



COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT

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KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR

September 1, 2011

Agenda Date: September 14, 2011

Planning Commission
County of Santa Cruz
701 Ocean Street
Santa Cruz, CA 95060

Subject: Review of Olive Springs Quarry Operating Under Mining Approval 88-0233 for Compliance with Conditions of Approval, and Minor Amendment to the Mining Plans

Members of the Commission:

Condition II.I of Mining Approval 88-0233 for Olive Springs Quarry requires that your Commission review this permit every five years (Permit Review). The last Permit Review was completed in 2006. Section 16.54.074 of the County Mining Regulations states that new conditions shall not be imposed as part of this review process unless:

- a) there is a threat to public health and safety;
- b) there is a significant injurious threat to the environment;
- c) there is a nuisance;
- d) there is a violation of approval conditions;
- e) there is a change in the scope of operations; or,

The following analysis and discussion address the Permit Review and Minor Amendment, including background information on quarry operations and the permit process.

Background

The County of Santa Cruz originally opened Olive Springs Quarry in 1932 to supply quarry products for County projects. Since that time the leasehold to operate the quarry and the property ownership has changed a number of times. The operation of the quarry continued through 1993 under Use Permits 431-U, 4413-U, 73-01-Q, and 78-355-PQ. In 1994 the Planning Commission certified an EIR and granted a Mining Approval for a 16-acre expansion and continuation of mining for another 50 years under Mining Approval 88-0233.

The Olive Springs Quarry is located on two contiguous parcels at the northern end of Olive Springs Road, approximately 1.5 miles east of Old San Jose Road on the easterly face of Sugarloaf Mountain (Exhibit A). The site is located adjacent to Soquel Creek

and timber resource land to the east, and the California Department of Forestry's Soquel Demonstration Forest to the north. Rural residential uses exist to the southeast, south and west.

The combined size of both parcels is 296 acres; however, the mining operation takes place within three leasehold areas totaling 132 acres (Exhibit B). The active mining site, the asphaltic concrete plant, and the crusher and screening facilities are located on Leasehold One. It is within Leasehold One that the 16-acre expansion area was approved in 1994. Leasehold Two provides access between Leasehold One and Three, and contains a permitted caretaker's quarters. Leasehold Three is the location of the Quarry entrance, scale house, and material stockpiles. The remainder of the land owned by CHY Company not included in the Mining Approval remains undeveloped, and has been harvested for timber periodically.

The mining operation at Olive Springs Quarry processes decomposed granite products for use in the construction industry. The work face consists of a series of stepped benches from which products are ripped and pushed from upper to lower benches with a large bulldozer. This requirement of moving resources from the upper bench to the lower bench within the limited Quarry area prevents concurrent reclamation of the working face. A front-end loader transports the material from the Quarry bottom to the receiving hopper of the crushing plant. After moving from the primary crusher to the secondary cone crusher, the rock is screened and mechanically conveyed to stockpile areas. Quarry products include base rock, granitic fines, and aggregate, in addition to the asphaltic concrete plant products.

The Planning Commission conducted reviews of Permit 88-0233 in 2001 and 2006. The 2006 Permit Review found that the Quarry was in substantial compliance with the conditions of Mining Approval 88-0233. At that time your Commission approved a Minor Amendment to the permit to incorporate changes to the operational drainage plan, a new revegetation plan, and various changes to Conditions of Approval.

Permit Review

The quarry is in substantial compliance with the Conditions of Approval of Permit 88-0233. A complete review of permit compliance is included in Exhibit C with review comments enclosed in boxes. The resolution of an issue involving Soquel Creek and recent landsliding on the quarry face are discussed below and in the Minor Amendment section of this staff report.

Protection of Soquel Creek

During the later parts of the dry season when pond water is depleted the quarry is allowed to pump water from Soquel Creek. Because of the potential impact on protected fish species during low-flow conditions the Conditions of Approval require maintenance of a minimum creek flow rate during pumping and limit the pumping rate. In the past, County staff had verified by inspection the maintenance of minimum flow rates and pumping capacity within the permit allowance. However, in order to more

accurately verify compliance with the permit condition as written, the operator was required to measure creek flow, collect the specific information listed in the permit conditions, and provide it to the County in the annual report.

The operator worked with a consultant and the California Department of Fish and Game on a design and permitting for a proposed temporary flume device to measure stream flow during withdrawal periods. During this process concern regarding creek flows and the Quarry's pumping was heightened in 2008 when Coho salmon, a federally listed endangered species, were observed in Soquel Creek. In response to the high costs associated with creek monitoring the Quarry pursued a new groundwater well as an alternative water supply. In 2008 the Quarry successfully completed a well with enough capacity to meet the Quarry's water needs throughout the dry season eliminating the need for creek pumping altogether.

Minor Amendment

In February 2010, two landslides occurred on the quarry face at Olive Springs Quarry. In January 2011, additional expansion of the top of landslide area occurred. The landslides occurred entirely within the granitic rock comprising the quarry face, and entirely within the authorized mining boundaries. The quarry operator was required to block access points to the slide area and create a safety buffer around the slide area with a combination of measures including earth berms, barricades and signage.

Conditions of Approval of the Quarry's permit require that the annual report include information from an engineering geologist regarding safety of the working face. In addition, the annual report must include information from a civil engineer regarding drainage on the working face as it affects safety of the working face. The annual report submitted July 1, 2010, included reports from the quarry's engineering geologist addressing the slope failure and the safety of the work face, reports from the quarry's civil engineer addressing drainage on the quarry face, and a slide mitigation plan.

The initial report by the engineering geologist (Exhibit D) provides a possible explanation for the failure as follows: The highly sheared working face was lengthened and oversteepened during a drought. When rainfall conditions returned to normal, high pore pressures decreased the stability of the working face and the slides occurred. The failed area will likely continue to expand into unbuttressed areas of the quarry face that have elevated pore pressures, low strength (sheared zones), oversteepened faces, and long unbenched slopes. The report recommends avoiding and monitoring the landslide area, additional drainage diversion, and changes to future mining procedures. All of these recommendations were implemented.

As required by the Conditions of Approval of the Quarry's permit a quantitative slope stability analysis using state-of-the-art geotechnical engineering methods was completed to determine appropriate bench heights, bench face angles, bench width, and overall slope angle for temporary and final quarry slopes (Exhibits E and F). These recommendations of the geotechnical report have been accepted by the County's engineering geologist and geotechnical engineer and have been incorporated into the

amended mining plans. Exhibits G, H, and I provide additional recommendations, and review of the amended mining plans by the Quarry's geologist and geotechnical engineer.

Based on inspection by County staff and recommendations of the Quarry's engineering geologist it was deemed safe to continue mining the northern portion of the mining face, which is separated from the area of recent landsliding by more than 200 feet. Slope conditions in the northern area are not as steep or long as those that failed. Excavation in the northern portion of the mining face has occurred primarily during the wet season to continue to provide material for the quarry's product stockpiles. The recommendation of the geotechnical report regarding slope and bench geometry are followed during excavation in the northern portion of the quarry face.

Mining the northern portion of the quarry face does not provide enough material for the quarry's production needs. Therefore, the quarry's engineering geologist has provided recommendation for mining accumulated landslide material below the failure on the quarry face (Exhibit J). This is done during the dry season according to strict procedures to ensure maximum safety of quarry personnel.

The long term plan for excavation of the quarry face is to start excavating from the top of the face and work down and through the landslide area, eventually mining out the landslide before reaching the established mining limits. The overall change to the mining plans consists of shorter and lower angle slopes and wider benches to create more stable interim and final slopes.

The amended mining plans show the configuration of final slopes, the current configuration of the northern portion of the mine, and the first phase of mining to mine out the landslide area (Exhibits K and L). The plans also include the procedures for mining the accumulated landslide material during the dry season. It has been determined that the proposed changes qualify for a Minor Amendment (County Mining Regulations Section 16.54.020) because the changes reflect a minor change to the mining operation having no significant impact on the environment. The amendment would result in lower angle slopes within the previously approved mining limits. The Minor Amendment results in new Exhibits added to the existing Conditions of Approval. Exhibits E through L in this report are incorporated into the Conditions of Approval as new Exhibits O through V.

The California Environmental Quality Act (CEQA) review of the existing mining permit 88-0233 is valid for this Minor Amendment because the amendment does not include any mining that has not already been permitted by 88-0233. The landslide and the adjustments in the mining plan take place entirely within the approved mining area. The actions taken to respond to the landslide and adjust the mining plan are contemplated in the existing permit conditions that were crafted to anticipate such events and respond to them.

Recommendation

As a result of the analysis and discussion above and in the Permit Review in Exhibit A staff recommends that your Commission take the following action:

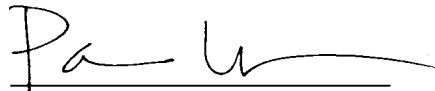
- Conduct a public hearing and perform a review of the Olive Springs Quarry for compliance with conditions of approval
- Add new Exhibits O through V to the conditions of approval showing temporary and final quarry wall excavation design

Sincerely,



David Carlson
Resource Planner

Reviewed By:



Paia Levine
Principal Planner

Exhibits:

- A. Vicinity Map
- B. Site Plan
- C. Permit Review
- D. Geologic Inspection of Winter 2010 Working Face Failures, letter report prepared by Rogers E. Johnson and Associates dated June 3, 2010
- E. Geotechnical Investigation Design Phase, Temporary Northern Quarry Wall Excavation Design, report prepared by CMAG Engineering, Inc. dated July 22, 2010 (Recommendations only)
- F. Geotechnical Investigation Design Phase, Temporary and Final Quarry Wall Excavation Design, report prepared by CMAG Engineering, Inc. dated December 26, 2010 (Recommendations only)
- G. Addendum to Geotechnical Report, letter prepared by CMAG dated March 23, 2011
- H. Geotechnical Plan Review, letter prepared by CMAG dated April 5, 2011
- I. Stability Assessment of Working Face, letter report prepared by Rogers E. Johnson and Associates dated April 6, 2011 (Text only)
- J. Review of Short-term Mining Procedures, letter report prepared by Rogers E. Johnson and Associates dated May 9, 2011
- K. 2011 Mining Procedures, by Olive Springs Quarry (Reduced Plans)

- L. Phase 1 Grading Plan, and Final Grading Plan and Details, consisting of sheets C-1, C-2, and C3 by Ifland Engineers dated March 25, 2011 (Reduced Plans)

Vicinity Map

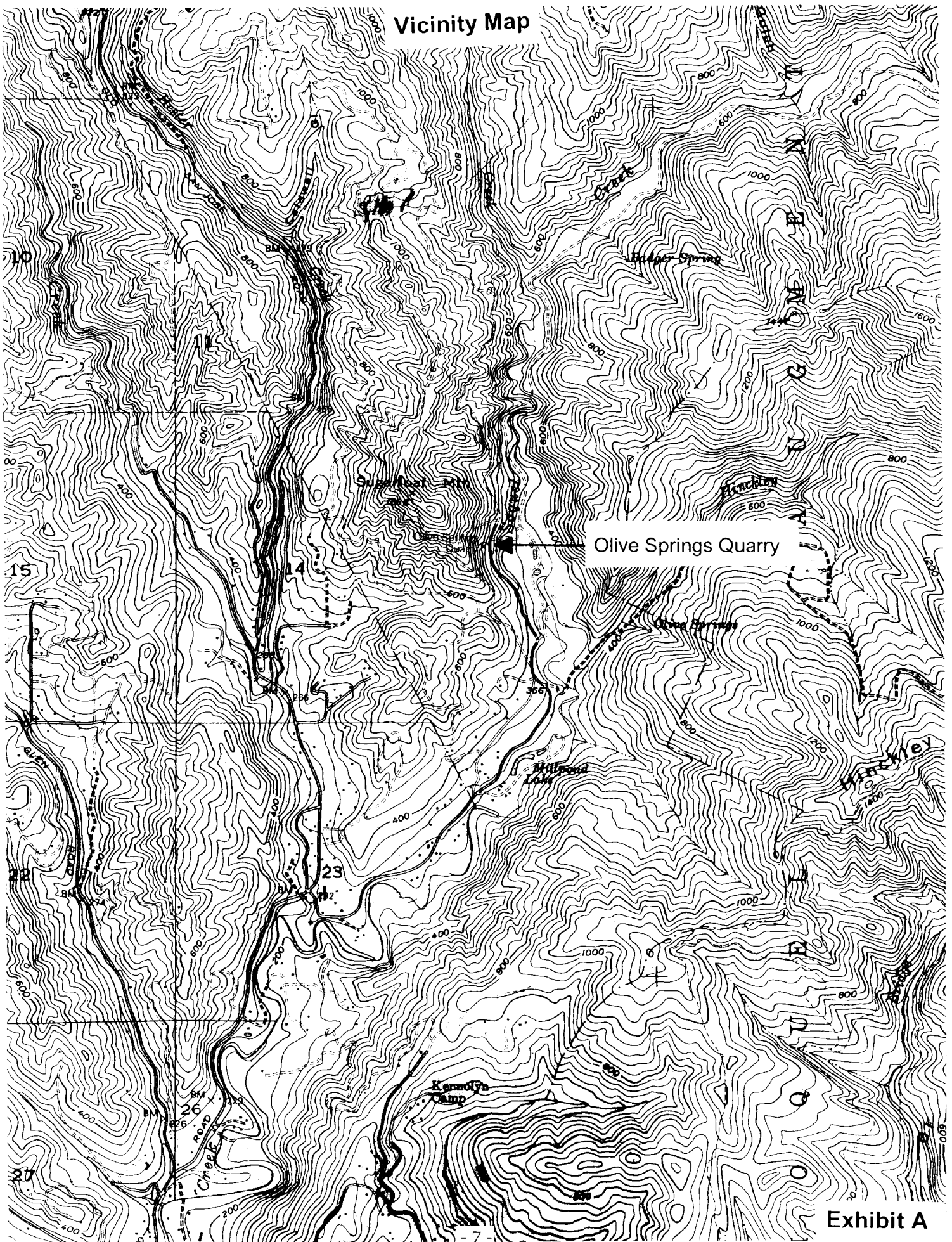
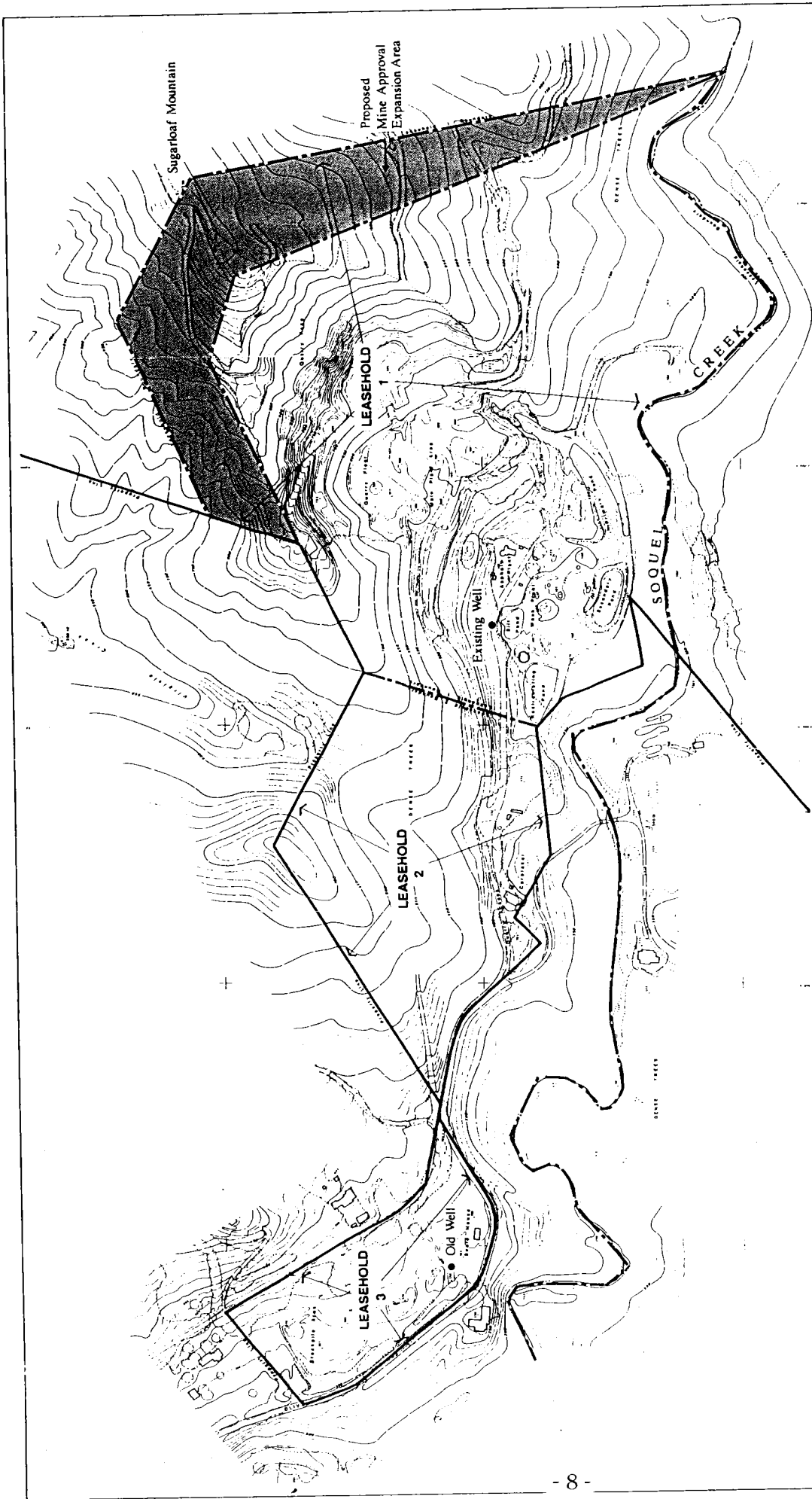


