

**CHOLLA POWER PLANT
CLOSURE PLAN §257.102(b)
FLY ASH POND
Amendment 2 (November 23, 2020)**

Closure Plan Contents §257.102(b)(1)

The owner or operator of a CCR unit must prepare a written closure plan that describes the steps necessary to close the CCR unit at any point during the active life of the CCR unit consistent with recognized and generally accepted good engineering practices. The written closure plan must include, at a minimum, the information specified in paragraphs (b)(1)(i) through (vi) of this section.

Prepared for Arizona Public Service by AECOM Technical Services, Inc. (AECOM)	
CLOSURE PLAN AMENDMENT HISTORY	
Initial	August 30, 2016
Amendment 1	October 2, 2020 - Updated regulatory framework information and dates
Amendment 2	November 23, 2020 – Deleted reference to closure of Sedimentation Pond being performed concurrently with closure of Fly Ash Pond. Added reference to “closure by removal” of CCR-impacted materials within the reservoir area to a consolidated CCR solids mound for “closure in place”. Added new Figure 1, renumbered remaining figure numbers.
SITE INFORMATION	
Site Name / Address	Cholla Power Plant / 4801 I-40 Frontage Road, Joseph City, AZ 86032
Owner Name / Address	Arizona Public Service / 400 North 5 th Street, Phoenix, AZ 85004
CCR Unit	Fly Ash Pond
Location	36° 55' 60" N, 110° 15' 51" W
Reason for Initiating Closure	Permanent cessation of a coal-fired boiler(s) by a date certain
Final Cover Type	Evapotranspiration Cover
Closure Method	Closure by leaving CCR in place

CLOSURE PLAN DESCRIPTION

(b)(1)(i) – A narrative description of how the CCR unit will be closed in accordance with this section.

The Fly Ash Pond is an existing Coal Combustion Residual (CCR) impoundment constructed for the storage of fly ash generated by the Cholla Power Plant. The Fly Ash Pond has a capacity of 18,000 acre-feet. The maximum impoundment area, which has never been reached, is approximately 430 acres. The Fly Ash Pond is regulated by the United States Environmental Protection Agency per 40 CFR parts 257 and 261. The Fly Ash Pond embankment dam is regulated by the Arizona Department of Water Resources (ADWR) Dam Safety Program (ADWR Dam #09.28).

The Fly Ash Pond consists of an engineered earthen embankment, an impounded reservoir of free water, and an impounded beach of CCR solids (fly ash and flue gas desulfurization (FGD) solids), both above and below the water reservoir level, that is identified herein as the “CCR solids mound”.

The Fly Ash Pond will be dewatered to facilitate initiation of closure of the facility. CCR-impacted materials (CCR transport water evaporates, shallow soils and drowned vegetation) from the estimated 157-acre impacted area within the reservoir will be excavated and transported for disposal within the CCR solids mound to complete “closure-by-removal” for the reservoir portions of the facility.

The consolidated CCR material within the 153-acre footprint of the CCR solids mound will be closed in place by regrading and construction of a final cover system. The final cover will be constructed over a graded and prepared CCR

subgrade. The final cover will be sloped to promote drainage and the storm water runoff will be discharged off the Fly Ash Pond via sheet flow into storm water diversion channels. The channels will collect and convey runoff from the closed Fly Ash Pond and divert storm water runoff around the perimeter of the closed Fly Ash Pond. Each storm water diversion channel will drain into a detention basin that will convey the storm water under Interstate 40.

Closure operations will consist of:

- 1) Dewatering,
- 2) Consolidating CCR-impacted materials from the reservoir area within the CCR solids mound,
- 3) Re-grading CCR solids mound to create acceptable grades for closure,
- 4) Installing the final cover system, and
- 5) Constructing the perimeter drainage channels.

In accordance with §257.102(b)(3), this Amendment 2 revises information in the initial and subsequently amended written closure plan regarding consolidation of CCR material from the reservoir into the CCR solids mound that will receive the final closure cover system. This amended written closure plan will be amended to provide additional details after the final engineering design for the grading and cover system is completed. The current version of the closure plan reflects the information and planning available at the time of issuance.

