EMERGENCY ACTION PLAN FOR THE CHOLLA POWER PLANT DAMS FLY ASH DAM, BOTTOM ASH DAM, AND COOLING POND DAM STATE ID NOS. 09.28, 09.27, and 09.29 CHOLLA POWER PLANT NAVAJO COUNTY, ARIZONA

Prepared for
ARIZONA PUBLIC SERVICE COMPANY

Prepared by
AECOM
June 2022

EMERGENCY ACTION PLAN
FOR THE CHOLLA POWER PLANT DAMS
FLY ASH DAM, BOTTOM ASH DAM, AND
CHOLLA COOLING POND DAM
STATE ID NOS. 09.28, 09.27, AND 09.29

Dam Location:
Navajo County, Arizona

Township, Range and Section:
T18N, R19E, Sections 13, 14, 22-27 and T18N, R20E, Sections 19, 29, and 30

Latitude and Longitude (Cholla Power Plant):
Latitude 34° 56' 25.18" and Longitude -110° 18' 2.57"

Dam Owner and Operator:
Arizona Public Service Company
Cholla Power Plant
Telephone: (928) 288-3381

AECOM
Phoenix, Arizona

June 2022

Mike Hancock
Plant Manager, Cholla Power Plant,
Arizona Public Service

6/22/22
Date

Catrina Jenkins. Emergency Manager,
Navajo County Department of Emergency
Management and Preparedness

6/16/22
Date

Certification Statement 40 CFR § 257.73 (a)(3) – Structural integrity criteria for existing CCR surface impoundments – Emergency Action Plan (EAP)

CCR Units: Arizona Public Service, Cholla Power Plant; Fly Ash Dam and Bottom Ash Dam

I, Jeffery B. Heyman, being a Registered Professional Engineer in good standing in the State of Arizona, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Units, that the Emergency Action Plan meets the requirements of 40 CFR § 257.73(a)(3).

Jeffery B. Heyman

Printed Name

June 16, 2022

Date

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1.0 BASIC EAP DATA

1.1 STATEMENT OF PURPOSE

The following document presents the Emergency Action Plan (EAP) for the two Coal Combustion (CCR) Impoundments: the Fly Ash Dam and Bottom Ash Dam, and for the Cooling Pond Dam at the Cholla Power Plant (the Dams). This EAP is a formal document that identifies potential emergency conditions that could develop at the dams for these structures, provides a plan for communication of the conditions, and specifies preplanned actions to be followed to minimize property damage and loss of life. This EAP also provides procedures and information to assist the owner in issuing early warning information about the emergency situation to responsible emergency management authorities. The **notification flow charts** and **evacuation maps** follow this section (see tabs). The notification flow charts provide the notification sequence to follow for the three emergency response levels. The evacuation maps provide the emergency managers with an identification of the critical areas located within the area of inundation from the release from each individual Dam or all of the Dams. Overall, the purpose of the EAP is threefold:

- To safeguard the lives of the citizens living within the potential flood or inundation area and to reduce property damage downstream of the Dams.
- To provide effective plans for surveillance of the Dams, prompt notification to local emergency management agencies, and citizen warning and evacuation response when required.
- To assign emergency actions to be taken by the dam operator/owner, public officials, emergency personnel, and to outline responsibilities of each party involved in the emergency management process in the event of a potential or imminent failure of the Dams.

1.2 POTENTIAL IMPACTED AREA

The impacted area is located along the banks of the Little Colorado River, directly adjacent, south, and west of the Cholla Power Plant.

- Interstate 40 (I-40) and the Burlington Northern and Santa Fe (BNSF) Railroad will be impacted and will need to be closed to traffic.
- Some residences/structures along the banks of the Little Colorado River from the east perimeter of the Cholla Power Plant to Winslow will require evacuation.

- Some residences to the south and north of the I-40 will require evacuation.
- A larger portion of the Town of Winslow will require evacuation. The additional area located South of Old Clear Creek Road and East of State Route 87 has been incorporated into this update.

Please refer to the **Evacuation Maps (Figures 1-3 to 1-8)** for more detail of the expected impacted area to be evacuated and known structures within this area.

1.3 SITE DESCRIPTION

The Dams are located in Northeastern Arizona, in Navajo County (T18N, R19E, Sections 13, 14, 22-27 and T18N, R20E, Sections 19, 29, and 30). The Dams are within the Cholla Power Plant property boundary, which is located approximately two miles east of Joseph City, Arizona. The Cholla Power Plant is owned and operated by Arizona Public Service Company (APS). The Cooling Pond Dam is accessible from the I-40 West frontage road (south of the Interstate) via Exit 277. The Bottom Ash Dam is accessible from I-40 via Exit 277. The Fly Ash Dam is accessible from I-40 via Exit 280. The Cholla Power Plant Location is shown in Figure 1-1A and the location of each dam is shown in Figure 1-1B. The following subsections provide general information about the Dams.

1.4 DESCRIPTION OF THE DAMS

1.4.1 Description of the Fly Ash Dam

APS constructed the Fly Ash Dam between 1976 and 1978. The Fly Ash Dam is an unlined retention basin located north of I-40 approximately 1.5 miles east of the Plant and three miles east of Joseph City. It is located one mile north of the Little Colorado River. It went into operation in 1978. The dam has a clay core, an outer sandy shell with rip-rap armoring, and an impervious cut-off slurry wall. The dam storage capacity is approximately 18,000 acre-feet and is 80 feet high. It has a Federal Emergency Management Agency (FEMA) rating of intermediate size and high hazard due to its height and location. The dam lacks a spillway structure because the majority of inflow is controlled through plant operations. There has been no significant flooding or earthquake events at the Fly Ash Dam.

The rainfall runoff associated with the 24-hour 100-year flood and the Probable Maximum Flood (PMF) would raise the water level in the Fly Ash Pond by approximately 1.6 feet and add 690 acre-feet to the impounded storage, respectively (AECOM 2017). A tropical depression storm or hurricane remnant may raise the water level by as much as two to three feet, but such events would not exceed the minimum dam freeboard of six feet. No dams are located upstream and the

Cooling Pond Dam is located immediately downstream. Downstream areas of concern are I-40, the [redacted] Families, the BNSF Railroad, the Little Colorado River, and the Cholla Power Plant, in that order.

The plan and profiles of the Fly Ash Dam are shown on Drawing Exhibits 1 through 4. The description of the Fly Ash Dam is provided in Table 1-1. The Storage Area and Capacity of the Fly Ash Dam based on the *Cholla Fly Ash Dam – ADWR Filing No. 09.28 – Dam Breach and Inundation Report* (AECOM 2017) is provided in Table 1-2.

Table 1-1 Description of the Fly Ash Dam

Purpose:	Fly Ash Disposal
Type:	Earthen Embankment
Built:	1976-1978
Hazard Classification:	High
State Identification Number:	09.28
Legal Description:	Fly Ash Dam
Owner:	Arizona Public Service
Location Coordinates:	Latitude: 34° 55' 48"; Longitude: -110° 16' 05"
Height:	80 feet
Crest Elevation:	5,120 feet above mean seal level
Crest Length:	4,583 feet
Crest Width:	24 feet
Upstream Slope:	3 Horizontal : 1 Vertical
Downstream Slope:	3 Horizontal : 1 Vertical
Reservoir Area:	420 acres
Drainage Area:	1,241.6 acres
Inlet of Dam:	Slurry pipes near the center of the embankment
Normal Operational Storage Capacity:	9,000 acre-feet
Maximum Storage Capacity:	18,000 acre-feet
Maximum Operating Level:	5,114 ft AMSL
Freeboard:	6 feet
Gage Type:	The pond level is surveyed with GPS equipment on a monthly basis
Outlets:	No outlet

Table 1-2 Fly Ash Dam Storage Area and Capacity (after AECOM 2017)

Elevation (ft)	Area (acres)	Capacity (acre-ft)
5050	37.27	0
5060	100.13	662
5070	170.81	2,001
5080	238.96	4,040
5090	291.06	6,686
5100	364.28	9,956
5110	397.99	13,766
5113	417.81	14,989
5114	427.00	15,412
5115	431.59	15,841
5116	439.62	16,277
5117	447.20	16,720
5118	452.48	17,170
5119	459.14	17,626
5120	466.59	18,089

1.4.2 Description of the Bottom Ash Dam

APS constructed the Bottom Ash Dam between 1976 and 1978. The Bottom Ash Dam is an unlined retention basin located north of I-40 approximately 0.6 miles north of the Plant and 1.5 miles east of Joseph City. It is located immediately west and adjacent to Tanner Wash. It went into operation in 1978. The dam has a clay core, an outer sandy shell with rip-rap armoring, and an impervious cut-off slurry wall. The dam storage capacity is approximately 2,300 acre-feet and is 73 feet high. It has a FEMA rating of intermediate size and high hazard due to its height and location. The dam lacks a spillway structure because the majority of inflow is controlled through plant operations. There have been no significant flooding or earthquake events at the Bottom Ash Dam.

The rainfall runoff associated with the 24-hour 100-year flood and the PMF would raise the water level in the Bottom Ash Pond by approximately one foot and add 90 acre-feet to the storage, respectively. A tropical depression or hurricane remnant may increase the pond water level by up to two feet, but such events would not exceed the minimum residual freeboard of 4 feet. No dams are located upstream and no dams are located downstream in the estimated inundation area. Downstream areas of concern are the Cholla Capacitor Bank, I-40, the I-40 Frontage Road, the Cholla Power Plant, and the BNSF Railroad, in that order.

The plan and profiles of the Bottom Ash Dam are shown on Drawing Exhibits 5 through 8. The description of the Bottom Ash Dam is provided in Table 1-3. The Storage Area and Capacity of

the Bottom Ash Dam based on the information presented in the *APS Cholla Dambreak Study* (Stantec 2000) is provided in Table 1-4.

Table 1-3 Description of the Bottom Ash Dam

Purpose:	Bottom Ash Containment
Type:	Earthen Embankment
Built:	1976-1978
Hazard Classification:	High
State Identification Number:	09.27
Owner:	Arizona Public Service
Location Coordinates:	Latitude: 34° 57' 07"; Longitude: -110° 17' 16"
Height:	73 feet
Crest Elevation:	5,123.3 feet
Crest Length:	4,040 feet
Crest Width:	12 feet
Upstream Slope:	3 Horizontal : 1 Vertical
Downstream Slope:	3 Horizontal : 1 Vertical
Reservoir Area:	80 acres
Drainage Area:	128 acres
Inlet of Dam:	Discharge pipe in the north half of the impounded area
Outlets:	Return water siphons – Three 12-inch diameter flexible pipes
Invert of inlet for return water siphon:	Floating – variable
Normal Operational Storage Capacity:	580 acre-feet
Maximum Storage Capacity:	2,300 acre-feet
Maximum Operating Level:	Elevation 5,117.8 feet
Freeboard:	5.5 feet
Reservoir Gage:	Located on the upstream face near the center of the South Embankment

Table 1-4 Bottom Ash Dam Storage Area and Capacity (after Stantec 2000)

Elevation (ft)	Water Surface Area (acres)	Capacity (acre-ft)
5055	0.76	-
5060	3.38	10.35
5065	5.14	31.66
5070	6.75	61.39
5075	7.83	97.85
5080	9.36	140.82
5085	10.99	191.70
5090	13.17	252.11
5095	14.58	321.51
5100	16.54	399.31
5105	18.41	486.68
5110	21.61	586.73
5115	27.41	709.29

1.4.3 Description of the Cooling Pond Dam

APS constructed the Cooling Pond Dam between 1960 and 1962. The Cooling Pond Dam is an unlined lake located south of I-40 and adjacent to the Cholla plant, two miles east of Joseph City. It is located one mile east of Tanner Wash and immediately north of the Little Colorado River. It went into operation in 1962. The dam embankment is a homogeneous earthen embankment. The dam storage capacity is approximately 2,200 acre-feet and it is 15 feet above grade at the highest point. It has a FEMA rating of small size and significant hazard due to its height and location. The pond collects rainfall runoff from approximately one acre.

The rainfall runoff associated with the 24-hour 100-year flood and the PMF would raise the water level in the Cooling Pond by approximately one inch and add 32 acre-feet to the storage, respectively. A tropical depression or hurricane remnant may yield up to twice the amount of a PMF, but is unlikely to exceed the dam freeboard of three feet and overtop the dam. The pond water level would be lowered as much as possible prior to adverse weather conditions in advance of significant known storm events. The Fly Ash Dam is located upstream and no dams are located downstream. Downstream areas of equal concern are the BNSF Railroad, the Little Colorado River, and the Cholla Power Plant switchyard.

The plan and profiles of the Cooling Pond Dam are shown on Drawing Exhibits 9 through 12. The description of the Cooling Pond Dam is provided in Table 1-5. The Storage Area and Capacity of the Cooling Pond Dam are provided in Table 1-6.

Table 1-5 Description of the Cooling Pond Dam

Purpose:	Cooling Water Reservoir
Type:	Earthen Embankment
Built:	1960-1962
Hazard Classification:	Significant
State Identification:	09.29
Owner:	Arizona Public Service
Location Coordinates:	Latitude: 34° 56' 00.0"; Longitude: -110° 17' 25.0"
Height:	13 feet
Crest Elevation:	5,026 feet
Crest Length:	13,520 feet
Crest Width:	12 feet
Upstream Slope:	3 Horizontal : 1 Vertical
Downstream Slope:	3 Horizontal : 1 Vertical
Reservoir Area:	380 acres
Drainage Area:	380 acres (direct precipitation within reservoir)
Normal Operational Storage Capacity:	2,200 acre-feet
Maximum Storage Capacity:	5,200 acre-feet
Inlet of Dam:	Single pipe on the western side of the reservoir
Outlets:	Water is circulated back to the plant for reuse.
Invert of inlet for return water siphon:	Floating - variable
Maximum Operating Level:	Elevation 5,022.4 feet
Freeboard Height:	3 feet
Reservoir Gage:	The pump intake structure.

Table 1-6 Cooling Pond Dam Storage Area and Capacity

Elevation (ft)	Area (acres)	Capacity (acre-ft)
5014	0	0
5015	50	20
5016	99	106
5017	157	255
5018	214	473
5019	243	741
5020	272	1045
5021	325	1396
5022	342	1789
5023	356	2200
5024	373	2629
5025	411	3091
5026	444	3595

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1.5 DIRECTIONS TO THE CHOLLA POWER PLANT AND DAMS

1.5.1 Directions to Cholla Power Plant

From I-40, take Exit 277 and head south to the Frontage Road. Turn left onto the Frontage Road and turn right onto the Entrance Road of the Cholla Power Plant.

1.5.2 Directions to Cholla Dams

In the event of an emergency, the Emergency Coordinator will facilitate and coordinate access to the Dams.

Fly Ash Dam

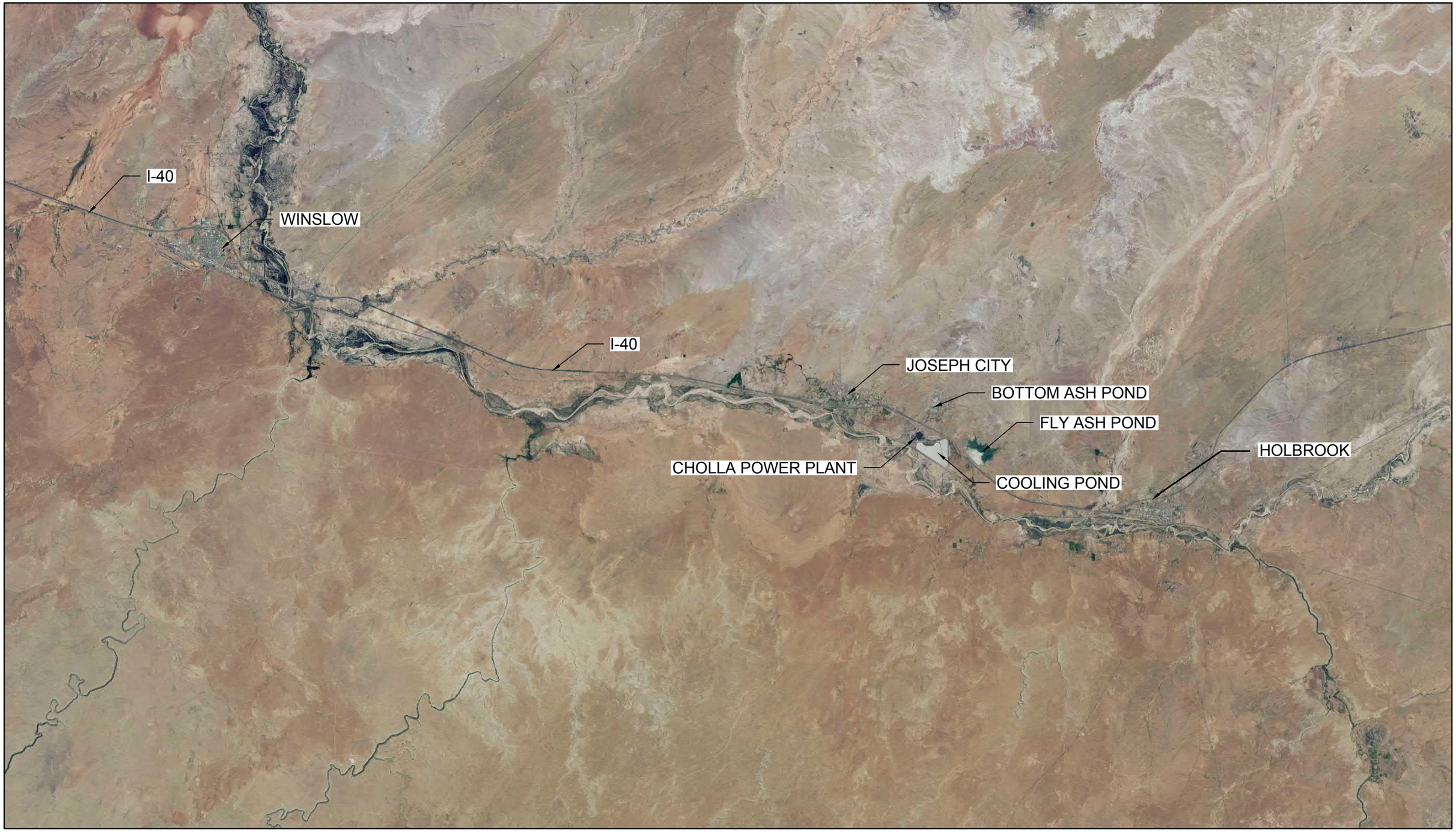
The Fly Ash Dam is located off of Exit 280 along I-40. Take Exit 280 from I-40 and drive north to the intersection with the access road. Turn left and drive through the gate onto the unpaved road towards the dam.

