



# DEPARTMENT OF CONSERVATION

*Managing California's Working Lands*

## OFFICE OF MINE RECLAMATION

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July 16, 2010

**VIA EMAIL: [joliveira@co.slo.ca.us](mailto:joliveira@co.slo.ca.us)**

**ORIGINAL SENT BY MAIL**

Jeff Oliveira  
San Luis Obispo County  
Department of Planning and Building  
976 Osos Street, Room 300  
San Luis Obispo, CA 93408

Dear Mr. Oliveira:

LAS PILITAS QUARRY RECLAMATION PLAN  
SAN LUIS OBISPO PERMIT #DRC2009-00025

The Department of Conservation's Office of Mine Reclamation (OMR) has reviewed the *Las Pilitas Quarry Draft Reclamation Plan* dated May 2010. The applicant, Las Pilitas Resources, is proposing to extract granitic rock for aggregate. The operation will yield up to 300,000 tons of material per year for the estimated 30-year life of the operation. The project consists of disturbing 45 acres within the 114 acre site located north of Highway 58, approximately 2.25 miles southeast of the town of Santa Margarita, and less than one half mile east of the Salinas River. The proposed end use for the mine will be a ranch for livestock and wildlife which is consistent with the site's current use.

The Surface Mining and Reclamation Act of 1975 (SMARA) (Public Resources Code section 2710 et seq.) and the State Mining and Geology Board Regulations (California Code of Regulations (CCR) Title 14, Division 2, Chapter 8, Subchapter 1) require that specific items be addressed or included in reclamation plans. OMR made a site visit to discuss reclamation issues on July 6, 2010. The following comments prepared by Beth Hendrickson, Restoration Ecologist, and Fred Gius, Engineering Geologist, are offered to assist in your review of this project. OMR recommends that the reclamation plan be supplemented and/or revised to fully address these items.

### **Mining Operation and Closure**

(Refer to SMARA sections 2770, 2772, 2773, CCR sections 3502, 3709, 3713)

1. SMARA section 2772(c)(3) requires that the reclamation plan include a specific termination date. There was no termination date proposed by the operator, only that

the mine will operate for a period of 25 to 55 years (30 years in the Reclamation Plan Application). OMR recommends that a termination date such as December 31, 2040 be clearly specified in the reclamation plan.

2. Pursuant to the Professional Engineers Act, Geologist and Geophysicist Act, and Professional Land Surveyors' Act (Business and Professions Code sections 6700 – 6799, 7800 – 7887, and 8700 – 8805, respectively), all applicable documents shall be prepared by a California-licensed professional, shall include his or her license number and name, and shall bear the signature and seal of the licensee. When reviewing documents submitted pursuant to SMARA section 2774, OMR must have confidence that the documents are complete and genuine, and have been prepared by or under the supervision of licensed professionals if and as required by law and regulation. Therefore, at least one copy of all documents which must, under applicable law, regulation, or code, be prepared by or under the supervision of licensed professionals bearing an original signature, stamp impression or seal, and date affixed by the author should be submitted to OMR prior to approval. For example, the site drawings prepared by Tartaglia Engineering should be signed and stamped by the responsible California-licensed professional. As a quasi-judicial body operating in the public trust, the County of San Luis Obispo should consider adopting a policy similar to that of the State Mining and Geology Board's *Internal Policy on Validating and Accepting Professionally Prepared Reports and Other Documents Submitted for Consideration*. The State Mining and Geology Board's policy can be found at:  
<http://www.conservation.ca.gov/smgb/staffreports2004/May/Documents/0513-3a.pdf>.

### **End Land Use**

(Refer to SMARA section 2772, CCR sections 3707, 3708)

3. The end land use is specified as ranching and wildlife habitat. OMR suggests that since ranching implies an agricultural end use that could trigger the need for a productivity rate success criterion under CCR section 3707(c), the operator may want to simply specify the end use will be open space. This would not change the way reclamation is carried out.