<p>(b)(1)(ii) – If closure of the CCR unit will be accomplished through removal of CCR from the CCR unit, a description of the procedures to remove the CCR and decontaminate the CCR unit in accordance with paragraph (c) of this section.</p>	<p>Applicable. A portion of the Fly Ash Pond will be closed by removal of shallow, CCR-impacted materials within the reservoir area and relocation and permanent disposal within the remaining CCR solids mound.</p> <p>Areas with the reservoir exposed by recently lowered water levels evidence crusting by CCR evaporites. No investigation of depth or extent has yet been performed. APS anticipates that decontamination of these areas of the CCR unit will be performed by physical removal of CCR-impacted materials to the CCR solids mound area, followed by visual verification of the absence of remaining surficial impacts.</p>
<p>(b)(1)(iii) – If closure of the CCR unit will be accomplished by leaving CCR in place, a description of the final cover system, designed in accordance with paragraph (d) of this section, and the methods and procedures to be used to install the final cover. The closure plan must also discuss how the final cover system will achieve the performance standards specified in paragraph (d) of this section.</p>	<p>Applicable. The CCR solids mound area of the Fly Ash Pond, including CCR materials consolidated from the reservoir area, will be closed by leaving CCR in place. The closure will be designed in accordance with §257.102(d).</p> <p>The site is in a semi-arid to arid climate with precipitation on the order of 6 inches per year and evaporation losses (pan evaporation rate) on the order of 50 inches per year. Therefore, this environment is appropriate for using a water-balance soil cover system that relies on the net water losing climate to reduce infiltration into the subgrade of the cover.</p> <p>The final cover system will be installed in direct contact with a sloped subgrade of CCR or other fill to achieve final subgrade elevations designed for positive drainage of storm water. The alternative final cover (“evapotranspiration cap”) system, designed in accordance with requirements of §257.102(d)(3)(ii), will consist of the following (from bottom to top):</p>

- 1) a minimum of 18 inches of compacted earthen material with a discharge (flux) through the cover material equivalent to a cover system with a single geomembrane;
- 2) Six inches of soil capable of sustaining native plant growth and resisting erosion (erosion layer); and
- 3) Seeded with native vegetation.

CCR material will be re-graded and earthen fill material placed, as required, to bring the grades to the design slopes. Earthen material for the infiltration layer will be placed, graded, and compacted to meet the specified thickness and permeability. The final cover surface will be seeded with native vegetation types.

Figures 1 through 3 show the general grading concept for the closure of the Fly Ash Pond. The final cover will have minimum as-constructed top slopes of 0.5 to 1.0 percent. The outside slopes of the existing dam will not be re-graded as the existing outside slopes already feature erosion protection and previous geotechnical analyses have shown the slopes to be stable in their current condition. Storm water runoff will be discharged off the Fly Ash Pond via sheet flow into storm water diversion channels. The channels will collect and convey runoff from the closed Fly Ash Pond and provide diversion of storm water run-on around the perimeter of the closed Fly Ash Pond. The storm water diversion channel will drain into detention basins, which will outfall into culverts that convey storm water under Interstate 40.

(b)(1)(iii) – How the final cover system will achieve the performance standards in §257.102(d).

Five Performance Standards:

<p>1. (d)(1)(i) – Control, minimize or eliminate, to the maximum extent feasible, post-closure infiltration of liquids into the waste and releases of CCR, leachate, or contaminated run-off to the ground or surface waters or to the atmosphere.</p>	<p>The infiltration (flux) through the final cover will be demonstrated to be equivalent to or less than flux through the unlined native soil comprising the bottom of the Fly Ash Pond. The demonstration of the alternative final cover system will be completed during final engineering design for the grading and cover system and issued in an amended closure plan.</p>
<p>2. (d)(1)(ii) – Preclude the probability of future impoundment of water, sediment, or slurry.</p>	<p>The final cover will have a minimum as-constructed top slope of 0.5 to 1.0 percent to preclude the probability of ponding. The final cover will generally slope from thickest to thinnest deposited CCR; the final design of the top slope for the final cover system will consider the magnitude of expected settlement of the wastes and the potential and locations of possible differential settlement. The post-closure plan includes maintenance measures to correct local grading deficiencies.</p>
<p>3. (d)(1)(iii) – Include measures that provide for major slope stability to prevent the sloughing or movement of the final cover system during the closure and post-closure care period.</p>	<p>The downstream slopes of the embankment dam will remain at 2H:1V and not be re-graded for the final closed configuration of the Fly Ash Pond. The final engineering design for the grading and cover system will include geotechnical analyses to demonstrate that the final outer slopes and cover will satisfy the stability requirements for the closed impoundment.</p>
<p>4. (d)(1)(iv) – Minimize the need for further maintenance of the CCR unit.</p>	<p>The final cover will be seeded with native vegetation to minimize erosion maintenance. Drainage channels will have appropriate erosion protection measures to minimize erosion maintenance.</p>