Exhibit A



Source: Ifland Engineers Inc., February 1992
03-08-92(PSC101)

Scale in feet
0 360

Figure 3

Project Site Plan

LSA

**Olive Springs Quarry
Mining Approval 88-0233
2011 Permit Review**

Note: Conditions of approval are listed in original outline format with staff review comments enclosed in boxes. Proposed new conditions of approval are underlined.

I. Exhibits

All mining operations shall conform to the following exhibits, which are incorporated as conditions of this Mining Approval, except as modified by specific permit conditions set forth below.

- A. Topographic Map of Olive Springs Quarry, Ifland Engineers, November 20, 1990 (one sheet).
- B. Leasehold One, Grading and Drainage Plan, Depletion Year 1993, Ifland Engineers
- C. Leasehold One, Ponds "A" and "B" Levee Buttress Plan, Ifland Engineers, Inc., October 22, 1993 (one sheet).
- D. Leasehold One, Pond "C" Levee Buttress Plan, Ifland Engineers, Inc., October 22, 1993 (one sheet).
- E. Leasehold One, Site Plan Depletion Year 2000 through 2080, Ifland Engineers, Inc., December 12, 1992, (five sheets).
- F. Leasehold Three, Maximum Stockpile Plan and Sections, Ifland Engineers, Inc., April 16, 1993 (two sheets).
- G. Leasehold Three Drainage Plan, Ifland Engineers, Inc. (Revised May 25, 1993-one sheet).
- H. Grading and Drainage plan, Leasehold One, Year 2080 Drainage System, Ponds A, B, C, with Site Sections, Ifland Engineers, Inc., Rev. December 4, 1992. (Final Mining and Grading Plan- three sheets).
- I. Revegetation Plan by Greening Associates dated May 2006
- J. Leasehold One Erosion Control Plan with Supporting Drawing, LSA Associates, November 30, 1993 (44 pages and 1 drawing).
- K. Draft Environmental Impact Report, Olive Springs Quarry, LSA.
- L. Final Supplemental EIR, LSA November 30, 1993.
- M. Draft Supplemental EIR, LSA, May 28, 1993.

Exhibit C

N. Mitigation Monitoring and Reporting Program, LSA, November 30, 1993

O. Geotechnical Investigation Design Phase, Temporary Northern Quarry Wall
Excavation Design report prepared by CMAG Engineering, Inc. dated June 3,
2010

P. Geotechnical Investigation Design Phase, Temporary and Final Quarry Wall
Excavation Design report prepared by CMAG Engineering, Inc. dated December
26, 2010

Q. Addendum to Geotechnical Report, letter prepared by CMAG dated March 23,
2011

R. Geotechnical Plan Review, letter prepared by CMAG dated April 5, 2011

S. Stability Assessment of Working Face, letter report prepared by Rogers E.
Johnson and Associates dated April 6, 2011

T. Review of Short-term Mining Procedures, letter report prepared by Rogers E.
Johnson and Associates dated May 9, 2011

U. 2011 Mining Procedures, by Olive Springs Quarry

V. Phase 1 Grading Plan, and Final Grading Plan and Details, consisting of sheets
C-1, C-2, and C3 by Ifland Engineers dated March 25, 2011

Copies of the above documents are available at the County of Santa Cruz Planning
Department.

Mining operations conform substantially with the County's Mining Regulations, SMARA and the above Exhibits, which are the basis for the following review. The proposed Reclamation Plan Amendment would add new Exhibits to this list as follows:

- Geotechnical Investigation Design Phase, report prepared by CMAG Engineering, Inc. dated December 26, 2010
- Addendum to Geotechnical Report, letter prepared by CMAG dated March 23, 2011
- Geotechnical Plan Review, letter prepared by CMAG dated April 5, 2011
- Stability Assessment of Working Face, letter report prepared by Rogers E. Johnson and Associates dated April 6, 2011
- Review of Short-term Mining Procedures, letter report prepared by Rogers E. Johnson and Associates dated May 9, 2011
- 2011 Mining Procedures, by Olive Springs Quarry
- Phase 1 Grading Plan, and Final Grading Plan and Details, consisting of sheets C-1, C-2, and C3 by Ifland Engineers dated March 25, 2011

II. GENERAL PROVISIONS

- A. This Approval shall supersede all provisions of Use Permit 78-355-PD, and shall be the sole and exclusive permit or approval authorizing mining operations at the Olive Springs Quarry and shall control and bind owner and all future owners, lessees, or operators.

Mining operations stayed within the boundaries of the approved area, and are in substantial compliance with the Conditions of Approval.

- B. This Approval is for the extraction, processing, storage, and shipping of all mineral resources obtained from the property, including the hot plant facilities, for production of asphalt conducted in accordance with the conditions herein and for the reclamation of existing, proposed and previously mined land as shown in the approved Reclamation Plan (Exhibits "H" and "I").

The operations at the Olive Springs Quarry are in general conformance with the Mining Approval for the extraction, processing, storage, and shipping of mineral resources.

- C. This Approval is limited to a portion of the following County assessor parcel numbers: 099-171-02, -03. For specific areas of mining and reclamation within these areas, please refer to above listed Exhibits.

The Quarry has maintained operations to the parcels noted. APN 099-171-02 has changed, the new number is 099-251-01.

- D. Minor variations to this Approval meeting the standards of County Code Section 18.10.134 and requested by the mining operator or staff which do not change the general concept of use and operation, and which do not adversely affect the environment, may be approved in writing by the Planning Director following review and recommendation by the County's Environmental Coordinator.

Under the Mining Regulations the definition for Minor Amendment is difficult to distinguish from the definition for Minor Variation found in §18.10.134. It was decided to process the proposed changes discussed in this report as a Minor Amendment because the proposal does include a change to the Mining Plans, which are a key aspect of the approval.

- E. If, at any time, the Planning Director determines that there is a substantial noncompliance with any of these conditions, and/or Exhibits, the Planning Director shall forward a recommendation to the Planning Commission to set a hearing to consider a revocation of this approval in accordance with the provisions of County Code Section 18.10.136.

The quarry is in substantial compliance with these conditions.

- F. Within 45 days from the date of issuance of this Approval, the property owner and applicant shall sign, date and return two copies of the Approval to indicate acceptance and agreement with the conditions thereof. By signing this Approval, property owners agree to file a Declaration with the County's Recorder Office within 45 days from the date of acceptance, binding themselves and any future lessees to the revegetation and reclamation requirements of this Approval. The Declaration shall be supplied by the Planning Director. Failure to sign the Approval or record the declaration as described above shall render this Approval null and void and all mining operations shall cease at the Quarry site except reclamation and revegetation work in accordance with the above listed exhibits.

The Quarry Operator complied with this condition in March 1994.

- G. All mining and reclamation activities shall conform with the Conditions of Approval and with the regulations of the following agencies as they apply to the mining operations. The mining operator shall provide the County with copies of any permits issued by these agencies and any permit amendments, within 30 days of receipt.
1. Central Coast Regional Water Quality Control Board (RWQCB)
 2. Monterey Bay Unified Air Pollution Control District (MBUAPCD)
 3. California Department of Fish and Game (DFG)

The Quarry operation requires compliance with permits with the RWQCB, MBUAPCD and DFG. In the annual report to the County the quarry provides copies of annual reports demonstrating compliance with permitting requirement of RWQCB and MBUAPCD. The issue involving DFG, stream monitoring during water withdrawals, has been resolved with the quarry developing a groundwater well for water supply.

- H. This approval shall expire 50 years from the date of issuance.

The permit was issued in 1994; therefore, 50 years extends to 2044.

- I. The Approval shall be reviewed by the Planning Commission within five years from the date of issuance. Subsequent reviews shall be done at a 5-year interval unless the Planning Commission determines that a shorter interval is necessary. In connection with such review, the Planning Commission shall take public testimony and shall otherwise investigate the permittee's compliance with the conditions of this Approval if there is a threat to public health and safety, a significant injurious threat to the environment, a nuisance or a violation of permit conditions.

The last Permit Review was completed in 2007.

- J. In conjunction with the annual report to the State Geologist required by SMARA, an Annual Report to the Planning Director shall be prepared by the mining operator or other professional determined by the Planning Director as qualified to prepare such a report. The report shall be submitted by the mining operator to the Planning Director each year by July 1. If the Planning Director determines the need for an independent consultant with specialized expertise, the mining operator shall obtain such consultant. All costs of such report and its review shall be paid by the mining operator. The report shall include the following unless waived or modified in writing by the Planning Director.

1. A report on compliance with all Conditions of Approval including the required monitoring programs.

This report is included in the annual reports.

2. An analysis of any significant changes in environmental conditions or in the mining operation, which have not been anticipated in this Approval.

Analysis of the landsliding has been included in the annual report and other technical reports and plans.

3. A current aerial photograph of the site (1" = 200' scale) showing facilities, stripped areas, and re-vegetated and reclaimed areas, together with a report on the extent of excavation and reclamation completed in the previous year and projected for the coming year.

Yearly aerial photographs have been included in the Annual Reports.

4. Every fifth year, a current aerial photogrammetric topographical map prepared from current aerial photographs map (1" = 200' scale with a 10 foot contour interval) showing lease and property lines and all the requirements of II.J.3 above.

This map was prepared in 2005 and updated in 2010.

5. A revegetation report prepared by a botanist, horticulturist or plant ecologist retained by the mining operator and approved by the Planning Director. The revegetation report shall describe the degree of success in achieving the objectives of the revegetation plan, and shall identify any changes or additional measures, which may facilitate achievement of the desired results.

For reasons discussed in this staff report, concurrent reclamation does not occur at this mine. When revegetation activities commence annual revegetation reports will be included in the annual report for the mine. Invasive weed control is an ongoing activity on the mine site.

6. Written verification of the renewal and/or validity of the financial assurance.

An updated financial assurance cost estimate has been approved and the financial assurance mechanism will be updated accordingly.

7. A report to be held as proprietary information in accordance with the County's Mining Regulations, stating the annual amounts of production and shipping of mining products, and the estimated time to complete mining in the permitted area.

This information is submitted to the Planning Department in each annual report.

8. A noise report prior to the required 5-year review shall be prepared by a qualified noise/acoustical consultant retained by the mining operator and approved by the Planning Director. The noise report shall determine whether or not the mining operator is in compliance with noise standards contained in the County Mining Regulations, and shall investigate and make recommendations regarding (relative to noise mitigations): (i) Any mining equipment used at the mining site; (ii) Proposed and existing noise protection; (iii) Any other significant impact resulting from mining operations. The mining operator shall implement all recommendations of the noise consultant determined to be necessary by the Planning Director for compliance with the conditions of the Approval.

A noise reports submitted in 2010 demonstrates compliance with noise standards.

9. All reports submitted to the Monterey Bay Unified Air Pollution Control District.

These reports are included in the annual report.

10. An inspection report by an Engineering Geologist addressing the safety of the work face.

This report is included in each annual report. The report for 2010 is significantly more detailed because it addresses the landsliding on the quarry face.

- K. All costs for the County's inspections and review of the Annual Reports and other reports submitted by the Quarry shall be paid by the Quarry, within 30 days after billing.

All invoices are paid promptly.

- L. All mining operations shall be in compliance with the State's Surface Mining and Reclamation Act (SMARA).

Except for the landsliding on the quarry face Olive Springs Quarry mining operations are in compliance with SMARA. This is documented in Annual Inspection Reports submitted to the State by the County in compliance with SMARA. The landsliding has been addressed and a plan is in place to maintain a low risk from landslide-related hazards during ongoing mining operations.

- M. In the event that future County inspections of the subject property disclose non-compliance with any Conditions of this Approval or any violation of the County Code, the operator shall pay to the County the full cost of such County Inspections, including any follow-up inspections and/or necessary enforcement actions, up to and including Approval revocation.

The quarry is in substantial compliance with Conditions of Approval.

