Records:** Historically known to occur in TNF (USFWS 2011).	**Potential to Occur in Proposed Action Area:** None. No suitable marsh habitat is present within the Analysis Areas.
Loach minnow *Tiaroga cobitis* Threatened	**Habitat Requirements:** Turbulent, rocky riffles or mainstream rivers and tributaries. Occupies interstices of cobble-sized substrate occasionally with dense growth of filamentous algae. Elevations up to 7,200 ft (TNF 2000). **Known Occurrence/Records:** Restricted to Black, White including North and East forks, San Francisco, Blue, Campbell Blue Rivers, and Aravaipa and Eagle Creeks in Arizona (AGFD 2011).	**Potential to Occur in Proposed Action Area:** None. No suitable aquatic habitat is present.
Mexican spotted owl *Strix occidentalis lucida* Threatened	**Habitat Requirements:** Nests in canyons and dense forests with multilayered foliage strictures, generally older forests of mixed conifer or ponderosa pine/gambel oak. Elevations of 4,100 to 9,000 ft (USFWS 2011). **Known Occurrence/Records:** Throughout the state (UFSWS 2010).	**Potential to Occur in Proposed Action Area:** None. The Analysis Areas are below the known elevation range for this species and well outside the designated critical habitat boundary.

Attachment 8. Special status species screening analysis for Resolution East and West Plant Analysis Areas Jurisdictional Determination.

Species and Status	Suitable Habitat and Known Occurrence	Potential for Occurrence
Spikedace *Meda fulgida* Threatened	**Habitat Requirements:** Midwater habits of runs, pools, and swirling eddies, typically less than 1 foot deep (TNF 2000). Elevations of 1,620 to 4,500 ft (AGFD 2011). **Known Occurrence/Records:** Currently found in portions of Aravaipa and Eagle creeks as well as Gila and Verde rivers (AGFD 2011).	**Potential to Occur in Proposed Action Area:** None. The Analysis Areas do not support suitable aquatic habitat.
Acuña cactus *Echinomastus erectocentrus* var. *acunensis* Candidate	**Habitat Requirements:** Well drained knolls and gravel ridges in Sonoran desertscrub. Elevations of 1,300 to 2,000 ft (USFWS 2011). **Known Occurrence/Records:** Western Pima to Maricopa and Pinal counties (AGFD 2011). Nearest populations are located in the hills between Florence and Kearney (USFWS 2011).	**Potential to Occur in Proposed Action Area:** None. The Analysis Areas are outside of the known geographic range for this species.
Northern Mexican gartersnake *Thamnophis eques megalops* Candidate	**Habitat Requirements:** Riparian areas (wetlands, cienegas, or stock tanks). Found in densely vegetated riparian woodlands, forests and along streamside gallery forests with limited groundcover. Not found in steep mountain streams. Elevations of 3,000 to 5,000 ft (Rosen and Schwalbe 1988). **Known Occurrence/Records:** Generally south of Gila River. San Rafael and Sonoita grasslands, Arivaca, Agua Fria River, Oak Creek, Verde River, and upper sites in the Salt/Black Rivers (AGFD 2011).	**Potential to Occur in Proposed Action Area:** None. The Analysis Areas do not support suitable aquatic habitat and are outside the known geographic range for this species.
Ocelot *Leopardus [Felis] pardalis* Endangered	**Habitat Requirements:** Desertscrub areas with dense vegetation in Arizona and humid tropical and sub-tropical forests, and savannahs in southern U.S. (USFWS 2011). **Known Occurrence/Records:** Confirmed records in Cochise and Gila counties since 2009 (USFWS 2011).	**Potential to Occur in Proposed Action Area:** Potential. The Analysis Areas are within the known geographic range for this species though sightings are rare and species is transient.

Attachment 8. Special status species screening analysis for Resolution East and West Plant Analysis Areas Jurisdictional Determination.

Species and Status	Suitable Habitat and Known Occurrence	Potential for Occurrence
Roundtail Chub *Gilarobusta* Candidate	**Habitat Requirements:** Mid-elevation rivers and streams primarily in pools deeper than 6 feet situated near swift riffles and runs. Usually in areas covered by boulders, vegetation, or stream banks. Typically in riparian vegetation (cottonwood, willows, or tamarisks galleries). Elevations of 1,210 to 7,220 ft (AGFD 2011). **Known Occurrence/Records:** Occur outside Pinal County with the exception of the nearest population in Devil's Canyon (AGFD 2011).	**Potential to Occur in Proposed Action Area:** None. The Analysis Areas do not support suitable aquatic habitat.
Sonoran desert tortoise *Gopherus agassizii* Sensitive	**Habitat Requirements:** Normal distribution at elevations below 4,000 feet in desert rocky foothills, lower bajadas, and semidesert grassland (TNF 2000). **Known Occurrence/Records:** Areas south and east of the Colorado River, from locations near Pearce Ferry in Mojave County, to the south beyond the International Boundary, and scattered locations in between. The northeastern-most records occur along the Salt River near Roosevelt Lake in Gila County, though populations have not been confirmed. The middle San Pedro River drainage in Cochise County harbors the easternmost substantial populations. Confirmed in extreme southeastern Cochise County, but likely represent released captives (pets). Have been found as far southwest as the Barry M. Goldwater Range, Yuma Proving Ground, and the Cabeza Prieta National Wildlife Refuge (AGFD 2011).	**Potential to Occur in Proposed Action Area:** Some potential to occur. The Analysis Areas are within range and suitable habitat is present. Scutes from this tortoise were found during biological investigations along Queen Creek, west of Superior.
Tucson shovel-nosed snake *Chionactis occipitalis klauberi* Candidate	**Habitat Requirements:** Arid locations with sandy washes, dunes, and rocky hillsides. Elevations of up to 4,700 ft (AGFD 2011). **Known Occurrence/Records:** Historically found in Pima County, Avra and Santa Cruz valleys in west Pinal County, and portions of eastern Maricopa County (AGFD 2011). Nearest detection was at Florence Military Reservation (AGFD 2011) at least 8 miles southwest.	**Potential to Occur in Proposed Action Area:** None. The soil within the Analysis Areas does not appear to be suitable, and the Analysis Areas are outside the known geographic range for this species.

Attachment 8. Special status species screening analysis for Resolution East and West Plant Analysis Areas Jurisdictional Determination.

Species and Status	Suitable Habitat and Known Occurrence	Potential for Occurrence
Yellow-billed cuckoo *Coccyzus americanus occidentalis* Candidate	**Habitat Requirements:** Associated with perennial riparian woodland habitats (cottonwoods, willows and tamarisk galleries). Elevations below 6,710 ft (AGFD 2011). **Known Occurrence/Records:** Extreme northeast, as well as central, and southern Arizona (AGFD 2011).	**Potential to Occur in Proposed Action Area:** None. The Analysis Areas do not support suitable riparian habitat.

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