2.0 COMMENTS ON THE DRAFT EIR AND RESPONSES

2.1 COMMENT LETTERS RECEIVED ON THE DRAFT EIR

This Section contains written comments received on the Draft EIR and responses to the comments. The comment letters are presented in the order indicated in Table 2-1 below, and the responses follow each letter. Each comment and response is identified with corresponding numbers. If the letter has no comments relevant to significant environmental issues, then no response is necessary.

Table 2-1
Comment Letters Received for the
Bonny Doon Limestone Quarry Boundary Expansion Project and
Reclamation Plan Amendment Draft EIR

Number	Received From	Page
I.	***Federal Agencies***	
A.	Dick Butler, Santa Rosa Area Office Supervisor, NOAA National Marine Fisheries Service, 777 Sonoma Avenue, Room 325, Santa Rosa, CA 95404. September 26, 2007.	2-3
II.	***State Agencies***	
A.	James Pompy, Manager, Department of Conservation, Office of Mine Reclamation, 801 K Street, Sacramento, CA 95814. September 6, 2007.	2-9
B.	Richard Sampson, Division Chief, Department of Forestry and Fire Protection, 6059 Highway 9, Felton, CA 95018. September 17, 2007.	2-15
C.	Serge Glushkoff, Environmental Scientist, California Department of Fish and Game, Bay Delta Region, P.O. Box 47 Yountville, CA 94599. October 26, 2007.	2-19
D.	Susan Craig, Planner, California Coastal Commission, 725 Front Street, Suite 300, Santa Cruz, CA 95060. October 2, 2007.	2-29
III.	***Local Agencies***	
A.	Bill Kocher, Director, City of Santa Cruz Water Department, 809 Center Street, Santa Cruz, CA 95060. September 28, 2007.	2-33
B.	Neal Coonerty, County of Santa Cruz, County Supervisor, Third District, 701 Ocean Street, Suite 500, Santa Cruz, CA 95060. September 17, 2007.	2-57
C.	Nicolas Papadakis, Executive Director, Association of Monterey Bay Area Governments, 445 Reservation Road, Suite G, P.O. Box 809, Marina CA 93933. September 14, 2007.	2-61
D.	Jean Getchell, Supervising Planner, Planning and Air Monitoring Division, Monterey Bay Unified Air Pollution Control District, 24580 Silver Cloud Court, Monterey, CA 93940. February 14, 2008.	2-65
IV.	***Private Organizations***	
A.	CEMEX, Robert Walker, Quarry Manager, 700 Highway 1, Davenport, CA 95017. October 1, 2007.	2-69
B.	Jim Conklin, Executive Director, Santa Cruz County Business Council, 740 Front Street, Santa Cruz, CA 95060. October 1, 2007.	2-89
C.	Aldo Giacchino, Sierra Club, Chair of the Santa Cruz County Group, P.O. Box 604, Santa Cruz, CA 95061. October 1, 2007.	2-93

Table 2-1 Comment Letters Received for the Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment Draft EIR		
Number	**Received From**	**Page**
D.	William R. Tysseling, Executive Director, Santa Cruz Chamber of Commerce, 611 Ocean Street, Santa Cruz, CA 95060. October 1, 2007.	2-113
E.	Homer McCrary, Vice President, Big Creek Lumber Company, 3564 Highway 1, Davenport, CA 95017. September 26, 2007.	2-117
F.	Carey Allen, Director, Boilermakers-Iron Shipbuilders, Blacksmiths-Forgers & Helpers, P.O. Box 813, Cloverdale, IN 46120. September 30, 2007.	2-121
G.	Ted Benhari, Chairman, Rural Bonny Doon Association (BDRA), 102 Sunlit Lane, Bonny Doon, CA 95060. September 28, 2007.	2-125
H.	Robert Walker, Quarry Manager, 700 Highway 1, Davenport, CA 95017. July 31, 2007.	2-131
I.	Sam Saiu, Business Representative, International Association of Machinists & Aerospace Workers, Local Lodge 93, 2102 Almaden Road, San Jose, CA 95125. October 1, 2007.	2-135
V.	***Private Individuals***	
A.	Barbara McCrary, Resident, 640 Swanton View Road, Davenport, CA 95017. September 27, 2007.	2-139
B.	Milton and Nancy Howe, Residents, 4141 Smith Grade Road, Santa Cruz, CA 95060. September 28, 2007.	2-143
C.	David S. Kossack, Ph.D., Resident, P.O. Box 268, Davenport, CA 95017. October 1, 2007.	2-147
D.	James Austin, Resident, P.O. Box 275Davenport, CA 95017. September 26, 2007.	2-153
E.	Karen McNally, Resident, Davenport CA 95017. October 1, 2007.	2-157
F.	Joan Hellenthal, Resident, 4177 Smith Grade Road, Santa Cruz, CA 95060. Not dated.	2-161
G.	Margaret Kliegel, Resident, 4175 Smith Grade, Santa Cruz, CA 95060. September 27, 2007.	2-165
H.	Tom Pye, Resident, 335 Shake Mill Road, Santa Cruz, CA 95050. Not dated.	2-169
I.	Wendy Domster and Christine Echavia, Residents, 4209 Smith Grade Road, Santa Cruz, CA 95060. September 28, 2007.	2-173
J.	Betty Brolly, Resident, 4203 Smith Grade Road, Santa Cruz, CA 95060. Not dated.	2-177
K.	Barry Balanda, Resident, 1700 Pine Flat, Santa Cruz, CA 95060. Not dated.	2-181
L.	Christel Markevich, Resident, 4015 Smith Grade Road, Santa Cruz, CA 95060. September 11, 2007.	2-185
M.	Roberta Smith, Resident, P.O. Box 174, Davenport, CA 95017. September 9, 2007.	2-189
N.	Gene Lytle, Resident, No Address. August 29, 2007.	2-193
O.	Jeannine Bassett, Resident, 2807 Smith Grade Road, Santa Cruz, CA 95060. September 30, 2007.	2-197

Comment Letter I-A
National Oceanic and Atmospheric Administration, National Marine Fisheries Service

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I-A

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
777 Sonoma Ave., Room 325
Santa Rosa, CA 95404-4731

September 26, 2007

In response refer to:
151416SWR2007SR00433:JEA

Todd Sexauer
County of Santa Cruz Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, California 95060

Dear Mr. Sexauer,

NOAA's National Marine Fisheries Service (NMFS) reviewed the July 2007 version of the County of Santa Cruz's (County) Draft Environmental Impact Report (DEIR) for the Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment. I am writing to draw your attention to what I believe are residual deficiencies in the DEIR. This letter is intended to emphasize the unaddressed issues in the DEIR and to assist the County in improving the DEIR so it includes an adequate analysis of all biological impacts.