### **Geotechnical Requirements**

(Refer to CCR sections 3502, 3704)

4. The slope stability analysis summarized in Section 7.0 of the July 14, 2009 Engineering Geology Investigation prepared by GeoSolutions, Inc. does not provide the detail necessary to ensure that the requirements of CCR sections 3502 and 3704 are met. For example, the limit-equilibrium analysis lacks the rationale on why a friction angle of 62.3 degrees, determined from laboratory analysis of the decomposed granite, was used for the "blue" granite. GeoSolutions, Inc. should ensure that the engineering properties of the material utilized in the slope stability analysis are representative of all material to be encountered on site and that the analysis considers the variety of discontinuities in these materials. As presented, the data appears to have been obtained from only one sample and does not represent

material observed during OMR's site visit or described in the Department of Water Resources September 2002 Final Construction Geology Report.

5. The slope stability evaluation does not describe whether a kinematic analysis was completed to evaluate the structural fabric of the rock mass to determine if the orientation of the discontinuities could result in instability of the final slopes. For example, the kinematic analysis can be accomplished by means of stereographic analysis of the structural discontinuities such as joints, foliations, and fractures. Discontinuities observed in the field and presented in the Department of Water Resources report justify the need for a kinematic analysis. The slope stability evaluation should be revised to address the structural fabric of the rock mass and its influence on stability and design of final slopes.
6. CCR section 3704(b) states that where backfilling is required for resource conservation purposes (e.g., agriculture, open space, and wildland conservation), fill material shall be backfilled to the standards required for the resource conservation use involved. The reclamation plan indicates that onsite, native material will be used to backfill a small portion of the site near the 0.5H:1V slopes. The slope stability evaluation did not analyze the stability of the 0.5H:1V slope and it is unclear whether the backfill will be used as a buttress for this slope. Since improperly placed backfill may result in erosion and instability, the reclamation plan should be revised to describe the methods of placement and compaction effort, if any, of the backfill materials that may be necessary for the proposed end use or stability of the 0.5H:1V slope. In addition, the grading plans should be revised, including the preparation of cross-sections, to clearly show the details of the backfill.

### **Hydrology and Water Quality**

(Refer to SMARA sections 2772, 2773, CCR sections 3502, 3503, 3706, 3710, 3712)

7. CCR section 3706(d) requires erosion control methods such as detention basins to be designed to handle runoff from not less than the 20 year/1 hour intensity storm event. However, the Drainage Calculations prepared by Tartaglia Engineering indicates that the hydraulic analysis for the detention basins and associated drainages was based on a 50 year/24 hour storm event. Although the 50 year/24 hour storm event may be more conservative for designing basin storage capacities, the 20 year/1 hour event is more protective for designing drainages because the 20 year/1 hour event results in a greater volume of water flowing through the drainages over a short duration. The hydraulic analysis presented in the reclamation plan should be evaluated to ensure that the drainages are designed to convey the higher flows and that they meet the requirements of CCR section 3706(d).
8. According to SMARA section 2772(d): "An item of information or a document required pursuant to subdivision (c) that has already been prepared as part of a permit application for the surface mining operation, or as part of an environmental document prepared for the project pursuant to Division 13 (commencing with Section 21000), may be included in the reclamation plan by reference, if that item of information or that document is attached to the reclamation plan when the lead agency submits the reclamation plan to the director for review. To the extent that the information or

document referenced in the reclamation plan is used to meet the requirements of subdivision (c), the information or document shall become part of the reclamation plan and shall be subject to all other requirements of this article". Since the reclamation plan relies on the Storm Water Pollution Prevention Plan (SWPPP) to meet the water quality, and erosion and sediment control requirements of SMARA, the applicable elements of the SWPPP should be incorporated into the reclamation plan or a copy of the SWPPP should be included as an appendix to the reclamation plan.

**Environmental Setting and  
Protection of Fish and Wildlife Habitat**

(Refer to CCR sections 3502, 3503, 3703, 3704, 3705, 3710, 3713)

9. OMR understands that an Environmental Impact Report for the project is under preparation. Mitigation measures developed through that process may substantially affect the manner in which mining and reclamation of the site is carried out, and OMR recommends that the reclamation plan not be finalized until those measures can be taken into account.

