



Project No. S9534-05-04
October 23, 2020

VIA ELECTRONIC MAIL

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Aggregate Resource Development
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Subject: GEOTECHNICAL ADDENDUM – SOUTH CANAL ALTERNATIVE
SHIFLER MINING AND RECLAMATION PROJECT
YOLO COUNTY, CALIFORNIA

- References:
- 1) *Slope Stability Evaluation – Teichert Shifler Mining and Reclamation Project, Yolo County, California*, prepared by Geocon (Geocon Project No. S9534-05-04), May 25, 2016
 - 2) *Geotechnical Addendum – Alternate A, Shifler Mining and Reclamation Project, Yolo County, California*, prepared by Geocon (Geocon Project No. S9534-05-04), March 4, 2020
 - 3) *Off-Channel Mining Plan – South Canal Alternative for Shifler Property, Yolo County, California (Sheets M-01 through M-09)*, prepared by Cunningham Engineering, October 2020.
 - 4) *Conceptual Off-Channel Reclamation Plan – South Canal Alternative for Shifler Property, Yolo County, California (Sheets R-01 through R-09)*, prepared by Cunningham Engineering, October 2020.

Mr. Smith:

As requested, we have prepared this Geotechnical Addendum for the proposed Shifler Mining and Reclamation site located northeast of the intersection of County Roads 22 and 94B in Yolo County, California. The approximate site location is shown on the Vicinity Map, Figure 1.

This Addendum is intended to provide a summary of our additional geotechnical analysis, conclusions, and recommendations for an alternative mining and reclamation operation (“South Canal Alternative”) where the existing Moore Canal is relocated from its current location to the southern and eastern limits of the proposed mining pit as shown on the Site Plan, Figure 2.

BACKGROUND AND PURPOSE

Geocon previously prepared the referenced *Slope Stability Evaluation* report for the project (Ref. 1, Geocon 2016). The purpose of our 2016 study was to evaluate subsurface conditions, evaluate pertinent geotechnical parameters, and to evaluate slope stability for proposed perimeter mining and reclamation slopes under static and dynamic (seismic) conditions with respect to the performance standards outlined in the Yolo County *Off-Channel Surface Mining and Reclamation Ordinances (YCSMRO)* and the California *Surface Mining and Reclamation Act (SMARA)*.

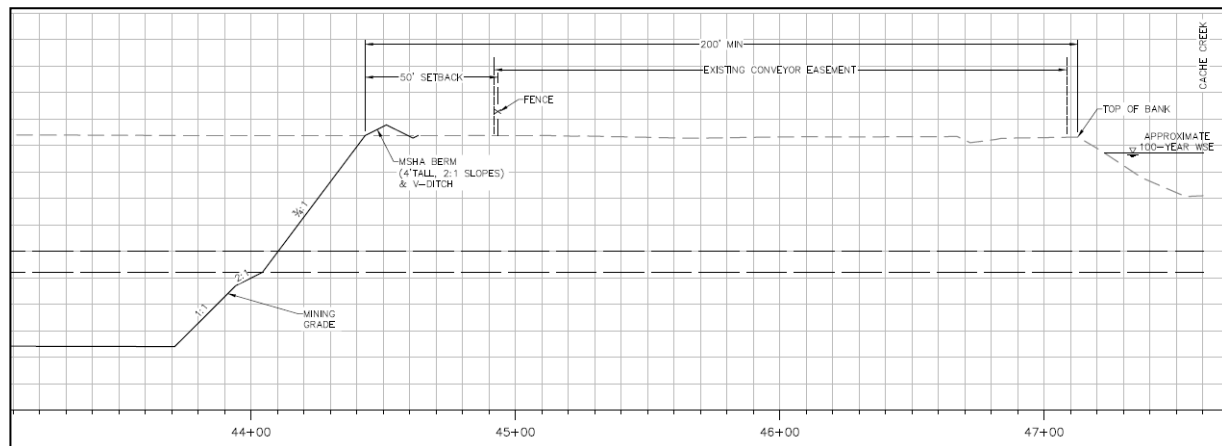
The Shifler site occupies approximately 320 acres south of Cache Creek and east of County Road 94B. Teichert proposes to excavate the site for gravel mining operations. The proposed mining operations will require excavation of the site to a maximum pit bottom elevation of -5 feet mean sea level (MSL). Our previous 2016 *Slope Stability Evaluation* was based on the 2016 *Mining and Reclamation Plans* (Cunningham Engineering, 2016), which considered that the existing Moore Canal would be relocated to a newly constructed concrete-lined channel adjacent to the north and west boundaries of the proposed mining/reclamation area. The new canal would be set back approximately 50 feet from the mining area. Yolo County later included a project alternative (“Alternative A”) where the Moore Canal is not relocated and mining and reclamation occurs on both sides of the existing canal. Geocon evaluated Alternative A as detailed in a memo dated March 2, 2020 (Ref. 2, Geocon 2020).

