Soils Evaluation Report and Reclamation Plan
Proposed Granite Construction Company
Esparto Facility
West of the Intersection of County Road 87 and
Fulton and Frank Lane
Esparto, California

August 20, 2007
003-09282-00

Prepared for

Granite Construction Company
4001 Bradshaw Road
Sacramento, California 95827

LFR

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APPENDIX A

CERTIFICATION

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in the document have been provided in a manner consistent with the current standards of the profession and to the best of my knowledge comply with all applicable federal, state and local statutes, regulations and ordinances.

8/20/07

J. Scott Seyfried, P.G.
Principal Hydrogeologist

Date

1.0 INTRODUCTION

LFR Inc. (LFR) has prepared this report presenting a soils evaluation and reclamation plan for agricultural soils associated with the proposed Granite Construction Company ("Granite") Esparto aggregate mine operation, located west of the intersection of County Road 87 and Fulton and Frank Lane, in Esparto, Yolo County, California ("the Site"; Figure 1). This report was prepared on behalf of Granite pursuant to the Yolo County Surface Mining and Reclamation Ordinance Title 10, Section 10-5.601, item C2, regarding the reclamation of land used for agriculture. In accordance with the California Department of Conservation, Division of Mining and Geology Surface Mining and Reclamation Act (SMARA) and the Yolo County Surface Mining Reclamation Ordinance, existing soil conditions must be evaluated and a reclamation plan to reclaim prime agricultural lands must be prepared before proposed mining activities begin.

1.1 Purpose and Scope of Work for this Report

This report was completed to accomplish the following objectives:

- Document existing soil conditions at the Site;
- Document existing crop yields for that portion of the Site that is proposed for agricultural reclamation;
- Assess the suitability of the Site for the proposed agricultural reclamation plan;
- Provide guidelines for the preservation of existing soil agricultural resources at the Site; and
- Provide guidelines for implementing the proposed reclamation plan.

These objectives were met through completion of the following scope of work:

- Historical crop yields were obtained for that portion of the Site that is proposed to be reclaimed for agriculture;
- Groundwater elevation data, including historical average high and low groundwater elevations, were obtained for the Site; and
- Research was conducted of the existing soils at the Site to assist with preparation of guidelines for the preservation and reclamation of that soil.

2.0 BACKGROUND

This section of the report presents our understanding of the project description, and provides relevant data regarding existing soils and hydrogeology.

2.1 Project Description

Granite has proposed to surface mine approximately 313 acres north of Cache Creek in Esparto, California. The purpose of this project is to recover subsurface gravel materials from the areas proposed for mining. According to information provided to LFR from Granite, the proposed mine site includes approximately 280 acres of land currently used for agricultural purposes. In addition, Granite's current conceptual reclamation plan includes restoration of 75 of those 280 acres to prime agricultural use. The remaining acreage will be restored as either open space or lake/shoreline habitat. This report focuses on the approximately 75 acres of land (shown on Figure 2) located along the northern site boundary to be reclaimed to prime agricultural use.

Mining and reclamation of the 75-acre agricultural use area will take place in three stages. These stages are indicated on Figure 3 as Ponds 1, 2, and 3. The boundaries indicated on Figure 3 are conceptual and may change as the project progresses. We understand that the mining operation will include excavation and recovery of materials to a depth of approximately 75 feet below current ground surface (bgs). After the desired materials have been recovered, we understand that the 75 acres proposed for future agricultural use will be built up using fines from material processing. These fines will be allowed to settle and dry prior to placement of stockpiled surface soils.

We understand that the total projected life cycle for this mining operation is approximately 30 years, and that reclamation of the 75 acres of agricultural land is projected to take place in stages, with filling of the first pond starting approximately 3 years after commencement of mining operations.

2.2 Hydrogeology

Granite retained Wallace Kuhl and Associates (WK) to install and monitor four shallow groundwater monitoring wells at the Site and to monitor two monitoring wells that had been installed in the site vicinity in 1995 (MW-4B and MW-5), for the purpose of assessing shallow groundwater conditions. Four groundwater monitoring wells (MW-6 through MW-9) were installed on June 5 through 8, 2007. The locations of these wells are shown on Figure 3. According to information provided by Granite, the screened intervals for the wells installed in June 2007 were as follows: MW-6 from 30 to 60 feet bgs; MW-7 from 40 to 70 feet bgs; MW-8 from 87 to 117 feet bgs; and MW-9 from 20 to 55 feet bgs.