**Resoiling and Revegetation**

(Refer to SMARA section 2773, CCR sections 3503, 3704, 3705, 3707, 3711)

10. Test plots are required under CCR section 3705(b); OMR suggests that the reclamation proposed in Phase 1B can serve as a test plot area to determine the success of the proposed revegetation measures. See attached information regarding test plots.
11. The plan should provide for decompaction of areas where the substrate has been compacted by equipment, vehicles, or other activities [CCR3705(c)]. This can be done by ripping to a depth of at least 12 inches.
12. The "separate, more detailed restoration plan" referred to on page 8 should be prepared prior to approval of the reclamation plan and included with it, since revegetation is an integral part of reclamation. The plan should include the details that are lacking in the current submittal, such as where and how much of each of the four habitat types is proposed to be recreated, maps showing the different habitat areas, the amount of each species to be included in the seed mixes (at least a basic seed mix for each, perhaps with optional additions according to the amount of seed collected), the amount and type of container stock (if any) that is proposed, and the baseline data used to come up with the performance standards (see attached information).
13. The text suggests that baseline data has not yet been collected, however the table on page 9 gives baseline numbers for species richness, cover and density, raising the question of how these numbers were obtained. OMR suggests that unless those numbers are supported by actual data, there is a danger that the standards may be unreachable. For example, it seems unlikely that there is actually an average of 20

different species per 100 square feet; moreover these figures do not refer to any specific habitat type and are likely to vary between the different types of habitats. The plan should include baseline data for each habitat type, and specific performance standards for each type.

14. SMARA does not require performance standards for height of vegetation (measured as "productivity" on page 10). If these standards are a requirement for some other reason, OMR recommends that the performance standards be revisited and adjusted according to advice from qualified local professionals. The performance standards shown on page 10 may be unrealistically high unless the plants are going to be irrigated on a regular basis.
15. The "Final Site Configuration" map legend shows most of the area as being revegetated with native species (no method given), but then a separate shaded area along the access road is shown as "Hydro-seed areas". The text refers to hydroseeding as the method used for revegetation throughout – this discrepancy should be corrected.

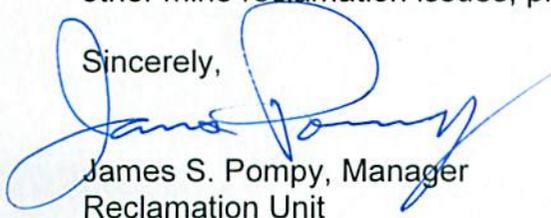
#### **Administrative Requirements**

(Refer to SMARA sections 2772, 2773, 2774, 2776, 2777, PRC section 21151.7)

Senate Bill 668, Chapter 869, Statutes of 2006 amended Public Resources Code section 2774 with respect to lead agency approvals of reclamation plans, plan amendments, and financial assurances. These requirements are applicable to this reclamation plan. Once OMR has provided comments on the reclamation plan, a proposed response to the comments must be submitted to the Department at least 30 days prior to lead agency approval. The proposed response must describe whether you propose to adopt the comments. If you do not propose to adopt the comments, the reason(s) for not doing so must be specified in detail. At least 30 days prior notice must be provided to the Department of the time, place, and date of the hearing at which the reclamation plan is scheduled to be approved. If no hearing is required, then at least 30 days notice must be given to the Department prior to its approval. Finally, within 30 days following approval of the reclamation plan, a final response to these comments must be sent to the Department. Please ensure that the County allows adequate time in the approval process to meet these SMARA requirements.

If you have any questions on the content of this letter or require any assistance with other mine reclamation issues, please contact me at (916) 323-5435.

Sincerely,



James S. Pompy, Manager  
Reclamation Unit

Attachments

different species per 100 square feet...  
The final report should include...  
specimens for each type

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### Administrative Requirements

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Name: S. Port...  
Title: ...

# REVEGETATION TEST PLOT GUIDELINES

The following are recommended guidelines for the creation and maintenance of revegetation test plots for surface mine reclamation plans. If there is a conflict between these guidelines and the specific conditions of approval of a reclamation plan, the conditions of approval must be followed or an application for a modification to the reclamation plan must be submitted to, and approved by, the County.