Currently, the County is considering a third option where the Moore Canal is relocated along the southern boundary of the proposed mining area (“South Canal Alternative”). Cunningham Engineering prepared mining and reclamation plans for this alternative (Refs. 3 and 4, Cunningham Engineering 2020). The purpose of our additional evaluation was to determine if the “South Canal Alternative” mining operation would result in more adverse slope stability or seepage conditions.

DISCUSSION AND CONCLUSIONS

As previously discussed, the South Canal Alternative relocates the existing Moore Canal along the southern portion of the proposed mining pit as shown on Figure 2. The original realignment of the Moore Canal was along the northern portion of the proposed mining pit between the pit and Cache Creek. In Geocon’s previous seepage and stability analysis (Geocon 2016), the original configuration (Moore canal relocated to the north) resulted in a minimum 300-foot setback between the proposed mining pit and the top of bank at Cache Creek. The 300-foot setback accounted for the existing aggregate conveyor easement and the area required for the relocated Moore Canal.

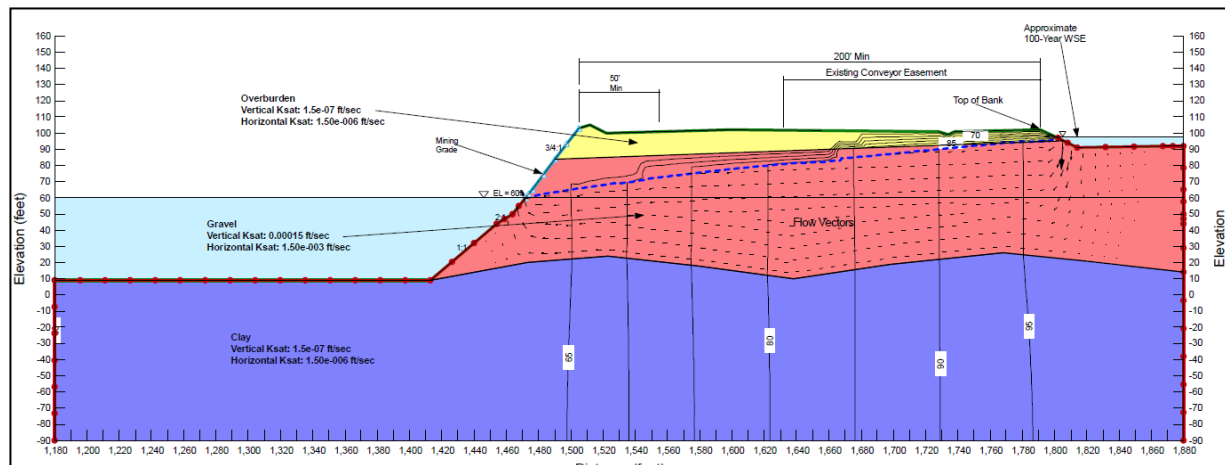
With the South Canal Alternative, mining would occur closer to Cache Creek as the area reserved for the Moore Canal would be mined. This results in a minimum 200-foot mining setback from the top of bank of Cache Creek, as shown in the section below (Cunningham Engineering 2020).



As shown above, the proposed mining slope inclinations are ¾:1 in the upper slope, 2:1 near the ground water level transition and 1:1 below groundwater. These slope inclinations and the overall mining depth are the same as previously proposed with the Moore Canal being relocated north. The only change is that the proposed mining will now be within 200 feet of the top of bank of Cache Creek instead of 300 feet.

As outlined in our 2016 *Slope Stability Evaluation* (Ref. 1), we evaluated slope stability at four locations considered representative of the anticipated mining and reclamation slope conditions. The north slope (adjacent to Cache Creek) is considered the critical slope with respect to seepage and slope stability. Our previous evaluation included a seepage analysis that analyzed the potential for adverse seepage conditions as a result of seepage from Cache Creek and the north relocation of the Moore Canal. The results of our analyses for the two conditions modeled (Cache Creek and the north relocation of the Moore Canal) indicate that the seepage front does not intercept the proposed north mining slope at an elevation higher than the average seasonal high groundwater condition, even when sustained indefinitely (steady-state flow). Therefore, we concluded that subsurface seepage conditions from Cache Creek and the relocated Moore Canal will not adversely impact stability of the proposed mining and reclamation slopes.

For the South Canal Alternative, the mining pit would be approximately 100 feet closer to Cache Creek. Therefore, we repeated the seepage analysis considering only a 200-foot setback from the top of bank of Cache Creek. Results of the analysis are shown below.