<p>5. (d)(1)(v) – Be completed in the shortest amount of time consistent with recognized and generally accepted good engineering practices.</p>	<p>Closure is expected to occur in coordination with the schedule for cessation of coal-fired electricity generation at the Cholla Power Plant. Coal-fired electricity generation is scheduled to cease in 2025. APS is seeking a time extension to initiate closure in accordance with the separate “Site-specific alternative deadlines to initiate closure of CCR surface impoundments” provisions of §257.103(f)(2). The Fly Ash Pond is scheduled to close no later than October 17, 2028.</p> <p>The Fly Ash Pond closure will include sufficient dewatering and ash material stabilization for construction of the final grading and cover. These activities will be performed concurrently with the cessation of coal-fired electricity generation at the Cholla Power Plant in 2025 and the closure of the Bottom Ash Pond and Bottom Ash Monofill. Stabilization is expected to take several years to complete because the majority of the impounded CCR is hydraulically placed (loose) fly ash and FGD sludge (a weak material). APS may elect to reduce the volume of water sent to the impoundment prior to commencing dewatering activities to help achieve a dewatered and stabilized condition within one year of the receipt of final waste.</p>
<p>(d)(2)(i) – Free liquids must be eliminated by removing liquid wastes or solidifying the remaining wastes and waste residues.</p>	<p>The CCR will be dewatered to remove incidental free liquids and to provide a stable base for the construction of the final cover system. As the free water pond is drawn down due to decreased Plant discharge and evaporation, water is expected to drain out of the deposited solids. The form and extent of any additional dewatering have not yet been identified.</p>

<p>(d)(2)(ii) – Remaining wastes must be stabilized sufficiently to support the final cover system.</p>	<p>The existing CCR will be re-graded so as to provide a stable base for the final cover. The form and extent of required stabilization have not yet been identified.</p>
<p>(d)(3) – A final cover system must be installed to minimize infiltration and erosion, and at minimum, meets the requirements of (d)(3)(i) of this section, or the requirements of the alternative final cover system specified in paragraph (d)(3)(ii) of this section.</p> <p>(d)(3)(i) – The design of the final cover system must be included in the written closure plan.</p>	<p>The alternative final cover system will meet the requirements of §257.102(d)(3)(ii). The requirements of §257.102(d)(3)(ii) will be achieved using the clayey and silty soils present at the site to construct an infiltration layer that promotes runoff and evapotranspiration. The infiltration layer will be a minimum of 18 inches thick and will be constructed to reduce infiltration or flux into the Fly Ash Pond. On-site soils or an off-site aggregate source will be used to provide an erosion layer to protect the infiltration layer.</p> <p>The engineering design for the final cover system will be issued in an amended closure plan when the final cover system is completed.</p>
<p>EITHER</p> <p>(d)(3)(i)(A) – The permeability of the final cover system must be less than or equal to the permeability of any bottom liner system or natural subsoils present, or a permeability no greater than 1×10^{-5} cm/sec, whichever is less.</p> <p>(d)(3)(i)(B) – The infiltration of liquids through the closed CCR unit must be minimized by the use of an infiltration layer than contains a minimum of 18 inches of earthen material.</p> <p>OR</p> <p>(d)(3)(ii)(A) – The design of the final cover system must include an infiltration layer that achieves an equivalent reduction in infiltration as the infiltration layer specified in paragraphs (d)(3)(i)(A) and (B).</p>	<p>The alternative final cover system will meet the requirements of §257.102(d)(3)(ii). The permeability of the final cover will be demonstrated prior to closure.</p>