## **Why establish test plots?**

The reason to establish test plots is to be able to determine in advance the most successful strategy for revegetation of a mine site. Although a reclamation plan establishes requirements for revegetation, it is not known at the time the reclamation plan is approved whether the approved revegetation will actually be successful.

Test plots help determine which plant species will actually grow on site, and what conditions of microclimate, soil, nutrients, etc. are necessary to achieve revegetation success. Test plots are typically required by reclamation plans.

## **Who is responsible for test plots?**

The mine operator is responsible for establishment, maintenance and monitoring of the test plot. The work may be delegated to a consultant, contractor, employee, etc. However, the operator remains responsible.

## **Where should test plots be located?**

Test plots should be located in an area or areas of the mine where they are unlikely to be disturbed during the rest of the time the mine is being operated. If this is not feasible, then locate test plots in an area that will not be disturbed for at least 4 or 5 years. If possible, the test plots should mimic the ultimate condition of the site. For example, test plots should be located in areas which are representative of the various significant microclimates which may exist on the mine site, such as slope (how steep the finished grade will be), aspect (the direction the slope faces), wet or dry conditions, etc. When possible, the soil or growth media that has been salvaged should be used in the test plots. More than one test plot area may be necessary to represent all conditions at the mine site.

## **What size should a test plot be?**

A test plot should be large enough to:

1. Have adequate area to plant a representative sample of the plants proposed for revegetation and enough individuals of each of the plant species to be able to determine the survival and success of the plants to be used for revegetation.
2. Reduce the amount of blown-in seed and invasion of adjacent plants.

3. Have areas for different soil treatments, planting mixes, etc.
4. Have room for people to monitor the plot without trampling all the plants.

A recommended minimum size is approximately 32 feet by 32 feet or 10 meters by 10 meters.

### **How should a test plot be marked?**

A recommended way of marking a test plot is to fence it with welded wire fencing, graduated hog wire or similar fencing, a minimum of 4 feet high, surrounding the plot. A gate and a cleared pathway to the plot are necessary for access. Fencing your test plot also discourages damage to the plants from browsing mammals. Deer and rodents will be attracted to the tender plants in your test plots and can ruin your data by destroying the plants. Test plot fencing in areas where deer are common should be 6 to 8 feet high. To prevent rodents from burrowing under the fencing, trench 6 to 8 inches beneath the soil surface, under the fence and install chicken wire at the base. Freeze-thaw cycles may damage the chicken wire by pushing it up and out of the soil, so you will need to watch for damage to the fence each spring.

### **What type of "soil" should be used?**

Whatever is used for "soil" or growth medium for the test plots should be representative of what will be available and used at the time of reclamation. A test plot planted in native or "virgin" soil will not be helpful in determining how plants will grow in actual reclaimed mine conditions.

Where possible, soil should be replaced on the test plot in such a way so as to imitate and reconstruct the original soil on site and/or as specified in the reclamation plan. Where possible, coarse rock shall be placed down first, followed by finer rock, followed by subsoil and soil, and capped with topsoil. Soil compaction should not exceed 80 percent in areas to be revegetated.

Where soil is not available, the test plot should be established on whatever growth medium will be available and replaced in the same way it will be at the time of reclamation.

### **What about soil testing?**

The soil or other growth medium used for reclamation should be tested to determine whether any nutrient amendment or other treatment is necessary. Many soil laboratories will conduct a basic soil analysis for approximately \$30. The soil test will provide you with important information that can save you money in the long run. The soil analysis will determine what your soil pH is. Soil pH is a measurement of how acidic or how basic your soil is. Plants grow best in soil with a pH of 6.5, but will grow in soils with a pH of 5.5 to 7.5. Mining can alter soil pH by exposing your soils to overburden and tailings, which may

contain very acidic or basic minerals. The soil test will also determine if amendments are needed. The soil analyses are based on demands of agricultural crops, so you must extrapolate your results to native plants. Native plants are not adapted to nutrient rich soils. In addition, for many California native species, it may be helpful to inoculate the soil with mycorrhizae.

Fertilizer should be avoided, but if required, any fertilizer that you add should be a slow-release or encapsulated type and at a lower rate than recommended for agricultural crops. If your soil lacks organic matter, then you may need to increase the organic matter content of your soil by adding compost. Compost should be weed-free.