- N. Within 120 days of the Approval of this application or prior to disturbance in the new mining area, whichever comes first, the Quarry should submit a revised financial assurance, in conformance with the requirements of SMARA, that takes into account the expanded mining area and the approved revegetation and reclamation plans. The Planning Director shall forward the financial assurance to the State Board of Mining and Geology for review and approval as specified in SMARA.

An updated financial assurance cost estimate has been approved and the financial assurance mechanism has been updated accordingly.

III. OPERATING REQUIREMENTS

A. Mining Operation

1. All mining activities, including clearing, excavation or other disturbances shall be done in conformance with the above Exhibits. Setbacks shall be measured from the property boundary lines on a horizontal plane. Within 60 days of issuance of Approval, staff shall determine which limits of Leasehold One and Three shall be surveyed and permanently staked at a 200 foot (maximum) interval by a licensed surveyor and fenced with a 3 foot high fence to prevent trespassing. Fencing and staking shall be completed within 120 days from Approval.

All mining activities have occurred within the areas designated on the above Exhibits. The limits of Leasehold One and Three were surveyed and staked in 1994, and have been maintained. The maintenance of the staking has been verified by quarterly inspections. The staked boundary has been roped-off, and posted with warning signs.

2. A benchmark shall be established in the mining floor at the 550-foot elevation in a visible area not proposed for disturbance. (Mit. B.1.2.)

A benchmark has been established on the Quarry floor, and maintained, as verified by inspections.

3. Any undiscovered active fault traces encountered during the mining operation shall be evaluated by an Engineering Geologist and documented in the required Annual Report. If an active fault trace is observed, the Engineering Geologist shall review the stability of the work face. (Mit. B.2.2.)

No new fault traces have been discovered per the reports of the Consulting Geologist and inspection by County staff.

4. The work face shall be excavated in compliance with the benching standards set forth by the Santa Cruz County Mining Ordinance, OSHA, MSHA, and in accordance with the above Exhibits. (Mit. B.3.1.)

The Quarry face experienced a landslide that was probably caused by a combination of groundwater conditions and oversteepened slopes. Pursuant to the County Mining Regulations the operator has retained professional consultants to investigate the landslide and the quarry face to establish new recommendations for bench heights, bench widths, slope angles, and phasing patterns for continued mining of the quarry face. The operator has implemented these recommendations. The technical reports and new mining plans would be added to the Exhibits of the permit.

5. Annual inspection of the work face shall be conducted by an Engineering Geologist to address conformance with the Mining and Drainage Plan. The annual inspection shall evaluate unexpected adverse geological conditions that may be encountered during mining operations. An inspection report shall be prepared by the Engineering Geologist and shall be included in the above required Annual Report. The report shall include the following:
 - a. A determination of how the newly exposed geologic structure will affect the stability of the work face.
 - b. An examination of stability factors using common engineering geologic graphs (hemispheric projections);
 - c. An examination of potential slope failures by a geotechnical engineer experienced in rock mechanics using data derived from the geologic examination;

- d. A statistical analysis of the various features that can cause weakness in the slope (classification of the orientation, persistence, roughness, undulation and aperture of the fractures or joints in the work face); and,
- e. How the fractures are filled or not filled with materials such as clay, rock, dust etc. The engineering geologist need not attempt to examine all fractures and joints, but can collect data along lines that represent different rock types in order to extrapolate the characteristics of the entire work face. (Mit. B.3.3 & B.3.2)
- f. If any discontinuities are discovered in the inspection of the work face, a geotechnical engineer shall develop a program to evaluate the discontinuities including, but not limited to, any wedge or block slide type failure analysis. (Mit. B.3.3. & B.3.2.)

The most recent geologic and geotechnical investigation of the work face is presented in the following reports:

- Geotechnical Investigation Design Phase, report prepared by CMAG Engineering, Inc. dated December 26, 2010
- Addendum to Geotechnical Report, letter prepared by CMAG dated March 23, 2011
- Geotechnical Plan Review, letter prepared by CMAG dated April 5, 2011
- Stability Assessment of Working Face, letter report prepared by Rogers E. Johnson and Associates dated April 6, 2011
- Review of Short-term Mining Procedures, letter report prepared by Rogers E. Johnson and Associates dated May 9, 2011

6. Production shall be limited to 226,000 tons per year of wet and dry aggregates and 35,000 tons per year for wet aggregates. If this aggregate production rate should be exceeded, it shall be reviewed by the Planning Commission for impacts to traffic, noise, air quality and other related issues.

Production information submitted to the Planning Department in each annual report is consistent with these limits.

7. Within 120 days after Approval has been granted and continuously thereafter, the outer boundaries of the mining site shall be posted with signs providing notice of approved mining operations to the public. Each sign shall state in letters not less than four inches in height: "MINING APPROVAL NUMBER _____" and in letters not less than one inch in height: THIS PROPERTY MAY BE USED FOR THE MINING AND PROCESSING OF ROCK, SAND, GRAVEL AND MINERALS. THE HOURS OF OPERATION AND MAINTENANCE ARE AS FOLLOWS; _____." Each sign shall be maintained in legible condition at all times.

The specified signs have been placed along the outer boundary s of the mining area, as required, and have been maintained.

B. Surface Drainage and Erosion Control:

1. All erosion control work shall be completed by October 15th of each year and stay in effect until April 15th. (Mit. B.5.2. & Mit. C.3.11).
2. Measures provided in the Mining and Drainage and Revegetation Plans shall be implemented to reduce sediment concentrations. These measures shall include provisions and maintenance of ditches and waterbars along existing and future dirt roads and filter berms.
3. Existing drains and berms created to control storm water runoff shall be modified and maintained as necessary to provide adequate runoff control without erosion and sedimentation of Soquel Creek, and monitored annually to evaluate their effectiveness. The control of runoff from the work face and floor shall be in conformance with the above Exhibits. If required by the Planning Director, all design changes and improvements to the drainage system shall be designed by a Registered Civil Engineer and submitted to County Planning for review, approval, and incorporated into this Approval. The following additional drainage and erosion control measures shall be implemented immediately:
 - a. The quarried material stockpile shall be moved at least eight feet from the outboard edge of the Quarry floor.
 - b. The six foot diameter culvert outlet extension shall be maintained to allow present and future runoff to continue discharging onto granitic rock to the headwall of the canyon.
 - c. The erosion scar below the discharge pipe of Pond B shall be filled with rip-rap to a minimum gradient of 1.6:1. (Mit. C.1.1.)

The erosion control measures specified in items 1, 2 and 3 above have been implemented. The Civil Engineer's reports included in each annual report have verified these conditions have been met, and that surface erosion has been significantly reduced. The operator has recently installed additional drainage controls in an effort to further reduce runoff from the mining area and improve water quality.

4. The proposed phased quarry expansion shall provide interim drainage control facilities for the site's increased drainage area as the mining operation progresses. Drainage control on the quarry face and floor shall be inspected and evaluated annually by the project engineering geologist and civil engineer. The annual geologic inspection of the working face by the

engineering geologist and the annual drainage report by the civil engineer shall provide conclusion on the adequacy of interim drainage control facilities and, if appropriate, provide recommendations for improvements. The goals are to minimize the potential safety hazard from slope failure on the quarry workface, which may be caused by improper drainage control, and minimize erosion and sedimentation, which will preserve the capacity of the ponds. (Mit. B.5.1. & C.1.2.)

The geologist and geotechnical engineer, in conjunction with Planning Department staff, have recommended additional drainage control measures on the quarry face in respond to the landsliding. These measures have been implemented.

5. Sediment detention ponds shall have the capacity to hold the runoff from repeated high-intensity and/or long-duration winter rainstorms and detain this turbid water until a sufficient amount of sediment removal has occurred. To accomplish this, one or more of the following mitigation measures shall be implemented immediately:
 - a. Pond A and B sediment shall be removed annually, or less frequently at the discretion of the quarry's civil engineer or Planning Department staff, during the summer/fall periods in order to maintain the volume established by the 2005 topographic survey. (Mit. C.2.1)

The ponds are periodically cleaned out to maintain capacity in conformance with this condition.

- b. The inlet level of the 30-inch culvert in Pond B shall be lowered by a minimum of 1.0 foot. (Mit. C.2.1)

This was completed in 2007.

- c. If material removed from the ponds has dried sufficiently (by September or October of each year), it shall be taken to Leasehold Three for temporary stockpiling until it can be sold. (Mit. C.2.1.)

The material excavated from the ponds has been stockpiled for processing near the ponds, and not taken to Leasehold Three. The storage of the material at this location is appropriate.

6. A written annual drainage report prepared by the Quarry's Civil Engineer shall be included in the Annual Report. (Mit. C.2.3.)

Annual inspection and report by the Quarry's Civil Engineer are completed and included in each annual report to the County.

7. Prior to stripping any new areas covered by loosely consolidated sediments (overburden) the operator shall notify the Planning Director for inspection to evaluate whether the stripping will affect erosion control measures. (Mit. C.3.1.)

Stripping of new area has not affected erosion control measures.

8. Prior to October 15, the Quarry shall clear the work face of large quantities of loose sediment and debris, which are prone to severe erosion during rain storms. (Mit. C.3.2.)

The quarry Operator keeps the work face free of loose material prior to the rainy season.

9. Channels that are designed to concentrate and direct storm water runoff into the sediment pond detention system shall be armored with erosion resistant materials (such as rip-rap) at points of potential gullyng. The areas to be protected shall be decided by the Quarry's Civil Engineer and recommendation included in the Annual Report to the County. (Mit. C.3.3.)

Rock armoring of channels has not been necessary since no rilling or gullyng is evident on the quarry floor. The large old gully above Pond A is stable, having eroded down to sound granite bedrock years ago.

10. The surface area of the Quarry which is stripped, mined or otherwise disturbed at any given time shall be minimized to the greatest extent compatible with reasonable mining and marketing requirements. (Mit. C.3.4.)

Given the relatively confined operational area of the Quarry, this condition has been met.

11. Upon completion of the mining operations, reclamation and revegetation of each bench shall be done as soon as possible, in accordance with the Revegetation Plan. (Mit. C.3.5.)

Final benching of the quarry face, starting at the top, has not commenced.

12. All changes and improvements to the surface drainage system shall be designed by a Civil Engineer and a brief report addressing any changes and improvements shall be included in the Annual Report. (Mit. C.3.7.)

The quarry is in compliance with this condition.

13. The recommendations of the Mining and Drainage Plan shall be implemented, as amended through the annual operational drainage reports approved by the County Planning Department. During winter months, a siphon system may be used in Pond B. (Mit. C.2.2.)

The quarry is in compliance with this condition.

C. Protection of Soquel Creek

1. Quarry storm water runoff control facilities into Soquel Creek shall be in compliance with the accepted Regional Water Quality Control Board (RWQCB) "natural turbidity" limits as set forth in the current approved RWQCB Discharge Order. (Mit. C.3.6.)
2. Prior to any discharge of pond water into Soquel Creek, turbidity and suspended solid tests of Soquel Creek and settling ponds shall be compared in order to determine if adequate settling has occurred in the ponds and if the pond's water quality is acceptable for release into Soquel Creek. The testing must take place immediately prior to discharge. (Mit. C.3.7)
3. Monitoring of water quality and discharges from the Quarry shall follow the standards for permissible increases in suspended solids and turbidity established by the RWQCB's Discharge Order and any standards set by California State Fish and Game. (Mit. C.3.7.)
4. If settling pond water is released, turbidity tests shall be run immediately upstream and downstream of the discharge point during discharge into Soquel Creek to monitor any increases in turbidity as a result of the release of pond waters. (Mit. C.3.7.)
5. As required by the RWQCB Order 89-02 (or subsequent Orders) for Leasehold One, runoff discharge into Soquel Creek shall meet the specified water quality requirements. A similar permit for Leasehold Three water discharge into Soquel Creek shall be obtained. All water quality monitoring and reporting requirements of the RWQCB shall be complied with. (Mit. C.3.8.)

Occasionally during the winter, overflow of storm water from Pond B and Leasehold 3 enters Soquel Creek. Additionally, overflow of storm water mixed with process water from Pond C enters Soquel Creek. These discharges are regulated under permits issued by the RWQCB. Results of monitoring and reporting of these discharges, whenever they occur, are reported to the RWQCB and copies of these monitoring reports are submitted to the County in the quarry annual report. The monitoring and reporting indicate that the Ponds and other drainage and erosion control measures are effective at detaining storm water and process water and the quality of any overflow

discharges is well within the standards established in the RWQCB permit.

6. A minimum flow rate in Soquel Creek of 0.5 to 0.75 cfs, as determined by the Department of Fish and Game, shall be maintained regardless of the water needs of the Quarry operations. Water withdrawal from the Creek shall not occur while the maintenance of this minimal flow rate is in jeopardy. Before any creek withdrawal, the operator shall be responsible for measuring the creek flow rate outside the southern boundary of the Quarry property. (Mit. C.5.1. & D.3.4.)
7. Unless a new agreement is made with the Department of Fish and Game, surface water pumping for mining operations shall not exceed their current permit allowance of 0.36 cfs. Any new requirement of the Department of Fish and Game are hereby included as conditions of this Approval. In the event that water from Soquel Creek is needed for mining operations, the flow rate, the date of withdrawal, the time duration and rate of withdrawal, as well as the downstream creek flow rate during withdrawal shall be logged by the operator and submitted to County Planning for review in the Annual Report. (Mit C.5.4. & C.5.2.)

In 2008 the Quarry successfully completed a well with enough capacity to meet the Quarry's water needs throughout the dry season eliminating the need for creek pumping altogether.

8. Any discharge into Soquel Creek from either Leasehold One or Three shall be monitored in accordance with standards established by the RWQCB. Monitoring shall be done by an independent laboratory or, as an alternative, may be accomplished by the installation of a mechanical/electrical turbidity meter. All monitoring results shall be included in the Annual Report. (Mit. C.3.7. & D.3.3.)

The annual monitoring reports submitted by the quarry indicate that any discharges are monitored according to standards established by the RWQCB.

9. Prior to any pumping from Soquel Creek for mining operations, the operator shall notify the Planning Director for review of the necessity of pumping and to verify that the operator has investigated and tried new ways of minimizing their surface water pumping from Soquel Creek. (Mit. C.5.3)

In 2008 the Quarry successfully completed a well with enough capacity to meet the Quarry's water needs throughout the dry season eliminating the need for creek pumping altogether.

D. Protection of Pond Levees:

2. On or before October 15, 1994, the following measures shall be implemented to increase the stability of pond levee "B":
 - a. Because of the presence of heavy vegetation at the outboard slope of the levee which precludes access to heavy equipment and stabilizing work, an acceptable factor of safety shall be achieved by limiting the height of the water level within the pond to 376 feet above Mean Sea Level (MSL) by pumping water to pond "C" or the adjacent creek. Elevation markers shall be placed in the pond by the Quarry's Civil Engineer to verify the water level during quarterly inspections for verification of the 376 foot elevation. (Mit B.4.2)
3. Pond water shall not be released at a rate which exceeds one-third of its capacity per 24 hours to prevent the rapid drawdown of pore waters within the levee which could result in levee failure. (Mit. B.4.4)
4. All levees shall be maintained to prevent uncontrolled discharge into Soquel Creek during a major earthquake and/or unusual storm event. (Mit. D.3.1)

The measures specified in the conditions above have been met. Inspection reports from the Quarry's Geotechnical Engineer and Civil Engineer on these issues are included in Planning Department files. Planning staff have also observed compliance with these conditions during quarterly and annual inspections.