<p>EITHER</p> <p>(d)(3)(i)(C) – The erosion of the final cover system must be minimized by the use of an erosion layer that contains a minimum of six inches of earthen material that is capable of sustaining native plant growth.</p> <p>OR</p> <p>(d)(3)(ii)(B) – The design of the final cover system must include an erosion layer that provides equivalent protection from wind or water erosion as the erosion layer specified in paragraph (d)(3)(i)(C) of this section.</p>	<p>The final cover will include either:</p> <ul style="list-style-type: none"> a) a minimum of 6 inches of a soil erosion layer that is capable of sustaining native plant growth (erosion layer) that will be seeded and vegetated to meet the requirements of §257.102(d)(3)(i)(C); or b) a minimum of 6 inches of rock armor erosion protection to meet the requirements of §257.102(d)(3)(ii)(B).
<p>(d)(3)(i)(D), (d)(3)(ii)(C) – The disruption of the integrity of the final cover system must be minimized through a design that accommodates settling and subsidence.</p>	<p>The engineering design for the final cover system will consider the magnitude of the expected settlement of the wastes and the potential and locations of possible differential settlement.</p> <p>The final cover will incorporate an 18-inch thick, loosely compacted evapotranspiration layer that will behave in a flexible manner so as to minimize the risk of disrupting the continuity of the cap due to settlement.</p>
<p>INVENTORY AND AREA ESTIMATES</p>	
<p>(b)(1)(iv) – An estimate of the maximum inventory of CCR ever on-site over the active life of the CCR unit.</p>	<p>9,300,000 cubic yards</p>
<p>(b)(1)(v) – An estimate of the largest area of the CCR unit ever requiring a final cover as required by paragraph (d) of this section at any time during the CCR unit’s active life.</p>	<p>153 acres</p>
<p>CLOSURE SCHEDULE</p>	
<p>(b)(1)(vi) – A schedule for completing all activities necessary to satisfy the closure criteria in this section, including an estimate of the year in which all closure activities for the CCR unit will be completed. The schedule should provide sufficient information to describe the sequential steps/milestones that will be taken to close the CCR unit, and the estimated timeframes to complete each step or phase of CCR unit closure. If closure timeframe is anticipated to exceed the timeframes specified in paragraph §257.102(f)(1) of this section, the written closure plan must include the site-</p>	

specific information, factors and considerations that would support any time extension sought under paragraph §257.102(f)(2).

APS is seeking a time extension to initiate closure in accordance with the separate “Site-specific alternative deadlines to initiate closure of CCR surface impoundments” provisions of §257.103(f)(2). The milestones and the associated timeframes are initial estimates. Some of the activities associated with the milestones will overlap. Amendments to the milestones and timeframes will be made as more information becomes available.

Initial Written Closure Plan Completed	August 2016
Closure Plan Amendment 1	October 2020
Closure Plan Amendment 2	November 2020
Permits and Approvals from Agencies	October 2024 (estimated)
Date of Final Receipt of CCR	April 2025
Closure Activities Initiated	March 2021 (assumed early start of dewatering)
Complete Dewatering	November 2026 (estimated – assuming early start date)
Complete CCR Stabilization	November 2027 (estimated)
Installation of Final Cover	Prior to October 17, 2028
Estimated Completion of Closure Activities	Prior to October 17, 2028

Certification Statement 40 CFR § 257.102(b)(4) – Amended Written Closure Plan for a CCR Surface Impoundment