Bottom Ash Dam

The Bottom Ash Dam is located off of Exit 277 along I-40. Take Exit 277 from I-40 and drive north on Highway 40B. Take the first right (across from the gas station) onto the unpaved road, then take the second left (heading north) on the unpaved road towards the dam (pipelines should be to the west of the road). The road leads to the right abutment of the dam and access to the crest.

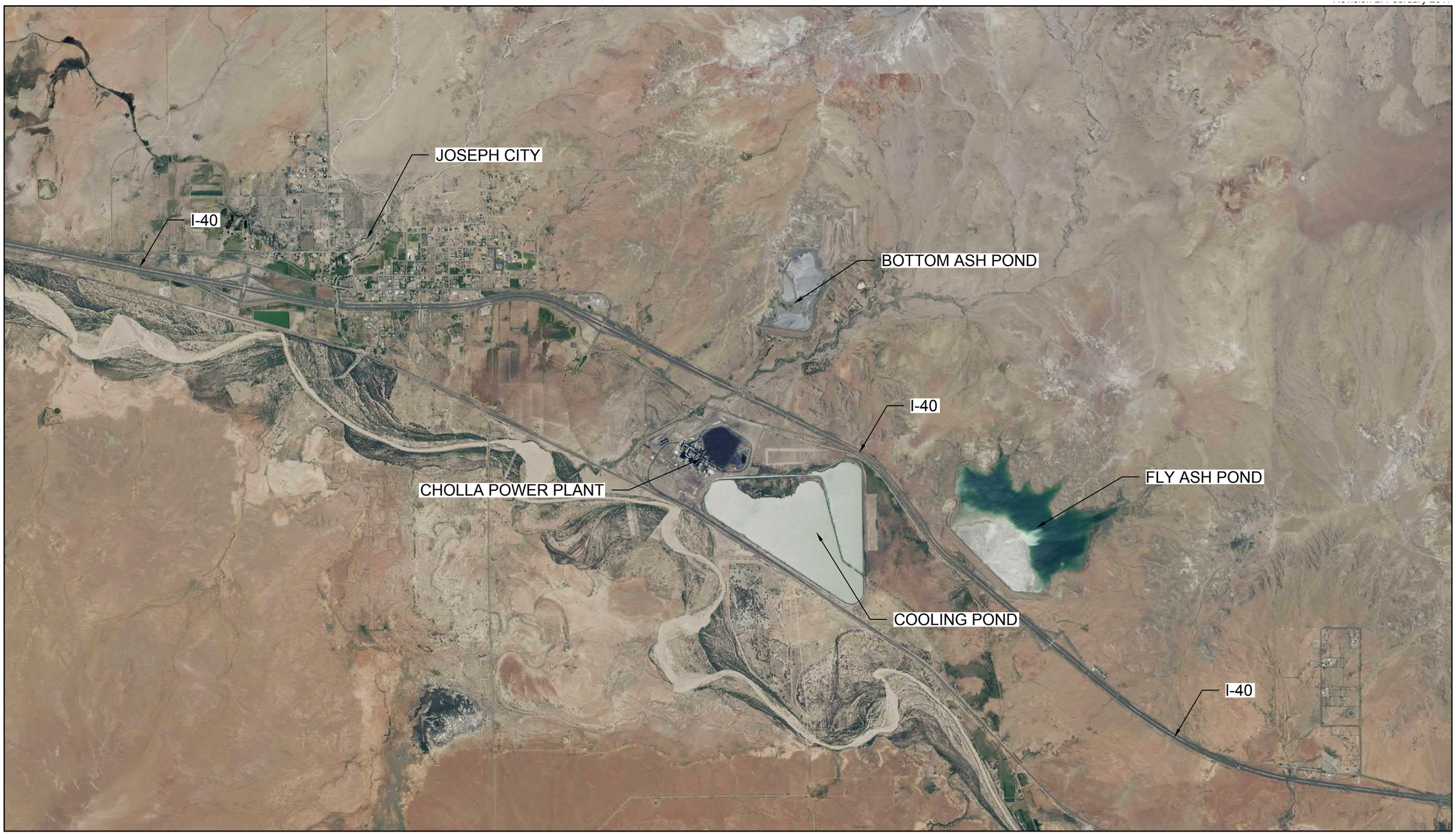
Cooling Pond Dam

On I-40, take Exit 277 and head south to the southern Frontage Road. Turn left onto the Frontage Road. Continue through the gate north of the Plant to access the northern area of the Cooling Pond and the crest road along the West Embankment.



APS Cholla Power Plant Location

Figure 1-1A



Cholla Dams Location Map

Figure 1-1B

1.6 EMERGENCY ACTION PLAN OVERVIEW

This EAP includes an identification of the extent of flood hazard in the event of a dam failure and structures at risk of damage from the flood. The *APS Cholla Dambreak Study* (Stantec 2000) and the *Cholla Fly Ash Dam – ADWR Filing No. 09.28 – Dam Breach and Inundation Report* (AECOM 2017) include the details of the flood modeling analysis for the Dams and are issued under separate cover. The inundation maps for these dam breach reports are located in Appendix E. This EAP directs emergency measures to known residential structures in the vicinity of the Little Colorado River (Figures 1-3 to 1-9). In addition, emergency management and response personnel should verify that no temporary or seasonal residences have been established within the floodplain. Figures 1-2A, B, and C show the notification flowcharts associated with the execution of this EAP.

The five primary components of the EAP described in this document include:

Step	Primary Component	Expected Action		
1	Emergency Detection	Detection and Evaluation of Emergency Situation (see Section 2.0)		
2	Emergency Classification	Response Level Green: Unusual Event, Slowly Developing (see Section 2.2.1)	Response Level Yellow: Potential Dam Failure Situation, Rapidly Developing (see Section 2.2.2)	Response Level Red: Urgent, Dam Failure is Imminent or in Progress (see Section 2.2.3)
3	Notification and Classification	Alert Level Green Notification List (see Section 3.2)	Alert Level Yellow Notification List (see Section 3.2)	Alert Level Red Notification List (see Section 3.2)
4	Expected Actions	**Refer to Table 4-1 (see Sections 3.0 and 4.0)**		
5	Termination and Follow-up	**See Section 3.4**		

1.7 ACTIVATION CRITERIA

1. The emergency conditions (as detected and classified as described in Section 2) at the _____ [Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam] are to be reported to the Plant Engineering Supervisor or the Plant Duty Manager in the Plant Engineering Supervisor's absence. This individual serves as the EAP Coordinator.
2. The EAP Coordinator shall verify conditions at the _____ [Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam], assign a monitor to the facility, and issue an alert if appropriate.

3. The EAP Coordinator shall issue a Green Alert when there is something unusual happening at the facility and there may be potential for adverse impacts.
4. The EAP Coordinator shall issue a Yellow Alert when there are significantly serious conditions confirmed at the facility such that these conditions could affect the integrity of the facility if left unresolved. The EAP Coordinator must initiate corrective measures to stabilize the facility. See Table 4-1, Emergency Action Guidelines (page 4-2).
5. The EAP Coordinator shall issue a Red Alert when failure of the facility has occurred or is imminent.
6. The Notification Flowcharts shown in Figures 1-2A, B, and C identify the notification sequence for emergency response personnel. See pages 3-2 through 3-7 for the red, yellow, and green alert notification script.
7. Refer emergency response personnel to the evacuation mapping (Figures 1-3 to 1-9).
8. Appendix B provides forms to document emergency events.

DEFINITION

RED ALERT: NOTIFIED IF FAILURE IS IMMINENT OR HAS OCCURED

YELLOW ALERT: NOTIFIED IF UNUSUAL SEEPAGE, CRACKS, OR SLOUGHING HAS OCCURRED AT THE DAM EMBANKMENT AND INDICATES THAT DAM FAILURE AND/OR SEVERE FLOODING MAY OCCUR IF CONDITIONS WORSEN

GREEN ALERT: NOTIFIED IF THERE IS ANY CHANGE OF A NON-SERIOUS OR NON-POTENTIALLY HAZARDOUS SITUATION AT THE DAM OR DOWNSTREAM OF THE DAM, AND THAT THE SITUATION COULD GET WORSE

DAM EMERGENCY CONDITION
GREEN

OPERATING STAFF
(AVAILABLE 24-7)

APS MANAGEMENT
MIKE HANCOCK (PLANT MANAGER)
SAMUEL NELSON (EAP COORDINATOR)
BRENT YOUNG (FIRE PROTECTION)
BYRON CONRAD (DAMS / NON-NUCLEAR GENERATION)

(2)

CHOLLA CONTROL ROOM

928-288-1411

(1)

PLANT PERSONNEL AND SWITCHYARD

7711

(3) ARIZONA DEPARTMENT OF PUBLIC SAFETY EMERGENCY OPERATIONS COMMAND

602-223-2212

(4) DEPARTMENT OF PUBLIC SAFETY - HIGHWAY PATROL - HOLBROOK

928-773-3700

(5) NAVAJO COUNTY SYSTEM / SHERIFF DISPATCH

928-524-4050

(6) BNSF DISPATCHER

1-800-795-2673

(7) NAVAJO COUNTY DEPARTMENT OF EMERGENCY MANAGEMENT

928-524-4163
928-414-1310

(8) ADWR DAM SAFETY PROGRAM

WALEED ABOSHANP	602-771-8418 (OFFICE) 480-388-9560 (CELL)
RAVI MURTHY	602-771-8656 (OFFICE) 602-692-5162 (CELL)

LEGEND

(1) PRIORITY OF CALL

ONE-WAY COMMUNICATION

TWO-WAY COMMUNICATION

Green Alert Notification Flowchart

Figure 1-2A

DEFINITION

RED ALERT: NOTIFIED IF FAILURE IS IMMINENT OR HAS OCCURED

YELLOW ALERT: NOTIFIED IF UNUSUAL SEEPAGE, CRACKS, OR SLOUGHING HAS OCCURRED AT THE DAM EMBANKMENT AND INDICATES THAT DAM FAILURE AND/OR SEVERE FLOODING MAY OCCUR IF CONDITIONS WORSEN

GREEN ALERT: NOTIFIED IF THERE IS ANY CHANGE OF A NON-SERIOUS OR NON-POTENTIALLY HAZARDOUS SITUATION AT THE DAM OR DOWNSTREAM OF THE DAM, AND THAT THE SITUATION COULD GET WORSE

DAM EMERGENCY CONDITION
YELLOW

OPERATING STAFF
(AVAILABLE 24-7)

CHOLLA CONTROL ROOM
928-288-1411

(1) NAVAJO COUNTY SYSTEM / SHERIFF DISPATCH
9-1-1
928-524-4050

(2) PLANT PERSONNEL AND SWITCHYARD
7711

(3) APS MANAGEMENT
MIKE HANCOCK (PLANT MANAGER)
SAMUEL NELSON (EAP COORDINATOR)
BRENT YOUNG (FIRE PROTECTION)
BYRON CONRAD (DAMS / NON-NUCLEAR GENERATION)

(4) [redacted] FAMILIES
[redacted]

(5) ADWR DAM SAFETY PROGRAM
WALEED ABOSHANP 602-771-8418 (OFFICE) 480-388-9560 (CELL)
RAVI MURTHY 602-771-8656 (OFFICE) 602-692-5162 (CELL)

(6) ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
602-771-2330

(7) EPA REGION 9
415-947-4400

(1) DEPARTMENT OF PUBLIC SAFETY - HIGHWAY PATROL - HOLBROOK
928-773-3700

(2) ARIZONA DEPARTMENT OF PUBLIC SAFETY EMERGENCY OPERATIONS COMMAND
602-223-2212

(4) BNSF DISPATCHER
1-800-795-2673

(5) NAVAJO COUNTY DEPARTMENT OF EMERGENCY MANAGEMENT
928-524-4163
928-414-1310

LEGEND

(1) PRIORITY OF CALL
ONE-WAY COMMUNICATION
TWO-WAY COMMUNICATION

Yellow Alert Notification Flowchart

Figure 1-2B

DEFINITION

RED ALERT: NOTIFIED IF FAILURE IS IMMINENT OR HAS OCCURED

YELLOW ALERT: NOTIFIED IF UNUSUAL SEEPAGE, CRACKS, OR SLOUGHING HAS OCCURRED AT THE DAM EMBANKMENT AND INDICATES THAT DAM FAILURE AND/OR SEVERE FLOODING MAY OCCUR IF CONDITIONS WORSEN

GREEN ALERT: NOTIFIED IF THERE IS ANY CHANGE OF A NON-SERIOUS OR NON-POTENTIALLY HAZARDOUS SITUATION AT THE DAM OR DOWNSTREAM OF THE DAM, AND THAT THE SITUATION COULD GET WORSE

DAM EMERGENCY CONDITION
RED

OPERATING STAFF
(AVAILABLE 24-7)

CHOLLA CONTROL ROOM
928-288-1411

(1) NAVAJO COUNTY SYSTEM / SHERIFF DISPATCH
9-1-1
928-524-4050

(2) PLANT PERSONNEL AND SWITCHYARD
7711

(3) APS MANAGEMENT
MIKE HANCOCK (PLANT MANAGER)
SAMUEL NELSON (EAP COORDINATOR)
BRENT YOUNG (FIRE PROTECTION)
BYRON CONRAD (DAMS / NON-NUCLEAR GENERATION)

(4) [redacted] FAMILIES
[redacted]

(5) ADWR DAM SAFETY PROGRAM
WALEED ABOSHANP 602-771-8418 (OFFICE) 480-388-9560 (CELL)
RAVI MURTHY 602-771-8656 (OFFICE) 602-692-5162 (CELL)