The information provided in this section was obtained through review of the data obtained from those wells.

2.2.1 Lithology

Sediments beneath the Site encountered during installation of the WK monitoring wells consisted primarily of light brown soft silt, with trace amounts of medium- to sand-sized basalt from the surface to approximately 5 feet bgs. Brown silty gravel with fine

silt to coarse gravel (up to 1.5 inches) was encountered below 5 feet bgs. These coarser-grained sediments also included flattened, well-rounded gravel, including basalt, quartz, jasper, and metamorphic quartzite, to approximately 49 feet bgs. A fine-grained interval classified as a clay was encountered at each of the site vicinity wells at the following depths: MW-4B at 48 feet bgs; MW-5 at 68 feet bgs; MW-6 at 71.5 feet bgs; MW-7 at 70 feet bgs; MW-8 at 65 to 75 feet bgs (assumed); and MW-9 at 49 feet bgs.

2.2.2 Depth to Shallow Groundwater

Estimated average high and average low groundwater elevation data collected and compiled by WK are summarized on Figures A and Figure B of Appendix A. As shown on those figures, the estimated average high groundwater elevation beneath the area proposed for agricultural reclamation ranges from approximately 150 to 142 feet above mean sea level (MSL). Based on a ground surface elevation of approximately 180 feet MSL, the estimated range of average high elevations correspond to a depth to water of approximately 30 to 38 feet below the ground surface (BGS). Data presented on Figure A of Appendix A indicates that the average low groundwater elevation beneath the area proposed for agricultural reclamation is approximately 139 feet MSL, corresponding to an approximately depth to water of 41 feet BGS. We understand that Granite will be collecting additional groundwater elevation data from each of the wells at this site at least quarterly, and that these data will be used to provide updated groundwater level data.

2.3 Soils

2.3.1 Soil Capability Classifications

The National Resource and Conservation Service (NRCS) has mapped soils in the site vicinity. Soils mapped at the Site include Class I, Class II, and Class IV soils. A description of these classifications is provided below:

- Class I soils have few restrictions that limit their land use.
- Class II soils have moderate limitations that reduce their choice of plants, require careful management or both.
- Class IV soils have very severe limitations that reduce their choice of plants and require very careful management or both.

Based on data from the NRCS, the California Department of Conservation has developed a Farmland Mapping and Monitoring Program (FMMP) to classify agricultural soil types based on their ability to sustain agricultural crops. For purposes of this report, the definition of “prime farmland” is based on the FMMP. According to information obtained in Title 10, Chapter 5 of the Yolo County Code, prime farmland

in Yolo county is qualified as either Class I or Class II soils (as classified by the NRCS). Additional information regarding prime farmland is included in the Yolo County Code. Mapping of the different soil units on the Site is included on Figure 2.

2.3.2 Site-Wide Soils

Soils at the Site consist of alluvium (loams and river wash) deposited by ancestral reaches and flood plains of Cache Creek. The NRCS has mapped the following soil units on the Site: Yolo silt loam (Ya), Brentwood silty loam (BrA), Loamy alluvial land (Lm), Riverwash (Rh), and Soboba gravelly sandy loam (Sn). The acreages and capabilities classifications for these soil units are summarized below.

Table 1: Site-Wide Soil Unit Summary

Soil Unit	Capability Class	# Acres (approximate)	Percentage of Total (approximate)	Prime Farmland Classification*
Ya	Class I/II	81.2	29	Yes
BrA	Class I/II	22.4	8	Yes
Lm	Class IV	47.6	17	No
Rh	Class IV	22.4	8	No
Sn	Class IV	106.4	38	No

Note: Ya and BrA soil units are assumed to be considered prime farmland if irrigated.