CCR Unit: Arizona Public Service; Cholla Power Plant; Fly Ash Pond

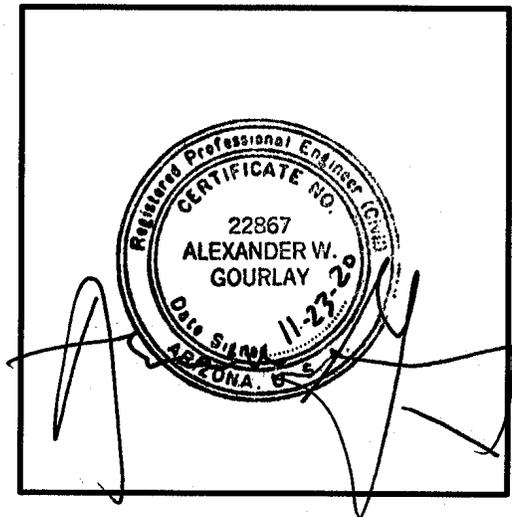
I, Alexander W. Gourlay, being a Registered Professional Engineer in good standing in the State of Arizona, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the information contained in the amended written closure plan dated November 23, 2020 meets the requirements of 40 CFR § 257.102.

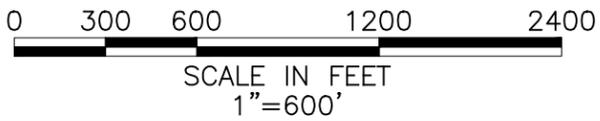
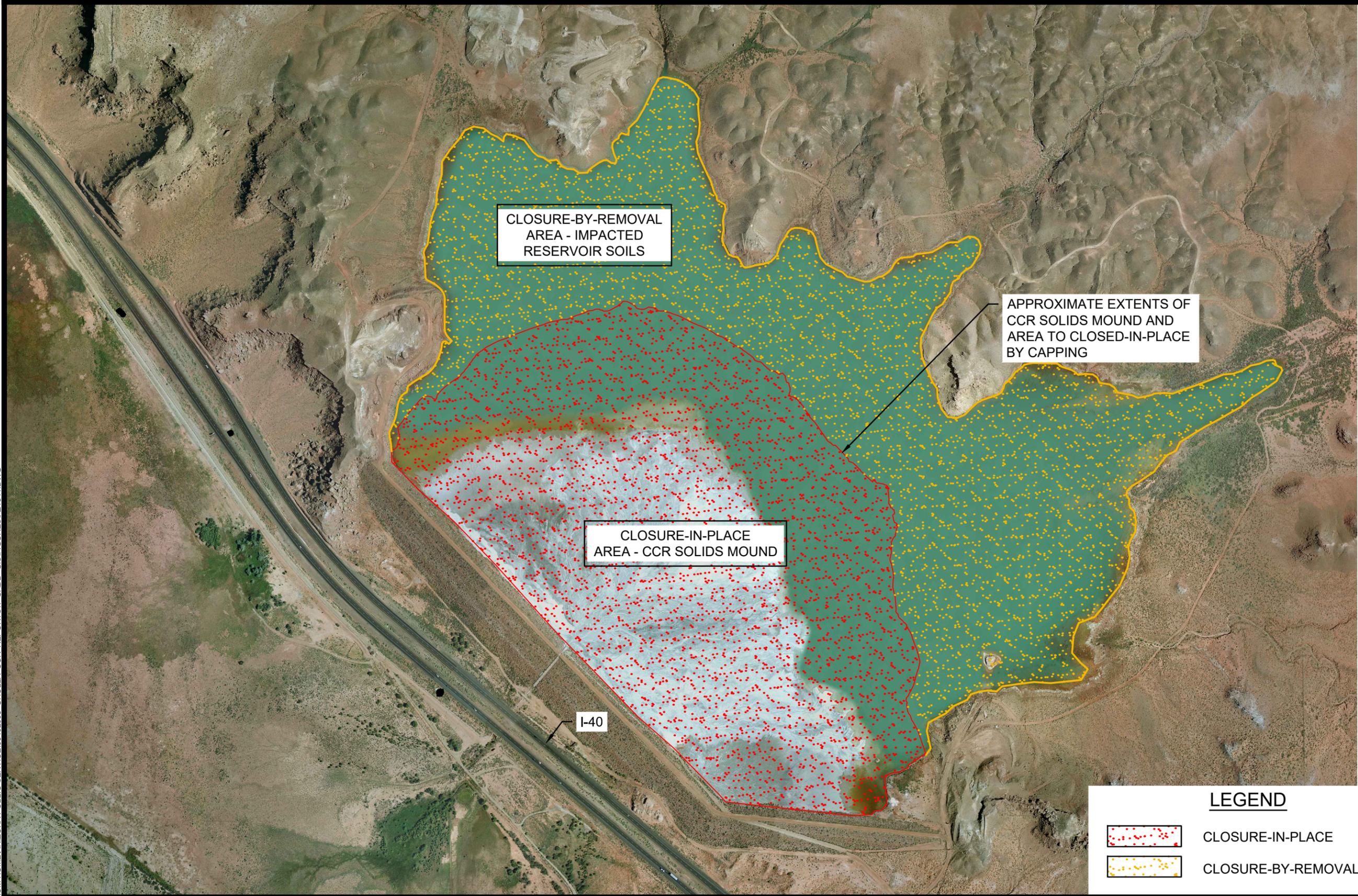
Alexander W. Gourlay, P.E.