NMFS provided the County with technical guidance in an effort to resolve our concerns regarding the 2002 DEIR for this project through a comment letter dated October 2, 2002, reference # 151422SWR02SR6443 (included in Appendix A of the DEIR). Although we appreciate that the County included some measures in the July 2007 DEIR to minimize the biological effects of the proposed project, we are concerned that the main issues we raised remain unresolved. The DEIR does not include either of the items NMFS requested: an analysis of the impacts to base flows within Liddell and San Vicente creeks, and an Instream Flow Incremental Methodology (IFIM) study. Without this information, it is impossible for NMFS to determine the effects of baseline operations at Bonny Doon Quarry on listed fish species, let alone the effects of the proposed expansion of the quarry. 1

In addition, as indicated in the comment letter from Shawn Chartrand and Barry Hecht of Balance Hydrologics[1], the watershed and aquifer systems which could be affected by the proposed actions extend beyond the boundaries of the geologic/hydrologic study area (G/HSA) defined in the DEIR. The limited scope of the G/HSA compromises the DEIR's consideration of project impacts on two fish species listed under the Endangered Species Act (ESA): threatened Central California Coast (CCC) Evolutionarily Significant Unit (ESU) steelhead (*Oncorhynchus mykiss*), and endangered CCC ESU coho salmon (*O. kisutch*). 2 The comment letter from Chartrand and Hecht also 3

[1] Letter dated September 11, 2007, from Chartrand and Hecht of Balance Hydrologics, Inc. to Chris Berry of the City of Santa Cruz providing comments on the Bonny Doon Limestone Quarry DEIR.

identified a prior history of breaches and spills, and evidence of high turbidity at Liddell Spring. NMFS is concerned about the implications of these findings for salmonid habitat in the affected area. 3

The G/HAS includes a substantial portion of the topographic watersheds of Liddell and San Vicente creeks, which have been designated as Critical Habitat under the ESA for CCC ESU steelhead trout and CCC ESU coho salmon. In addition, these creeks are Essential Fish Habitat for coho salmon under the Magnuson-Stevens Fishery Conservation and Management Act. CCC ESU steelhead are known to occur in Liddell Creek, and San Vicente Creek is the southern-most watershed where CCC ESU coho salmon are known to be present. Any decrease in baseline flows could have a detrimental effect on steelhead and coho in these creeks. Even if baseline flows are unaffected by the proposed quarry expansion, the current level of use may be adversely affecting CCC ESU coho salmon and CCC ESU steelhead trout. Therefore, NMFS believes it is critical for the DEIR to include results of an IFIM or similar study of Liddell and San Vicente creeks, in order to evaluate the effects of both the existing Bonny Doon Quarry operation and the proposed quarry expansion on coho salmon and steelhead trout found in these creeks. This study should include analysis of base flows during the dry season and should be designed in coordination with NMFS Southwest Region staff. 4

Thank you for the opportunity to comment on the DEIR. If you have any questions concerning the comments above, please contact Ms. Joyce Ambrosius at (707) 575-6064 or joyce.ambrosius@noaa.gov.

Sincerely,

Dick Butler
Santa Rosa Area Office Supervisor
Protected Resources Division

Enclosure

cc: Russell Strach, NMFS, Sacramento
Korie Schaeffer, EFH, NMFS, Santa Rosa
Serge Glushkoff, CDFG, Yountville
Chris Berry, City of Santa Cruz Water Department
David Carlson, County of Santa Cruz

Balance Hydrologics, Inc.

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September 11, 2007

Mr. Chris Berry
Water Resources Program Manager
Water Department, City of Santa Cruz
715 Graham Hill Road
Santa Cruz, California 95060

Dear Mr. Berry:

Thank you for the opportunity to review and comment upon the following documents related to the proposed Bonny Doon Limestone Quarry expansion.

- Bonny Doon Limestone Quarry, Boundary Expansion Project and Reclamation Plan Amendment, Draft Environmental Impact Report, TRA Environmental Sciences, July 2007 (DEIR).
- Geologic, Hydrologic, and Hydrogeologic Technical Appendix F of the Bonny Doon Limestone Quarry Draft Environmental Impact Report, Nolan Associates and Nicholas M. Johnson, February 13, 2007. 4

Per your request, we have reviewed these documents for technical merit and adequacy in identifying and addressing potential hydrologic and water quality impacts to Liddell Spring, the karst aquifer, and other receiving waters related to the proposed quarry expansion. Our review of Technical Appendix F suggests that it is a strong contribution to the local literature and sheds light on many previously unaddressed questions about the system. On the other hand, we believe that the DEIR could be substantially strengthened with specific respect to (1) the proposed hydrologic/water quality mitigation measures, and (2) development of an enhanced systems based analysis of potential impacts associated with the proposed quarry expansion. Specifically, we would highlight the following major points from our review of the DEIR:

1. The DEIR could be substantially strengthened with respect to potential water quality impacts at Liddell Spring as a result of future clearing and grubbing within the proposed expansion area. Previous water quality impacts associated with clearing and grubbing at the Bonny Doon Quarry in 1969 and 1970 seem to be firmly established (DEIR page 5-20, 5-30, and 5-35). Despite these findings, the DEIR does not provided adequate conceptual erosion control/clearing and grubbing plans for review by qualified professionals. Rather, the DEIR provides a written description on pages 5-35 and 5-36 of what these plans must address. While the written descriptions seem fairly complete, there are real questions about how these measures are to be implemented within a working quarry environment. For example, using movable plastic membranes throughout the quarry area will, in our opinion, be very difficult to implement effectively; secondly, by what means will runoff in disturbed areas be directed

away from sinkholes or otherwise obvious fractures? What if the slopes around these features are steeper than 1:1 (45 degrees) and bottomed on bedrock? We believe that the DEIR is not specific enough with respect to how this potentially significant impact to Liddell Spring water quality is to be mitigated and we believe that the present level of mitigation described (HYD-1) will not necessarily result in a less than significant impact – we do believe however that a well developed and conceived erosion control/clearing and grubbing plan for the clearing and grubbing phase could offer the requisite level of protection and mitigation.

2. The DEIR could be substantially strengthened with respect to further considerations of mitigation measure HYD-2. Making and supporting a case to proceed with a project as described without necessary information to assess a potential impact is worrisome and sets a bad precedent for future proposed projects within the County of Santa Cruz. Mitigation measure HYD-2 (DEIR page 5-37) proposes to concurrently monitor groundwater conditions within the proposed quarry expansion area as mining occurs. The intent of the monitoring program would be to assess whether or not mining has occurred to within 20 feet of the local maximum ground water elevation(s), or if mining has uncovered a sizable vadose zone water body. We believe issues implicit in this situation could be resolved at the County level by possibly drafting new ordinance language which recognizes that karst aquifers are not well-described by ground-water conditions typical of local sedimentary aquifers (i.e. the 20 foot offset). As it is very unlikely that a new ordinance could play any role in the present project, we would suggest that monitoring wells be drilled immediately in the proposed expansion area and those data collected prior to the commencement of mining be re-evaluated in relation to the proposed activity – this could be simply accomplished by making such actions a condition of the use permit. Alternatively, the County could permit the project to some depth higher than 750 feet (perhaps 850 feet) and assess groundwater conditions as the project proceeds and as data is collected. This type of permit condition would provide more protection for the vadose zone and provide for other review mechanisms in relation to the surprising apparent data gap. The apparent data gap in monitoring of groundwater conditions within the proposed expansion area begs the question of why has this data not been collected before now given that plans for the expansion have been in the works for some time?