(6) ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY
602-771-2330

(7) EPA REGION 9
415-947-4400

(1) DEPARTMENT OF PUBLIC SAFETY - HIGHWAY PATROL - HOLBROOK
928-773-3700

(2) ARIZONA DEPARTMENT OF PUBLIC SAFETY EMERGENCY OPERATIONS COMMAND
602-223-2212

(4) BNSF DISPATCHER
1-800-795-2673

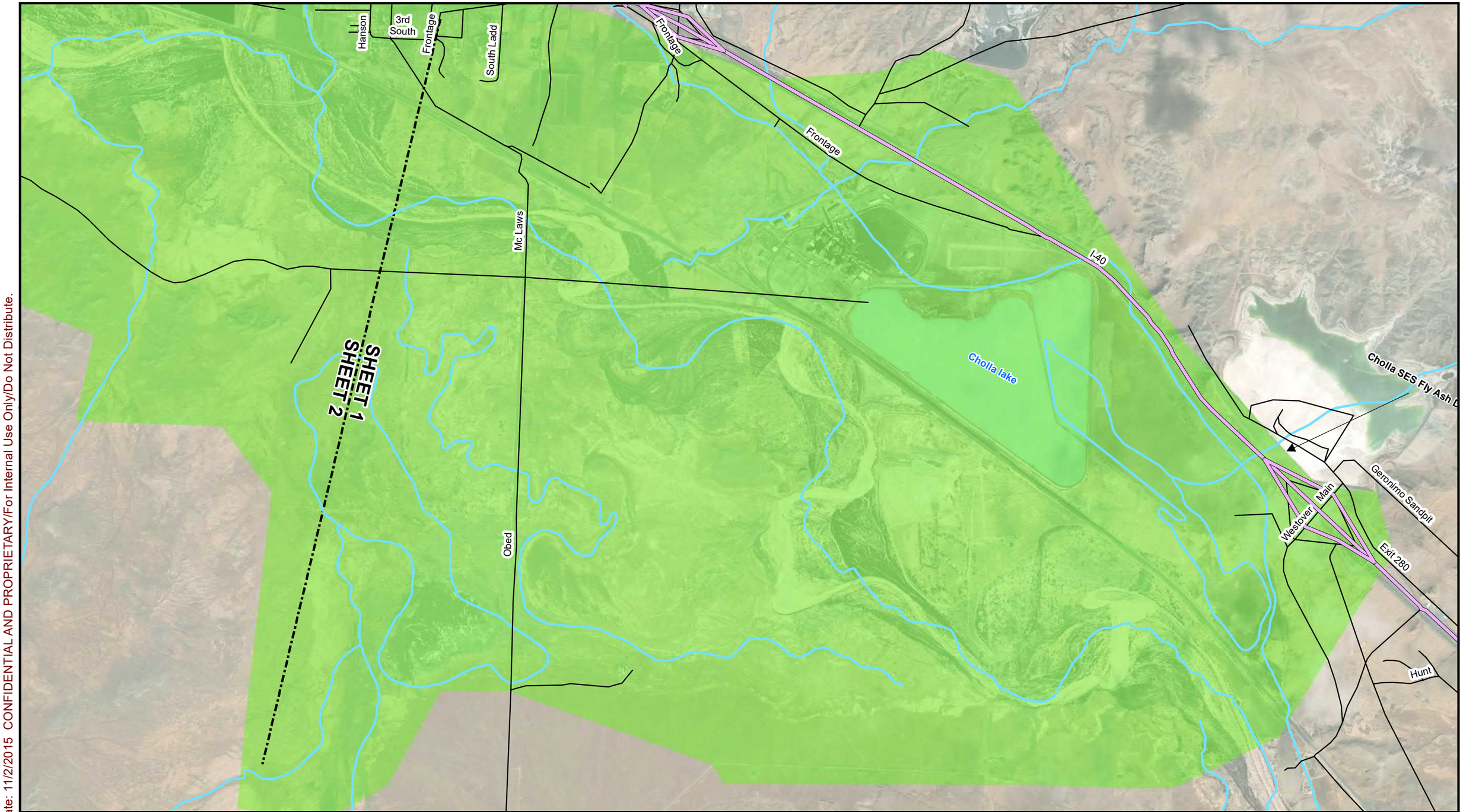
(5) NAVAJO COUNTY DEPARTMENT OF EMERGENCY MANAGEMENT
928-524-4163
928-414-1310

LEGEND

(1) PRIORITY OF CALL
ONE-WAY COMMUNICATION
TWO-WAY COMMUNICATION

Red Alert Notification Flowchart

Figure 1-2C



MAP LEGEND

- Minor_Streams
- Major_Roads
- Navajo_Co_Rds
- EvacuationMap_Cholla_2022
- Major Highways
- Matchline
- Drainageways
- Railroads
- Local Roads

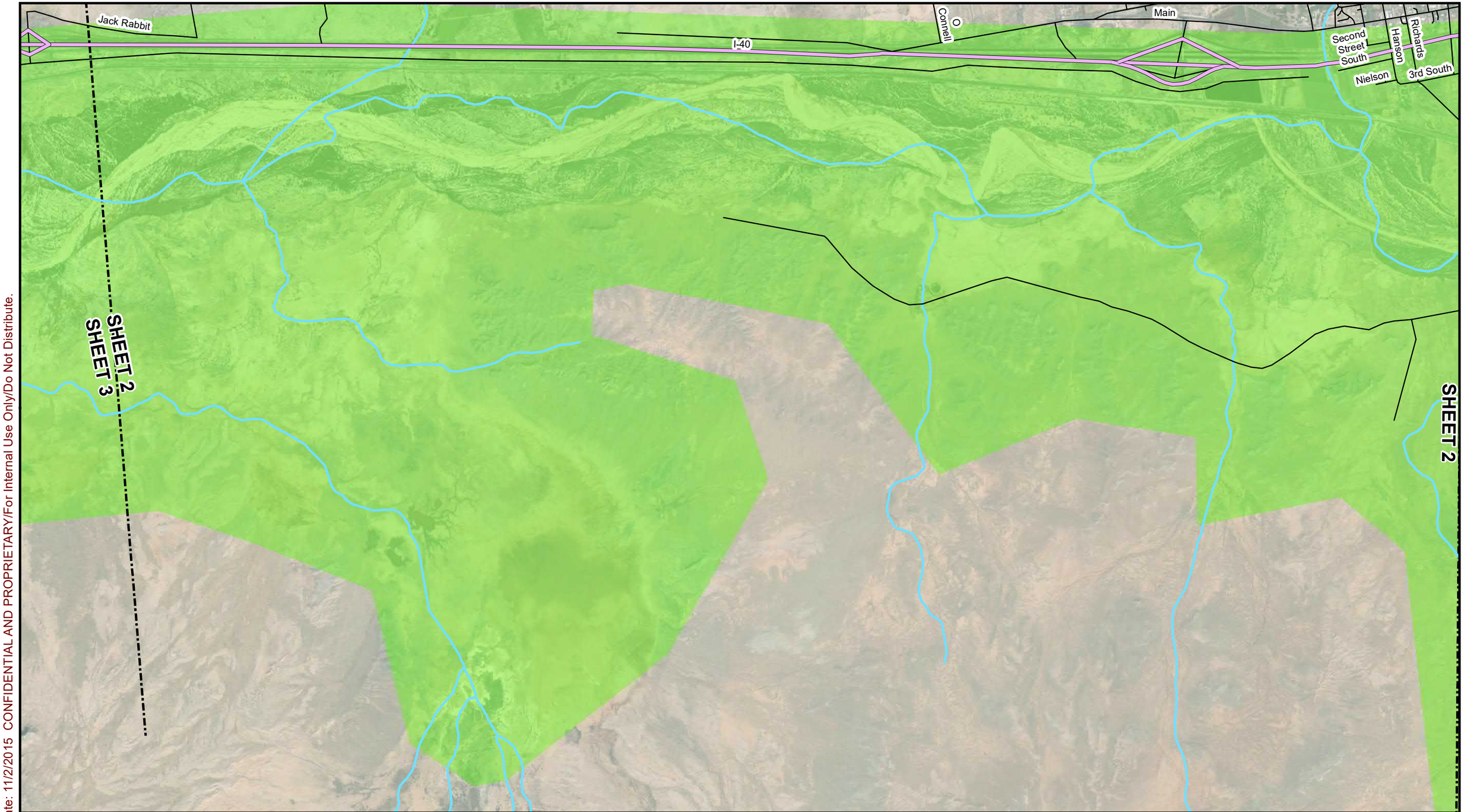
N W E S

AECOM

0 1,000 2,000 4,000 Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA SES FLY ASH DAM FLOOD EVACUATION MAP SHEET 1 OF 6



MAP LEGEND

- Minor_Streams
- Major_Roads
- Navajo_Co_Rds
- EvacuationMap_Cholla_2022
- Major Highways
- Matchline
- Drainageways
- Railroads
- Local Roads

N W E S

AECOM

0 1,000 2,000 4,000 Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA SES FLY ASH DAM FLOOD EVACUATION MAP SHEET 2 OF 6

Hibbard

Hibbard

I-40

Jack Rabbit

SHEET 4
SHEET 3

SHEET 3

MAP LEGEND

- Minor_Streams
- Major_Roads
- Navajo_Co_Rds
- EvacuationMap_Cholla_2022
- Major Highways
- Matchline
- Drainageways
- Railroads
- Local Roads

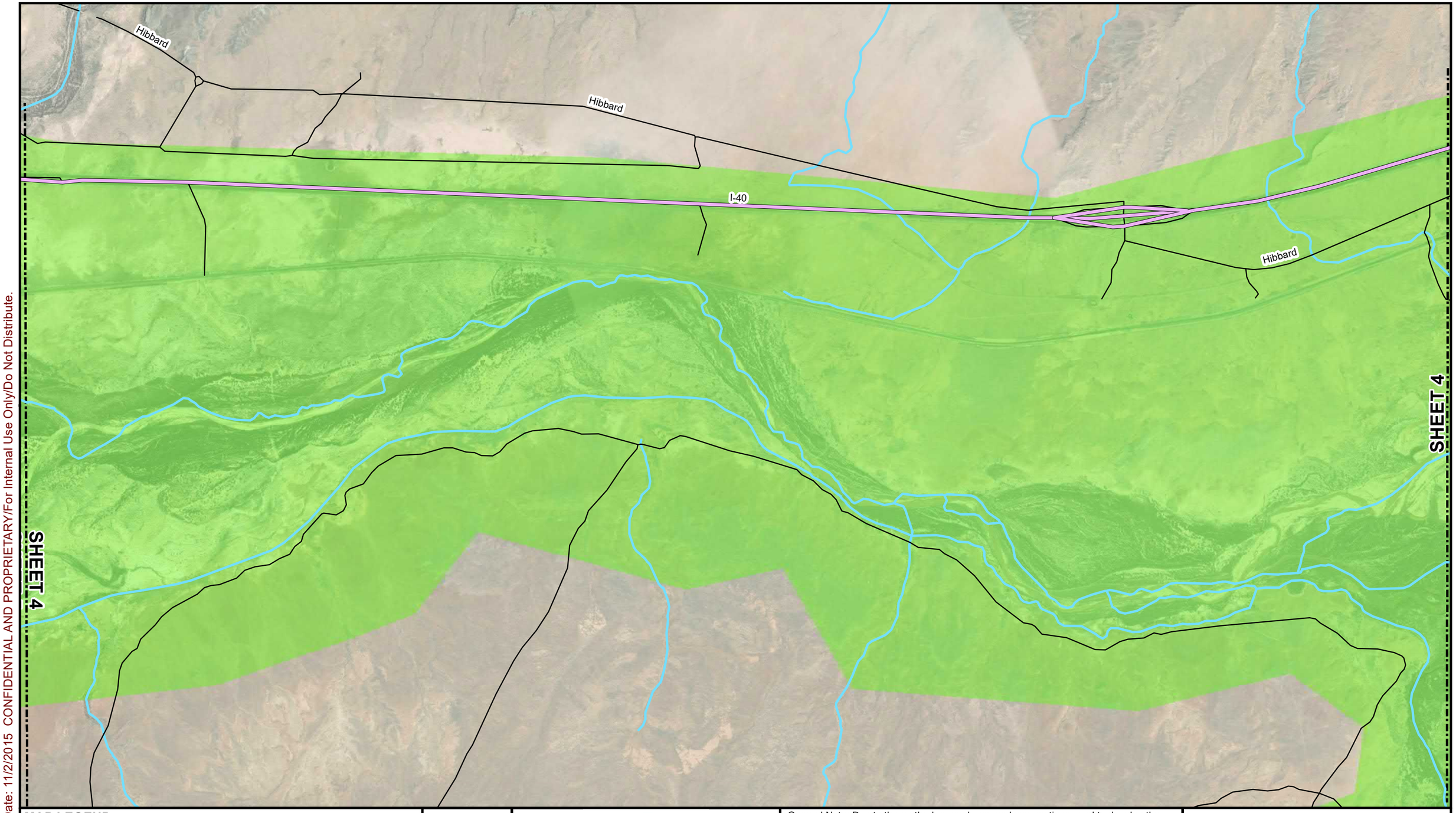
N
W E
S

AECOM

0 1,000 2,000 4,000
Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA SES FLY ASH DAM FLOOD EVACUATION MAP SHEET 3 OF 6



MAP LEGEND

- Minor_Streams
- Major_Roads
- Navajo_Co_Rds
- EvacuationMap_Cholla_2022
- Major Highways
- Matchline
- Drainageways
- Railroads
- Local Roads

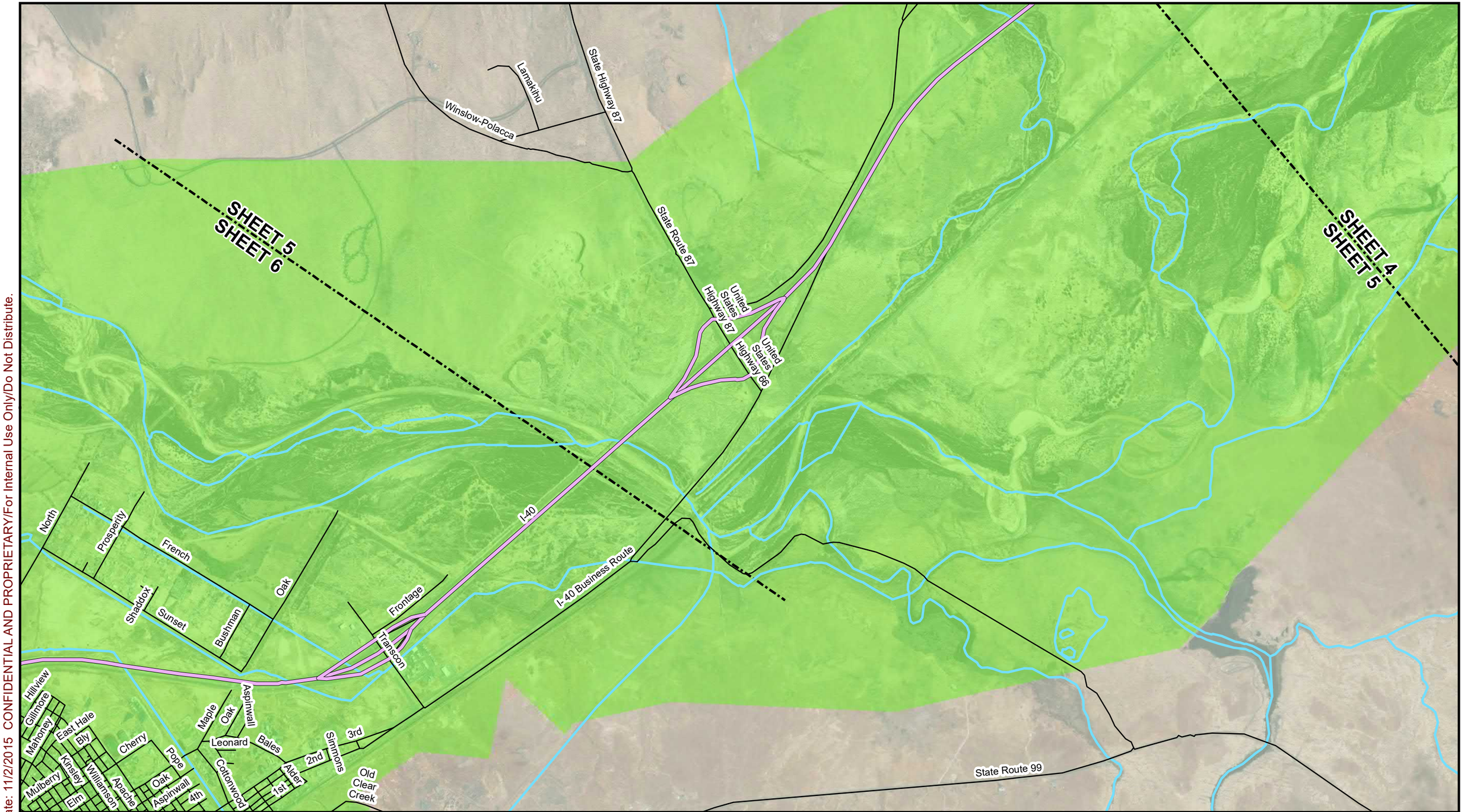
N E S W

AECOM

0 1,000 2,000 4,000 Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA SES FLY ASH DAM FLOOD EVACUATION MAP SHEET 4 OF 6



MAP LEGEND

- Minor_Streams
- Major_Roads
- Navajo_Co_Rds
- EvacuationMap_Cholla_2022
- Major Highways
- Matchline
- Drainageways
- Railroads
- Local Roads