E. Groundwater Protection:

1. Operators shall continue to protect the existing local groundwater level and quality by not mining below the proposed final 550-foot elevation and by not expanding pond capacity by increasing their depth but rather by increasing their width. (Mit. C.6.1)

Mining operations have been maintained above the 550-foot elevation per the elevation monument surveyed onto the Quarry floor, and Planning staff's quarterly inspections.

2. Mining Operations shall maintain a minimum 20-foot separation between peak groundwater table and the mining floor.

A minimum of 20-feet of separation from the Quarry floor to the groundwater table has been maintained.

F. Revegetation and Reclamation:

1. Within 90 days from issuance of Approval, a Habitat Management Plan with performance standards as set by SMARA shall be completed by a qualified biologist and submitted to County Planning for approval and inclusion in the Reclamation Plan for all species of concern as identified in the 1993 EIR by LSA. This report shall include nesting habitat for purple martin, golden eagle habitat identification of habitat of southwestern Pond Turtles, California Red-legged Frog and Foothill Yellow-legged Frog. (Mit. D.2.1 & D.2.2)

Olive Springs has complied with this condition. A Habitat Management and Monitoring Plan has been completed by Greening Associates in April 1994.

2. The Revegetation Plan designed by Greening Associates (May, 2006) shall be implemented to offset potential vegetation and wildlife impacts as soon as and area within the approved mining area is completed. (Mit. D.1.1 & D.2.3)

The revegetation plan will be implemented upon mining completion as the final quarry face is constructed starting with the top bench and working down.

3. The Revegetation Plan submitted by BioSystems Analysis shall be amended to include performance standards for revegetation. This amendment shall be included in the first Annual Report.

Performance standards for revegetation are incorporated into the new Revegetation Plan (Greening Associates May, 2006).

4. The Revegetation/Reclamation Plan shall be amended to indicate the location of all temporary topsoil storage areas. This amendment shall be included in the first Annual Report. (Mit. K.1.1)

All topsoil shall be stockpiled at Leasehold 3. Only minimal new stripping has occurred during this five year review period.

5. Upon closure of mining activities, all ponds shall be fenced. A 6-inch opening between the ground and the bottom of the fence shall be maintained to allow the passage of small animals. (Mit. K.2.1)

To be completed upon closure of mining activities.

6. Slash and brush from on-site clearing shall be chipped and added to the reserved topsoil on Leasehold Three. (Mit. K.1.2)

Slash and brush have been added to stockpiles in Leasehold Three per County quarterly inspections.

7. As soon as revegetation areas are available, test plots shall be conducted to determine the most successful revegetation procedures. (Mit. K.1.3)

There is an area on an existing bench on the mine face where test plots can be established, which will occur pursuant to the new Revegetation Plan.

8. Reclamation and revegetation shall occur concurrent with the continued mining to the extent feasible. (Mit. A.1.1)

Final revegetation areas are currently not available because virtually the entire quarry face is worked at the same time.

9. The Reclamation Plan shall conform to the County Mining Regulation standards. (Mit. C.3.12)

The Reclamation Plan conforms to the County Mining Regulations.

10. All drains, facilities, and devices to control storm water runoff shall be maintained effectively during reclamation. (Mit. C.3.13)

The quarry is in compliance with this condition during mining and this is to continue during reclamation.

G. Protection of Viewshed:

1. In the event that material in excess of the permitted 25,000 tons of material is needed to be stored on Leasehold Three, the extra material will be limited to a three-month storage period. After that time, all material in excess of 25,000 tons shall be removed from the Quarry property. If the need for storage of excess material occurs in future years, after the maturation of the vegetative screen required by this permit, the amount of material maintained on Leasehold Three may exceed the 25,000 ton existing limit for a longer period of time to the extent that the screening is effective. This additional amount of stored material shall require written approval by the Planning Director, in advance of placement of the material. (Mit. F.3.1)

There is less than 25,000 tons of material on Leasehold Three. This has been verified by the Quarry's Civil Engineer, and by quarterly inspections by Planning staff.

2. Benches on the work face shall be contoured to provide for a gradual transition into the adjacent hillside. (Mit. B.1.1)

This condition will be met as benches are completed in the future. Work face excavation, with regard to final contours, has not yet progressed to the final contour stage since this Approval.

3. Within 90 days of the date of issuance of Approval, the vegetative screening shall be planted along the southern property line of Leasehold Three to complement the existing sparse vegetation between the adjacent residences and the Quarry. This vegetation shall be planted and maintained by the Quarry according to a landscape plan prepared by a qualified botanist and reviewed and approved by County Planning. (Mit. F.2.1)

Additional vegetative screening has been planted along the southern property line of Leasehold. The previously existing vegetation has filled in substantially since approval. Additionally, the stockpile along the southern end of Leasehold Three provides a substantial visual and sound screen to the properties south of the Quarry. Quarterly inspections have verified that the existing vegetation and stockpile is adequate to fulfill the screening requirement.

H. Protection of Paleontological Resources:

1. In the event that significant paleontological resources (i.e., significant skeletal remains that would substantially contribute to the knowledge of prehistory) are found during mining operations, all work shall be halted within 200-feet of the find and the Planning Director shall be notified immediately. A qualified paleontologist shall be retained to assess the significance of the find and implement mitigation measures recommended as a result of such assessment, consistent with the County's Paleontological Resource Protection ordinance. (Mit G.1.11)

Paleontological resources have not been discovered during operations.

I. Operating and Shipping Hours:

1. Hours of Quarry operation shall be 7:00 AM to 7:00 PM, Monday through Friday, but only during daylight hours. Retail sales may be allowed 7:30 AM to 12:00 noon on Saturdays.

County Planning has not received complaints of Quarry operations being conducted outside of the approved hours.

J. Traffic Control:

1. The Quarry shall request from the Department of Public Works warning sign placement along Soquel-San Jose Road at its northern and southern approaches to Olive Springs Road to warn drivers of truck traffic entering and exiting Soquel-San Jose Road. Any cost of the preparation and placement of signs shall be paid by the Quarry. (Mit. H.2.1)

Signs have been placed along Soquel-San Jose Road as specified.

2. Pavement conditions along Olive Springs Road shall be monitored by the County Public Works Department to determine the extent to which pavement degradation is attributable to Quarry operations. The Quarry shall be responsible for repairing unacceptable pavement conditions caused by Quarry traffic. (Mit H.4.1)

The Department of Public Works assesses pavement damage caused by Quarry related trucking on Olive Springs Road. Pursuant to this permit the quarry will be responsible for repairs accordingly.

3. When logging of the Soquel Demonstration Forest begins in spring of 1994, the Quarry and the State Forest shall coordinate operation schedules to prevent traffic backup on this roadway. The State Forest access through the Quarry shall continue as administrative only, and public use by recreational visitors shall be prohibited by signing and gating the roadway to the State Forest. (Mit. A.2.1)

Since Approval, logging has taken place on the Soquel Demonstration Forest, and on the lands of CHY Company, with no significant traffic problems. The required signs and gating are in place.

4. The applicant shall maintain an affirmative action program to inform all truck drivers of their obligation to comply with State and Federal vehicle noise regulations and State and local traffic regulations, and encourage programs of vehicle safety and driving courtesy. The Quarry shall maintain a speed monitoring and enforcement program at Olive Springs Road. The program shall include the following, at a minimum:
 - a. Verification, using radar or other appropriate means, of truck speeds on Olive Springs Road. This verification shall occur at least two days per week, on a random day basis. The Quarry shall keep a record of the speed verification program and shall provide a summary of the results to the County in the Annual Report.
 - b. Trucks exceeding the posted 25 mph speed limit shall be reported to the Quarry. The Quarry shall provide written warnings to drivers observed exceeding the speed limit. Three-time violators shall be prohibited from transporting materials from the Quarry for a period of at least 30 days. Copies of the written warnings to truckers shall be provided to the Planning Department upon request and included in the annual report.
 - c. All complaints of excessive truck speed shall be reviewed by the Quarry and kept in a permanent log. All complaints shall be investigated

promptly. Immediately following any complaint the quarry shall provide written response to the complainant and the Planning Department and copies of the complaint log and all complaint correspondence in the annual report. The quarry shall maintain an answering machine to accept complaints 24-hours per day.

- d. The Quarry shall provide written notification of the speed limit and the consequences of non-compliance to all truck drivers entering the Quarry. A sign informing drivers of the 25 mph speed limit on Olive Springs Road shall be posted at the weigh station.

The quarry maintains a program to inform and remind truckers of the speed limit and traffic courtesy expectations on Olive Springs Road. The quarry has been diligent in their speed enforcement program as is evidenced in the voluminous radar log section in the annual reports. The quarry operator issues speed limit reminders to truckers and warnings to truckers caught speeding. Planning staff does not receive complaints regarding truck traffic on Olive Springs Road.

K. Air Quality:

1. Actively used unpaved Quarry roads shall be watered or sprayed with lignin sulfonate or other environmentally approved dust retardant to reduce fugitive dust.

The Quarry has been diligent in maintaining their road system for dust control, as verified by quarterly Planning staff inspections.

2. All equipment and processing facilities shall be maintained in accordance with the Monterey Bay Air Pollution Control District standards for stationary sources.

The Olive Springs Quarry has maintained their permits with MBAPCD, and Planning staff has verified the permits are in good standing with MBAPCD staff. Annual reports include use log of equipment and processes that produce air emission to verify operations within limits set by the air district permits.

3. By October 14, 1994, the operation of the asphalt plant shall be permanently fueled by Liquefied Petroleum Gas (LPG). The use of diesel fuel shall be discontinued. (Mit. I.2.1)

The asphalt plant has been converted to LPG, as verified by Planning staff and MBAPCD inspections.

4. Revegetation in accordance with the approved Reclamation and Vegetation Plan shall be initiated as soon as practical in order to minimize fugitive dust.

Revegetation has not yet begun on the Olive Springs Quarry property, however, erosion control efforts on Leasehold Three have greatly reduced fugitive dust from that area, paved roads and unpaved road watering continue to be effective at controlling fugitive dust.

L. Miscellaneous Conditions:

1. Any new on-site structures shall incorporate approximate seismic forces (a mean peak horizontal ground acceleration of 0.54, a maximum horizontal ground acceleration of 52 cm/sec, and a 20-40 sec ground shaking duration) into the design of criteria, and be designed by a registered Civil Engineer. (Mit. B.2.1)

There have been no new structures constructed on the Olive Springs Quarry site.

2. The Quarry shall obtain a Timber Conversion Permit from the California Department of Forestry prior to any timber harvest on the site. The Quarry shall comply with all requirements of this permit including installation of erosion control measures of the cessation of harvest and institution of the fire protection measures both during and after harvest. (Mit. E.1.1)

The Quarry has obtained the required permit from CDF.

3. All drains, facilities and devices to control storm water shall be maintained to operate effectively during Quarry reclamation. (Mit. C.3.13)

Effective drainage control is maintained during quarry operations and is to continue during reclamation.

4. The Quarry and CHY Corporation shall work with the County Parks and Open Space and Cultural Services Department to determine if a trail from Olive Springs Road to the Soquel Demonstration Forest is safe and feasible. The results of the research shall be reported by staff to the Planning Commission on the consent agenda in one year.

As reported to the Planning Commission in 2001, a meeting was held with County Parks, the California Department of Forestry (CDF), County Planning, and the CHY Company. The result of this meeting was that the potential routes investigated for access were infeasible due to safety issues regarding the Quarry, or steep slopes. Although access is not appropriate during mining operations, safety issues associated with mining operations would be eliminated after mining operations cease. Further work pursuant to this Condition of Approval at that time may determine that access is safe and feasible. Therefore, it is premature to eliminate this condition.

CDF is pursuing the development of access from Soquel-San Jose Road by purchasing three private parcels along Soquel-San Jose Road and linking these properties to the Demonstration Forest, which involves discussions with the CHY company to acquire access across a corner of the larger CHY Company property on which the quarry is located on the northwest side of Sugarloaf Mountain.

M. Mitigation Monitoring Program

The mitigation measures contained in Exhibit "N" of this permit have been incorporated into the conditions of approval for this project in order to mitigate or avoid significant effects on the environment. As required by Section 21081.6 of the California Public Resources Code, a monitoring and reporting program for the mitigations is hereby adopted as a Condition of Approval and is attached as Exhibit "N". The purpose of this monitoring is to ensure compliance with the environmental mitigations during project implementation and operation. Failure to comply with the Conditions of Approval, including the terms of the adopted monitoring program, may result in permit revocation pursuant to Section 18.10.136 of the Santa Cruz County Code. All mitigation monitoring shall be documented in the required Annual Report. If the next quarterly inspection following the submittal of the Annual Report shows non-compliance with any provisions of this Mining Approval, enforcement actions in accordance with the County Code and SMARA will be implemented to achieve compliance.

As described in this Permit Review the quarry is in substantial compliance with Conditions of Approval and the Mitigation Monitoring Program.

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3 June 2010

Job No. G95064-43

Christine Bone, Manager
Olive Springs Quarry
P.O. Box 747
Soquel, California 95073-0747

Re: Geologic Inspection of Winter 2010 Working Face Failures
Olive Springs Quarry, Mining Approval 88-0233
Olive Springs Road, Santa Cruz County, California

Dear Ms. Bone:

As the contracted engineering geologists for the Olive Springs Quarry, we have completed our initial review of the recent failures on the working face at the quarry.

During the weekend of 6-7 February 2010, two large slides occurred on the working face of the quarry. These slides have subsequently enlarged in a piecemeal fashion. We inspected the working face of the quarry on 11 February 2010 with quarry staff and Gary Ifland of Ifland Survey, the project surveyor. We performed follow-up inspections on 4 and 30 March, and 18 May 2010. The slide area consists of a North Slide on the tallest portion of the working face, and a smaller South Slide immediately to the south (Figure 1; 2010 Aerial Photograph of Quarry and Figure 2; Photograph of Slide Area). During our inspections, we noted that the slide areas were limited to the active working face of the quarry and occurred entirely within the granitic rock comprising the quarry face. The failures likely toe at the base of the working face along a narrow bench with the slide deposits burying the bench and extending down onto a wide bench above the quarry floor. Photographs of the North and South slides appear on Figures 3 and 4, respectively.