Our full comments on the DEIR and Appendix F are provided below and have been organized according to the two separate documents and broken down within into general or global comments as well as specific comments. We have attached 15 figures and 1 table to this letter to add to, supplement, or otherwise question points highlighted in Appendix F. We have also provided our own substantial citation list at the end of this letter which we believe is wither lacking from the DEIR and/or Appendix F.

Bonny Doon Quarry Proposed Expansion Draft EIR Comments.

General Comments

A regional perspective. Amongst the many pages, there is no mention of:

- The role that Liddell Spring plays in meeting the water-supply needs of Santa Cruz County, and its special role in dry years and sustained droughts, as well as its importance in event that the San Lorenzo watershed sources are temporarily lost to contamination or other closures. Although the City operates the Liddell Spring diversion, the area served from Liddell Spring extends well beyond the City limits to include most of the population between Santa Cruz and Capitola, as well as areas west and north of the City. Details are available on the City's website.

- Other springs in the Santa Cruz Mountains, and what might be learned from their attributes or management; among them are Skyline Quarry (Crystal Springs), Tunnel Spring (La Honda), or any number of springs in the Santa Margarita outcrop of central Santa Cruz County. There is only passing mention of Liddell Spring being one of the major springs of the Santa Cruz Mountains; in fact, it is by far the largest, and perhaps most constant in its yield, with little explanation of how the aquifer processes combine to make this the case.

- Despite the primacy of water supply in environmental and natural-resource planning in Santa Cruz County, the DEIR does not consider a major sustainable resource in the 'Energy and Natural Resources' chapter (9.0), nor the energy costs of alternative supplies or additional treatment associated with the project; without this information, it seems quite difficult to evaluate the discussion of impacts, alternatives, or potential mitigation and mitigation-monitoring measures,

- Similarly, the regional search for additional instream flows to protect aquatic habitat and sensitive species is a major ongoing change at the regional level. The quarry drains to Liddell Creek, a known salmonid and stream and CRLF corridor for which habitat-restoration activities – including design and construction of a fish ladder beneath Highway 1 – are now underway.

- Substantial investigation into many biological, hydrological, and cultural dynamics has been completed on the adjoining Trust for Public Lands' property. One of these is the Existing Conditions Report developed by ESA. It is a substantial document recently developed for lands within the same watershed that is not used in any of the named sections, nor does it appear in the bibliography. We believe that substantial work on adjoining properties on watershed issues should be included in the background and evaluative sections of the DEIR, and politely inquire why this was not done.

A systematic watershed perspective and analysis appears to be missing from the DEIR.

Watershed planning with watershed analysis is one of the cornerstones of public policy in the county. There is no systematic analysis of the effects of the project (and especially the reclamation plan) on flows:

- For dry, critically dry, normal and wet years at Liddell and Plant Springs,

- For design flows (such as the storm events with expected recurrences of 10 and 100 years) at key nodes in the hydrographic net downstream from the quarry floor, such that effects of releasing water to Pond 3 and thence to the Liddell Creek drainage network can be evaluated vis a vis retaining the water on the quarry floor,

- Integrated discussion of storm runoff and sediment sources and/or sediment transport on channel downstream from the quarry, such that effects on sedimentation and sediment transport of stormflow releases from the quarry might be evaluated,

- Considering which episodic events might affect the watershed, and how the proposed project might affect flows and sedimentation downstream; for example, replacing redwood forest with grassland and chaparral vegetation sharply increases the frequency of fire and of post-fire channel sedimentation and related water-quality constraints,

- Induced erosion (generally expressed as channel incision or bank retreat) associated with greater storm water peaks that might emanate from the quarry; our own work in the Arana Gulch watershed, a similar-sized catchment a few miles to the east, suggests that somewhat over half of the sediment entering the harbor derives from erosion of the channel downstream from where the storm-water hydrograph has been modified. Similar effects have been observed throughout the region, and are increasingly being regulated by the RWQCBs in the so-called C(3)(f) provisions of recent discharge permits, being phased in statewide.

A sense of consistency with other EIRs prepared by Santa Cruz County for hard rock quarries.

One way of evaluating potential gaps in this DEIR is by comparing it with CEQA documents developed for other hard-rock quarries in the region. Santa Cruz County completed the Felton Quarry EIR in 1978 – nearly 30 years ago. This EIR (Environ, 1978, p. 43 ff) contained provisions recognizing that:

- Mining of the rock means removal of aquifer material, resulting in less water emanating from the aquifer with perhaps less reliability,

- Removal of aquifer material leads to disproportionately greater effects during dry years,

- Measures to provide compensatory water or good quality to downstream users was both merited and feasible,

- The potential effects of removing aquifer materials on the water supplies of downgradient water districts merits continuous monitoring,

- Known and potential water-quality effects must also be monitored,

- While all of this quarry was topographically in one watershed, the possibility that it might affect adjoining watersheds warranted monitoring flows and water quality in the adjoining watersheds.

It seems to us that each of these conditions applies in some degree to the proposed project. While no two projects are the same, these impacts and corresponding mitigation or mitigation-monitoring measures might be considered for inclusion in the Final EIR.

A critical look at prior data used for this DEIR.

The only substantive discussion we could find of sediment originating from the quarry and its potential effects on salmonids downstream of the quarry is a paragraph in section 6.1.3.3, which reads:

> *"McGinnis (County of Santa Cruz, 1996a&b) sampled sediments in the settlement basin and in the creek downstream of the basins and tested them for content of limestone and granite with the purpose of determining whether the quarry was contributing most of the sedimentation to Liddell Creek. The results were that the settlement basins were capturing most of the sediment and that the quarry was contributing a small amount to the downstream watershed. The embeddednesss in Liddell Creek was attributed mainly to natural erosion and weathering in the watershed, as opposed to surface runoff from quarry operations." [p. 6-10]*

Several of the mitigation measures or alternatives can affect the rate and volume of releases to the stream system downstream from the quarry. It appears, though, that no independent work on sediment and its effects on Liddell Creek downstream of the project has yet been conducted for this DEIR. This is important because:

- It does not address downstream effects of the quarry operation on flows consistent with the regional literature on induced ('hydromodification' or 'hydrograph-modified') sedimentation, and
- Unfortunately, there is no record that Sam McGinnis, a biology professor, is or has ever been a registered geologist in California. Yet it appears that he reached a conclusion on mineralogic determination of sediment sources that seems to require geologic licensing in California. We were wondering if reliance of the DEIR on this quotation might possibly compromise the defensibility of the DEIR. Or, if perhaps TRA might be able to locate other, properly credentialed and accredited assessments, would that not help strengthen the document? Unfortunately, it is not feasible within the limited time available to locate and check the original documents to assess what was done, or to evaluate whether the cited work conforms to prior standards of care for mineralogical assessment in Santa Cruz County. We do note, though, that all other geologic and hydrogeologic work in Appendix F is not only carefully done and documented, but is also clearly performed by registered professionals.