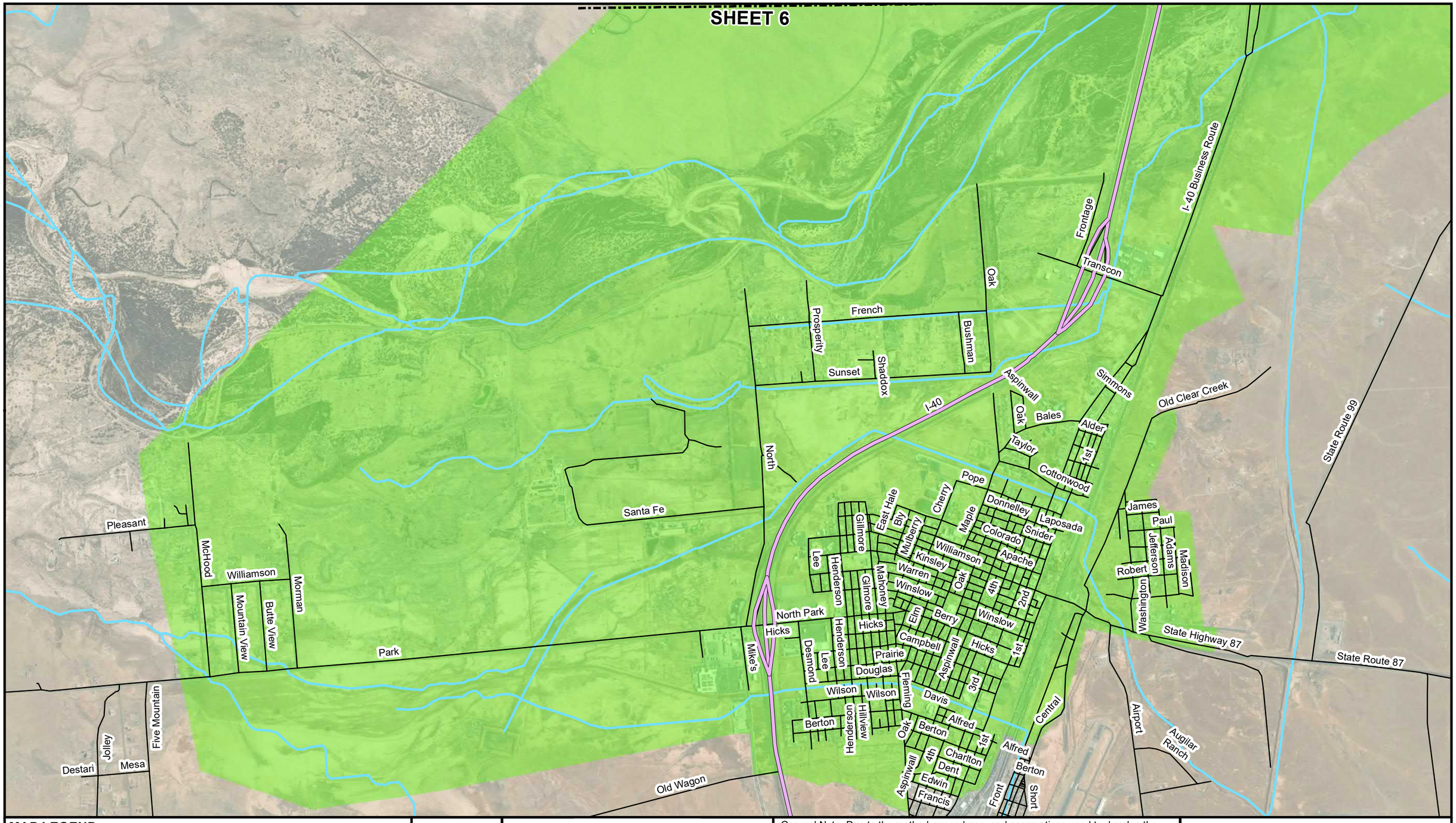
AECOM

0 1,000 2,000 4,000 Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA SES FLY ASH DAM FLOOD EVACUATION MAP SHEET 5 OF 6

SHEET 6



MAP LEGEND

- Minor_Streams
- Major_Roads
- Navajo_Co_Rds
- EvacuationMap_Cholla_2022
- Major Highways
- Matchline
- Drainageways
- Railroads
- Local Roads

N E S W

AECOM

0 1,000 2,000 4,000 Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA SES FLY ASH DAM FLOOD EVACUATION MAP SHEET 6 OF 6

2.0 EMERGENCY DETECTION, EVALUATION, AND CLASSIFICATION

2.1 EMERGENCY DETECTION AND EVALUATION

2.1.1 Observations of Dams

Cholla Power Plant personnel routinely inspect the Fly Ash Dam, Bottom Ash Dam, and Cooling Pond Dam. The Cholla Power Plant is staffed 24 hours per day/7 days per week/365 days per year and therefore would have a much quicker emergency detection than is common among un-staffed, isolated dams in the State of Arizona. The pond and piezometer water levels are monitored for all the dams. The Geronimo sump turbidity is monitored for the Fly Ash Dam. The settlement monuments and sump flows are monitored for the Fly Ash Dam and the Bottom Ash Dam. The water level in the Cooling Pond is monitored using a staff gage located immediately adjacent to the Cholla Power Plant. These data and information are evaluated on an ongoing basis to determine dam operating characteristics. The information enables operating personnel to determine the difference between normal and emergency conditions at the dams.

2.1.2 Emergency Detection and Evaluation

Early detection and evaluation of any emergency situation is crucial. Establishing procedures for reliable and timely classification of an emergency situation is necessary in order to proceed with the appropriate course of action. It is better to activate the EAP while confirming the extent of the emergency than to wait for the emergency to occur. Some conditions involving the embankment, foundation, and structures of the Cholla Dams that pose a potential emergency situation if not immediately detected and properly corrected are listed as follows:

- Settlement and subsidence
- High ash and/or water levels in the Fly Ash Pond, Bottom Ash Pond, or Cooling Pond
- Elevated pore pressures in the foundation
- Sinkholes
- Cave-ins
- Seepage and boils
- Cracks in the embankment
- Slumping, slides

- Erosion of embankment materials

Evaluation of these conditions must be immediate and should be followed by prompt corrective measures to avoid a deteriorating situation. Refer to the Decision Criteria Matrix for assistance in evaluating and classifying the conditions. The discovery and/or detection of these conditions shall be relayed immediately to the EAP Coordinator.

2.2 EMERGENCY CLASSIFICATION

Definitions of Levels of Incident Severity

2.2.1 Response Level Green (Stand-by Condition)

- **SLOWLY DEVELOPING SITUATION**
- Something unusual is happening at the _____ [Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam].
- There is the potential for impoundment breach.
- Current conditions are not serious, could progress into a potential impoundment failure if it continues or intensifies.
- Initiate Level GREEN notifications (Flowchart: Fig 1-2A, GREEN phone list: p 3-3).

2.2.2 Response Level Yellow

- **RAPIDLY DEVELOPING SITUATION**
- Conditions are serious (more than a GREEN condition).
- Notify 24-hour operating staff (Refer to Notification Flowchart).
- The condition of the _____ [Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam] is becoming unstable.
- Initiate Level YELLOW notifications (Flowchart: Fig 1-2B, YELLOW phone list: p 3-4).
- Populations at risk SHOULD be notified to stand by, prepare to leave, and await further instructions.
- Evacuations in low-lying areas may be required.

2.2.3 Response Level Red

- **FAILURE IS IMMINENT (it has been determined that the _____ [Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam] will fail), IS OCCURRING, OR HAS OCCURRED; LIFE THREATENING FLOOD WATERS HAVE BEEN OR WILL BE RELEASED.**
- Life threatening releases will definitely affect populations at risk.
- Immediate evacuation of population at risk is necessary.
- Initiate Level RED notifications (Flowchart: Fig 1-2C, RED phone list: p 3-6).

Table 2-1 Decision Criteria Matrix[(1)]

Determine if a situation is Developing or Imminent, then refer to the Notification Charts (Figures 1-2A, B & C)

Problem	GREEN 1) There is a **potential** impoundment breach, **and** 2) No external assistance is needed from other agencies or jurisdictions. (**Qualifiers – potential, slowly, progressing, can mitigate, some time is available**)	YELLOW 1) There is **immediate or inevitable** impoundment breach, (**Qualifiers – immediate, rapidly, sudden, complicated, little or no time is available before adverse impacts will occur**)	RED Impoundment(s) failure: 1) Is imminent, 2) Is occurring, **OR** 3) Has occurred, **OR** Life threatening flooding is occurring or may occur.
Embankment Piping	Significant new or increased seepage or sand boils downstream from the embankment (new seep, boggy wet area, etc.).	Rapidly increasing seepage and/or transporting large quantities of materials. Sand boils rapidly increasing in size or number and/or rapidly increasing flows. Failure expected.	Impoundment(s) failure is imminent, is occurring, or has occurred.
	Significant new or larger sinkhole(s), or crest settlement.	Sinkhole(s) or settlement rapidly increasing in size or number. Failure expected.	
	Pond level is dropping at an unexpected rate without apparent cause (no increase in pumping rates).	Whirlpool or other signs of the pond draining at an unexpected rate through the impoundment(s) or foundation.	
	New, stable, or slowly increasing seepage rates transporting some sediment and/or unusual discoloration (higher turbidity readings) of seepage flows.	Rapidly increasing seepage transporting large amounts of sediments. Failure expected.	
Embankment Cracking	New cracks or cracks significantly increased in length, width, or offset anywhere on the facility.	Rapidly increasing flow through crack(s) and transporting materials. Failure expected.	Impoundment(s) failure is imminent, is occurring, or has occurred.
	Cracking is the beginning of a large slide. Refer to Embankment Deformations below.	Refer to Embankment Deformations below.	

Problem	GREEN 1) There is a **potential** impoundment breach, **and** 2) No external assistance is needed from other agencies or jurisdictions. (**Qualifiers – potential, slowly, progressing, can mitigate, some time is available**)	YELLOW 1) There is **immediate or inevitable** impoundment breach, (**Qualifiers – immediate, rapidly, sudden, complicated, little or no time is available before adverse impacts will occur**)	RED Impoundment(s) failure: 1) Is imminent, 2) Is occurring, **OR** 3) Has occurred, **OR** Life threatening flooding is occurring or may occur.
Embankment Deformations	Large deformations or slides. Potential for breach of impoundment(s).	Large deformations and breach of impoundment(s) is imminent or occurring.	Impoundment(s) failure is imminent, is occurring, or has occurred.
Earthquake Occurs ***Immediate Facility Inspection Required**	An earthquake is felt or reported with a Richter magnitude (M) of: 4.0M or greater within a 10-mile radius or, 5.5M or greater in 60-mile radius or, 6.5M or greater within 100-mile radius. Refer to indicators for Embankment Piping, Embankment Cracking, and Embankment Deformations.	Impoundment(s) are expected to fail due to vulnerability of facility and magnitude of earthquake. (Failure predicted by analysis.)	Impoundment(s) failure is imminent, is occurring, or has occurred.
High Water Level Condition	The impoundment levels reach crest elevation minus 2 feet.	The impoundment levels reach crest elevation minus 1 foot.	The impoundment levels reach or are within inches of crest elevation.
Bomb Detonation/Explosion or Act of War		Verified bomb threat or impending act of war that, if carried out, could result in damage to impoundment(s).	Detonated bomb or explosion that has resulted in damage to impoundment(s) or appurtenances.
Vandalism / Sabotage	Damages to the impoundment(s) or appurtenances with no impacts to the functioning of the impoundment	Damages to the impoundment(s) or appurtenances that has resulted in seepage flow. Refer to indicators for Embankment Piping, Embankment Cracking, and Embankment Deformations.	Impoundment(s) failure is imminent, is occurring, or has occurred.

NOTE: (1) Other problems on or near the impoundment(s), not affecting its structural integrity (auto accident, chemical spills, drowning, etc.) should be reported to the Arizona Department of Public Safety, Navajo County Sheriff, Fire & Rescue Services, the Arizona Department of Environmental Quality, and/or Region 9 of the Environmental Protection Agency.

3.0 GENERAL RESPONSIBILITIES UNDER EAP

The primary responsibility of the owner is to monitor the Dams for potential problems, to mitigate any problems, and to provide timely notification to emergency management officials so that a potential hazard to life, safety, and property may be avoided.

This section outlines the responsibilities of the owner in detecting potential problems leading to the issuance of warning notifications and provides guidelines for effective emergency notification, evacuation, termination, and follow-up. It also describes the responsibilities of the designated EAP coordinator that shall administer and coordinate all emergency activities provided in the emergency action plan.

3.1 EAP COORDINATOR

The EAP Coordinator is designated as the Cholla Plant Engineering Supervisor. The EAP Coordinator may designate responsibilities to plant personnel as needed during emergency activities.

3.2 OWNER RESPONSIBILITIES

APS is responsible for the maintenance and operation of the Dams, which includes monitoring the instrumentation. The instrumentation monitoring includes the water level in the pond, piezometers, and wells adjacent to the dams and monitoring settlement monuments to determine vertical and lateral movement of the dams. APS is responsible for monthly operational inspections, annual safety inspections, maintenance, emergency condition detection, evaluation, and notification to the proper authorities.

Detecting potential problems could be made by monitoring and surveillance. The following tasks are the owner's responsibilities in the monitoring and surveillance of the Dams. Provided below are two conditions for which monitoring and surveillance are implemented.

3.2.1 Normal Conditions

(a) The EAP Coordinator or his/her authorized representatives should regularly conduct an on-site visual inspection of the Dams, the impoundment(s) control systems, and the toe area below the impoundment(s). This should be done a minimum of once every month. Any abnormal or questionable conditions observed during the routine inspection should be brought to the attention of the Arizona Department of Water Resources (ADWR) Dam Safety Program.

(b) If any abnormal condition is found during a routine dam inspection, the EAP Coordinator must immediately determine the level of emergency required. If the EAP Coordinator is unavailable, then the Plant Duty Manager must make this determination. Either a Green, Yellow, or Red Alert Warning should be issued by the EAP Coordinator depending on the emergency classification determined.

3.2.2 Unusual Event Conditions

(a) The presence of sloughs, sinkholes, cracking, and/or new settlement is an unusual condition. In addition, possible failure of the _____ [Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam] can occur when unusual seepage is detected at the toe of the embankment. If seepage is pronounced or "muddy" in clarity, the EAP Coordinator should issue a Green, Yellow, or Red Alert Warning as deemed appropriate.

(b) The EAP Coordinator (Plant Engineering Supervisor) should commence 24-hour continuous around-the-clock monitoring and surveillance of conditions at the site when:

(i) Any observed conditions that are considered "unusual" by the EAP Coordinator, Plant Duty Manager, or operations staff and that raise concerns on the structural integrity and stability of the embankment.

(ii) Following the occurrence of an earthquake in the general location of the Dams (see Decision Criteria Matrix, p. 2-3).

The EAP Coordinator (Plant Engineering Supervisor) will terminate the 24-hour surveillance of site conditions when:

(i) Inspection by a registered professional engineer knowledgeable in earthen impoundment design determines that the condition of each of the Dams is safe.

(ii) The reservoir has been drained to a non-hazardous level.

(iii) The ADWR Dam Safety Program has been consulted and determines that the termination of the surveillance is appropriate.

3.3 RESPONSIBILITY FOR NOTIFICATION

As indicated in Sections 1 and 2, the Cholla Power Plant Unit 3 Control Room is responsible for initial notifications, as described in the Notification Flow Charts (Figures 1-2A through 1-2C). As described in Section 2, emergencies are classified according to their severity and urgency. Notifications are done immediately at an instance when an emergency is determined. The order and chain of notification is provided in this section, which begins with the Cholla Power Plant

operations staff (see Figures 1-2A, B, and C Notification Flowchart and the communication directory). The Arizona Department of Public Safety – Emergency Management Unit and Emergency Operations Center may also provide assistance notifying and coordinating with local, state, and federal agencies.

A. Green Alert Warning

When the EAP Coordinator observes or receives word of a problem or unusual situation at the Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam, he/she should confirm the severity of the situation. After confirming that the situation is potentially serious or hazardous and that the situation could get worse, he/she should issue a Green Alert warning.

The EAP Coordinator (Plant Engineering Supervisor) will then notify the Cholla Unit 3 Control Room to begin the Green Alert notification by contacting the following, in order. Each contact shall be notified that there is a Green Alert warning at the CHOLLA POWER PLANT Dams (identify the specific dam), and that appropriate procedures are being initiated.

GREEN ALERT CONTACT TELEPHONE NUMBERS APS RESPONSIBLE FOR CALLING	
Plant Personnel and Switchyard	7711
APS Management	
Arizona Department of Public Safety (DPS) – Emergency Operations Command (EOC)	602-223-2212
DPS – Highway Patrol – Holbrook (District 3)	928-773-3700
Navajo County Sherriff's Department Dispatch	928-524-4050
Burlington Northern Santa Fe (BNSF) – Dispatcher (Railroad)	1-800-795-2673
Navajo County Department of Emergency Management and Preparedness – Catrina Jenkins	928-524-4163 928-386-2316
Arizona Department of Water Resources – Dam Safety Program	Waleed Aboshanp..... 602-771-8418 (office), 480-388-9560 (cell) Ravi Murthy ..... 602-771-8656 (office), 602-692-5162 (cell)

Sample Notification for a Green Alert Condition

The following text is a sample notification script prepared for the purpose of informing individuals or agencies of the Green Alert condition. This script shall be read or pre-recorded and activated when the notification procedure is initiated.

> "*This is (**state your name and title**) from the Cholla Power Plant. A <u>GREEN ALERT</u> condition has been issued for the _____ [Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam] located near Joseph City at the Cholla Power Plant. (Repeat above)*

*This condition is considered a non-emergency at this time. Our Engineer is on site and we are coordinating activities with the Arizona Department of Water Resources Dam Safety Program. (Describe situation). We are monitoring the situation in case conditions change to an emergency condition. Consult the Emergency Action Plan for the Cholla Power Plant Dams for further instructions. This is (**state your name and title**) and I can be reached at (**give telephone number and/or radio information**). Thank you.*"

B. Yellow Alert Warning

When the EAP Coordinator observes or receives word of a problem or unusual situation at the Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam, he/she should confirm the severity of the situation. After confirmation that the situation is serious or hazardous and that the situation could get worse, he/she should issue a Yellow Alert warning.

A monitor or monitors should be assigned to the specific dam(s), if one is not already present at the site. The monitor will keep the EAP Coordinator up to date on the conditions at the Cholla Power Plant Dams.