Printed Name

November 23, 2020

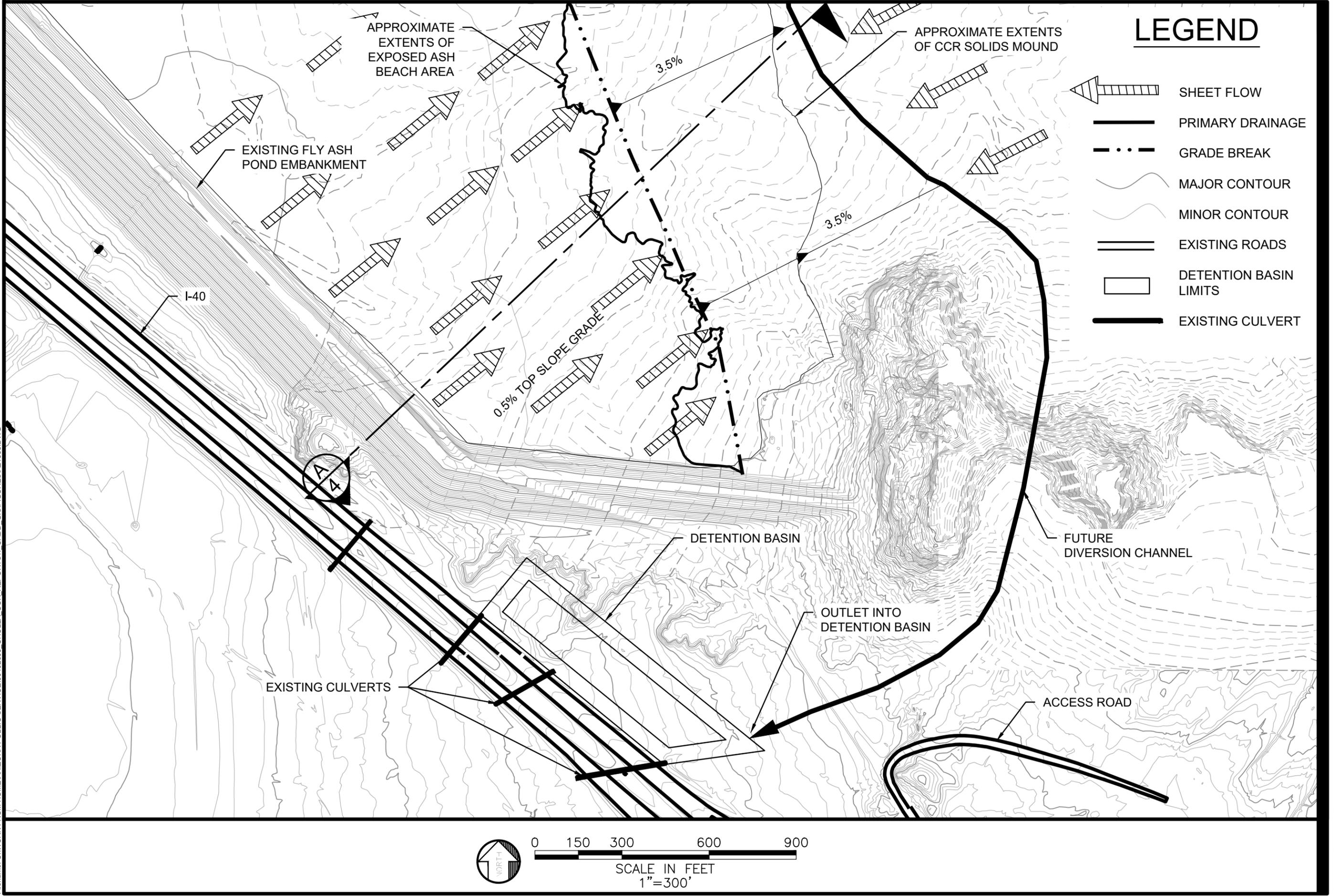
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