Our search indicates a prior history of breaches and spills, and data which may conflict with the McGinnis finding. For example, Creegan and D'Angelo Consulting Engineers (1984, Table 18) sampled the stream emanating from Liddell Spring as well as others in the Liddell watershed. The sampling was conducted on June 10, 1982, approximately 60 days following the last runoff-generating rainfall of the season. They reported turbidities of 840 NTUs below Liddell Spring, while other streams in the watershed – including East Branch Liddell – had readings of 2.5 to 3.5 NTUs on that date.

Specific Comments

1. Page 5-1, 3rd paragraph – Geologic/Hydrologic Study Area

The "geologic/hydrologic study area" (hereafter, G/HSA) defined in the DEIR is helpful in some respects and misleading in others. It has arbitrary boundaries, defined by roads, that have little to do with hydrology. While it may be useful for limited purposes such as estimating recharge or illustrating concepts, it has no basis in the watershed sciences. Its use is inconsistent within the document.

- The rationale for the G/HSA is that "surface water and ground water originate beyond the boundaries of the quarry property and flow through the quarry to areas downstream, it has been necessary to study a large area around the quarry. ". Yet the downstream limit of the G/HSA is Liddell Spring, neglecting the remainder of the watershed and the aquifer system(s) extending to the coast – and probably beyond. The G/HSA simply excludes many areas, significant hydrologic elements and impacts, and makes it harder to realize some of the potentially beneficial hydrologic aspects of the project.
- The G/HAS discourages analysis of potential effects on Mill and San Vicente Creeks, despite including a substantial area within their topographic watershed. In fact, the County has made protection of aquatic habitat (especially the coho run) a high priority. This is documented in a 2002 proposed Board of Supervisors' resolution, and the present proposal to restore the San Vicente ponds funded through under the IWRP in which the County is participating). Subsurface conditions north of the quarry are clearly conducive to flow toward Mill Creek, and a small change in gradient or water levels could alter the direction of flow from a substantial area north of the quarry away from or towards Mill Creek. Similarly, a small change could alter the direction toward which a substantial volume of recharge flows, either toward or from Mill Creek. Yet there is no mention of these processes or their potential effects on water use, water quality or sensitive species of the Mill/San Vicente system in the EIR. there is no focused mention, let alone assessment of potential effects on coho, or of CRLF or other beneficial uses in the San Vicente watershed. (see California SWRCB, Jan 31, 2003 notice).
- This G/HSA ignores the remainder of the karst complex of the general Bonny Doon area, which also includes substantial areas in the Mill Creek, San Vicente Creek, and portions of the San Lorenzo watershed. The Bonny Doon karst complex also includes linked and large sinkholes southeast of Laguna Creek, in areas mapped as Lompico formation. The complex is likely interlinked in complicated ways. Changes in flows in one area can result in changes in flows in the adjoining watersheds. Effects can be much more extensive than the limited area from which individual molecules of water flow toward Liddell or Plant Springs – which is the important but limited information that a dye study delineates.
- The EIR needs to make it very clear that not all areas within the arbitrarily designated study area necessarily drain (above or below ground) toward the proposed project, and that substantial areas beyond the study area likely contribute to Liddell and Plant Springs, directly[1] or indirectly. It might be worth noting that the inferred contributing area identified by the applicant's consultants expanded substantially during the course of the investigations, and that their most recent findings

[1] Such as the eastern half of the Laguna watershed, which is specifically cited as being a direct contributor to flow beneath the quarry property.

identify direct contributions from beyond the G/HSA. The indirect effects on contributing area are even more widespread. It would be an unfortunate and very incorrect legacy if watershed management or 'watershed sanitary survey' programs were regulated under the assumption that the County designates this area as the Liddell Spring watershed. We suggest the term 'core area for G/H study' rather than G/HSA.

2. **Page 5-35 to 5-37 , Mitigation Measure HYD-1**

In addition to our comments provided on page 1 and 2 of this letter with respect to mitigation measure HYD-1, we offer the following comment related to structural loading of the karst beneath the quarry pit. One aspect of the problem which is not addressed by the DEIR includes the possible affect of surcharging the quarry pit with spoils to 15 foot depths and further loading due to ponding of water on the pit floor to at least several feet of additional depth. Given that the finished floor elevation of the quarry pit could be relatively close to the phreatic zone, and that the karst beneath quarry pit has a history of applied stress through routine quarry activities, what is, if any, the possible affect of these actions on shifting or settlement within the karst and temporarily affecting drainage to Liddell Spring? It could be that this potential impact is small relative to the others identified but it should be considered.

3. **Page 5-37 to 5-38 , Mitigation Measure HYD-2**

We would re-iterate point 2 highlighted on page 2 of this letter made with respect to mitigation measure HYD-2.

4. **Alternative Mitigation Measure and a Proposed Mitigation Monitoring Element**

There is at least one additional mitigation measure which should be considered with regards to hydrology and water quality and one element to consider for inclusion into the mitigation monitoring plan for the project. These include:

- Alternative Winter Blasting Schedule: We are certainly cognizant of the difficulties in work flow related to possibly altering blasting activities with relation to climatic conditions. Despite the apparent operational hurdles, it may be worthwhile to explore the notion of a adaptive blasting schedule for wet or prolonged wet periods when it is likely that potential water quality impacts could be elevated. We note that recent data related to this might suggest that there is no clear pattern in the magnitude of water quality impact associated with blasting during the winter months and wet periods, but there have been instances when blasting during wet periods has resulted in significant turbidity responses. Therefore, would it be at all feasible to adapt blasting schedules during very wet periods when blasting could compound turbidity responses at Liddell Spring? PELA (2007) has previously reported that blasting related impacts to Liddell Spring water quality will of course be compounded or elevated during wet conditions. Wet periods or conditions could easily be defined based on the antecedent precipitation index as discussed in citation 7 provided at the end of this letter.

- Coordinated Mitigation Monitoring at Liddell Spring during the Clearing and Grubbing Phase of the Expansion: An additional measure might include coordinated monitoring at Liddell

Spring during periods of overburden removal and during at least the first several significant rainstorms of the year(s) following the clearing and grubbing process. It seems to us that potential water quality impacts associated with clearing and grubbing will be very difficult to mitigate and in the end may need to be addressed by some other mitigation related mechanism.

Bonny Doon Quarry Proposed Expansion Draft EIR Technical Appendix F Comments.

General Comments

Technical Appendix F is a great addition to the local hydrologic literature and adds greatly to our understanding and conceptualization of the Liddell Spring aquifer system. While we have provided numerous comments outlined below, it is our opinion that the report does not contain serious flaws or technical omissions that would otherwise require substantial rethinking or additional substantial analysis. We believe our comments will close some of the gaps highlighted in the report and should provide additional support and evidence for some of the major questions addressed by the report.

Prior to providing specific comments we would like to point out that Appendix F, in many cases, is either missing citations or has provided slightly misleading citations. While this point is minor in nature it does suggest that perhaps the authors were not provided all of the recent materials developed in relation to Liddell Spring - if this is the case if does not have appeared to have hampered the authors abilities to develop a fairly robust technical report. Regardless of whether this is the case or not, for documentation purposes we have provided proper citation information where needed for future uses and users of the information.