The EAP Coordinator will then notify the Cholla Unit 3 Control Room to begin the Yellow Alert notification by contacting the following, in order. Each contact shall be notified that there is a Yellow Alert warning at the Cholla Power Plant Dams (identify the specific dam), and that appropriate emergency procedures should be quickly initiated.

YELLOW ALERT CONTACT TELEPHONE NUMBERS APS RESPONSIBLE FOR CALLING	
Navajo County System Dispatch	9-1-1
Plant Personnel and Switchyard	7711
APS Management	
[redacted] Families [redacted]	[redacted]
Arizona Department of Water Resources – Dam Safety Program	Waleed Aboshanp .....602-771-8418 (office), 480-388-9560 (cell) Ravi Murthy.....602-771-8656 (office), 602-692-5162 (cell)
Arizona Department of Environmental Quality – APP	602-771-2330
Environmental Protection Agency – Region 9	415-947-4400
YELLOW ALERT CONTACT TELEPHONE NUMBERS 9-1-1 SYSTEM DISPATCH RESPONSIBLE FOR CALLING	
DPS – Highway Patrol - Holbrook (District 3)	928-773-3700
DPS – Emergency Operations Command (EOC)	602-223-2212
Navajo County Sherriff's Department Dispatch	928-524-4050
Burlington Northern Santa Fe (BNSF) – Dispatcher (Railroad)	1-800-795-2673
Navajo County Department of Emergency Management and Preparedness – Catrina Jenkins	928-524-4163 (office) 928-414-1310 (cell)

Sample Notification for a Yellow Alert Condition

The following text is a sample notification script prepared for the purpose of informing individuals or agencies of the Yellow Alert condition. This script shall be read or pre-recorded and activated when the notification procedure is initiated.

> "*This is (**state your name and title**) from Cholla Power Plant. We have an emergency condition for the _____ [Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam] located near Joseph City at the Cholla Power Plant. We have activated the Emergency Action Plan for the Cholla Power Plant Dams and are currently under A YELLOW ALERT. (Repeat above). We are implementing predetermined actions to respond to a rapidly developing situation that could result in dam failure. Please prepare to evacuate the area as shown on the Evacuation Map in the Emergency Action Plan (EAP) for the Cholla Power Plant Dams. We will advise you as soon as the situation is resolved or if the situation gets worse. This is (**state your name and title**) and I can be reached at (**give telephone number and/or radio information**). Thank you.*"

C. Red Alert Warning

When the EAP Coordinator receives word of a problem or unusual situation at the Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam, he/she should confirm the severity of the situation. After confirmation that a failure is imminent or occurring, he/she should issue a Red Alert warning.

A monitor or monitors should be assigned to the specific dam(s) if one is not already present at the site. The monitor(s) will keep the EAP Coordinator up to date on the conditions at the Cholla Power Plant Dams.

The EAP Coordinator will then notify the Cholla Unit 3 Control Room to begin the Red Alert notification by contacting the following, in order. Each contact shall be notified that there is a Red Alert warning the Cholla Power Plant Dams (identify the specific dam), and emergency procedures should be initiated.

RED ALERT CONTACT TELEPHONE NUMBERS APS RESPONSIBLE FOR CALLING	
Navajo County System Dispatch	9-1-1
Plant Personnel and Switchyard	7711
APS Management	
[redacted]Families [redacted]	[redacted]
Arizona Department of Water Resources – Dam Safety Program	Waleed Aboshanp .....602-771-8418 (office), 480-388-9560 (cell) Ravi Murthy.....602-771-8656 (office), 602-692-5162 (cell)
Arizona Department of Environmental Quality – APP	602-771-2330
Environmental Protection Agency – Region 9	415-947-4400
RED ALERT CONTACT TELEPHONE NUMBERS 9-1-1 SYSTEM DISPATH RESPONSIBLE FOR CALLING	
DPS – Highway Patrol - Holbrook (District 3)	928-773-3700
DPS – Emergency Operations Command (EOC)	602-223-2212
Navajo County Sherriff's Department Dispatch	928-524-4050
Burlington Northern Santa Fe (BNSF) – Dispatcher (Railroad)	1-800-795-2673
Navajo County Department of Emergency Management and Preparedness – Catrina Jenkins	928-524-4163 (office) 928-414-1310 (cell)

Sample Notification for a Red Alert Condition

The following text is a sample notification script prepared for the purpose of informing individuals or agencies of the Red Alert condition. This script shall be read or pre-recorded and activated when notification procedure is initiated.

"*This is an emergency. This is (**state your name and title**) from the Cholla Power Plant. The _____ [Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam] located near Joseph City at the Cholla Power Plant is failing (REPEAT). Block traffic on Interstate-40 in both directions from Exit 253 to Exit 280 and stop all rail traffic between Winslow and Holbrook. Stop rail traffic on the BNSF railroad between Winslow and Holbrook. Evacuate the low-lying areas along the Little Colorado River downstream of the Cholla Power Plant. We have activated the Emergency Action Plan for the Cholla Power Plant Dams and are currently under A RED ALERT. Reference the Evacuation Map in your copy of the Emergency Action Plan (EAP) for the Cholla Power Plant Dams. Please advise me on what I can do to help with the warnings and evacuations. This is (**state your name and title**) and I can be reached at (**give telephone number and/or radio information**). Thank you.*"

3.4 RESPONSIBILITY FOR EVACUATION

APS is responsible for evacuating the power plant. APS will conduct traffic control on I-40 and the Frontage Road in the vicinity of Exit 277 until the Arizona Department of Public Safety (DPS) and Navajo County Sheriff have arrived. DPS is responsible for closing I-40 between Winslow and Holbrook (between Exit 253 and 280). BNSF is responsible for stopping rail traffic between Winslow and 4 miles east of Joseph City. DPS and the Navajo County Sheriff's Office are responsible for the evacuation of all downstream residents in the inundation zone as well as for coordinating the evacuation plans with other emergency personnel. DPS shall be assisted by the Fire & Rescue for Joseph City and Winslow in directing residents and the public to designated safe areas. It will be the responsibility of DPS and Navajo County Sheriff's Office to establish and manage all traffic controls, detours, and road closures in coordination with the Arizona Department of Transportation (ADOT) to facilitate the evacuation plan.

3.5 RESPONSIBILITY FOR TERMINATION AND FOLLOW-UP

Termination of emergency conditions in the inundation area shall be made by the ADWR Dam Safety Program after determining that the threat to the public has subsided. These conditions are different for the two emergency classifications:

A. Yellow Alert Warning

The cancellation of a Yellow Alert warning shall be made by the EAP Coordinator in consultation with the ADWR Dam Safety Program after validating the following conditions:

- The threat of impending failure has been downgraded to “no-threat”; or,
- The conditions that caused the Yellow Alert warning to be declared have stopped.

A follow-up evaluation should be conducted by all participants after the emergency is over. The results of the evaluation should be documented in a written report as a basis to improve and upgrade the existing EAP. Use the forms provided in Appendix B to document the tasks performed and the manpower used during the emergency.

B. Red Alert Warning

The cancellation of a Red Alert warning shall be made by the ADWR Dam Safety Program after validating the following conditions:

- The Dam(s) have failed, and the flood wave has subsided.
- The flood-inundated areas have been secured.
- Disaster relief services are in place and operational.

Or

- The Dam(s) does/do not fail and the conditions that caused the Red Alert failure warning to be initiated have been mitigated or controlled.

AND

- The ADWR Dam Safety Program has inspected the Dam(s) and determines that cancellation of a Red Alert warning is appropriate.

3.6 EAP COORDINATOR RESPONSIBILITY

The Plant Engineering Supervisor shall be the designated EAP Coordinator who will be responsible for all EAP-related activities, including (but not limited to) the revisions to the EAP, establishing training seminars for operations staff and emergency personnel, and coordinating EAP exercises. The EAP Coordinator is the EAP contact if any involved parties have questions about the plan. In the event that the Plant Engineering Supervisor is unavailable, the Plant Duty Manager is the back-up EAP Coordinator. The back-up EAP Coordinator shall be fully versed in all of the responsibilities of the EAP Coordinator and capable of implementation of the EAP.

3.7 COMMUNICATION METHODS

The plant has a number of communication systems, which include telephone, Gaitronics, two-way radios, cellular phones, pagers, FAX, and e-mail. It is unlikely that the communications

systems would fail during a dam emergency. Cellular phones are used as an alternate means of communication. The EAP Coordinator and designated personnel will communicate on site via two-way radio, plant intercom, land-line phone, and/or cellular phone. Emergency alert level communication and status changes will be through telephone communication (landline or wireless telephone). Email communication may be utilized, but only for back-up or follow-up purposes.

3.8 MAINTENANCE OF THE EAP

Without periodic maintenance, the EAP will become outdated and may no longer be workable. The document must be updated annually or as needed. It is recommended that it be reviewed annually and after each emergency action notification. Changes that will require revision and updates to the plan include:

- Changes in personnel at the various organizations
- Changes in communications systems
- Changes to the impoundment(s)
- Changes in land use within the downstream inundation area that alter the potential threat to the public.

The plan should be exercised so that those involved in its implementation may become familiar with their roles and responsibilities. Exercises (dry runs) should be conducted at the Cholla Power Plant, Holbrook, or Winslow. These may include the following:

- Tabletop Exercise – A low level exercise which involves a meeting between the owner and state and local emergency management officials to look at simulated emergency events and discuss the procedures to be taken.
- Functional Exercise – A higher level exercise involving a test of the procedures required for an actual emergency action.

A review meeting between the APS EAP Coordinator and emergency responders shall be scheduled on an annual basis. It is recommended that the Tabletop Exercise be performed every three (3) years with the Functional Exercise being performed every five (5) years. After any exercise, the EAP document should be revised and corrected as necessary, at a frequency no greater than every five (5) years. Further, at the conclusion of the Tabletop Exercise, the participants should evaluate the need to undertake a Functional Exercise based upon their experience with the Tabletop Exercise.

3.9 GENERAL PROVISIONS

All persons and agencies listed in this EAP should maintain communication logbooks. The books should indicate the date, time, type of alert, the name and telephone number of the person calling, the name and telephone number of the person being called, a description of the problem, and any other pertinent information.

The lines of communication in the notification flowcharts (see Figures 1-2A, B, and C) and as listed above in the notification section are not one-way paths. The EAP participants should freely exchange new information and evacuation status updates, as necessary, to optimize the use of manpower and equipment resources.

Key management shall be required to review this document annually and be thoroughly familiar with the information presented in this EAP.

4.0 PREPAREDNESS

Preparedness actions are considered in this EAP document to moderate or alleviate the effects of a failure and facilitate response to emergencies. This section identifies actions to be taken before any emergency call or warning is initiated.

4.1 MONITORING

Monitoring of the Cholla Power Plant Dams is an essential component of the Emergency Action Plan for both preventative and responsive hazard mitigation.

Daily surveillance of the dams is conducted during routine monitoring. The pond water level is monitored daily and the level is recorded and controlled by plant operators. Unusual dam conditions are reported immediately to plant management. Plant Security can also view the Cooling Pond through the use of stack surveillance cameras. The plant is staffed 24 hours per day, every day of the year, so the response to an emergency should be timely and carried out the same way on weekdays, weekends, holidays, and after-hours.

The Cholla Power Plant Operations staff personnel are trained to recognize abnormal conditions at the Dams. The Plant Duty Managers have the authority to initiate a failure warning in the event that the EAP Coordinator (Plant Engineering Supervisor) cannot be reached.

As part of APS' routine monitoring, the specific features that could threaten the longevity of the facility such as those listed in Table 4-1 are given attention.

4.2 MITIGATION

Table 4-1 lists expected actions to take regarding potential problems, which may be observed during monitoring of the Dams and which could be hazardous and require immediate action. Recommended actions are for emergency mitigation and issuance of a Green, Yellow, or Red Alert. If mitigation becomes necessary, an emergency command center will be set up at the Cholla Power Plant in the Administration Building located near the front gate.

The plant is located two miles east of Joseph City off Exit 277 along I-40. Access to the dams is by dirt roads, one of which remains accessible during an emergency event due to its location outside of the potential inundation area. These areas are fenced and gates are locked for security and to control access. Plant personnel have access to the dam during the nighttime.

If time permits, the Owner's Engineer should be contacted for technical consultation and the ADWR Dam Safety Program should be contacted to be made aware of the situation and be advised of any action taken. Emergency remedial actions outside the scope of activities listed below require ADWR Dam Safety Program approval, if time permits.

If issuing a RED ALERT becomes necessary, the emergency command center will be established at the DPS Holbrook Barracks, 2411 E. Navajo Blvd., Holbrook, AZ 86025.

The following materials and equipment are available for emergency repairs to the Dams include: two bulldozers, a backhoe, access to soil and ash, various 4x4 trucks, ambulance, fire van, and fire engine. Bottom ash and/or sandy soil can be used in bulk or in sandbag placement for Standby or Condition YELLOW circumstances. Red barrier tape and emergency vehicles can be used to isolate areas during a RED Condition. Table 4.1 provides guidelines for actions that can be taken during emergency conditions. Other local, county, or State resources can be used depending on the magnitude of the emergency.

The following steps will be taken by the operations staff if unusual conditions are reported at the Dams:

- Quick deployment of operations staff and the EAP Coordinator (Plant Engineering Supervisor) to the dam site(s), if not already at the site(s).
- Assessment of the emergency situation and initiation of an alert notification if necessary.
- If unusual conditions are recorded/observed with the piezometer readings, more frequent readings should be initiated. The interval between readings should initially be of short duration (i.e., hourly) until it is established that stabilized conditions persist.

Recommended emergency actions associated with the problem could be made by following the guidelines provided in Table 4-1. Any actions associated with environmental impacts shall follow the proper Arizona Department of Environmental Quality (ADEQ) permit requirements. The EAP Coordinator (Plant Engineering Supervisor) shall be responsible for directing and implementing emergency mitigation measures.

Table 4-1 Emergency Action Guidelines

RESPONSE LEVEL GREEN: Non-Emergency, Unusual Event, Slow Developing	
Step	**Task / Observations**
A	The Plant Engineering Supervisor (EAP Coordinator) should inspect the dam. At a minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope. Also check the reservoir area, abutments, and downstream channel for signs of changing conditions. Set up 24-hour surveillance of the dam. **IF INCREASED SEEPAGE, EROSION, CRACKING, OR SETTLEMENT IS OBSERVED, IMMEDIATELY REPORT THE OBSERVED CONDITIONS TO THE EAP COORDINATOR; REFER TO THE EMERGENCY LEVEL TABLE FOR GUIDANCE IN DETERMINING THE APPROPRIATE EVENT LEVEL FOR THE NEW CONDITION AND RECOMMENDED ACTIONS.**
B	Record all information, observations, and actions taken on the Event Log Form (Appendix A-1). Note the time of changing conditions. Document the situation with photographs and video if possible.
C	The Plant Engineering Supervisor (EAP Coordinator) must contact his/her engineer and request an investigation of the situation and recommend corrective actions.
D	The Plant Engineering Supervisor (EAP Coordinator) must contact the Arizona Department of Water Resources Dam Safety Program, advise it of the situation, what action is being proposed, and obtain approval.
E	The Plant Engineering Supervisor (EAP Coordinator) will advise the Local Emergency Manager if it is determined that the condition may possibly develop into a YELLOW ALERT NOTIFICATION condition.