* = Prime Farmland according to Table Y of the NRCS Web Soil Survey Report for Yolo County, California

As summarized in Table 1, approximately 104 of the Site's total 280 acres (37%) of agricultural areas have been mapped with soils that have been classified by NRCS as prime farmland. Soils within the 75-acre area designated for agricultural reclamation are limited to the BrA, Ya, and Lm soil types.

Table 2: Soil Unit Summary for the Proposed Reclaimed Agriculture Land

Soil Unit	Capability Class	# Acres (approximate)	Percentage of Total (approximate)	Prime Farmland *
Ya	Class I/II	39	52	Yes
BrA	Class I/II	16.5	22	Yes
Lm	Class IV	19.5	26	No

Note: Ya and BrA soil units are assumed to be considered prime farmland if irrigated.

* = Prime Farmland according to Table Y of the NRCS Web Soil Survey Report for Yolo County, California

As summarized on Table 2, approximately 55.5 of the 75 acres proposed for reclaimed agricultural use (75%) have been mapped with soils that have been classified by NRCS as prime farmland.

2.3.3 Soils within the 75-Acre Agriculture Reclamation Area

Ya (Yolo silt loam): Ya soil is on alluvial fans with slopes less than 1 percent. According to the NRCS, the Ya soil type is characterized by the following profile:

- 0-2 inches bgs: Ap1 horizon, grayish-brown (2.5Y 5/2) silt loam, moderate, thick, platy structure, hard, friable, slightly sticky, and plastic. Many micro and very fine roots. Average pH of 6.7. Abrupt, slightly wavy boundary.
- 2-8 inches bgs: Ap2 horizon, grayish-brown (2.5Y 5/2) silt loam, massive, probable tillage pan, hard and friable, sticky, and plastic. Many micro and very fine roots with common micro tubular pores. Typical neutral pH of 7.1. Clear, wavy boundary.
- 8-19 inches bgs: A11 horizon, grayish-brown (2.5Y 5/2) silt loam, dark brown (10YR 3/3) when rubbed and very dark grayish-brown (10YR 3/2) coatings when moist, weak, coarse sub angular blocky structure, hard, friable, slightly sticky, and plastic. Common micro and very fine random roots. Few thin clay films on ped faces and continuous thin clay files in pores. Neutral pH of 7.2. Clear, wavy boundary.
- 19-26 inches bgs: A12 horizon, grayish-brown (2.5Y 5/2) silt loam, massive, slightly hard, friable, slightly sticky, and plastic. Many micro and very fine and few fine random roots and many micro and very fine tubular pores. Neutral pH of 7.3. Clear irregular boundary.
- 26-33 inches bgs: C1 horizon, brown (10YR 5/3) silt loam, massive, slightly hard, friable, slightly sticky, and plastic. Common micro and very fine random roots, common micro and very fine tubular pores and clusters of interstitial pores. Mildly alkaline with a pH of 7.4. Clear, irregular boundary.
- 33-41 inches bgs: C2 horizon, pale-brown (10YR 6/3) silt loam with dark grayish-brown (2.5Y 4/2) stains in root channels. Massive, soft, very friable, slightly sticky, and slightly plastic. Few micro and very fine random roots. Mildly alkaline with a pH of 7.4. Abrupt, wavy boundary.
- 41-58 inches bgs: Ab horizon, grayish-brown (2.5Y 5/2) silty clay loam. Massive, slightly hard, friable, very sticky, and plastic. Mildly alkaline with a pH of 7.4. Clear, wavy boundary.

As indicated by the above profile, the A horizon for the Ya soil extends to a depth of approximately 20 to 26 inches bgs, and is underlain by a C horizon.