Specific Comments

A. Page 2, Section 1.3, Discussion of available data for hydrogeologic review

While we recognize that the authors reviewed tremendous volumes of material in support of their analysis and reporting, we find that many of the references to available data within Table 1 are not fully correct and thus provide the following specific references of Balance work at Liddell Spring and other local systems to more fully document existing literature. It should be noted that careful review of the below referenced work will reveal that data gaps in any records are clearly identified in those reports. Table 1 in many cases misrepresents existing data through incorrect data period citations:

- Liddell Spring: Balance has monitored Liddell Spring since WY[2]2001 at varying levels of scope for the quarry operator, the County of Santa Cruz and more recently solely for the City of Santa Cruz. For WY2001-2003 and partial WY2004, we documented roughly monthly and storm conditions of Liddell Spring primarily with respect to water quality. Since mid-year WY2004 we have more formally monitored Liddell Spring through the use of telemetered monitoring equipment and also have continued monthly and storm monitoring visits. We are presently in the process of finalizing WY2005 and WY2006 data reports for Liddell Spring. Monitoring is presently conducted on behalf of the City

[2] WY represents water year which is defined as the period of October 1st through September 30th of the following year. For example, WY2006 covers the period October 1, 2005 through September 30, 2006.

of Santa Cruz Water Department. See citations 1 through 8 at the end of this letter for a list of Balance work developed for Liddell Spring.

- Liddell Creek: Balance installed the East Branch Liddell Creek gage during WY2001 and installed the Anadromous Liddell gage during WY2004. We have maintained and operated the East Branch Liddell gage since WY2001 for the City of Santa Cruz and maintained and operated the Anadromous Liddell gage for WY2004 only – since then the City has taken over gage operation responsibilities for Anadromous Liddell. We have completed six (6) water year data reports for the East Branch Liddell station and completed one water year data report for Anadromous Liddell. See citations 1 through 5 and 9 through 10 at the end of this letter for a list of Balance work developed for Liddell Creek.
- Laguna Creek: Balance installed the presently active Laguna surface water gaging stations (Upper, Lower and Anadromous stations) in WY2003 and have maintained and operated the gages for the City since that time. We have completed three water year data reports for the Laguna Gages since WY2003 and monitoring presently continues at all three gaging stations. See citations 11 through 13 at the end of this letter for a list of Balance work developed for Laguna Creek.
- Majors Creek: Balance installed the presently active Majors surface water gaging stations (Upper, Lower, and Anadromous stations) in WY2004 and maintained and operated the gages for that water year only. Starting in WY2005, the City took over responsibility for maintaining and operating the Majors Creek gages. See citation 14 at the end of this letter.
- X-ray diffraction: Balance has also collected and previously reported x-ray diffraction results for suspended sediment collected at Liddell Spring during WY2002 and WY2005. The WY2002 data is reported within citation 1 provided at the end of this letter and the WY2005 data is reported within citation 7. Please also see comment Q provided below.

B. Page 8, 1st paragraph

"A sustained yield of 50 gpm or more would suggest that this zone is part of the "marble aquifer..."

The findings of Appendix F, among other evidence, suggests that water moves downward thru the vadose and perched-water zones in the marble to Liddell Spring, generally but not exclusively through one or more continuous saturated zones. The concept of a 'water table' in this system is questionable; using such criteria to consider whether the spring is protected is misleading, as is the notion that conforming with state- or county-wide regulations intended for many different geologic settings is equivalent to protection of a unique water body. Appendix F and other recent technical documents have fundamentally changed the understanding of how water, sediment and contaminants may move through this system. The DEIR should make a finding whether the 20-foot separation from high water table is appropriate or sufficient in this setting, based on what is now known about it, to minimize water quality risks. If new criteria are warranted, then it should be proposed. One suitable measure for resolving disparities between the ordinance – written based on superseded information – and what should be done at this site would be recommended changes in the ordinance, perhaps specific to karstic settings.

C. Page 24, 2nd paragraph

"The hydrologic studies at the site indicate that eh landslide mass is trapping water..."

The discussion of previous investigators conclusions/findings lacks a citation. Pacific Geotechnical Engineering and others, 2002, suggests something similar to that stated by the authors. A more accurate representation of these specific previous findings would include the conclusion that groundwater in the landslide is likely sourced from shallow groundwater moving downward from the slope north of the landslide and also from groundwater moving out of fractures in the marble and into the landslide debris. Based on the mapped fault at the base of the landslide, it was concluded that it is very likely that groundwater, and sediment transported through the landslide debris could discharge to (1) Liddell Spring, as well as (2) at the base of the landslide - as is evidenced by the occurrence of a very well developed seasonal seep located there.

D. Page 25-26, last and first paragraphs respectively

"PELA (May 2005) described the local karst system as including two semi-distinct..."

We agree with the conceptualization of hydrologic connection between the vadose and phreatic zones of the local marble aquifer. Starting in WY2001 with monitoring conducted at the Liddell Spring landslide, we have documented consistent specific conductance spikes in response to storm events for both groundwater in the Liddell Spring landslide as well as discharge from Liddell Spring. The spikes suggest that more mineralized water is transported through and to these features during and in response to head changes in the aquifer associated with the storms. Perhaps the most appropriate citation to support this line of reasoning is that of Toran and others, 2005 (citation 15 at the end of this letter). Based on the documented specific conductance responses, we have concluded in part that vadose zone water could be responsible for the specific conductance spikes. Other mechanisms might include sections of the near phreatic zone which store groundwater annually but which require threshold local head gradients to mobilize the groundwater. Groundwater which is not in active transport to the spring at all times yet which resides in marble would logically become increasingly mineralized with more time spent in the marble. The attached **Figures 1** through **3** provide some data to support these claims.

E. Section 2.8, Pages 24-26

Although consistent with the last paragraph of the Karst Processes section, it would be helpful to mention that karst extends well beyond the areas considered into (1) the outcrop of Lompico sandstone south of Smith Grade, where multiple large sinkholes are developed in sandstone members with calcareous cementation and westward beyond Mill and San Vicente Creek (c.f., Weber, 2004). Portions of these areas lie below 750 or 800 feet in elevation and could potentially be affected by conditions within the general quarry area.

F. Page 27, 2nd paragraph

"Annual data are typically expressed in water years. For example, water year (WY) 2006..."

Typo: (WY) 2006 should read (WY) 2005.

G. Page 31, 1st paragraph

"...the anomalous water-level drop on February 23..."

At the bottom of page 30 the authors cited February 24th as coinciding with the anomalous water drop. Figure 11 of Appendix F suggests the drop occurred on the 23rd.

H. Page 31, mid-way through 2nd paragraph

"...; furthermore, the pond and streamflow hydrographs were of generally similar shape,..."