### **What plants should be planted in a test plot?**

The plants used in the test plots should be the same as the species and density of plants approved in the reclamation plan. You may also consider native plants that are already coming in on the site.

### **What other conditions can I test in my test plots?**

You can test the following conditions:

- Amended "soil" vs. non-amended "soil." Different trials can include: the use of compost, fertilizer, and soil additives such as lime to raise pH and sulfur to lower pH.
- Seeding methods, such as broadcast seeding, hydroseeding, and drill seeding can be tested.
- The need for plant protection can be tested outside of your fenced area. Try the different kinds of cages that are available from forestry suppliers.
- What species will work best and do they establish quicker as seeds or containerized plants.
- The need for weed control and what methods work best.
- The need for irrigation, or irrigation the first year to get the plants established.

### **What about irrigation?**

Unless otherwise specified in the approved reclamation plan, permanent irrigation is not recommended. Plants should be planted during the optimum time of year for them to obtain the moisture they need. If possible, avoid irrigation entirely. If additional moisture is needed, periodic irrigation for the first year may be used, keeping in mind that similar irrigation will likely be necessary for the entire mine site at the time of reclamation.

### **How should test plots be monitored?**

The goal is for the test plot to show that if the "soil" is replaced and the former mine is planted according to the standards and conditions of the reclamation plan, the revegetation will be successful as specified in the plan.

The test plot should be monitored once a year, after the majority of growth has ceased, usually in the late summer. Plots should be monitored the same time each year, and within 2 weeks of the previous year's monitoring. Photographs of the overall plot(s) and of the plants shown next to a measuring device such as a ruler or tape measure, and showing the date are recommended. Make sure that you keep a record of the success rates of the various plant species, conditions, etc. The record should also compare the *actual plant success rates* with the success criteria specified in the reclamation plan. A copy of this record should be submitted to the Planning Division and/or provided to the inspector during the annual inspection.

After two or more years, it may become apparent that the survival rate of certain species specified in the reclamation plan is low and/or otherwise does not meet the success criteria for revegetation specified in the reclamation plan. If so, then other soil constructions, nutrient amendments, irrigation, and/or plant species should be tried. In this case, the operator may apply for and obtain approval of a minor modification to the reclamation plan to change the species to be planted.

### **When should test plots be established?**

A test plot should be established within one year of the beginning of mining operations. In many cases this will allow a number of years of testing prior to reclamation.

### **How long should test plots be maintained and monitored?**

A test plot should be maintained for at least four or five years, and monitored for the life of the mining operation. It may be helpful to consider the standard for determining revegetation success:

"The reclamation shall be monitored until the revegetation performance standards are met provided that, during the last two years, there has been no human intervention, including, for example, irrigation, fertilization, or weeding."

# COLLECTING BASELINE DATA AND MONITORING MINE RECLAMATION

## Baseline studies

### Requirement for baseline studies

If natural vegetation is present on the site, a baseline vegetation study should be done prior to any soil disturbance. Baseline vegetation studies are required in order to establish the amount and type of cover, density of perennial plants, and species diversity in the undisturbed natural vegetation of the site. These data are used to establish success criteria for revegetation following mining.

If natural vegetation on the site is lacking or disturbed, and the end land use involves revegetation with native plants, baseline conditions may be established using data from a nearby undisturbed area that is similar in soils, slopes and elevation to the mining site.

If the end use does not involve revegetation (for example, end uses like agriculture, residential or commercial development, golf courses) baseline studies are not required.

### Planning baseline studies

- If more than one vegetation type is present, a vegetation map of the site must be prepared, and the acreage of each vegetation type calculated.
- A sampling plan should be prepared such that each vegetation type in the area affected by mining is adequately sampled.
- Sampling is adequate when sufficient replicates are obtained to give a minimal 80% confidence level in the results. For most situations in native vegetation, this can be accomplished by sampling 14 transects or plots per vegetation type (Newton and Claassen, 2003)
- Studies should be conducted in a season when most of the perennial vegetation is identifiable (i.e. leaves or aboveground parts are present).
- Methods used for baseline studies are not sufficient or suitable for rare plant surveys; those surveys should follow California Dept. of Fish and Game guidelines (attached).