RESPONSE LEVEL YELLOW: Potential Dam Failure Situation; Rapidly Developing	
Step	**Task / Observations**
A	The Plant Engineering Supervisor (EAP Coordinator) must contact his/her Engineer and the Arizona Department of Water Resources Dam Safety Program to report the situation and, if time permits, request technical assistance from the Owner's Engineer to investigate the situation and recommend corrective actions. The Arizona Department of Water Resources Dam Safety Program's approval of any emergency remedial action outside the scope of activity listed below is required, if time permits.
B	The Plant Engineering Supervisor (EAP Coordinator) must contact the Local Emergency Manager to inform him/her that the emergency action plan has been activated and if current conditions get worse, an emergency situation may require evacuation or warning. Preparations should be made for possible road closures, warnings, and evacuations.
C	The Plant Engineering Supervisor (EAP Coordinator) must provide updates to the Local Emergency Manager to assist in making timely decisions concerning the need for warnings and evacuations.
D	If time permits, Plant Engineering Supervisor (EAP Coordinator) should inspect the dam. At a minimum, inspect the full length of the upstream slope, crest, downstream toe, and downstream slope. Also check the reservoir area, abutments, and downstream channel for signs of changing conditions. **IF PIPING, INCREASED SEEPAGE, EROSION, CRACKING, OR SETTLEMENT ARE OBSERVED, IMMEDIATELY REPORT THE OBSERVED CONDITIONS TO THE APS ENGINEER, REFER TO THE EMERGENCY LEVEL TABLE FOR GUIDANCE IN DETERMINING THE APPROPRIATE EVENT LEVEL FOR THE NEW CONDITION AND RECOMMENDED ACTIONS.**

E	Record all information, observations, and actions taken on the Event Log Form (Appendix B). Note the time of changing conditions. Document the situation with photographs and video if possible.	
F	If time permits, the following emergency remedial actions should be taken as appropriate. Immediate implementation of these remedial actions may delay, moderate, or prevent the failure of the dam. The remedial actions listed below do not require ADWR Dam Safety Program approval prior to implementing the action. Time permitting, any remedial action should be developed through consultation with the Owner's Engineer and the ADWR Dam Safety Program. Several of the listed adverse or unusual conditions may be apparent at the dam at the same time, requiring implementation of several modes of remedial actions. Close monitoring of the dam must be maintained to confirm the success of any remedial action taken at the dam.	
No.	**Problem**	**Recommended Emergency Actions** **(Time permitting, these actions must be decided in consultation with ADWR)**
1.	**EMBANKMENT OVERTOPPING**	1. Place sandbags along the dam crest to increase freeboard. 2. Cover the dam crest and downstream slope with riprap, sandbags, plastic sheets, or other materials to provide erosion-resistant protection.
2.	**SEEPAGE AND SINKHOLES**	1. Attempt to lower the reservoir level as rapidly as possible to a level that stops or decreases the seepage to a non-erosive velocity. Pumping or siphoning would be required. 2. Continue lowering the water level at a safe drawdown rate until the seepage stops. 3. If the entrance to the seepage origination point is observed in the reservoir (possible whirlpool) and is accessible, attempt to reduce the flow by plugging the entrance with readily available materials, including hay bales, bentonite, soil or rock fill, or plastic sheeting. 4. Cover the seepage exit area(s) with several feet of sand/gravel to hold fine-grained embankment or foundation materials in place. Alternatively, construct sandbag or other types of ring dikes around seepage exit areas to retain a pool of water, providing backpressure and reducing the erosive nature of the seepage. 5. Prevent vehicles and equipment from driving between the seepage exit points and the embankment to avoid potential loss from the collapse of an underground void.
3.	**EMBANKMENT MOVEMENT**	1. Lower the reservoir to a safe level at a rate commensurate with the urgency and severity of the condition of the slide or slump. Pumping or siphoning would be required. 2. Repair settlement of the crest by placing sandbags or structural fill materials in the damaged area to restore freeboard. 3. Stabilize slides on the downstream slope by placing a soil or rock fill buttress against the toe area of the slide.
4.	**EARTHQUAKE**	1. Immediately conduct a general overall visual inspection of the dam. 2. Perform field survey to determine if there has been any settlement and movement of the dam embankment, spillway and low-level outlet works. 3. Drain reservoir if required.

RESPONSE LEVEL RED: Urgent; Dam Failure is Imminent or in Progress	
Step	**Task / Observations**
A	The Plant Engineering Supervisor (EAP Coordinator) must immediately contact the Local Emergency Manager, the ADWR Dam Safety Program, and the Owner's Engineer.
B	The Local Emergency Manager shall lead the efforts to carry out warnings and evacuations of people at risk downstream from the dam (see "Evacuation Map" tab).
C	Emergency Management services personnel and local law enforcement shall alert the general public and immediately evacuate at-risk people and close roads as necessary.
D	The Plant Engineering Supervisor (EAP Coordinator) must maintain continuous communication and provide the Local Emergency Manager with updates of the situation to assist him in making timely decisions concerning warnings and evacuations.
E	Assure personnel monitoring the dam are safe and out of harm's way.

5.0 EVACUATION MAP

The evacuation maps prepared for the area downstream of the Dams is an integral part of this Emergency Action Plan (EAP). The map is an essential tool for the evacuation and mitigation effort during a failure or flooding event.

A single Evacuation Map for all three dams will be used for the EAP. The Evacuation Map, attached as Figures 1-3 to 1-9, is based on the inundation results for the Fly Ash Dam and the Bottom Ash Dam reported in the: *Cholla Fly Ash Dam – ADWR Filing No. 09.28 – Dam Breach and Inundation Report* (AECOM 2017) and the *APS Cholla Dambreak Study* (Stantec 2000), respectively. The inundation maps for the Fly Ash Dam and the Bottom Ash Dam are attached in Appendix E. The results of a dam breach and inundation for the Cooling Pond Dam were not found and therefore not used for development of the Evacuation Map (Figures 1-3 to 1-9).

The evacuation boundaries were expanded beyond the limits of inundation shown on the inundation maps attached as Appendix E. The expansion of the limits is based on qualitative judgement and should be reviewed by the local emergency managers and responders to verify areas requiring evacuation and/or if the evacuation limits should be expanded further. A review of the habitable structures within the evacuation limits should be completed.

The travel times estimated in both of the inundation reports are summarized in the following table. The breach analyses indicate that directly downstream of the Cholla Power Plant Dams, the time from the initial onset of rising water due to a failure of the impoundment and the peak water levels is extremely short (i.e., minutes).

Summary Chart for Flood Inundation Maps

Structure	Approximate Arrival Time (hr)	Approximate Maximum Water Level (ft)
I-40 (adjacent to Fly Ash Pond)	0.1	8
BNSF Railroad	0.5	5
I-40 at Exit 274	2	4
Winslow – Bridge over Little Colorado (West of Exit 257)	18	7

6.0 EAP DISTRIBUTION LIST

The following list provides the names of persons and organizations that are entitled to receive numbered copies of the Emergency Action Plan for the Cholla Power Plant Dams (see Table 6-1). The Arizona Public Service Company will provide each party listed below with periodic updates to the EAP, including current contacts, addresses and telephone numbers of all individuals, local and state agencies listed in the EAP on an annual basis.

Table 6-1 EAP Distribution List

No.	Name	Office	Address
1	Mike Hancock	APS Plant Manager	Cholla Power Plant P.O. Box 188 Joseph City, AZ 86032
2	Samuel Nelson	APS EAP Coordinator	Cholla Power Plant P.O. Box 188 Joseph City, AZ 86032
3	Brent Young	APS Cholla Fire Protection	Cholla Power Plant P.O. Box 188 Joseph City, AZ 86032
3	Byron Conrad	APS Engineering (Non-Nuclear Generation)	P.O. Box 53999 Phoenix, AZ 85072-3999, M.S. 9219
4	Captain Jeffrey Sharp (District 3)	Arizona Department of Public Safety Highway Patrol	2411 E. Navajo Blvd., Holbrook, AZ 86025
5	Sherriff David Clouse	Navajo County Sherriff's Department – District 1 – Holbrook and Winslow / Joseph City Substations	137 W. Arizona St., Holbrook, AZ 86025
6	Dispatch	BNSF Railroad Dispatch	1417 W. 2nd St., Winslow, AZ 86047
7	Catrina Jenkins, Director	Navajo County Department of Emergency Management and Preparedness	100 E. Code Talkers Dr. South Highway 77 Holbrook, AZ 86025 928-524-4163
8	Ravi Murthy, P.E.	Arizona Department of Water Resources, Dam Safety Program	1110 West Washington Street, Suite 310, Phoenix, AZ 85007
9	APP Unit Manager (Request APP Staff)	Arizona Department of Environmental Quality APP	1110 W. Washington St., Phoenix, AZ 85007
10	Duty Desk	Arizona Department of Emergency Management	5636 E. McDowell Rd., Building M5101, Phoenix, AZ 85008
11	American Red Cross (Jermaine Barkley)	American Red Cross – Flagstaff	1750 Railroad Springs Blvd., Suite 1, Flagstaff, AZ 86001
12	Ross Black, Chief Operating Officer) Whitney Caraway (Care Coordination and Emergency Preparedness Manager)	Little Colorado Medical Center	1501 N. Williamson Ave., Winslow, AZ 86047

7.0 REFERENCES

This section provides the list of materials used in the preparation of the Emergency Action Plan for the Cholla Power Plant Dams located near Joseph City, Arizona.

AECOM (2017). *Cholla Fly Ash Dam ADWR State ID No. 09.28 – Dam Breach and Inundation Report – Navajo County, Arizona (Draft)*. Prepared for Arizona Public Service. March 8.

Federal Emergency Management Agency (1998). *Federal Guidelines for Dam Safety: Emergency Action Planning for Dam Owners*, prepared by the Interagency Committee on Dam Safety, October, pp. 34.

New York State Department of Environmental Conservation (1987). *An Owner's Guidance Manual For the Inspection and Maintenance of Dams in New York State*.

Stantec Consulting Services, Inc. (Stantec) (2000). *Draft Final Report – APS Cholla Dambreak Study*. prepared for the Arizona Public Service Company, Phoenix, Arizona. November.

APPENDIX A

PLANS FOR TRAINING, EXERCISING, AND UPDATING THE EAP

A.1 PLANS FOR TRAINING AND EXERCISE

The dam owner (through its duly designated EAP Coordinator (Plant Engineering Supervisor, Table 6-1) shall advise the involved agencies and parties of scheduled training or exercises (see Section 3.6 for types of exercises) and coordinate with the local communities involved to exercise all or portions of this EAP as part of Arizona Public Service Company's all-hazard exercise program schedule.

A.2 UPDATING OF THE EMERGENCY ACTION PLAN

The Emergency Action Plan shall be reviewed every year or as needed by the owner through its duly designated EAP Coordinator with the aim to improve and update the plan. Upgrading the plan shall incorporate feedback from emergency response agency officials resulting from the review and evaluation of the existing EAP or from the conduct of a drill or an exercise pertaining to the execution of the EAP.

During the review of the existing EAP, the owner (through its duly designated EAP Coordinator) shall have the following responsibilities:

- Conduct an on-site inspection and review of the flood inundation area for any increase in downstream development and revise the evacuation map, if needed.
- Review, revise, or improve surveillance conditions around the vicinity of the Cholla Power Plant Dams, as needed.
- Advise and coordinate with the designated consultant if population increases or development within the inundation area could impact the emergency response requirements. If so, a new or revised EAP shall be developed.
- Obtain concurrence from emergency response agency officials attesting to their continued understanding of their role(s) and involvement in the EAP.
- Submit the revised EAP document to the ADWR Dam Safety Program for approval.

APPENDIX B

REPORT FORMS

This Appendix contains three report forms to be used by personnel involved in emergency activities. These report forms are used as means to compile relevant information on the flooding emergency associated with the failure of any of the Cholla Power Plant Dams. The information provided will catalog the steps undertaken and provide estimates of manpower and cost, which could streamline various action plans described in the document.

A. Situation Reports

When a flood emergency or disaster occurred involving the failure of any of the Cholla Power Plant Dams, the Situation Report should be forwarded to the Plant Manager, Plant Engineering Supervisor, Environmental section leader, and others as appropriate. Initial reports may be fragmentary. Data will be transmitted by reference to “line item” and be supplemented as additional information becomes available.

B. After-Action Report

- When emergency operations are ended, each involved department should submit the After-Action Report.
- Reports need to contain estimates of operational costs. Supplementary reports should be made as requested and as defined data becomes available.

C. Contact Log Sheet

This sheet should be completed by the person who is making the call to provide information on the emergency situation.

SITUATION REPORT

Item

1 Report No. _____ Date/Time: _____

2 From: _____

3 To: _____

4 Nature of Emergency: _____

5 Location of Emergency: _____

_____

6 Date/Time of Occurrence: _____

7 Casualties: a. Injured _____ b. Dead _____ c. Homeless _____

8 Property Damage: _____

_____

9 Actions Taken (Details in Remarks):

a. Declaration of Emergency _____ c. Movement of People _____

b. Evacuation _____ d. Movement of Supplies _____

10 Assistance Required:

a. Personnel: Skill/Number _____

b. Equipment: Type/Number _____

_____

c. Other Resources: _____

_____

_____

11 Is area accessible? _____

_____

SITUATION REPORT (continued)

12. Communications Available: _____

_____

_____

13. Actions Taken by:

    a. American Red Cross: _____

    _____

    _____

    b. Others: _____

    _____

    _____

14. Remarks: _____

_____

_____

_____

AFTER-ACTION REPORT

1. Department Making Report: _____

2. Period of Emergency Operations: _____

3. Nature of Emergency: _____

4. Departments or Jurisdictions which you supported:

   a. _____ d. _____

   b. _____ e. _____

   c. _____ f. _____

5. What was your Emergency Support Function?

   _____

6. Manpower:

   a. Total number of Employees participating in the Emergency Function:

      _____

   b. Regular Man-hrs, Total: _____ c: Overtime Man-hrs, Total: _____

   d. Employees Injured, No.: _____ e. Estimated Hours Lost: _____

ESTIMATED EMERGENCY MANPOWER EXPENDITURES

JOB TITLES	NUMBER OF PERSONS	ESTIMATED COST TO DEPARTMENT

AFTER-ACTION REPORT (continued)

7. Resources:

   a. Expenditures of Department-owned Resources: Estimated Total: $_____

   b. Expenditures for Emergency Requirements: Estimated Total: $_____

   c. Description of Expended Materials: _____

   _____

   _____

8. Damage or Loss of Owned Property: Estimated Total: $_____

   Description: _____

   _____

   _____

   _____

   _____

8. Summary of Activities Related to your Emergency Support Function:

   _____

   _____

   _____

   _____

   _____

Signed: _____
Department Representative

CONTACT LOG SHEET

Name: _____ Page: _____

Title: _____

Person Calling: _____ Date: _____

Title: _____ Time: _____

Phone Number: _____

Alert Status: Red Alert Yellow Alert Test
(Circle One)

Description of Problem: (Location, Size, Current Conditions, etc.)

_____

_____

_____

Notes:

_____

_____

_____

Person Being Called: _____ Time: _____

Title: _____ Phone Number: _____

Notes:

_____

_____

_____

CONTACT LOG SHEET (continued)

Person Being Called: _____ Time: _____

Title: _____ Phone Number: _____

Notes:

_____

_____

_____

Person Being Called: _____ Time: _____

Title: _____ Phone Number: _____

Notes:

_____

_____

_____

Person Being Called: _____ Time: _____

Title: _____ Phone Number: _____

Notes:

_____

_____

_____

APPENDIX C

GLOSSARY OF TECHNICAL TERMS

ABUTMENT – The part of the valley's hillside against which the dam abuts. Right and left abutments are those on respective sides of the dam, as an observer looks downstream.

BLOW DOWN OPERATIONS – The controlled release of lake water to maintain total dissolved solids and temperature of the lake water.

BOIL – A disturbance in the surface layer of soil caused by water escaping under pressure from behind a water-retaining structure such as a dam or a levee. The boil may be accompanied by deposition of soil particles (usually sand or silt) in the form of a ring (miniature volcano) around the area where the water escapes.

BREACH – An opening or a breakthrough of a dam sometimes caused by rapid erosion of a section of earth embankment by water.

CONDUIT – A pipe or a channel used to convey water through or around or under a dam.

CRACK IN THE EMBANKMENT – A fissure or an opening in the embankment.

CREST OF DAM – The crown of an overflow section of the dam. In the United States, the term "crest of dam" is often used when "top of dam" is intended. To avoid confusion, the terms "crest of spillway" and "top of dam" should be used for referring to the overflow section and dam proper, respectively.

CULVERT – A drain or waterway structure built transversely under a road, railway, or embankment. Culverts usually comprise a pipe or a covered channel of box section. A gallery or waterway constructed through any type of dam, which is normally dry but is used occasionally for discharging water; hence the terms scour culvert, drawoff culvert and spillway culvert.

DAM – A barrier built (typically across a watercourse) for impounding or diverting the flow of water.

DAM FAILURE – The uncontrollable release of dam's impounded water. It is recognized that there are degrees of failure. Any malfunction or abnormality, outside the design assumptions and parameters, which adversely affect a dam's primary function of impounding water, is properly considered a failure. Minor malfunctions or abnormalities can result in a sudden failure of a dam.

EARTH DAM (EARTHFILL DAM) – An embankment dam in which more than 50% of the total volume is comprised of compacted fine-grained earth.

FLDWAV – The FLDWAV program, developed by the National Weather Service (NWS), is a generalized flood routing program with the capability to model flows through a single stream or a system of interconnected waterways.

EMBANKMENTS – Fill material, usually earth or rock, placed with sloping sides.

EMERGENCY – A condition of serious nature which develops unexpectedly and endangers the structural integrity of a dam or endangers downstream property and human life. An emergency requires immediate action.

EMERGENCY ACTION PLAN (EAP) – A formal document that identifies potential emergency conditions at a dam and specifies preplanned actions to be followed to minimize property damage and loss of life. The EAP specifies actions the dam owner should take to moderate or alleviate the problems at the dam. The document contains procedures and information to assist the dam owner in issuing early warning and notification messages to responsible downstream emergency management authorities of the emergency situation. It also contains inundation maps to show the emergency management authorities of the critical areas for action in case of an emergency.

EMERGENCY POTENTIAL – Whenever people live in an area that could be flooded by the operation or failure of a dam, an emergency potential is assumed to exist.

EROSION – The removal or separation of materials from the embankment through the action of water or wind.

FACE – With reference to a structure, the external surface that limits the structure, e.g., the face of a wall or a dam.

FAILURE – An incident resulting in the uncontrolled release of water from an operating dam.

FOUNDATION OF DAM – The natural material on which the dam structure is placed.

GROIN – That area along the contact (or intersection) of the face of a dam with the abutment.

HAZARD – A situation that creates the potential for adverse consequences such as a loss of life, property damage, and adverse social and environmental impacts. Impacts may be for a defined area downstream of a dam from floodwaters released through spillways and outlet works of the dam or waters released by partial or complete failure of the dam. This could include an area

upstream of the dam from effects of backwater flooding or effects of landslides around the reservoir perimeter.