Ifland Survey surveyed the slide area on 16 February 2010 and summarized the slide dimensions and their locations on the quarry working face in a letter dated 18 February 2010. The letter includes a map depicting the slide area superimposed upon a 2005 aerial topographic map of the quarry. As evident in the field and on the Ifland survey, the slide masses conceal the base of the slide scars. In addition, the slide masses themselves mantle an irregular rock slope extending from the buried bench to the wide bench below. Because of the potential for continued minor sloughing in the vicinity of the slide areas, close inspection and detailed surveying of the slide area was not performed. For these reasons the true extent of the slides and their masses is difficult to ascertain, and therefore the volume of failed material can only be estimated. In addition, the slides continue to enlarge, deepening and failing at their margins in a piecemeal fashion. During our 4 March

Rogers E. Jr - 32 - & Associates

which there may be a color contrast or along which the crushed granite has been eroded from (Figures 3 and 4). Groundwater seeps are present along some faults. The faults or shears are related to the main trace of the Zayante Fault which trends northwest-southeast through the quarry property (Figure 1). Although the dominant orientation of shears trend northwest and dip steeply to the southwest, many shears trend southwest into the working face and dip steeply to the southeast. The shears are planes of weakness across which there is little to no cohesion of the granitic rock. Most of the failures have occurred on and are bounded by these faults or shears.

Prior to 1998 or so, the working face of the quarry was not smoothly contoured like it is today. It was rocky and uneven, a result of the mining methods at the time. Since 1998, the current working face of the quarry has been smoothly contoured from the upper bench downward as granite is mined. The recent slides on the working face occurred in areas where much smaller spalls have occurred in the past. Johnson and Weber (1974) identified the area of the recent slides as being a weak zone of faulted and fractured rock. For the most part however, the working face during its development has adequately retained its contoured slope.

During the mining of the working face over the past several years, the bench at the base of the working face (above which the failures are occurring) has been lowered and as a result the slope of the working face lengthened. We are not aware of any time in the past when the working face, in the fashion it is currently mined, was as long as it is today. We measured the slope gradient of portions of the working face during our 4 March 2010 follow-up inspection at the quarry. In the area of the recent slides, the uppermost 240 feet or so of the working face has a slope gradient of about 54 degrees (138%), below which the slope steepens to about 61 degrees (180%) for the remaining 120 feet to the bench at the base of the working face.

Prior to this winter the working faces of the quarry have been marginally stable: any change in conditions on the working face can potentially destabilize all or portions of the slope. The length and steepness of the slope on which the failures occurred, the highly fractured material, degree of weathering of the exposed granite, the presence of numerous shears in the area of the slides and the abundance of runoff and groundwater from recent rains all likely contributed to the slides. Following is a possible failure scenario: The steep working face of the quarry becomes further steepened due to mining of harder, less weathered granite near its base (bluish color on Figure 3). Continued downcutting of the active bench into the harder granite lengthens the steepened slope of the working face. Continued lengthening of the slope through downcutting of the bench occurs during several years of below average rainfall (i.e. low pore pressures). With resumption of normal or above average rainfall, runoff infiltrates the many shears and highly fractured granite of the working face at the quarry. This groundwater elevates the pore pressures along shears and fractures in the granite. In addition, clay minerals which result from the weathering of feldspars within the granite absorb percolating groundwater and dilate. Elevated pore pressures and dilation of clay minerals decrease the cohesion of the shear-bounded granite. At the base of the steepened working face, where stresses are highest, the granite responds by 'popping out' or spalling along shears and fractures, creating a void on the quarry face. The granite face above the spall is now unsupported and it too fails. The spall area continues to grow as the unbuttressed material on the working face continues to fail along shear-bounded zones. To summarize, the highly sheared

working face was lengthened and oversteepened during a drought. When rainfall conditions returned to normal, high pore pressures decreased the stability of the working face and the slides occurred.

During our recent inspections, we observed no significant changes in mining procedure or drainage on the working face of the quarry since our annual quarry inspection in April 2009 (REJA, 2009).

Recommendations

The failed area will likely continue to expand into unbuttressed areas of the quarry face that have; elevated pore pressures; low strength (sheared zones); oversteepened faces; and long unbenched slopes. For this reason, the area of the recent failures on the working face of the quarry should be avoided by equipment and personnel. As rainfall diminishes, the elevated pore pressures within the fractured granite will decrease, thereby temporarily increasing the stability of the working face. No attempt to remove failed material should be made until the slide area as a whole is deemed safe. Until such time, mining activity should focus on the intact portions of the working face north of the failure which do not have slopes greater than 200 feet in length. Future slopes on the working face should maintain gradients less than 55 degrees (150%), and be interrupted by benches at intervals of 200 feet measured along the working face.

It should be noted that future seismic shaking from regional earthquakes may cause further and/or renewed failures on the quarry slopes.

Runoff along the quarry benches should be prevented from ponding, especially above the slide area and other long, oversteep faces. Ponding water, and to a lesser extent runoff, infiltrates the shears and fractured granite on the exposed quarry faces and benches. Limiting the amount of runoff that infiltrates the quarry slopes reduces the potential for elevated pore pressures and subsequent failures. In general, positive drainage should be maintained on all quarry benches.

We recommend that the slide areas be monitored. If significant failures continue to occur, we must inspect the working face and slide area to determine what, if any, short and long-term changes to the mining plan should be made. When the area drains and dries out this coming summer, we should again inspect and evaluate the stability of the working face as a followup evaluation to this letter report. A long-term solution to stabilize the slide area would be to grade a new working face from the top of the quarry at a gradient no steeper than 55 degrees from horizontal (150%). The length of any future working faces of the quarry should be limited to 200 linear feet by creating benches. Island Engineers, working with Olive Springs Quarry and our firm, has developed a Slide Mitigation Plan to help remediate the short and long term hazards associated with the slide area through implementation of our recommendations. We have reviewed the mitigation plan and it is in general consistent with the above recommendations. This mitigation plan should be incorporated into the Olive Springs Quarry mining plan.

Chris Bone
3 June 2010

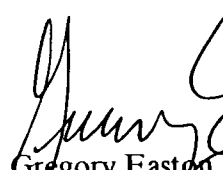
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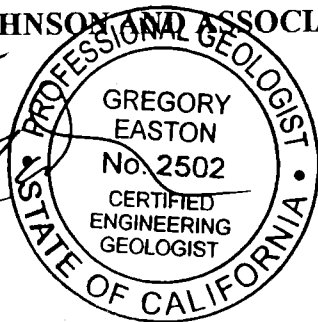
The safety measures currently implemented in the slide area at the quarry should be maintained until the long, oversteep slopes at the quarry are mitigated.

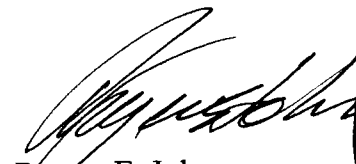
If you have any questions or comments, please contact us at your convenience.

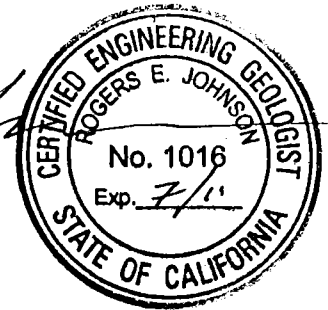
Sincerely,

ROGERS E. JOHNSON AND ASSOCIATES


Gregory Easton
Project Geologist
C.E.G. No. 2502




Rogers E. Johnson
Principal Geologist
C.E.G. No. 1016



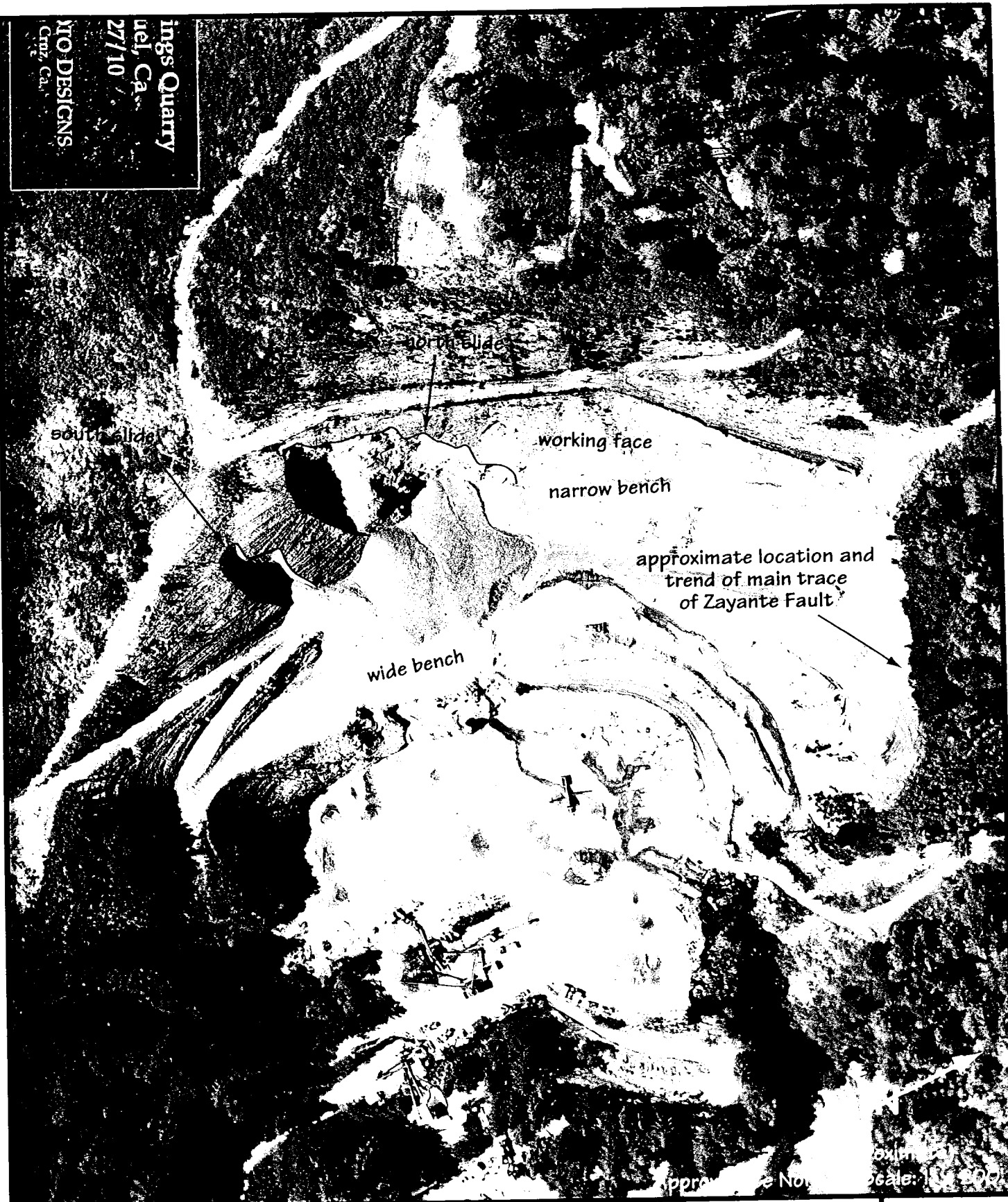
copies: Addressee (1)
Dave Heinrichsen, Ifland Engineers, Inc. (1)
Ron Powers, Powers Land Planning, Inc. (5)

attachments: References
Figure 1; 2010 Aerial Photograph of Quarry
Figure 2; Photograph of Slide Area
Figure 3; Photograph of North Slide
Figure 4; Photograph of South Slide

REFERENCES

- Airphoto Designs, 1998, Olive Springs Quarry, photo date 19 September 1998.
- Airphoto Designs, 2010, Olive Springs Quarry, photo date 27 March 2010.
- Ifland Engineers, 2010, Slide Mitigation Plan, Olive Springs Quarry, Soquel California, Job No. 88066.01, sheets C1 and C2, dated 5/27/10.
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- Johnson, R.E. and Associates, 1988, Geologic report, Olive Springs Quarry (unpublished report issued October 4, 1988).
- Johnson, R.E. and Weber, G.E., 1973, Geologic conditions on the southwest slope of Sugarloaf Mountain, Santa Cruz County, California, summarized in Soquel Village Realty, 1974, Master Plan, Olive Springs Quarry (unpublished report issued April 27, 1974).

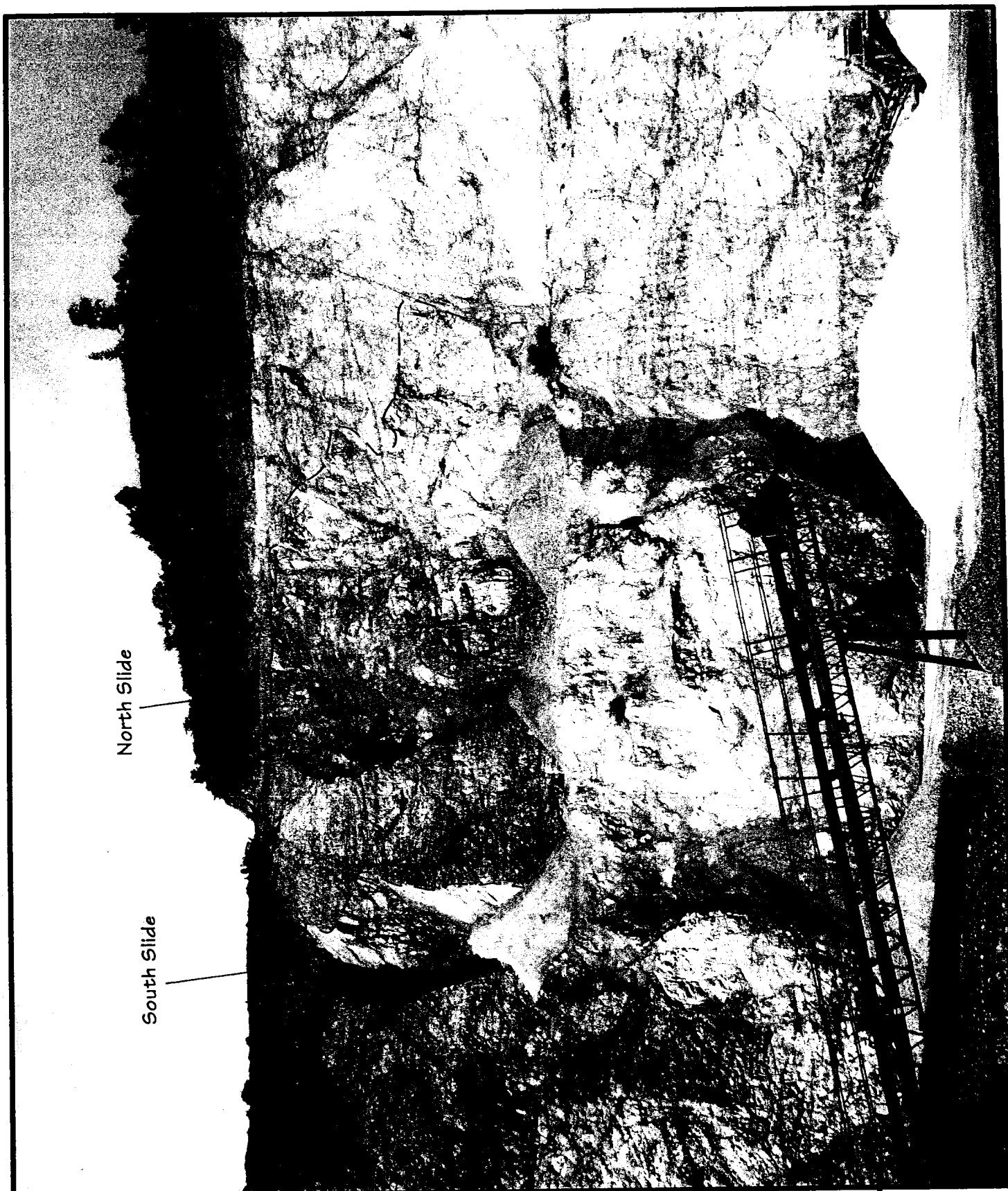
ings Quarry
uel, Ca.
27/10
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Cmz, Ca.