BrA (Brentwood silty loam): BrA is encountered on alluvial fans with slopes less than 1 percent. According to the NRCS, the BrA soil type is characterized by the following profile:

- 0-4 inches: Ap1 horizon, grayish-brown (10YR 5/2) silty clay loam. Massive, hard, friable, sticky and slightly plastic. Common micro random roots and common medium and coarse vertical roots. Mildly alkaline with a pH of 7.5, abrupt, smooth boundary.
- 4-10 inches: Ap2 horizon grayish-brown (10YR 5/2) silty clay loam. Moderate, medium and coarse, sub angular blocky structure. Hard, friable, sticky and slightly plastic. Common micro random roots and common medium and coarse vertical roots. Moderately alkaline with a pH of 8.0, very slightly effervescent, clear and wavy boundary.
- 10-15 inches: B21 horizon, grayish-brown (10YR 5/2) heavy silty clay loam. Weak, coarse, subangular blocky structure. Hard, friable, slightly sticky and plastic. Common micro random roots and common medium and coarse vertical roots. Moderately alkaline with a pH of 8.0, strongly effervescent, gradual, wavy boundary.
- 15-20 inches: B22 horizon, grayish-brown (10YR 5/2) heavy silty clay loam. Weak, coarse, sub-angular blocky structure. Hard, friable, slightly sticky and slightly plastic. Common micro random roots and common medium and coarse vertical roots. Moderately alkaline with a pH of 8.0, very slightly effervescent, clear, wavy boundary.
- 20-35 inches: B3 horizon, grayish-brown (10YR 5/2) silty loam. Massive, hard, very friable, non-stick and slightly plastic. Common micro random roots and common medium and coarse vertical roots. Moderately alkaline with a pH of 8.0, slightly effervescent, 3-inch krotovina present, filed with surface material, gradual, smooth boundary.
- 35-60 inches: C35 horizon, pale-brown (10YR 6/3) silty clay loam. Massive, hard, very friable, slightly sticky and plastic. Common micro and very fine random roots and common medium and coarse vertical roots. Many very fine and fine vesicular, interstitial, and tubular pores with a few thin clay films in pores. Moderately alkaline with a pH of 8.0, very slightly effervescent.

As indicated by the above profile, the A horizon for the BrA soil extends to a depth of approximately 10 inches bgs; the B horizon to approximately 35 inches bgs; and the C horizon to approximately 60 inches bgs.

Lm (Loamy alluvial soil): Lm soil is described as nearly level and excessively drained. Lm soils formed in mixed, stratified alluvium recently deposited adjacent to streams. Lm soils contain a sand, sandy loam, loam, and silt loam texture, and are typically underlain at a depth of 24 to 40 inches bgs by sand and gravel. Slopes are 0 to 2 percent. Lm soils have been mapped on the potentially reclaimed agricultural soil portion of the Site in small, erratic inclusions. Evidence from the aerial photograph (Figure 2) does not indicate that these apparently minor inclusions affect the drainage or performance of the Ya/BrA soil unit. In contrast, where larger inclusions of Lm are encountered, drainage and apparent soil quality is noted on the aerial photograph (see Lm area located approximately 1,200 feet south of the 75-acre area on Figure 2).

2.3.4 Yields

According to Granite, crops grown on the 75-acre area over the past approximately five years have included tomato (2003, 2005, and 2006) and sunflower (2004). We understand that cotton was planted in 2002, with unsuccessful results. Tomato yields have ranged from 39 tons per acre (2003) to 33 tons per acre (2006), with a calculated average of 37 tons per acre. Sunflower yield in 2004 was approximately 870 pounds per acre. Expected yield data for these crops for these types of soil were not available from the NRCS.

3.0 SOIL RECLAMATION PLAN

Soil removal, storage, replacement, and monitoring will be conducted in accordance with the SMARA Article 9 guidelines including information on, but not limited to, backfilling, grading, habitat protection, slope stability, and re-contouring lands.

Strategies for soil replacement and reclamation/rehabilitation activities for the remaining site area (not including the reclaimed agriculture land) are being developed by Granite according to standards identified in the SMARA and Yolo County Code, and are not included in this report. Proposed mining and reclamation techniques implemented by Granite for the Site will be included in Granite's Site Mining Reclamation Plan. The soil reclamation plan for the area of the Site proposed for agricultural reclamation (shown as Pond areas 1, 2, and 3 on Figure 3) is detailed below.