INUNDATION AREA – The downstream area that could be flooded or otherwise affected by the failure of a dam or large flows.

INUNDATION MAP – A map delineating the area that would probably be flooded in the event of a dam failure. This map must be prepared by a registered professional engineer.

NOTIFICATION – To promptly inform appropriate individuals or emergency agency about an emergency condition so they can initiate appropriate actions.

NORMAL WATER LEVEL (NORMAL WATER POOL) – For reservoir with a fixed overflow spillway crest, it is the lowest level of that crest.

OPERATOR – The person or position in a company or organization, who is responsible for a dam's operation and surveillance.

OUTLET – A constructed opening through which water can be safely discharged for a particular purpose from a reservoir.

OWNER – Any person, authority or agency that manages a dam or reservoir.

PMP (Probable Maximum Precipitation) – Theoretically, the greatest depth of precipitation for a given duration that is physically possible over a given size storm area at a particular geographic location at a certain time of the year.

PMF (Probable Maximum Flood) – The largest flood that may reasonably be expected to occur at a given point on a stream from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible on a particular watershed. This term identifies estimates of hypothetical flood characteristics (peak discharge, volume, and hydrograph shape) that are considered to be the most severe "reasonably possible" at a particular location, based on relatively comprehensive hydro meteorological analyses of critical runoff-producing precipitation (and snowmelt, if pertinent) and hydrologic factors favorable for maximum flood runoff. The maximum runoff condition resulting from the most severe combination of hydrologic and meteorological conditions that are considered reasonably possible for the drainage basin under study.

RIPRAP – A layer of large uncoursed stones, broken rock, boulders, pre-cast block, bags of cement, or other suitable material generally placed in random fashion on the upstream and downstream faces of embankment dams, stream banks, on a reservoir shore, on the sides of a channel, or other land surfaces to protect them from erosion or scour caused by current, wind, wave, and/or ice action. Very large riprap is sometimes referred to as "armoring."

SEEPAGE – The movement of water that might occur through the dam, its foundation or its abutment. Small amounts of clear water seepage is normal. Increase in the amount of water flow or change in color is a concern for a dam's safety.

SETTLEMENT – The degradation in the ground surface by subsidence or by sinking.

SINKHOLE – A natural depression in a land surface formed by the collapse of a cavern roof.

SLIDE – The movement of a mass of earth and/or down a slope. In embankments and abutments, this involves the separation of a portion of the slope from the surrounding materials.

SLUMPING – The sudden sinking or sliding of materials in the embankment.

SPILLWAY – A structure over or through which flows are conveyed and discharged. If gates control the flow, it is considered a controlled spillway; if the elevation of the spillway crest is the only control, it is considered an uncontrolled spillway.

SPILLWAY CHANNEL – A channel conveying water from the spillway crest to the river downstream.

THALWEG – Deepest part of a river channel in a cross section of a river profile. The path of deepest flow. Line connecting the deepest points along a riverbed. The lowest thread along the axial part of a valley. The middle or chief navigable channel of a waterway

TOE OF DAM – The junction of the downstream face of a dam with the ground surface. Also referred to as downstream toe. For an embankment dam, the junction of the upstream face with ground surface is called the upstream toe.

TOP OF DAM – The elevation of the uppermost surface of a dam, usually a road or walkway, excluding any parapet wall, railings, etc.

APPENDIX D

MEDIA ANNOUNCEMENT

Media Announcement

The media announcement associated with the failure of the any of the Cholla Power Plant Dams is provided in this Appendix. The announcement contains three separate messages as follows: (1) a warning message; (2) an evacuation message; and (3) an incident resolved, safe return message.

The suggested media announcement texts are provided below. These messages can be modified as necessary to fit the emergency situation. Refer to Section 3.3 for the warning messages to be sent to emergency responders and other organizations to be notified.

Warning Message

"Reporting entity is advising that due to the conditions developing at the _____ [Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam] at the Cholla Power Plant located near Joseph City, the public should avoid the Interstate I-40 and the vicinity of the Little Colorado River between Exit 280 (east of Cholla Power Plant) and Exit 253 (Winslow) I-40."

REPEAT PERIODICALLY

Evacuation Message

"Reporting entity is advising all residents living on the low lying sides of the Little Colorado River in the proximity of the towns of Joseph City and Winslow to evacuate and seek higher ground. Flooding from the _____ [Fly Ash Dam, Bottom Ash Dam, or Cooling Pond Dam] at the Cholla Power Plant could crest as high as 10 feet. Do not use I-40 between Exit 280 (Geronimo Trading Post) and Exit 253 (Winslow) unless directed by the highway department or police safety personnel. If you require shelter during this emergency you should report to (location of reception/mass care center)."

REPEAT PERIODICALLY

Incident Resolved, Safe to Return Message

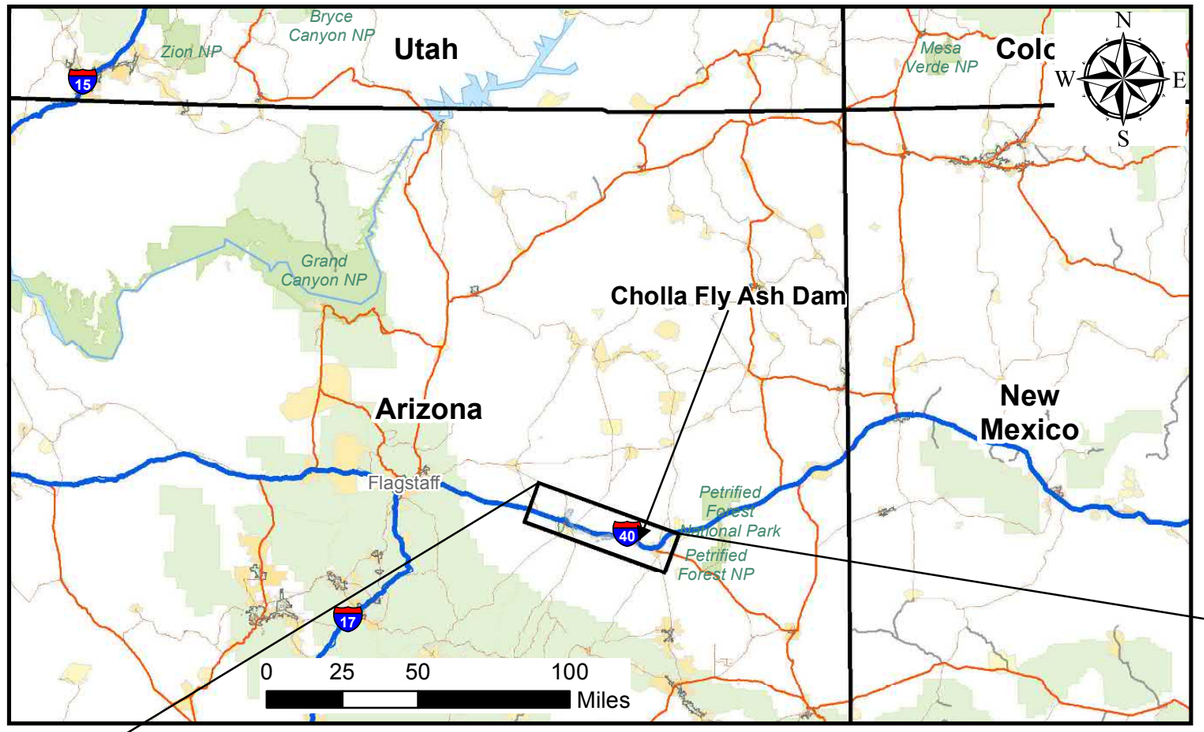
"Reporting entity is advising residents of the area downstream of Cholla Power Plant near and within the towns of Joseph City and Winslow that the problem at the impoundment(s) has been resolved and that residents may return to their homes."

REPEAT PERIODICALLY

APPENDIX E

INUNDATION MAPS

Inundation Maps



Vicinity Map

Cholla Fly Ash Dam

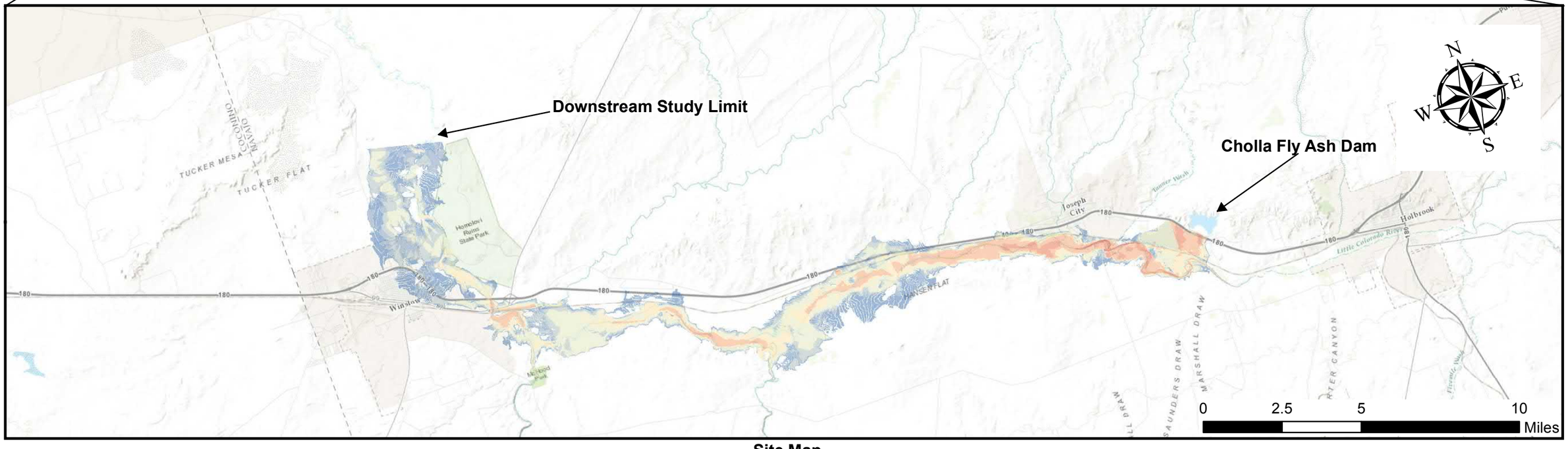
Flood Inundation Map Index

Prepared For:
Arizona Public Service Co.

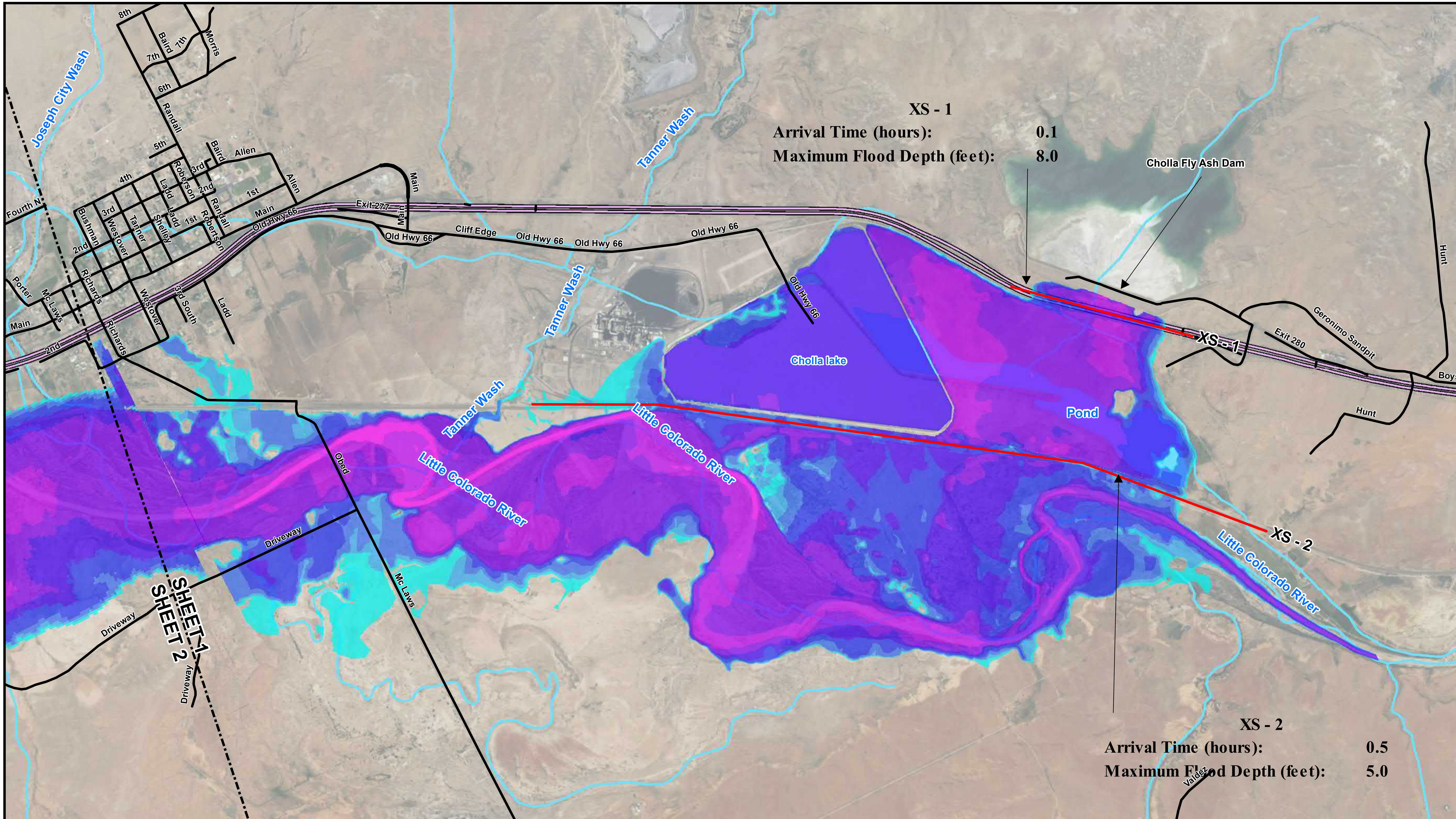
Prepared By:

AECOM

March 2017



Site Map



MAP LEGEND

Maximum Flood Depth (feet)

0 - 0.5 | 0.5 - 1 | 1 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | > 15

Major Highways
Matchline
Drainageways
Local Roads
Cross Sections

N E S W

AECOM

0 | 1,000 | 2,000 | 4,000 Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA FLY ASH DAM FLOOD INUNDATION MAP SHEET 1 OF 6

XS - 3

Arrival Time (hours): 2.0

Maximum Flood Depth (feet): 4.0

Manila Wash
Manila Wash
Manila Wash
Mesa Wash
Joseph City Wash
Little Colorado River
Little Colorado River
Little Colorado River
Little Colorado River
Exit 269
Exit 269
Jack Rabbit
Driveway
Main
O Connell
Exit 274
XS - 3
Exit 274
Main
Main
Main
Driveway
Fish
Fish
Porter
Boyce
Fourth N
Edwards
Porter
4th
Bushman
2nd
3rd
1st
Richards
Mclaws
2nd
Richards
Driveway
Driveway
Driveway
SHEET 1
SHEET 2
SHEET 2
SHEET 3

MAP LEGEND

Maximum Flood Depth (feet)

0 - 0.5 | 0.5 - 1 | 1 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | > 15

- Major Highways
- Matchline
- Drainageways
- Local Roads
- Cross Sections

N E S W

AECOM

0 1,000 2,000 4,000 Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA FLY ASH DAM
FLOOD INUNDATION MAP
SHEET 2 OF 6

Hibbard
Exit 264
Exit 264
Hibbard
Hibbard
Jack Rabbit
Exit 269
Exit 269
Jack Rabbit
SHEET 4
SHEET 3
Little Colorado River
Little Colorado River
Little Colorado River
Little Colorado River
Chevelon Creek
Chevelon Creek
Chevelon Creek
Pond
Pond
Pond
Pond
Driveway
Driveway
Driveway
SHEET 2
SHEET 3

MAP LEGEND

Maximum Flood Depth (feet)

0 - 0.5 | 0.5 - 1 | 1 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | >15

- Major Highways
- Matchline
- Drainageways
- Local Roads
- Cross Sections

N W E S

AECOM

0 1,000 2,000 4,000 Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA FLY ASH DAM
FLOOD INUNDATION MAP
SHEET 3 OF 6

Hibbard

Hibbard

Hibbard

Exit 264

Exit 264

Hibbard

Little Colorado River

Little Colorado River

Little Colorado River

Little Colorado River

Little Colorado River

Little Colorado River

Little Colorado River

4wd

SHEET 4
SHEET 3

SHEET 4
SHEET 5

MAP LEGEND

Maximum Flood Depth (feet)

0 - 0.5
0.5 - 1
1 - 2
2 - 4
4 - 6
6 - 10
10 - 15
> 15

- Major Highways
- Matchline
- Drainageways
- Local Roads
- Cross Sections

N
E
S
W

AECOM

0 1,000 2,000 4,000 Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA FLY ASH DAM
FLOOD INUNDATION MAP
SHEET 4 OF 6