The springflow hydrographs as presented in the Technical Appendix are inaccurate, as the authors allude to on page 34 (2nd paragraph). An algorithm is needed to compute Liddell Spring flows including a complete record of corresponding flow for the East Branch of Liddell Creek, and ideally a complete record of City maintenance activities for their diversion at Liddell Spring and their North Coast diversion pipeline. Additionally, it is important to conduct field visits to document overflow from the springbox at the head of the East Branch tributary. The authors discuss two of these three informational items on page 34 (2nd paragraph). We have developed one possible Liddell Spring flow algorithm in the process of completing water year data reports for Liddell Spring for the years 2005 and 2006. **Figure 4** of this letter illustrates the computed WY2005-2006 Liddell Spring flow record. The dissimilarity of the springflow record to that of the turbidity and cited streamflow record may be cleared up by utilizing the attached computed springflow records. The Liddell Spring flow algorithm is provided as **Figure 5** to this letter and is reported within citation 7 noted at the end of this letter.

I. Page 33, 1st paragraph

"The City of Santa Cruz resumed gaging of Laguna and Majors creeks in 2003."

See comment A above for a full listing of citations related to the City of Santa Cruz gaging program.

J. Page 34, 2nd paragraph

"A corrected record of total springflow should be possible using detailed diversion and maintenance..."

See comment E provided above.

K. Page 38, last paragraph

"This assertion cannot be tested given that hourly turbidity data have only been collected since 1997."

It is unclear which turbidity data you are referring to in this statement. Since at least mid-year 2004, turbidity has been collected at the 15-minute interval. This statement unfortunately greatly misrepresents monitoring efforts at Liddell Spring.

L. Page 48, last paragraph

"Based on an estimated average saturated thickness of 40 ft and an assumed average specific yield of 16 percent..."

The stated average specific yield value of 16 percent seems low compared to conventional values. How was this value determined? No citation or reasoning is provided.

M. Page 50, 4th full paragraph

"PELA (May 2005) estimated sinking-stream capacities between 0.5 and 1.0 cfs..."

A combined annualized flow of roughly 1000 acre-feet of water per year for both sinking sections of Reggiardo and Laguna creeks would be more equivalent to an average annual flow sinking rate of 1.3 to 1.4 cubic feet per second. It is unclear how 1000 acre-feet of water was arrived at from flows in the range of 0.5 to 1.0 cubic feet per second?

N. Page 51, 1st full paragraph

"These attributes suggest that streamflow captured by the swallow holes flows to the springs..."

The tendency, as stated by the authors, for karst systems to cut down to near base level is attributed by the authors as resulting from the process of karst systems to minimize flow energy through a reduction in average slope of the highly conductive groundwater features (i.e. conduits or solution-widened fractures, etc.). This hypothesis seems to miss geochemical aspects of the marble as well as the geologic history component of the region. Limestone and marble are highly soluble rock types. Solubility of the rock around the margins of conduits could easily explain the notion that the relatively deep zones of the karst system have cut down to near base level due to dissolution along those conduits for many of thousands of years. Additionally, downcutting likely slows down greatly in response to reaching near-base level elevations of the system in order to continue to provide drainage for the system. Secondly, at Liddell Spring, the depth of the relatively deep zone could be an artifact of the system having previously adjusted to a much lower base level, for instance during the most recent low sea level stand (~ 15,000-18,000 years before present).

O. Page 52, 2nd paragraph

"Liddell Spring's increased mineral concentration (>600uS/cm) following storms..."

It is important to point out that Toran and others, 2006 (citation 15 at the end of this letter) used the same reasoning in observing specific conductance spikes following rain events. This point has previously been contested by P.E. LaMoreaux & Associates during meetings with the City of Santa Cruz and CEMEX. It is the most basic explanation for the process driving the specific conductance spikes recorded at Liddell Spring in relation to rain events. This characterization is largely true for the WY2005 and WY2006 records as illustrated in the **Figures 1** and **2** of this letter.

P. Page 52, last paragraph

"A seep near Liddell Spring (SP-2) and two seeps near Plant Spring (SP-4 & -6) differ isotopically..."

We have collected stable isotopic data at Liddell Spring and other locations since the beginning of WY2007 and will continue to do so into WY2008 in order to add to data collected by PELA. Data collected within our monitoring program also suggests that groundwater within the Liddell Spring landslide is isotopically different to that discharged at Liddell Spring. This information is illustrated in **Figure 6** of this letter. The data and analysis of is draft in nature and subject to change at completion of the WY2007 data report for Liddell Spring.

Q. Page 59, 1st paragraph

"Table 31 summarizes general mineral analyses for about 20 different sources of water..."

We have previously published Piper Plots of waters sampled from Liddell Spring, the Liddell Spring landslide, and the East Branch of Liddell Creek. Those results are presented in Pacific Geotechnical Engineering and others, 2002. We have included those Piper Plots with this letter as **Figures 7** and **8**. Our data agrees well with your results and thus supports your conclusions.

R. Page 60, 2nd paragraph

"Figure 36a illustrates the direct, albeit rough, correlation between the spring's specific conductance and discharge."

We have found that daily maximum specific conductance of Liddell Spring is strongly correlated to the Antecedent Precipitation Index[3] (A.P.I.) as defined by Linsley 1958[4]. The correlation to A.P.I. is much more well defined than the equivalent linear relationship to discharge and is more representative of transient head conditions in the watershed. **Figure 9** illustrates this relationship and

[3] A.P.I. is defined as the current day precipitation plus the previous day precipitation multiplied by a recession constant k. For Liddell, a value of 0.90 was chosen as the recession constant based on the range of values for k cited by Linsley and others.

[4] Linsley, R.K., Kohler, M.A., and Paulhus, J.L., 1958, *Hydrology for Engineers*, McGraw-Hill Book Company, New York, New York.

confirms the earlier conclusion that specific conductance is dependent upon head conditions in the system.

S. Page 62, 2nd, 3rd and 4th paragraphs

"Liddell Spring (-5.9δ^{18}O, -34 δD) plots midway between groups 1-2..."

There is recurrent misuse of isotope terminology within paragraphs 2, 3 and 4 of page 62. It is generally advised to avoid use of the terms "enriched" and "depleted" unless the author is sure to indicate enrichment or depletion relative to some other material and that the resulting enrichment or depletion is the result of x or y process (Kendall and McDonnell, 1998[5], page 56). Numerous sentences in the referenced paragraphs do not conform to the suggested standards.

T. Page 64, 4th paragraph

"Mineralogical analysis has been used to assess the source of Liddell Spring's sediment load."

We also collected suspended sediment samples for x-ray diffraction analysis in WY2005. These results are included in the Draft WY2005 data report for Liddell Spring, as cited in item E above. The 2005 data agree well with our previously reported 2002 data as well as that reported by the authors. The 2005 data collected by Balance Hydrologics is provided in **Table 1** to this letter.

U. Page 65, 2nd paragraph

"We found that our finest grained prepared samples of loose material from the quarry..."

We also agree with the conclusion that it is not reasonable to rule out the quarry as a possible source of turbidity to Liddell Spring because of the low levels of calcite observed in the x-ray diffraction results. From a geochemical perspective, one would expect to observe low levels of calcite in the suspended load of Liddell Spring given that small particle sizes of calcite will be more susceptible to dissolution due to the increased surface area relative to volume characteristic of small grains sizes. See **Table 1** provided with comment Q above with regards to levels of calcite observed in our samples collected in WY2002 and WY2005 – they agree reasonably well with a value of about 10% calcite.

V. Page 66, 2nd paragraph

"Lewis (2003) documented the relation between turbidity and the concentration of ..."