3.1 Removal of Top Soil Overburden

Prior to startup of mining operations, the specific depth of the A/C horizon contact for the Ya soil will confirmed in the field through completion of no less than 10 soil test pits. At least approximately 212,000 cubic yards of A horizon soils will be recovered from the project site for use as the uppermost soil layer during reclamation. This estimate is based on a soil depth of 20 inches over the 75-acre agricultural reclamation area. Approximately 363,000 cubic yards of additional C horizon and/or A horizon soils also will be recovered for use as cover for wash fines and subsoils. This estimate is based on a minimum soil depth of 36 inches of these additional soils over the 75-acre agricultural reclamation area. The minor amount of Lm inclusions within the Ya unit and the minor amounts of BrA soils near the northern edge of the Ya unit will be allowed to mix with the upper approximately 20 inches of Ya A-horizon soil. The potential for mixing of these units is warranted for the Site based on:

- the relatively small area of Lm and BrA soil to be included in the Ya matrix
- the high quality (prime farmland) of the BrA soil
- the similarities of the BrA and Ya soils

3.2 Soil Stockpiling

Double handling of the excavated A-horizon soil material will be kept to a minimum and the procedures used for handling will limit impact on the soils while maintaining functionality. In addition, to assist in soil reclamation, the three pond areas shown on Figure 3 will be mined in order to limit the volumes of reclaimed soil stockpiled on the Site.

Ideally, top soil removed from a given pond will be transported to the adjacent reclaimed pond within the 75-acre agricultural reclamation area with only very minimal stockpiling and storage. This is the most desirable project phasing scenario in that it minimizes potential losses to soil functionality through the storage and stockpiling process and is the most economical way to implement the project.

For those cases where stockpiling of A- and/or C-horizon soils is indicated, this reclamation plan includes the following minimum criteria for soil handling and stockpiling:

Reclaimed soils should be stockpiled with the least amount of soil moisture as feasible within Granite's mining plan. Limiting equipment traffic during the excavation and stockpiling activities will also minimize compaction of the stockpiled material. If possible, soil excavation and stockpiling activities within the reclaimed soil area of the Site should be conducted during the late summer or fall months when the soils are typically at their driest. Following stockpiling activities of the reclaimed soil, minor maintenance of the stockpiles will be conducted (if necessary) to reduce the potential for wind or water erosion. Mounding of the stockpiles to help in surface drainage is suggested along with a vegetation cover. The vegetation cover may assist in minimizing rain or wind erosion and may also be useful in drying the soils to minimize compaction when handled.

3.3 Buildup of Ponds for Agricultural Reclamation

According to Granite's mining plan, washed fines material associated with the gravel mining process will be placed in Ponds 1, 2, and 3. These fines will be placed in stages and allowed to settle and dry prior to placement of stockpiled surface soils. Given the non-load-bearing (agricultural) end use of the agricultural reclamation area, compaction specifications and testing are not included in this reclamation plan.

3.4 Soil Placement, Grading and Cultivation

A minimum of 56 inches of A and C horizon soils will be placed atop wash fines, with a minimum of 20 inches of A horizon soil on top. All soils will be graded for proper drainage. The upper surface of the A and C horizon mixture will be scarified as necessary to allow for a functional transition to the upper A-horizon soil.

Per the Yolo County Surface Mining Reclamation Ordinance Section 10-5.516, the final distance between lowered surfaces reclaimed to agriculture and the average high groundwater shall not be less than five (5) feet.

It is anticipated that the soils will be graded to drain to the south-southeast, generally perpendicular to and away from the West Adams Canal, which will be used for irrigation supply. We understand that the final grade will include a larger subdrain, which will drain irrigation return flow toward the northeast corner of the agricultural reclamation area where a retention pond will be located to collect these waters. Proper subsoil drainage and irrigation systems (including field slope grades) will be determined and designed (if necessary) by qualified engineers before reclaimed soil reconstruction activities begin.

The chemical, nutrient, and organic matter status of the A-horizon soils will be evaluated before mining operations begin and following the reconstruction of the reclaimed soil. Following the evaluation of the status of the reclaimed soil, the necessity for soil treatments and fertilizer requirements will be determined.

Revegetation of the reclaimed agriculture area will be conducted using deep-rooted cover crops in the agricultural fields as the first crops after reclamation. The deep-rooted vegetation may assist in improving soil structure, organic matter and microbial activity.