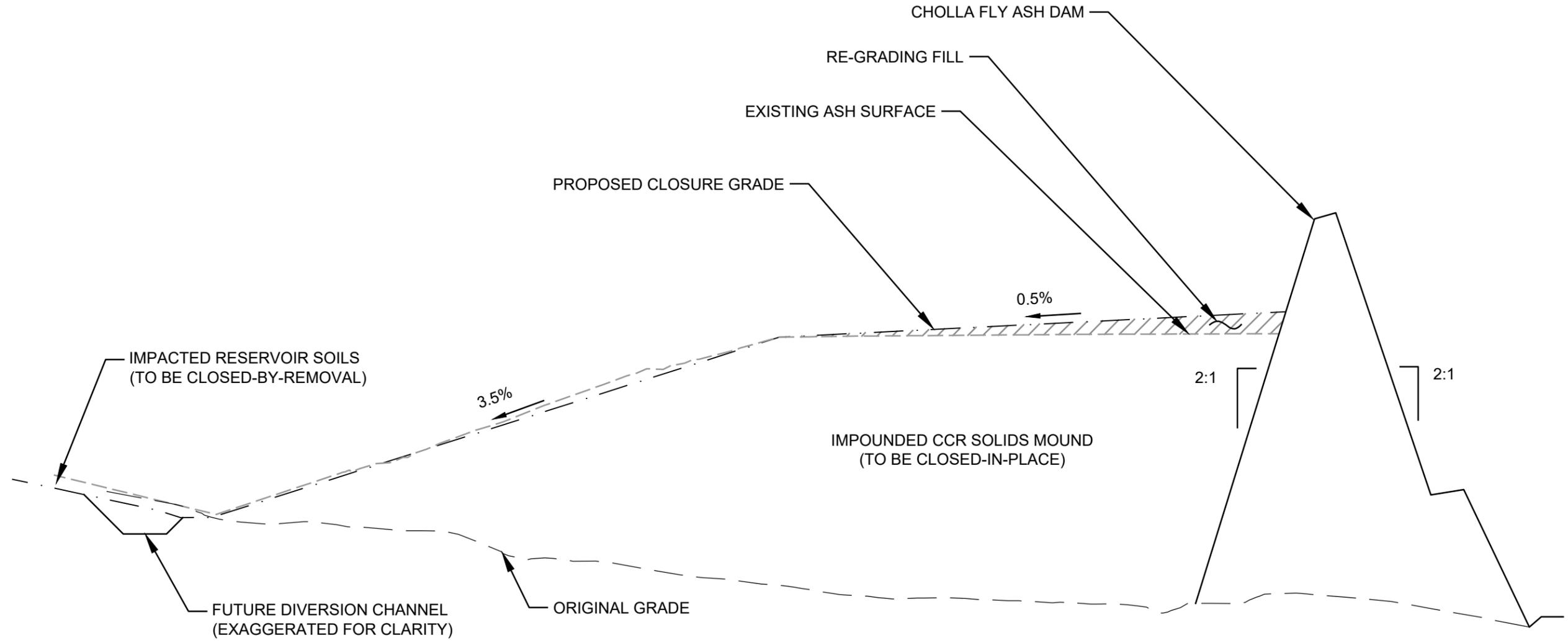




LEGEND

	CLOSURE-IN-PLACE
	CLOSURE-BY-REMOVAL





Cholla Fly Ash Pond Closure
Section A