As shown above, similar to our previous analysis, the seepage front does not intercept the proposed north mining slope at an elevation higher than the average seasonal high groundwater condition, even when sustained indefinitely. Therefore, we do not expect an adverse seepage condition that would impact slope stability.

Based on our review, the “South Canal Alternative” mining and reclamation option where the existing Moore Canal is relocated along the south portion of the proposed mining pit does not result in more adverse slope stability and seepage conditions compared to the other project alternatives where the Moore Canal is relocated along the north or where the Moore Canal remains in its current alignment. The results of our previous analyses (Geocon 2016 and 2020) and conclusions that the project should not be subject to slope instability, adverse seepage or pit capture remain applicable to this alternative.


CLOSURE

Our professional services are provided in general accordance with generally accepted geological principles and practices used in the site area at this time. No warranty is provided, express or implied.


Please contact us if you have any questions regarding this letter or if we can be of further service.

Respectfully Submitted,

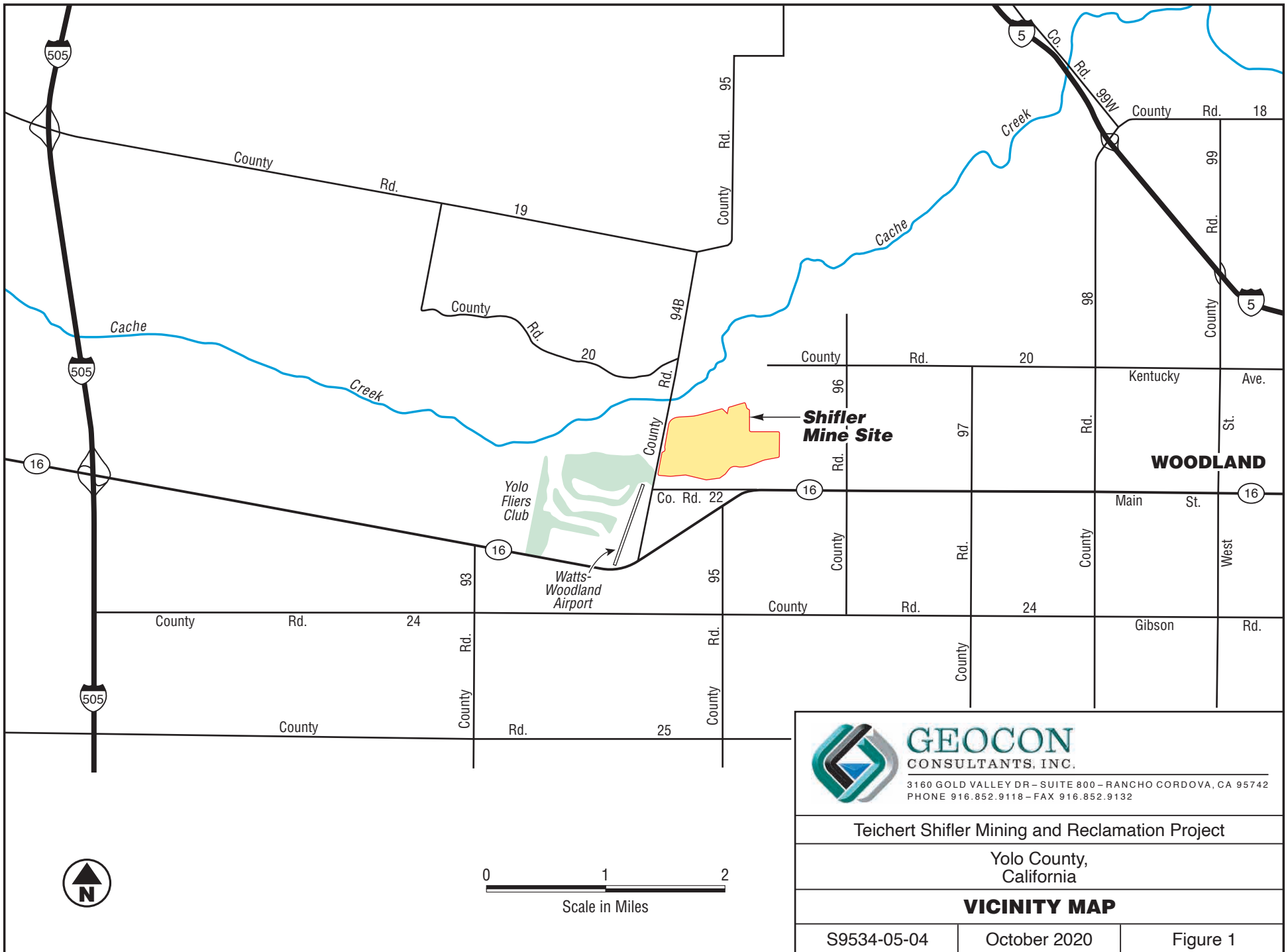
GEOCON CONSULTANTS, INC.