The chemical, nutrient, and organic matter status of the topsoil will be evaluated following the cover crop. Following evaluation, the agriculture field will be planted with crops previously grown on the Site.

3.5 Performance Criteria and Monitoring

3.5.1 Final Grade Elevation

As identified in the Yolo County Surface Mining and Reclamation Ordinance Section 10-5.516, the final distance between surfaces reclaimed to agriculture and the average high groundwater level will not be less than 5 feet. Digital Terrain Monitoring conducted annually by Yolo County will verify that this criterion has been met. Additionally, as required by the Yolo County Surface Mining Reclamation Ordinance Section 10-5.512, the operator will retain a Licensed Land Surveyor or Registered Civil Engineer to resurvey any areas reclaimed to agricultural usage after the first two (2) crop seasons to monitor the settlement of the fields. Areas where settling has occurred shall be releveled to the field grades specified in the approved reclamation plan.

3.5.2 Crop Yields

Post-reclamation crop yields will be within approximately 80% of pre-mining yields as summarized in Section 2.3.3. If less than approximately 80% of pre-mining yields are obtained during the first three years of cultivation, then Granite will apply soil amendments and/or modify or improve irrigation and drainage to bring yields up to within approximately 80% of pre-mining levels.

4.0 LIMITATIONS

The opinions and recommendations presented in this report are based upon the scope of services, information obtained through the performance of the services, and the schedule as agreed upon by LFR and the party for whom this report was originally prepared. This report is an instrument of professional service and was prepared in accordance with the generally accepted standards and level of skill and care under similar conditions and circumstances established by the environmental consulting industry. No representation, warranty, or guarantee, express or implied, is intended or given. To the extent that LFR relied upon any information prepared by other parties not under contract to LFR, LFR makes no representation as to the accuracy or completeness of such information. This report is expressly for the sole and exclusive use of the party for whom this report was originally prepared for a particular purpose. Only the party for whom this report was originally prepared and/or other specifically named parties have the right to make use of and rely upon this report. Reuse of this report or any portion thereof for other than its intended purpose, or if modified, or if used by third parties, shall be at the user's sole risk.