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2010 AERIAL PHOTOGRAPH OF QUARRY
Olive Springs Quarry
Mining Approval 88-0233
photo date: 27 March 2010

FIGURE #
1
JOB #
G95064-43



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PHOTOGRAPH OF SLIDE AREA
Olive Springs Quarry
Santa Cruz County, California
Mining Approval 88-0233
photo date: 4 March 2010

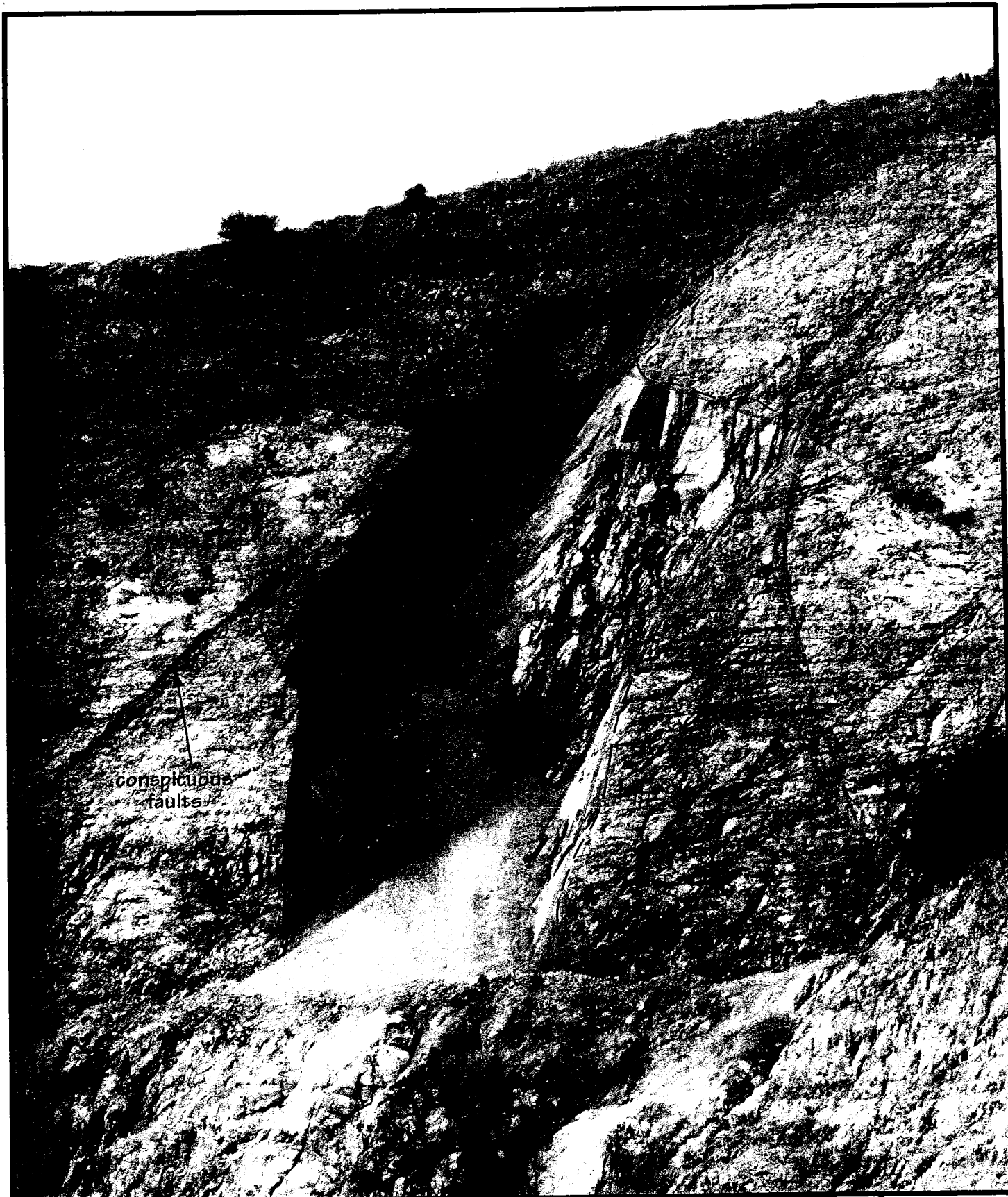
FIGURE #
2
JOB #
G95064-43



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PHOTOGRAPH OF NORTH SLIDE
Olive Springs Quarry
Santa Cruz County, California
Mining Approval 88-0233
photo date: 4 March 2010

FIGURE #
3
JOB #
G95064-43



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PHOTOGRAPH OF SOUTH SLIDE
Olive Springs Quarry
Santa Cruz County, California
Mining Approval 88-0233
photo date: 4 March 2010

FIGURE #
4
JOB #
G95064-43

5.0 RECOMMENDATIONS

5.1 General

Based on the results of our field investigation, and engineering analysis it is our opinion that from the geotechnical standpoint, the proposed slope geometry consisting of the following recommendations will be suitable for the temporary excavation of the northern quarry wall:

- Maximum Bench Face Angle - 63° (200%)
- Maximum Bench Height - 50 feet
- Minimum Bench Width - 25 feet
- Maximum Overall Slope Angle - 45° (100%)

See Figure 3 for the typical bench design.

We recommend that a berm with a minimum height of 6 feet be placed on the outboard edge of each bench.

To alleviate the potential for surface runoff to adversely affect the stability of the slopes, we recommend that the benches be constructed with a minimum inboard gradient of 10 percent. Surface runoff should not be allowed to discharge onto or near the slopes. Concentrations of surface runoff should be handled by providing the necessary structures.

5.2 Plan Review

The recommendations presented in this report are based on preliminary design information for the proposed project and on the findings of our geotechnical investigation. When completed, the Grading Plans should be reviewed by CMAG Engineering, Inc. Additional field exploration and laboratory testing may be required upon review of the final project design plans.

5.3 Field Observation

Field observation must be provided by a representative of CMAG Engineering, Inc. to enable them to form an opinion regarding the stability of the slopes and to verify the slope geometry. If any tension cracks occur at the top of the benches or within the slopes, our firm should be notified immediately. All work within the excavation area should stop until a representative of our firm is present at the site.

5.5.10 Discussion of Stability Results of the Decomposed Granite and Conglomerate

The results of our stability analysis indicate that the static and pseudostatic factors of safety for the proposed excavation of the decomposed granite and conglomerate considering failures greater than 1 bench, utilizing Hoek-Brown rock mass shear strength parameters, meet industry standards. The results of our stability analysis indicate that the static factors of safety for the proposed excavation of the decomposed granite and conglomerate, considering failures greater than 1 bench, utilizing the back-calculated shear strength, meet industry standards.

Based on the results of our shear fracture contour plots, the maximum overall slope angle of 31 degrees for the decomposed granite and conglomerate will help to mitigate against failures greater than 1 bench height (50 feet). Approximately 4 percent of the shear fractures measured had slope angles less than the proposed overall slope for the decomposed granite and conglomerate of 31 degrees.

It is our opinion that the proposed excavation slope configuration is able to retain anticipated failure volumes for a failure less than 1 bench within the decomposed granite and conglomerate.

6.0 RECOMMENDATIONS

6.1 General

Based on the results of our surface mapping program and engineering analysis, it is our opinion that from the geotechnical standpoint, the proposed slope geometry consisting of the following recommendations, is suitable for the temporary and final quarry wall excavation design:

GRANITE

- Maximum Bench Face Angle - 63° (200%)
- Maximum Bench Height - 50 feet
- Minimum Bench Width - 25 feet
- Maximum Overall Slope Angle - 45° (100%)

DECOMPOSED GRANITE AND BUTANO CONGLOMERATE

- Maximum Bench Face Angle - 40° (84%)
- Maximum Bench Height - 50 feet
- Minimum Bench Width - 25 feet
- Maximum Overall Slope Angle - 31° (60%)

See Figures 8 and 9 for the typical quarry wall excavation design. See Plate 1 for the boundaries of the granite, decomposed granite, and Butano conglomerate. It should be noted that due to the heterogeneous nature of the rock, conditions may change and should be reevaluated by the Geotechnical Engineer and Engineering Geologist as mining progresses.

We recommend that a berm with a minimum height of 6 feet be placed on the outboard edge of each bench.

To alleviate the potential for surface runoff to adversely affect the stability of the slopes, we recommend that the benches be constructed with a minimum inboard gradient of 10 percent. Surface runoff should not be allowed to discharge onto or near the slopes. Concentrations of surface runoff should be handled by providing the necessary structures.

The head scarp of the southern most failure, that occurred in February of 2010, currently has not failed to the top of the bench. Ground cracks exist up-slope of the failure on the bench above. It is our understanding that the quarry staff and Engineering Geologist have set up a monitoring program to observe movement of the ground cracks. We recommend removing the remaining portion of the southern failure starting from above the failure, following the quarry bench design recommendations in this report, or as an alternative, blasting the remaining portion of the failure.

Mining should not occur beneath the failures, as both the northern and southern failures are currently unstable. To remove the failures, we recommend mining from above the failures, following the quarry bench design recommendations in this report. The Geotechnical Engineer and Engineering Geologist should observe the removal of the failures.

It is our opinion that the current mining method of pushing the ripped material over the benches and onto the quarry floor does not decrease the stability of the quarry walls and is acceptable from a geotechnical standpoint. We recommend pushing the material to a maximum height of 2 benches (100 feet). In addition, we recommend the material be pushed at an angle of no more than 38 degrees (78 percent).

The Geotechnical Engineer should be notified immediately if large zones of weak rock (high intensity of shear fractures), ground cracks, and/or failures are observed within the quarry.

6.2 Plan Review

The recommendations presented in this report are based on preliminary design information for the proposed project and on the findings of our geotechnical investigation. When completed, the Grading Plans should be reviewed by CMAG Engineering, Inc. Additional field exploration and laboratory testing may be required upon review of the final project design plans.

6.3 Field Observation

Field observation must be provided by a representative of CMAG Engineering, Inc. to enable them to form an opinion regarding the stability of the slopes and to verify the quarry excavation design. If large zones of weak rock (high intensity of shear fractures), ground cracks, and/or failures are observed within the quarry, our firm should be notified immediately. All work within the excavation area should stop until a representative of our firm is present at the site.

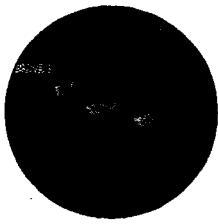
7.0 LIMITATIONS

The recommendations contained in this report are based on our surface mapping program, and our understanding of the mining methods. Variation in rock, geologic, and groundwater conditions can vary significantly throughout the quarry and as mining progresses. As in most projects, conditions revealed during construction excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the Project Geotechnical Engineer and the Engineering Geologist, and revised recommendations be provided as required. In addition, if the scope of the proposed construction changes from the described in this report, our firm should also be notified.

Our investigation was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this report.

This report is issued with the understanding that it is the responsibility of the Owner, or of his Representative, to ensure that the information and recommendations contained herein are brought to the attention of the Civil Engineer for the project and incorporated into the plans, and that it is ensured that the recommendations presented herein are implemented in the field.

This firm does not practice or consult in the field of safety engineering. We do not direct the operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is your responsibility.



CMAG ENGINEERING, INC.

3130 WINKLE AVENUE, SANTA CRUZ, CALIFORNIA 95065

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FAX: 831.600.8422

WWW.CMAGENGINEERING.COM

March 23, 2011
Project No. 10-116-SC

Olive Springs Quarry
P.O. Box 747
Soquel, California 95073-0747

ATTN: Christine Bone, Manager

SUBJECT: **ADDENDUM TO GEOTECHNICAL REPORT**
Olive Springs Quarry, Mining Approval 88-0233
Olive Springs Road, Santa Cruz County, California

REFERENCE: CMAG Engineering, Inc. (December 26, 2010). *Temporary and Final Quarry Wall Excavation Design, Olive Springs Quarry, Mining Approval 88-0233, Olive Springs Road, Santa Cruz County, California*. Project No. 10-116-SC.

Dear Ms. Bone:

This letter presents additional recommendations for the removal of the slides that occurred in February of 2010. Due to the current geometry of the failures and the geometry of the quarry wall above the crown of the failures, removal of a portion of the Butano Conglomerate (Tbc) will be required prior to removal of the slides.

We recommend a temporary excavation slope within the Butano Conglomerate not to exceed the current slope angle of the majority of the quarry wall above the uppermost bench. The temporary excavation slope angle should not exceed 55 degrees. Once the slides are removed and the area is actively mined, the recommendations for bench geometry within the Butano Conglomerate presented in the referenced report should be adhered to.

The Geotechnical Engineer and Engineering Geologist should observe the removal of the failures and the temporary excavation of the Butano Conglomerate.

Addendum to Geotechnical Report
Olive Springs Quarry
Santa Cruz County, California

March 23, 2011
Project No. 10-116-SC
Page 2

It is a pleasure being associated with you on this project. If you have any questions, or if we may be of further assistance, please do not hesitate to contact our office.

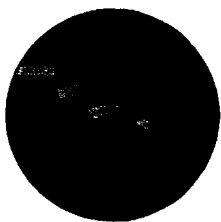
Sincerely,

CMAG ENGINEERING, INC.



Adrian L. Garner, CE, GE
Principal Engineer
CE 66087, GE 2814
Expires 6/30/12

Distribution: (2) Addressee



CMAG ENGINEERING, INC.

3130 WINKLE AVENUE, SANTA CRUZ, CALIFORNIA 95065

PHONE: 831.475.1411

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April 5, 2011

Project No. 10-116-SC

Olive Springs Quarry
P.O. Box 747
Soquel, California 95073-0747

ATTN: Christine Bone, Manager

SUBJECT: GEOTECHNICAL PLAN REVIEW
Olive Springs Quarry, Mining Approval 88-0233
Olive Springs Road, Santa Cruz County, California

REFERENCES: CMAG Engineering, Inc. (December 26, 2010). *Temporary and Final Quarry Wall Excavation Design, Olive Springs Quarry, Mining Approval 88-0233, Olive Springs Road, Santa Cruz County, California.* Project No. 10-116-SC.