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Attachments: Figure 1, Vicinity Map
Figure 2, Site Plan




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Teichert Shifler Mining and Reclamation Project

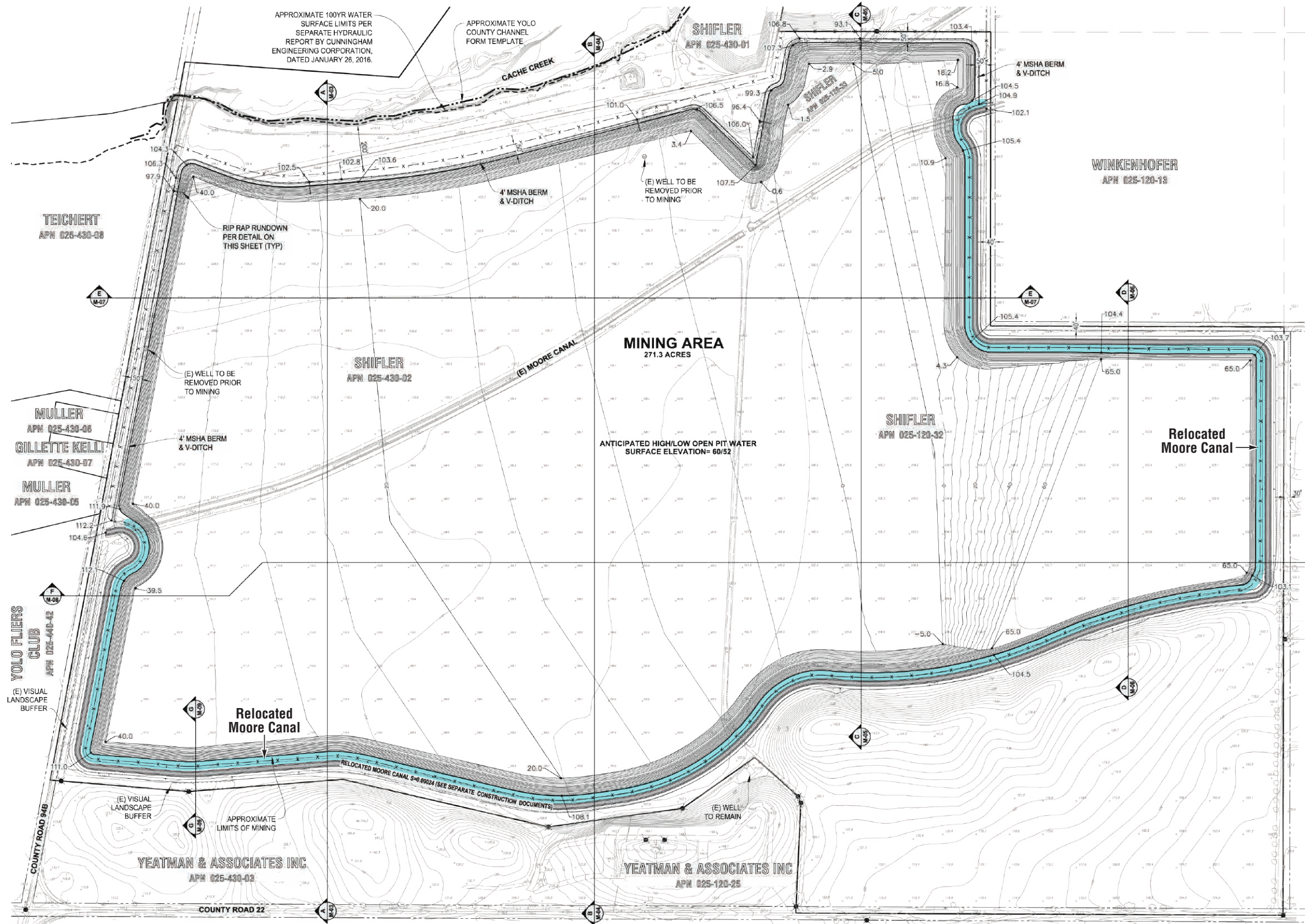
Yolo County,
California

VICINITY MAP

S9534-05-04

October 2020

Figure 1



Ref: Cunningham Engineering, 9/18/20

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Teichert Shifler Mining and Reclamation Project		
Yolo County, California		
SITE PLAN		
S9534-05-04	October 2020	Figure 2