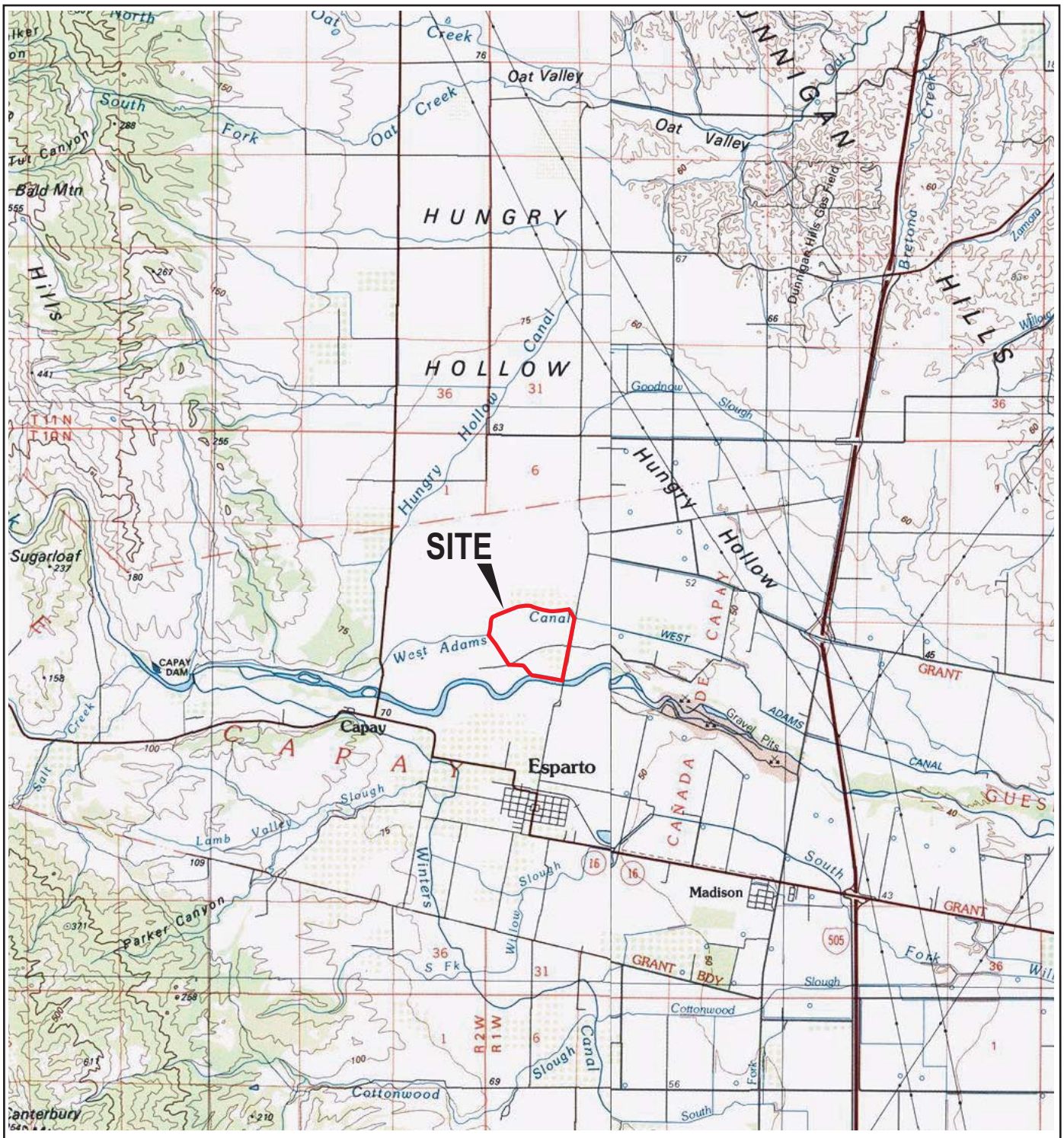
LFR, does not provide any guarantees, certifications, or warranties regarding any conclusions regarding environmental contamination of any such property. Furthermore, nothing contained in this document shall relieve any other party of its responsibility to abide by contract documents and applicable laws, codes, regulations, or standards.

5.0 REFERENCES

California Department of Conservation, Division of Mines and Geology. 1975. Surface Mining and Reclamation Act.

NRCS Web Soil Survey Version 2.0. Yolo County California. www.nrcs.usda.gov. Launched in August 2005.

Yolo County Code. 1979. Surface Mining Reclamation Ordinance, Title 10, Chapter 5.



J:\Illustrator\09282_Granite Esparto\003.09282.00.***\Fig1: Site Loc Map.ai 070707