CMAG Engineering, Inc. (March 23, 2011). *Addendum to Geotechnical Report, Olive Springs Quarry, Mining Approval 88-0233, Olive Springs Road, Santa Cruz County, California.* Project No. 10-116-SC.

Dear Ms. Bone:

1.0 INTRODUCTION

Per your request, we have reviewed the following plans for the subject project:

- Ifland Engineers (March 25, 2011). *Olive Springs Quarry, Soquel, California.* Sheets C-1 through C-3, Job No. 88066.01.

The purpose of our review was to ensure the conformance of the geotechnical aspects of the plans with the geotechnical conditions present on the site and with the recommendations provided in the referenced report and addendum.

2.0 CONCLUSIONS AND RECOMMENDATIONS

It is our opinion that the plan reviewed is in general conformance with the recommendations presented in the referenced report and addendum. The recommendations presented in the referenced report and addendum should not be considered to preclude more restrictive criteria by the governing agencies.

Observation services should be provided by CMAG Engineering, Inc. during excavation as outlined in the referenced report and addendum.

3.0 LIMITATIONS

Our review was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. No other warranty, expressed or implied, is provided as to the conclusions and professional advice presented in this review.

As in most projects, conditions revealed during construction may be at variance with preliminary findings. Should this occur, the changed conditions must be evaluated by CMAG Engineering, Inc. and revised recommendations provided as required.

This plan review letter is issued with the understanding that it is the responsibility of the Owner, or his Representative, to ensure that the information and recommendations presented herein are brought to the attention of the Architect and Engineers for the project and incorporated into the plans, and that the Contractor and Subcontractors implement such recommendations in the field.

This firm does not practice or consult in the field of safety engineering. We do not direct the Contractor's operations, and we are not responsible for other than our own personnel on the site; therefore, the safety of others is the responsibility of the Contractor. The Contractor should notify the Owner if he considers any of the recommended actions presented herein to be unsafe.

The findings of this review are considered valid as of the present date. However, changes in the conditions of a site can occur with the passage of time, whether due to natural events or human activity on this or adjacent sites. In addition, changes in applicable or appropriate codes and standards may occur as a result of legislation or a broadening of knowledge. Accordingly, this review may become invalidated, wholly or partially, by changes outside our control. Therefore, this report is subject to review and revision as changed conditions are identified.

Geotechnical Plan Review
Olive Springs Quarry
Santa Cruz County, California

April 5, 2011
Project No. 10-116-SC
Page 3

It is a pleasure being associated with you on this project. If you have any questions or if we may be of further assistance please do not hesitate to contact our office.

Sincerely,

CMAG ENGINEERING, INC.



Adrian L. Garner, CE, GE
Principal Engineer
CE 66087, GE 2814
Expires 6/30/12

Distribution: (4) Addressee

ROGERS E. JOHNSON & ASSOCIATES
CONSULTING ENGINEERING GEOLOGISTS
41 Hangar Way, Suite B
Watsonville, California 95076-2458
e-mail: rogersjohnson@sbcglobal.net
Ofc (831) 728-7200 • Fax (831) 728-7218

6 April 2011

Job No. G95064-43

Christine Bone, Manager
Olive Springs Quarry
P.O. Box 747
Soquel, California 95073-0747

Re: Stability Assessment of the Working Face
Olive Springs Quarry
Olive Springs Road, Santa Cruz County, California
Mining Approval 88-0233

Dear Ms. Bone:

As the contracted engineering geologists for the Olive Springs Quarry, we have completed our geologic assessment of the quarry's working face. The stability assessment was required by the Santa Cruz County Planning Department as a result of the failures on the western portion of the quarry's working face which began in February of 2010 and subsequently enlarged in a piecemeal fashion. This report presents the work we have performed to date to; 1) characterize and monitor the area of the recent failures and 2) collect geologic structural data to assess the overall stability of the quarry's working faces. We worked closely with Adrian Garner of CMAG Engineering and David Heinrichsen of Ifland Engineers during the course of this assessment. As a result of the collective work of the three firms, a new mining plan has been developed which if properly implemented should ensure the quarry's short and long-term mining goals while maintaining relative stability and safety of the quarry faces.

Previous work performed by our firm for the Olive Springs Quarry includes:

- Weber and Johnson, 20 April 1974.
- Geologic Inspection of Winter 2010 Working Face Failures, 3 June 2010.
- Quarry Drainage and Fissure Monitoring, 6 October 2010.
- Mandated yearly inspections of quarry faces, benches and drainage.

Please refer to these reports for background geologic information of the quarry site.

Geologic Mapping and Data Collection

Until the western portion of the quarry's working face could be mapped in detail and its stability quantitatively analyzed, mining was limited to the northern portion of the quarry. The northern portion of the quarry had not experienced any large failures such as occurred on the western quarry face. Together with CMAG Engineering in July 2010, we mapped the northern portion of the quarry. We collected structural information on the quarry faces and a slope stability analysis

was performed by CMAG Engineering. The results of the slope stability analysis suggested that benches up to 25 feet wide and 50 feet in height would result in a relatively safe, stable configuration for the northern working face, with the understanding that anticipated small-scale failures could be contained on an individual bench.

We applied the same structural mapping methods to the western portion of the working face in November and December of 2010. During the mapping we measured geologic and geotechnical characteristics of shears and joints in the granitic rock such as; strike, dip, length, spacing, surface roughness, surface hardness, fracture width, and infilling type. We collected over 650 measurements of shears and jointing within the granitic bedrock. We also measured the orientation of sandstone bedrock which is exposed along the southern portion of the working face, and shearing within the conglomerate/breccia above the uppermost bench of the quarry.

In general, the granite of the quarry is highly fractured, with numerous anastomosing shears pervading throughout. The shears are related to the Zayante Fault, the main trace of which trends immediately northeast of the quarry operation. From our mapping, we have delineated exposed zones of stronger granitic rock from zones of weaker rock such as sandstone, conglomerate and weathered granite. The rock units are depicted on Plate 1.

Analysis

Quantitative slope stability analysis of the western portion of the quarry's working face performed by CMAG Engineering, the project geotechnical engineer, suggests that weaker zones of weathered granite, sandstone and conglomerate should be excavated so that their bench face angles do not exceed 40 degrees (84%) and their overall slopes do not exceed 31 degrees (60%). The analysis also indicates that the unweathered granite within the quarry may be excavated so that its bench face angle does not exceed 63 degrees (200%) and its overall slope not exceed 45 degrees (100%). For all rock types within the quarry, maximum bench heights and widths should be limited to 50 and 25 feet, respectively.

It should be noted that as quarrying operations continue, the rock characteristics may change at a given location due to spatial variations in faulting, jointing, weathering and rock type. We recommend that the project engineering geologist and project geotechnical engineer inspect the quarry once a month to observe any variations in the distribution of rock types and provide any supplemental recommendations if needed.

Fissure Monitoring Program

During an inspection of the bench above the slide area in late June 2010, Joe Hanna, the County Geologist, observed fissures above the southernmost working face failure. At the time, the fissured area extended from the top edge of the upper bench and down a side-hill access approximately 110 feet (Plate 1). The anastomosing fissures were generally within 20 feet of the top of the working face, with measured offsets of up to 2 inches vertically and horizontally. The project geologist subsequently devised and in August 2010 installed a monitoring system to

measure horizontal and vertical offsets along the fissures. Also at this time, quarry personnel, at the direction of the project professionals, constructed interim drainage improvements in the area of fissuring and along the upper bench to limit the amount of runoff that may enter the fissured area (Plate 1). Grading of the upper bench was also performed by quarry personnel to establish more positive drainage above the North slide area. The fissures were monitored by quarry personnel and the project engineering geologist. Little change in offsets along the fissures was observed by quarry personnel and our firm until late December 2010 when heavy winter rains began. Renewed failure atop the South slide area occurred in January 2011, with significant growth of the fissure system and increased offsets at our monitoring stations. Complete failure occurred along some of the fissures, with new minor fissuring occurring headward and to the sides of the fissured area (Plate 1). The project geologist set new stakes to monitor the lateral limits of fissuring. Through February and late March, regular rains prohibited any safe inspection of the fissured area. A representative of our firm inspected the fissured area and slide area on 6 April 2011. We observed that failure has continued along the fissure system since January. Only one fissure monitoring station (#5) remains functional (Plate 1). It was installed across the furthest observed fissure from the top of the working face (about 35 feet). With the renewed failures, the top of the failed working face is now about 11 feet from station #5 and stations #1 thru #4 have failed away. The fissure at station #5 has widened about 1/4 inch since January. No further expansion of the fissured area was observed during our most recent site inspection. Continued headward failure has occurred above the North slide on the working face, in places failing through the berm along the edge of the upper bench. The recently measured limits of failure are depicted on Plate 1.

Drainage Improvements - Inspection

During our reconnaissance of the quarry slopes since interim drainage improvements were installed, we have inspected the drainage improvements to determine that they were functioning adequately. We have periodically advised quarry staff when adjustments to the drainage improvements were deemed necessary. To date, the drainage improvements appear to be functioning as designed. However, a steeper gradient for the inboard drainage ditch along the upper bench of the quarry should be developed. It currently is approximately 1 to 2% grade and shows signs of ponding. The upper bench itself also shows signs of ponding of runoff. Inboarding drainage along the upper bench will also aid in transporting runoff from the failure area.

Procedure for Mining Toe of Slides and Slide Removal

To maintain a supply of quality material, the Quarry has expressed interest in removing slide material from the toe of the slidemasses. In our opinion, any mining of the toe of the slidemasses should be done with the utmost care. Removal of slide material should be performed after a minimum of 5 days after *any* prior rains. The quarry face above the slidemass should be monitored for any signs of recent instability such as rockfalls or fissuring prior to removal of slide material. Equipment used for the removal of slide material should provide adequate protection to quarry personnel in the event of continued rockfall.

Removal of the slide areas themselves will be performed by excavating a series of benches starting above and working down through the failure areas. A temporary excavation into the Butano Conglomerate will be necessary to construct these benches. The temporary excavation will be steeper than the gradient recommended by CMAG Engineering, however the excavation shall not be steeper than the existing slope excavated into the Butano Conglomerate. Once the slides have been removed, the conglomerate will be graded per the long-term recommendations by CMAG Engineering.

Review of Plans

We have reviewed the Final Grading Plan (Sheet C1), the Details and Sections (Sheet C2) and the Phase I Grading Plan (Sheet C3) from Ifland Engineers. The plans incorporate the stability analysis performed by CMAG Engineering and depict the approximate limits of the final configuration of the quarry's slopes. The final configuration of the quarry slopes will remain within the quarry's leasehold boundary. The plans depict phase I and final slope configurations of the quarry slopes and conform to the acceptable bench/slope dimensions recommended by CMAG Engineering.

The plans by Ifland Engineers do not provide thorough drainage details, however, they do show that drainage will be inboarded along the benches. We recommend that the benches be excavated with a positive gradient (along the bench) of at least 2%. More extensive drainage plans should be developed prior to the next rainy season.

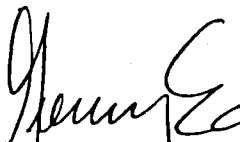
We have also reviewed the 2011 Mining Procedures (Sheet MP-1) prepared by Olive Springs Quarry. The sheet describes the general mining procedures for future excavation on the quarry's working face as well as removal of the existing failures and their resulting slide masses.

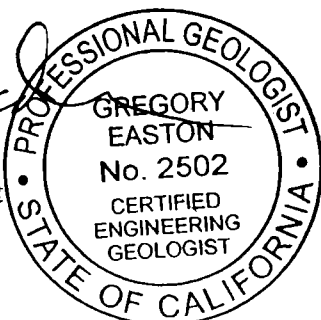
The reviewed plans are in general conformance with our recommendations and engineering geologic practice.

If you have any questions or comments, please contact us at your convenience.

Sincerely,

ROGERS E. JOHNSON AND ASSOCIATES


Gregory Easton
Project Geologist
C.E.G. No. 2502



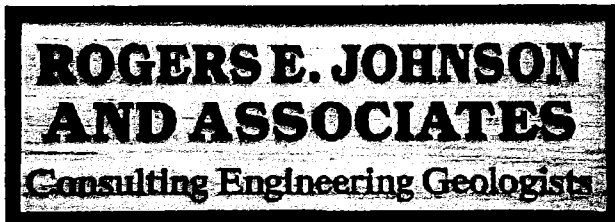
Rogers E. Johnson
Principal Geologist
C.E.G. No. 1016

copies: Addressee (1)
David Heinrichsen, Ifland Engineers, Inc. (1)
Adrian Garner, CMAG Engineering (1)
Joe Hanna, Santa Cruz County Planning Department (1)
Dave Carlson, Santa Cruz County Planning Department (3)

attachments: Plate 1; Site Geologic Map

REFERENCES

- CMAG Engineering, Inc., 2010, Geotechnical Investigation - Design Phase, Temporary and Final Quarry Wall Excavation Design, Olive Springs Quarry, Job No.10-116-SC, prepared 26 December 2010, 62p.
- CMAG Engineering, Inc., 2011, Addendum to Geotechnical Report, Olive Springs Quarry, Job No.10-116-SC, prepared 23 March 2011, 2p.
- Ifland Engineers, 2011, Final Grading Plan, Details and Sections and Phase I Grading Plan, Olive Springs Quarry, Soquel, California, Job No. 88066.01, 3 sheets dated 3/25/11.
- Ifland Engineers, 2010, Interim Drainage Plan, Olive Springs Quarry, Soquel, California, Job No. 88066.01, sheet C1, dated 6/15/10 (hand-drawn plan October 2010).
- Ifland Survey, 2010, Untitled topographic survey of Olive Springs Quarry, October 2010.
- Johnson, R. E. and Associates, 2010, Geologic Inspection of Winter 2010 Working Face Failures Olive Springs Quarry, Mining Approval 88-0233, Olive Springs Road, Santa Cruz County, California, prepared 3 June 2010, 6p.
- Johnson, R. E. and Associates, Annual Geologic Inspection of Working Face, Olive Springs Quarry, Job No. G95064, 1996 to 2010 annual reports.
- Olive Springs Quarry, 2011, 2011 Mining Procedures, Olive Springs Quarry, Mining Approval 88-0233, Olive Springs Road, Santa Cruz County, California, sheet MP-1, dated 5 April 2011.