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[5] Kendall, C., and Caldwell, E.A., 1998. Fundamentals of Isotope Geochemistry, in Kendall, C. and McDonnell, J.J., eds., Isotope Tracers in Catchment Hydrology. 1998, Elsevier, Amsterdam, Netherlands.

We have developed a turbidity - suspended sediment rating curve[6] for Liddell Spring utilizing Spring data we have collected since WY2005. The relationship we have developed differs from any of those provided on page 66, but that is not surprising and we acknowledge the effort conducted by the authors to arrive at some estimate of suspended load discharge from Liddell Spring. The present Liddell Spring turbidity – suspended sediment rating curve developed from our data is provided in **Figure 10** to this letter. The lower end of the curve is best described by a non-linear function while the upper end of the curve is best described by a linear function. The linear function equates to approximately a factor of 1.3 applied to the turbidity data to compute corresponding suspended sediment load – this value does not fall within the cited range of 1.8-3.5 cited by the authors. This difference may be a function of a spring system verses a surface water system. We have applied these curves to compute estimated annual suspended loads for Liddell Spring for WY2005 and WY2006. We computed a total suspended load of 16.9 tons for WY2005 (citation 7 provided at the end of this letter) and 28.3 tons for WY2006 (citation 8 provided at the end of this letter).

W. Page 68, last paragraph

"Some iron-stained fine- to medium-grained subrounded quartz sand was present..."

Photomicrographs provided to Balance by DCM Science Laboratory, Inc.[7] indicate the occurrence of some iron oxides in suspended sediment samples collected from Liddell Spring on December 8, 2004. The occurrence of iron oxides in the samples supports the reported observation of iron stained quartz grains present in the northeastern part of the quarry, as reported by the authors on page 68. We have scanned several of the photomicrographs including the associated discussion of the sample by DCM Science Laboratory director, Ron Schott for your review and included here as **Figure 11**. The consistency of these results support the conclusion that the quarry pit is an (not the only) active source of sediment to Liddell Spring. An important confirmation of the author's conclusion which now has multiple lines of evidence to support it.

X. Page 77, 1st sentence carried over from page 76

"...discharge hydrograph are difficult to interpret because of apparent data anomalies..."

The data anomalies present in your records represent inaccurate flow records for Liddell Spring stemming from use of the raw Liddell Spring flow record, rather than use of an algorithm which incorporates the East Branch of Liddell records, as well as maintenance records of pipeline work. See comment E above and **Figure 4**.

[6] The rating curve was developed from total suspended solids concentrations reported by Soil Control Lab of Watsonville, California and the associated Liddell Spring recorded turbidity at the time of sampling. There are differences between the Soil Control Lab reported turbidity values of the collected samples and those recorded in the field by the Liddell Spring instrumentation. In most cases the differences occur during periods of elevated turbidity at the Spring and in all but one case the onsite turbidity instruments record a lower turbidity value than that reported by Soil Control Lab. The differences likely can be accounted for by the method of measuring turbidity at Soil Control Lab which includes re-suspension of suspended material in the collected samples by mechanical agitation. As indicated above, the rating curve has been developed from the turbidity values recorded by the Liddell Spring instrumentation at the time of sampling.
[7] DCM Science Laboratory, 12421 W. 49th Ave. Unit 6, Wheat Ridge, CO. Letter report to Balance Hydrologics dated April 13, 2005. Pages 3 and 4 of letter provided as Figure 11 of this letter.

Y. Page 82, last bullet point on page

"Even at peak rates, the hydraulic power of the spring's discharge may be insufficient..."

Your reasoning here is unclear.

Z. Page 84, mid-way down page

"PELA (May 2005) estimated sinking-stream capacities from 0.5-1.0 cfs for both..."

The 1,000 acre-feet per year value does not follow from the average flow values cited by the authors. See comment J above.

AA. Pages 91-92

For what it is worth, we have completed a full analysis of blasting related turbidity responses at Liddell Spring for WY2005 and WY2006 associated with development of Liddell Spring data reports for those two years. The analysis has been completed under the criteria of no precipitation for 24 hours and 48 hours prior to and following the date and time of blasting. For WY2005, 48 blast events and for WY2006 49 blast events appear to have resulted in a measurable and discernable turbidity response at Liddell Spring in the absence of rainfall for 24 hours prior to and following the date and time of blasting. **Figures 12** and **13** present a time-series plot of the WY2006 turbidity record including quarry blasts without rainfall for 24 and 48 hours prior to and following the date and time of blasting. Figures 12 and 13 confirm the strong trend during WY2006 related to quarry blasts and subsequent turbidity responses at Liddell Spring. **Figure 14** illustrates one blast event and the associated turbidity rise recorded at Liddell Spring a few hours later – the characteristics of the response (excluding the response time) illustrated in **Figure 14** is consistent with many of the blast generated turbidity responses recorded at Liddell Spring during WY2005 and WY2006. Additionally, **Figure 15** illustrates a frequency of exceedance curve for blast generated turbidity responses at Liddell Spring under the 24 hour criteria for WY2006. Figures 12 through 14 clearly demonstrate a strong causal linkage between normal quarry operations and Liddell Spring water quality dynamics while Figure 15 quantifies the blasting related impact using one measure of water quality for Liddell Spring flows. Because of this linkage and the additional ones demonstrated by the Nolan and Johnson Appendix F, we hope that the Final EIR does a more substantial job in developing mitigation measures HYD-1 and HYD-2, specifically, to provide for a more robust level of water quality protection of flow discharging from Liddell Spring.

BB. Page 95, 5th conclusion

"The bulk volume of sediment needed to account for Liddell Spring's turbidity..."

The authors seem to generally lack the data to quantitatively support the conclusion that quarry operations alone could account for observed turbidity events at Liddell Spring. While the authors clearly demonstrate a linkage between the quarry pit ponds and turbidity response at Liddell Spring, there is no data or analysis provided to reasonably hold quarry operations accountable for the entire turbidity load of the Spring. What is more important is that a linkage has been established between the quarry pit ponds and turbidity response at Liddell Spring, albeit through indirect methods. This finding in and of itself further strengthens the argument that blast related turbidity responses at

Liddell Spring clearly highlights a hydrologic connection between quarry operations and Liddell Spring water quality – a finding which highlights the extreme necessity of planning any quarry expansion very carefully on all possible fronts. It is our opinion that the DEIR could be strengthened significantly by more fully addressing this potential impact, as we have discussed above.

Closing

We are pleased to have the opportunity to provide these comments to the City regarding the Bonny Doon Expansion and Reclamation Plan Amendment DEIR. Please do not hesitate to contact us with questions or comments regarding our letter.

Sincerely,

BALANCE HYDROLOGICS, Inc.