### Sampling methods

There are many valid vegetation sampling methods described in the literature and any appropriate method can be used for conducting baseline studies. The methods described here have been found by OMR staff to be efficient and require a minimum of equipment. Vegetation sampling should always be carried

out by qualified botanists familiar with the flora of the area. Examples of line-intercept and density and species richness data sheets are attached.

### **Stratified random sampling**

Different vegetation types on a site are sampled separately, so that the sample area for each is a relatively homogenous stand. Then, within each stand, the location of plots is randomized. This is what is meant by stratified sampling.

Sampling locations should be selected so as to reduce the possible effects of observer bias. This can be done prior to field work by randomly selecting GPS points within each stratified area. Each point serves as the starting point for a transect. The direction of the transect can be a randomly determined number between 1 and 360, representing the degree of angle from north.

In an alternative method, transects can be placed at given intervals, such as every five meters, starting from a randomly determined point.

### **Line intercept method for cover**

Plant cover is defined as the vertical projection of the area of the ground covered by vegetation, in percent. There are several commonly used methods for determining plant cover. The line intercept method described here has the advantages of being relatively free of observer error, fast, and easy to master.

A 50 or 100 meter transect tape is located and laid out as described above. The observer notes where the canopy of each species begins and ends on the tape, for example: "55 to 103 cm-black sage". There can be overlap of different species where one is underneath the other, and total cover in areas with overlapping plants can be over 100%. In grasslands or areas of very high annual plant densities, documenting individual species can be too cumbersome; such areas may simply be lumped together as "annual grasses". In areas dominated by perennial plant species, annual plants may simply be ignored, as they will not form part of the success criteria.

In areas with tree cover, estimating the location of the intersection of the canopy with the tape can be facilitated by using a pole to mark the edge of the canopy down to the tape.

### **Plot method for density**

Density is defined as the number of stems per unit area. Annual species are excluded from density measurements because counting them would be too cumbersome, and their numbers vary from year to year depending on rainfall, etc. Using the same transect as above and a meter stick, the observer walks the length of the transect tape on either one side or both sides of the tape, counting the perennial species rooted within one meter of the tape. The observer can thus quickly determine the number of stems in a plot that is 1 or 2 meters wide and 50 to 100 meters long.

### **Plot method for species richness**

Species richness can be determined using the data obtained in the density measurements above, if the stems are tallied by species. Species richness is simply the number of different plant species in a given area.

### **Reporting data**

- Include a species list, with scientific names for all species encountered on the site. Species that are noted but that did not occur in the transects should also be included.
- Describe sampling methods used.
- Report data on mean cover, density and species richness for each vegetation type on the site. Express results as a sample size, mean value, range of values, and a variance

### **Reclamation Monitoring**

#### **Establishment phase monitoring**

Establishment phase monitoring is a qualitative assessment of the site, done in order to ensure that weeds, erosion, drought or other problems are detected and remediated before they compromise the success of the project. It is conducted as often as necessary, but usually frequently during the first year after revegetation.

- Post-installation monitoring is conducted to check for correct implementation of the plan.
- Monitoring should be done on a regular basis (the schedule will be determined by site conditions, weather, and the type of revegetation methods used).
- Qualitative monitoring includes observations of plant health, plant cover estimates, and evidence of pests, herbivory, drought, and excessive erosion.
- Interim success criteria or action levels for remediation should be clearly established, so that problems are dealt with at an early stage before compromising the success of the project.

#### **Quantitative monitoring**

Quantitative monitoring is done to determine whether or not the reclamation goals have been met, after the project has gone without irrigation or other maintenance for two years. This type of monitoring can also be used to evaluate test plots and compare treatments. Quantitative revegetation monitoring uses the same methods and sampling design as baseline monitoring.

## **Sources**

Newton, G. A. and V. P. Claassen, 2003. Special Publication 123. Rehabilitation of Disturbed Lands in California: A Manual for Decision-Making. California Dept. of Conservation, California Geological Survey.