SHEET 5
SHEET 6

SHEET 4
SHEET 5

XS - 4

XS - 4	
Arrival Time (hours):	18.0
Maximum Flood Depth (feet):	7.0

MAP LEGEND

Maximum Flood Depth (feet)

0 - 0.5 | 0.5 - 1 | 1 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | > 15

- Major Highways
- Matchline
- Drainageways
- Local Roads
- Cross Sections

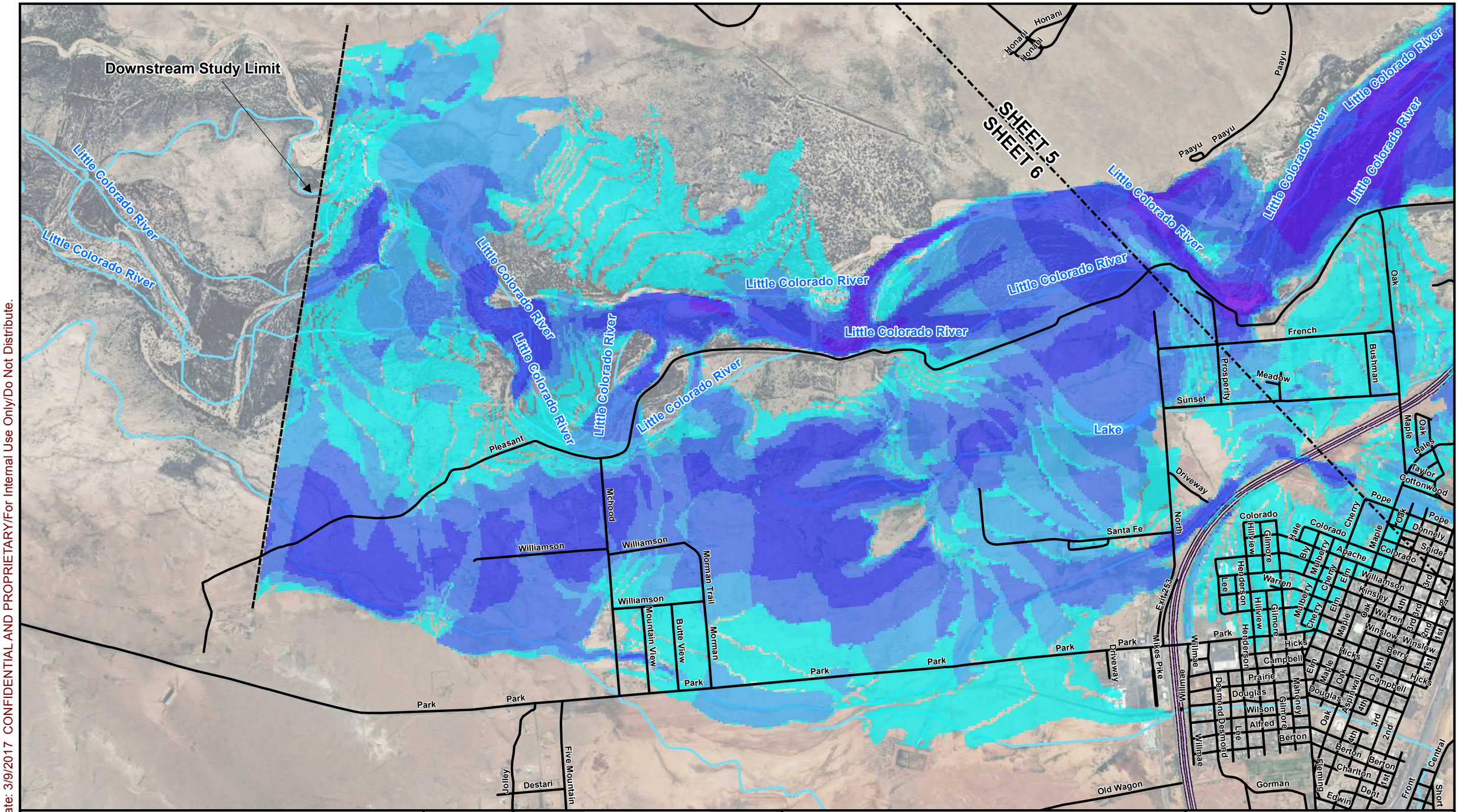
N E S W

AECOM

0 1,000 2,000 4,000 Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA FLY ASH DAM
FLOOD INUNDATION MAP
SHEET 5 OF 6



MAP LEGEND

Maximum Flood Depth (feet)

0 - 0.5 | 0.5 - 1 | 1 - 2 | 2 - 4 | 4 - 6 | 6 - 10 | 10 - 15 | > 15

- Major Highways
- Matchline
- Drainageways
- Local Roads
- Cross Sections

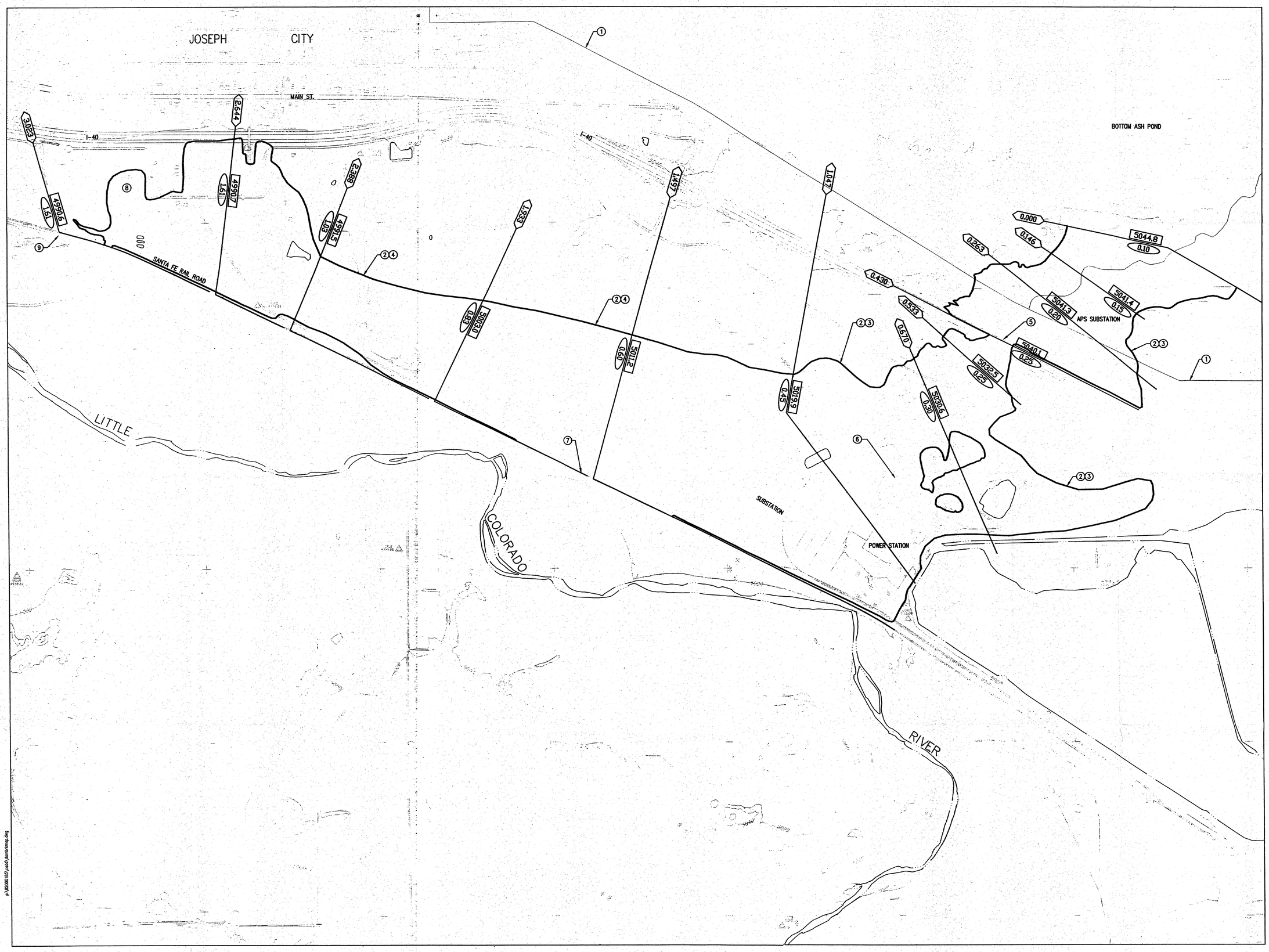
N E S W

AECOM

0 1,000 2,000 4,000 Feet

General Note: Due to the method, procedures, and assumptions used to develop the flooded areas, the limits of the flooding shown and wave travel times are approximate and should be used only as a guideline for establishing evacuation zones. Areas inundated will depend on actual failure conditions and may differ from the areas shown on this map. No flood discharge contribution from tributaries located downstream of the dam are considered for the analyses, therefore flood discharge, velocities, and depths shown on the inundation maps may be appreciably greater than indicated.

CHOLLA FLY ASH DAM
FLOOD INUNDATION MAP
SHEET 6 OF 6



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Legend

- CONTOUR LINES
- SPOT ELEVATION
- ROADS
- BUILDINGS/HOUSES
- EXISTING POND/LAKE/WASH/RIVER
- RAILROAD
- 1.047 — MODEL CROSS-SECTION ID (IN RIVER MILES)
- 5020.8 — PEAK WATER SURFACE
- 0.40 — TRAVEL TIME (HOURS)

Notes

1. TWO TOPOGRAPHIC MAPS WERE USED TO DEVELOP THE FLOOD INUNDATION BOUNDARIES: THE TOP PORTION WAS REPRODUCED FROM MAPPING (C.I.=10ft) DEVELOPED BY COOPER AERIAL, PHOENIX, AZ (AERIAL PHOTO DATED JULY 15, 1992). THE BOTTOM PORTION WAS REPRODUCED FROM MAPPING (C.I.=4ft) DEVELOPED BY KENNEY AERIAL MAPPING INC, PHOENIX, AZ (AERIAL PHOTO DATED JULY 24, 1997).
2. THE EXTENT OF FLOOD INUNDATION IS BASED ON THE FLOOD ROUTING ANALYSIS PERFORMED USING THE NWS DAMBRK PROGRAM.
3. "MODEL1" MODELS THE FLOOD INUNDATION ALONG TANNER WASH FROM BELOW THE BOTTOM ASH POND (MILE 0.00) TO THE AT&SF RAILROAD (MILE 1.497).
4. "MODEL2" MODELS THE FLOOD BREAKOUT WEST OF TANNER WASH (MILE 1.497) TO JOSEPH CITY WASH AT THE AT&SF RAILROAD (MILE 3.023).
5. FLOOD LEVELS AT I-40 CHANGE SIGNIFICANTLY AND RAPIDLY WHEN BOTTOM ASH POND FAILS.
6. THE APS PLANT LOCATED EAST OF TANNER WASH BECOMES INUNDATED AFTER A DAM FAILURE.
7. THE AT&SF RAILROAD BECOMES INUNDATED AT TANNER WASH.
8. THE COMMUNITY SOUTH OF I-40 IN JOSEPH CITY IS IMPACTED WITH SHALLOW FLOODING.
9. THE STUDY STOPPED AT MILE 3.023 SINCE THE DAMBREAK PEAK OF 1033 CFS IS SIGNIFICANTLY LOWER THAN THE 100-YEAR PEAK DISCHARGE OF 5625 CFS (FEMA, 2000).

Revision	By	Appd.	Date

Issued	By	Appd.	Date

File Name:DAMBRKMAP.DWG	ND/JK	CCC	FWT	11/21/00
	Dwn.	Dsgn.	Chkd.	Date

Permit/Seal

Registered Professional Engineer (Civil) CERTIFICATE NO. 34346 FRANK W. THOMAS Date Signed ARIZONA, U.S.A.

Client/Project

ARIZONA PUBLIC SERVICE COMPANY

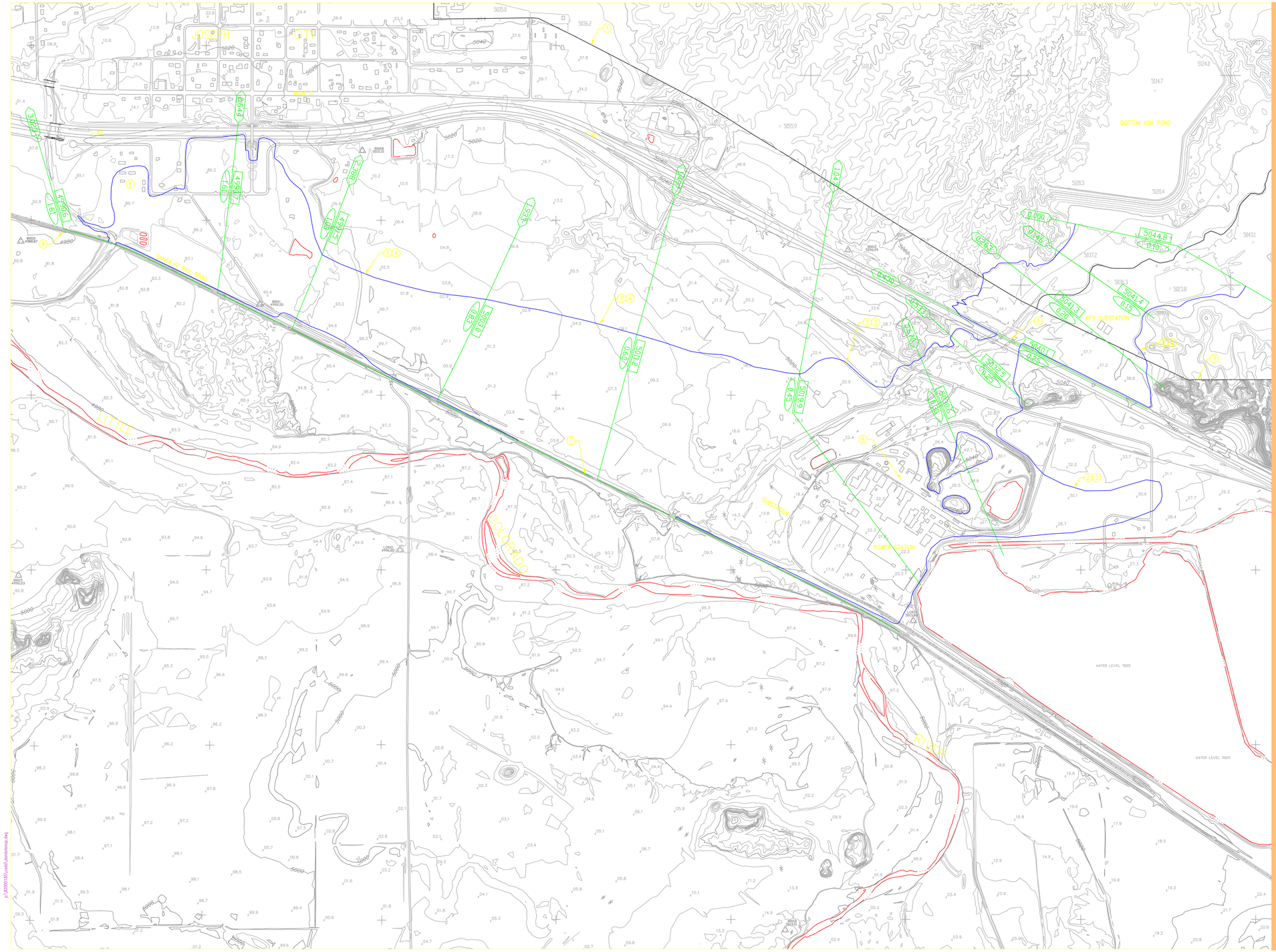
APS CHOLLA DAMBREAK STUDY

JOSEPH CITY, ARIZONA

Title

FLOOD INUNDATION MAP
EXHIBIT A

Project No.	Scale	
82000185	1"=600'	
Drawing No.	**Sheet**	**Revision**
-	1 of 1	0



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Legend

	CONTOUR LINES
5043.1	SPOT ELEVATION
	ROADS
	BUILDINGS/HOUSES
	EXISTING POND/LAKE/WASH/RIVER
	RAILROAD
1.047	MODEL CROSS-SECTION ID (IN RIVER MILES)
5020.8	PEAK WATER SURFACE
0.40	TRAVEL TIME (HOURS)
	FLOOD INUNDATION BOUNDARY
	100-YEAR FIS FLOODPLAIN BOUNDARY

Notes

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Revision		By	Appd.	Date
Issued		By	Appd.	Date
File Name:DAMBRKMAP.DWG	ND/JK	CCC	FWT	11/21/00
	Dwn.	Dsgn.	Chkd.	Date

Permit/Seal

APS # CC-C-17-PSG-100001-42

Client/Project

ARIZONA PUBLIC SERVICE COMPANY

APS CHOLLA DAMBREAK STUDY

JOSEPH CITY, ARIZONA

Title

FLOOD INUNDATION MAP
EXHIBIT A

Project No.	Scale	
82000185	1"=600'	
Drawing No.	**Sheet**	**Revision**
-	1 of 1	0