Site Location Map

Granite Esparto Facility, Esparto, California

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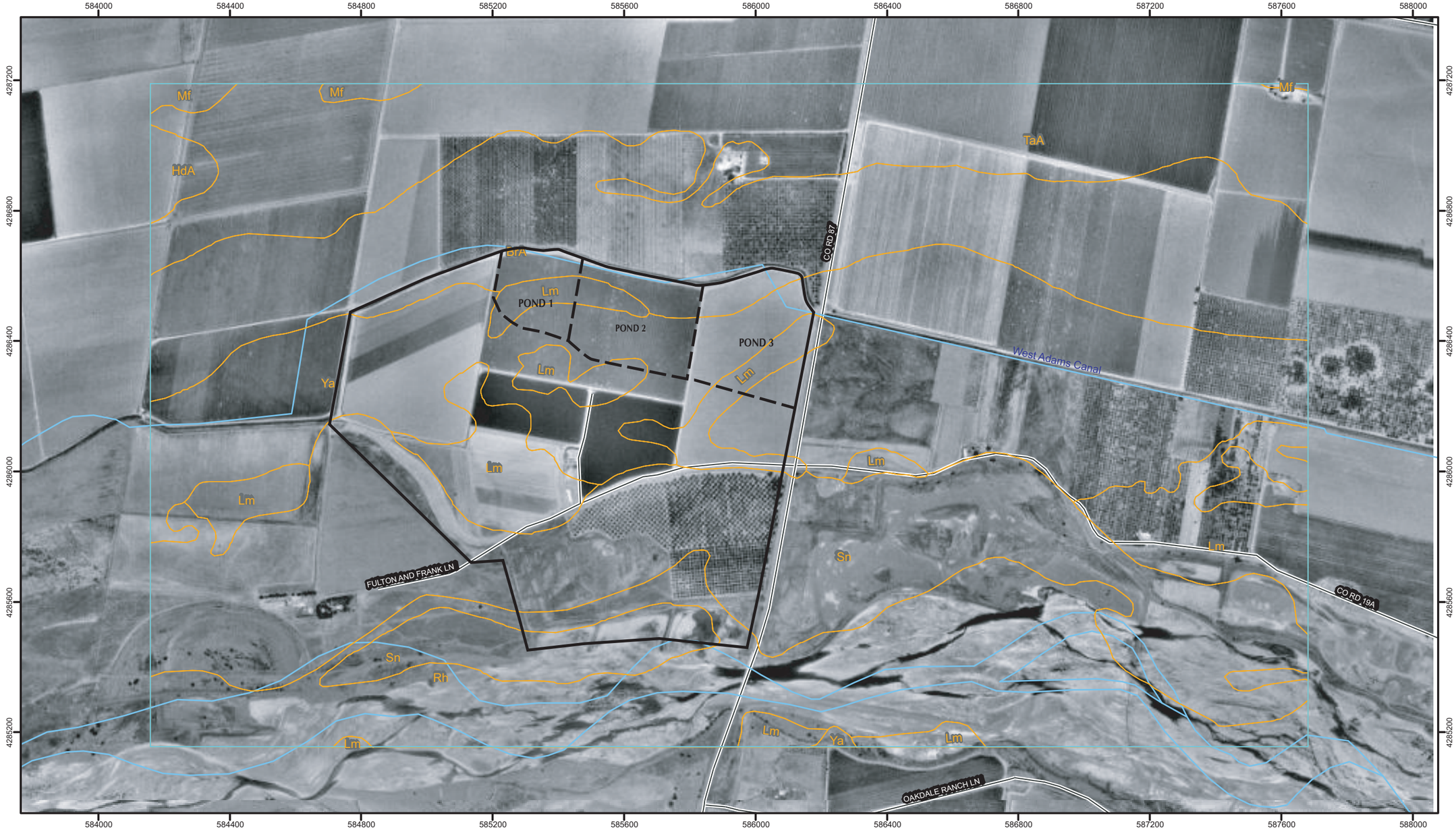
Figure 1



LEGEND

APPROXIMATE SITE BOUNDARY

APPROXIMATE AREA PROPOSED FOR AGRICULTURAL RECLAMATION

Meters: 0, 200, 400, 800, 1,200

Feet: 0, 500, 1,000, 2,000, 3,000

N

SOURCE: Soil unit map provided by the USDA NRCS Web Soil Survey 2.0

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Site Map with Soil Unit Detail

Granite Esparto Facility, Esparto, California

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Figure 2

LEGEND

APPROXIMATE SITE BOUNDARY

APPROXIMATE AREA PROPOSED FOR AGRICULTURAL RECLAMATION

MW-5 GROUNDWATER MONITORING WELL LOCATION

N

0 500 FEET

(APPROXIMATE SCALE)

Site Plan

Granite Esparto Facility, Esparto, California

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Figure 3

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APPENDIX A

GROUNDWATER ELEVATION DATA

WallaceKuhl & Associates Inc

POTENTIOMETRIC GROUNDWATER SURFACE MAP - ESTIMATED LOW

GRANITE ESPARTO FACILITY

Esparto, California

FIGURE	A
DRAWN BY	AEF
CHECKED BY	PJJ
PROJECT MGR	KMB
DATE	7/07

WKA NO. 5871.05

WallaceKuhl & Associates Inc

POTENTIOMETRIC GROUNDWATER SURFACE MAP - ESTIMATED HIGH

GRANITE ESPARTO FACILITY

Esparto, California

FIGURE	B
DRAWN BY	AEF
CHECKED BY	PJJ
PROJECT MGR	KMB
DATE	7/07

WKA NO. 5871.05