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Ofc (831) 728-7200 • Fax (831) 728-7218

9 May 2011

Job No. G95064-43

Christine Bone, Manager
Olive Springs Quarry
P.O. Box 747
Soquel, California 95073-0747

Re: Review of Short-term Mining Procedures
Olive Springs Quarry
Olive Springs Road, Santa Cruz County, California
Mining Approval 88-0233

Dear Ms. Bone:

As the contracted engineering geologists for the Olive Springs Quarry, we recently completed a geologic assessment of the quarry's working face. The stability assessment was required by the Santa Cruz County Planning Department as a result of the failures on the western portion of the quarry's working face. The failures initially occurred in February of 2010 and subsequently enlarged in a piecemeal fashion. The recent work completed by our firm and by CMAG Engineering, the project Geotechnical Engineers, assessed the stability of the quarry slopes and a new mining plan has been developed which implements the recommendations of our reports. The Santa Cruz County Planning Department has accepted our recent work and the Quarry is preparing to implement the new mining plan. We recently met with you and quarry personnel to discuss the timeline and procedures for implementing the short and long-term mining plan. This letter summarizes the procedures and their relative timing.

Removal of Slidemasses

Recommencement of mining of the west quarry face will begin with removal of the slidemasses which extend out onto the bench above the quarry floor. The equipment to be used in the slidemass removal has been armored to protect the operator. Removal will begin with the north slidemass and will progress to the south slidemass. Removed slide material will be dropped to the quarry floor at the north end of the bench. Slidemass removal should only be performed 5 or more days after any significant rainfall (over 0.5 inch in a 24 hour span). When the slidemasses have been removed and the bench width restored, the protective berm on the quarry floor may be removed, while the berm at the edge of the bench above the floor shall remain. To facilitate the transport of material for processing, the berm on the bench above the quarry floor may be breached only above the chutes where material will be pushed or dumped. The breached berm must be reconstructed at the end of the work.

Removal of Overburden (Tbu) Prior to Slide Removal

After the slidemasses have been removed, a portion of the face above the upper bench on the west working face will be removed. This will allow for the upper bench to be widened in the area above the north and south slide areas in preparation for their removal. The material exposed in the working face above the upper bench consists of Butano Conglomerate. Removed material will be pushed over the upper bench outside of the slide areas and down to the wide lower bench below the slides, where it will either be stockpiled or processed.

Removal of North and South Slide Areas

Once the bench above the north and south slide is widened, the quarry will begin excavating into the slide area, creating a series of benches. The resulting benches and their slopes will ultimately result in a flatter and more stable working face. Ripped material from the benching will be pushed either to the north or south, outside of the slide areas, where it will fall to the wide bench above the quarry floor. Removal of the slide areas should only be performed 5 or more days after any significant rainfall.

Crack Monitoring

During the removal of the overburden and north and south slide areas, quarry benches and faces in the work area should be monitored for signs of new or continued fissuring. If any renewed movement, failures or signs of distress are observed, or if there is any concern regarding the stability of the working area, the project engineering geologist and geotechnical engineers should be contacted for a reassessment of the mining procedures.

Mining Observation

The project engineering geologist and geotechnical engineer should observe and inspect the removal of the slidemasses a minimum of once per week, or immediately after any rains.

The project engineering geologist and geotechnical engineer should observe and inspect the removal of the Butano Conglomerate (Tbu) overburden a minimum of once per month.

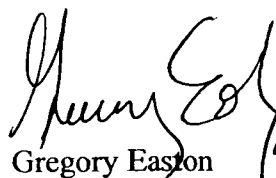
The project engineering geologist and geotechnical engineer should observe and inspect the removal of the north and south slide areas a minimum of once per week, or immediately after any rains.

Our firm should be notified at least 5 days prior to commencing the aforementioned mining procedures. The short-term mining procedures described above are geologically acceptable to us.

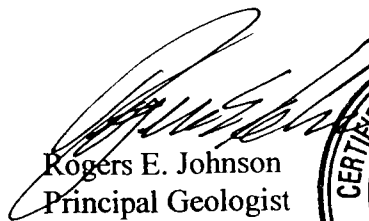
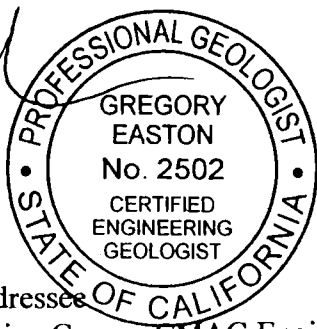
If you have any questions or comments, please contact us at your convenience.

Sincerely,

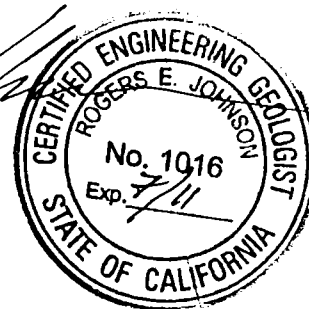
ROGERS E. JOHNSON AND ASSOCIATES



Gregory Easton
Project Geologist
C.E.G. No. 2502



Rogers E. Johnson
Principal Geologist
C.E.G. No. 1016



copies: Addressee
Adrian Garner, CMAG Engineering
Joe Hanna, Santa Cruz County Planning Department
Dave Carlson, Santa Cruz County Planning Department

REFERENCES

CMAG Engineering, Inc., 2010, Geotechnical Investigation - Design Phase, Temporary and Final Quarry Wall Excavation Design, Olive Springs Quarry, Job No.10-116-SC, prepared 26 December 2010, 62p.

CMAG Engineering, Inc., 2011, Addendum to Geotechnical Report, Olive Springs Quarry, Job No.10-116-SC, prepared 23 March 2011, 2p.

Ifland Engineers, 2011, Final Grading Plan, Details and Sections and Phase I Grading Plan, Olive Springs Quarry, Soquel, California, Job No. 88066.01, 3 sheets dated 3/25/11.

Johnson, R. E. and Associates, 2010, Geologic Inspection of Winter 2010 Working Face Failures Olive Springs Quarry, Mining Approval 88-0233, Olive Springs Road, Santa Cruz County, California, prepared 3 June 2010, 6p.

Olive Springs Quarry, 2011, 2011 Mining Procedures, Olive Springs Quarry, Mining Approval 88-0233, Olive Springs Road, Santa Cruz County, California, sheet MP-1, dated 5 April 2011.

2011 MINING PROCEDURES OLIVE SPRINGS QUARRY MINING APPROVAL 88-0233

GENERAL NOTES:

1. ALL MINING PROCEDURES SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS OF MSMA, SMARA, AND THE COUNTY OF SANTA CRUZ.
2. ALL EXCAVATION SHALL BE CONSTRUCTED PER THE GEOTECHNICAL INVESTIGATION REPORTS BY CMAG ENGINEERING, INC. THE GEOTECHNICAL INVESTIGATION REPORTS BY ADRIAN L. GARNER, INC. AND THE PLANS BY LAND ENGINEERS.
3. NO CHANGES IN THE APPROVED PLANS SHALL BE MADE WITHOUT PRIOR APPROVAL OF THE ENGINEERING GEOLOGIST, THE GEOTECHNICAL ENGINEER, AND THE CIVIL ENGINEER.

GENERAL EXCAVATION PROCEDURES:

1. THE EXCAVATION SLOPE GEOMETRY SHALL CONSIST OF THE FOLLOWING:

GRANITE
 MAXIMUM BENCH FACE ANGLE: 60 DEGREES (60%)
 MAXIMUM BENCH HEIGHT: 50 FEET
 MAXIMUM BENCH SLOPE: 1:1 (45 DEGREES)
 MAXIMUM OVERALL SLOPE: 45 DEGREES (100%)
 DECOMPOSED GRANITE AND BUTANO CONGLOMERATE
 MAXIMUM BENCH HEIGHT: 50 FEET
 MAXIMUM BENCH SLOPE: 1:1 (45 DEGREES)
 MAXIMUM OVERALL SLOPE: 31 DEGREES (60%)

FOR INFORMATION ON LOCATION OF ABOVE ROCK MATERIALS AND BOUNDARIES - SEE PLATE 1 OF THE GEOTECHNICAL INVESTIGATION BY CMAG ENGINEERING, INC. DATED DECEMBER 28TH, 2010.

2. A BERM WITH A MINIMUM HEIGHT OF 8 FEET, SHALL BE CONSTRUCTED ON THE OUTBOARD EDGE OF EACH BENCH.
3. THE BENCHES SHALL BE CONSTRUCTED WITH A MINIMUM INBOARD GRADIENT OF 10 PERCENT.
4. THE GEOTECHNICAL ENGINEER AND ENGINEERING GEOLOGIST SHALL VISIT THE QUARRY A MINIMUM OF ONCE A MONTH TO OBSERVE THE EXCAVATION SLOPES.
5. THE GEOTECHNICAL ENGINEER AND ENGINEERING GEOLOGIST SHOULD BE NOTIFIED IMMEDIATELY IF LARGE ZONES OF WEAK ROCK (HIGH INTENSITY OF SHEAR FRACTURES), GROUND CRACKS, AND/OR FAILURES ARE OBSERVED WITHIN THE QUARRY. ALL WORK SHOULD STOP IN THE AREA OF CONCERN UNTIL THE GEOTECHNICAL ENGINEER AND ENGINEERING GEOLOGIST ARE PRESENT.

TRANSPORTATION OF EXCAVATED MATERIAL:

1. THE EXCAVATED MATERIAL SHALL BE TRANSPORTED VIA FRONT END LOADER, HAUL TRUCK, OR DOZING THE MATERIAL OVER A SLOPE. THE SLOPE SHALL BE MINIMUM HEIGHT OF 2 FEET (20 VERTICAL FEET). THE ANGLE OF THE MATERIAL SHALL NOT EXCEED 30 DEGREES (75%).

WINTERIZATION:

1. THE DRAINAGE PLAN BY LAND ENGINEERS SHALL BE IMPLEMENTED BETWEEN OCTOBER 15TH AND APRIL 15TH.
2. MATERIAL MAY BE STOCKPILED BETWEEN THE MONTHS OF OCTOBER 15TH TO APRIL 15TH ON A BENCH FOLLOWING THE RECOMMENDATIONS PRESENTED IN THE LETTER, "WINTERIZATION OF NON PROCESSED MATERIAL" BY CMAG ENGINEERING, INC. DATED AUGUST 30TH, 2010. THE GEOTECHNICAL ENGINEER SHOULD BE NOTIFIED OF THE EXACT LOCATION AND PROPOSED CONFIGURATION OF THE STOCKPILED MATERIAL PRIOR TO CONSTRUCTION.

REMOVAL OF EXISTING FAILURES:

1. THE FAILURES THAT OCCURRED IN FEBRUARY OF 2010, NAMED THE "NORTH" AND "SOUTH" FAILURES SHOULD BE REMOVED STARTING WITH THE "NORTH" FAILURE. THE REMOVAL OF THE FAILURES SHALL BE MONITORED BY THE GEOTECHNICAL INVESTIGATION REPORT DATED DECEMBER 28, 2010 BY CMAG ENGINEERING, INC.
2. THE GEOTECHNICAL ENGINEER AND ENGINEERING GEOLOGIST SHOULD OBSERVE THE REMOVAL OF THE FAILURES.
3. THE REMOVAL OF THE FAILURES SHOULD OCCUR BETWEEN THE MONTHS OF APRIL 15TH TO OCTOBER 15TH. REMOVAL OF THE FAILURES SHOULD NOT OCCUR DURING RAIN EVENTS.
4. THE TEMPORARY SLOPE ABOVE THE UPPER MOST BENCH WITHIN THE BUTANO CONGLOMERATE SHALL NOT EXCEED 35 DEGREES. THE EXCAVATED MATERIAL SHALL BE PUSHED TO THE NORTH OF THE NORTHERN FAILURE ALONG THE UPPER BENCH. THE EXCAVATED MATERIAL SHALL BE PUSHED OVER THE FACE TO THE BENCH BELOW. NO MATERIAL SHALL BE PUSHED OVER THE FAILURES.
5. THE FOLLOWING PROCEDURES SHALL BE IMPLEMENTED FOR REMOVAL OF THE TALUS BENEATH THE NORTH FAILURE:
 - 5.1. THE PROTECTION BERM SHALL BE PENETRATED BY THE FRONT END LOADER IN ONE LOCATION ONLY.
 - 5.2. THE TALUS SHALL NOT BE REMOVED DURING A RAIN EVENT OR WITHIN 5 DAYS AFTER A RAIN EVENT.
 - 5.3. THE GEOTECHNICAL ENGINEER AND ENGINEERING GEOLOGIST SHALL OBSERVE THE NORTH FAILURE AFTER A RAIN EVENT, PRIOR TO COMMENCING REMOVAL OF THE TALUS.
 - 5.4. THE GEOTECHNICAL ENGINEER AND ENGINEERING GEOLOGIST SHALL OBSERVE THE NORTH FAILURE DURING TALUS REMOVAL A MINIMUM OF ONCE A WEEK.
6. THE FOLLOWING PROCEDURES SHALL BE IMPLEMENTED FOR REMOVAL OF THE TALUS BENEATH THE SOUTH FAILURE:
 - 6.1. THE PROTECTION BERM SHALL BE PENETRATED BY THE FRONT END LOADER IN ONE LOCATION ONLY.
 - 6.2. THE TALUS SHALL NOT BE REMOVED DURING A RAIN EVENT OR WITHIN 5 DAYS AFTER A RAIN EVENT.
 - 6.3. THE GEOTECHNICAL ENGINEER AND ENGINEERING GEOLOGIST SHALL OBSERVE THE SOUTH FAILURE AFTER A RAIN EVENT, PRIOR TO COMMENCING REMOVAL OF THE TALUS.
 - 6.4. THE GEOTECHNICAL ENGINEER AND ENGINEERING GEOLOGIST SHALL OBSERVE THE SOUTH FAILURE DURING TALUS REMOVAL A MINIMUM OF ONCE A WEEK.

PROJECTED MINING LOCATIONS AND QUANTITIES FOR 2011:

1. APRIL 15TH TO OCTOBER 15TH, 2011:
 - 1.1. EXCAVATION OF THE NORTHERN AND SOUTHERN FAILURE TALUS
 - 1.2. EXCAVATION OF THE NORTHERN AND SOUTHERN FAILURES, STARTING AT AN ELEVATION OF 1175 FEET, FOR A TOTAL APPROXIMATELY VOLUME OF 70,800 CUBIC YARDS.
2. OCTOBER 15TH TO DECEMBER 31, 2011:
 - 2.1. EXCAVATION OF THE NORTHERN PORTION OF THE QUARRY, STARTING AT AN ELEVATION OF 720 FEET FOR A TOTAL APPROXIMATELY VOLUME OF 47,400 CUBIC YARDS.

OLIVE SPRINGS QUARRY
 P.O. BOX 747
 SOQUEL, CALIFORNIA 95073
 PH: 831.475.1610

2011 MINING PROCEDURES
 OLIVE SPRINGS QUARRY
 MINING APPROVAL 88-0233
 OLIVE SPRINGS ROAD, SANTA CRUZ COUNTY, CALIFORNIA

SHEET
 MP-1

DATE: APRIL 8, 2011

DATE	REVISION	BY

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QUARRY MANAGER

ENGINEERING GEOLOGIST

GEOTECHNICAL ENGINEER

CIVIL ENGINEER