Shawn M. Chartrand

Shawn Chartrand, Geomorphologist/Hydrologist
PG 7817, CEG 2442

Barry Hecht

Barry Hecht, Principal
CEG 1245, Chg 50

Enclosures: 15 Figures and 1 Table

DEIR and Non-numerated Comment Related References

a. *CDM Camp Dresser & McKee, 1996, San Lorenzo Valley and North Coast watersheds sanitary survey: Consulting report prepared for the City and County of Santa Cruz, San Lorenzo Valley Water District, Lompico County Water District and others. Multipaged.*

b. *California State Water Resources Control Board, 2003, Notice of application to appropriate water by permit: Division of Water Rights Notification for Application 31352, Jan. 31, 2003.*

c. *Creegan and D'Angelo Consulting Engineers, 1984, Watershed analysis: San Vicente Creek, Mill Creek, Liddell Creek, East Branch Liddell Creek: Consulting report prepared for Lone Star Industries, Multipaged with appendices.*

d. *Environ, 1978, Draft environmental impact report for proposed operations, Felton Quarry, Felton, California: Prepared by Environ for Santa Cruz County, 88 p.*

e. *Greene, H.G., Orange, D., and Barry, J.P., 1993, Geologic diversity of cold seep communities, Monterey Bay region, central California, USA (abs.). Trans. American Geophysical Union, v. 74 (43), p. 578*

f. *Greene, H.G., Barry, J.P., Hasimoto, J., Fujiwara Y, Kochevar, R.E, and Robison, B.H., 1997, A submersible-based comparison of cold-seep regions in Sagami and Monterey Bays, JAMSTEC Journ. Deep Sea Research, v. 13, p. 395-415*

g. *P.E. LaMoreaux & Associates, 2007, Long-term trends in the dry season base-level turbidity of Liddell Spring based on data from the City of Santa Cruz Water Department. Consulting report prepared for CEMEX. 12p.*

h. *Weber, G. I., 2004, Response to Jodi Frediani's nescient comments on karst terrains and the San Vicente Creek sinkhole. Posted on the Central Coast Forest Association website, CCFAssociation_org/ News & Information.htm*

Appendix F Comment Related References

1. *Pacific Geotechnical Engineering and Balance Hydrologics, 2002, Landslide investigation, Liddell Spring Landslide, Bonny Doon Quarry, Santa Cruz County, California. Consulting report prepared for the County of Santa Cruz Planning Department. February 28, 2002. 70p. + tables, figures, and appendices.*

2. *Chartrand, S., and Hecht, B., 2002, (2004 updated), Annual hydrologic record for the East Branch of Liddell Creek, Santa Cruz County, California—Data report for water year 2002: Balance Hydrologics, Inc. consulting report prepared for City of Santa Cruz Water Department, 10 p.*

3. *Chartrand, S., and Hecht, B., 2002, Liddell Spring landslide and East Branch of Liddell Creek Streamflows, Bonny Doon Quarry, Santa Cruz County, California—Data report for water year 2002: Balance Hydrologics, Inc. consulting report prepared for County of Santa Cruz, 11 p.*

4. *Chartrand, S., and Hecht, B., 2003, Annual hydrologic record for the East Branch of Liddell Creek and the Liddell Spring Landslide, Santa Cruz County, California—Data report for water year 2003: Balance Hydrologics, Inc. consulting report prepared for the County of Santa Cruz, 11 p.*

5. *Hastings, B., Chartrand, S., and Hecht, B., 2006, Annual hydrologic record for Liddell Creek, Santa Cruz County, California: Data report for water year 2004 – East Branch and Anadromous gaging stations: Balance Hydrologics, Inc. consulting report prepared for City of Santa Cruz Water Department, 15 p.*

6. *Chartrand, S., 2005, Interim data and memo: Liddell Spring WY2005 monitoring program, Santa Cruz County, California. Consulting report prepared for the City of Santa Cruz Water Department. Multi-paged.*

7. *Chartrand, S., Hastings, B., and Hecht, B., 2007, Annual hydrologic and suspended sediment record for Liddell Spring, Santa Cruz County, California: Draft data report for water year 2005: Balance Hydrologics, Inc. consulting report prepared for the City of Santa Cruz Water Department, 19 p.*

8. *Chartrand, S., Hastings, B., and Hecht, B., 2007, Annual hydrologic and suspended sediment record for Liddell Spring, Santa Cruz County, California: Draft data report for water year 2006: Balance Hydrologics, Inc. consulting report prepared for the City of Santa Cruz Water Department, 19 p.*

9. *Chartrand, S., Hastings, B., and Hecht, B., 2006, Annual hydrologic record for the East Branch of Liddell Creek, Santa Cruz County, California—Data report for water year 2005: Balance Hydrologics, Inc. consulting report prepared for City of Santa Cruz Water Department, 12 p.*

10. *Hastings, B., Chartrand, S., and Hecht, B., 2007, Annual hydrologic record for East Branch Liddell Creek, Santa Cruz County, California—Data report for water year 2006: Balance Hydrologics, Inc. consulting report prepared for City of Santa Cruz Water Department, 12 p.*

11. *Chartrand, S., Hastings, B., and Hecht, B., 2005, Annual hydrologic record for Laguna Creek, Santa Cruz County, California: Data report for water year 2004—Upper, Lower, and Anadromous gaging stations: Balance Hydrologics, Inc. consulting report prepared for the City of Santa Cruz Water Department, 16 p.*

12. *Chartrand, S., Hastings, B., Parke, J., and Hecht, B., 2006, Annual hydrologic record for Laguna Creek, Santa Cruz County, California: Data report for water year 2005—Upper, Lower, and Anadromous gaging stations: Balance Hydrologics, Inc. consulting report prepared for the City of Santa Cruz Water Department, 14 p.*

13. *Hastings, B., Parke, J., Chartrand, S. and Hecht, B., 2007, Annual hydrologic record for Laguna Creek, Santa Cruz County, California: Data report for water year 2006 – Upper, Lower, and Anadromous gaging stations: Balance Hydrologics, Inc. consulting report prepared for the City of Santa Cruz Water Department, 15 p.*

14. *Hastings, Chartrand, S. and Hecht, B., 2005, Annual hydrologic record for Majors Creek, Santa Cruz County, California: Data report for water year 2004 – Upper, Lower, and Anadromous gaging*

stations: Balance Hydrologics, Inc. consulting report prepared for the City of Santa Cruz Water Department. 12 p.

15. Toran, L., Tancredi, J.H., Herman, E.K., White, W.B., 2006, Conductivity and sediment variation during storms as evidence of pathways to karst springs, in Harmon, R.S., and Wicks, C.M., eds, Geological Society of America Special Paper 404, 2006, p. 169-176.

Responses to Comment Letter I-A:
National Oceanic and Atmospheric Administration, National Marine Fisheries Service

1. As explained in Draft EIR Appendix F Section 5.5.1, the existing and proposed quarry pit has no outlet for surface drainage. Runoff from approximately 125 acres of quarry and upgradient drainage area percolates into the karst aquifer through fractures and solution cavities on the quarry walls and across the quarry floor. Hydrogeologic interpretation indicates that this recharged groundwater migrates southward before discharging from Liddell Spring roughly 1,000 feet from the quarry operation (Draft EIR Appendix. F, Sec. 4). Additionally, the continued diversion of approximately 21 gallons per minute (gpm) from Plant Spring for use by quarry operations would continue to impose a relatively minor loss of flow to the East Branch Liddell Creek relative to the City of Santa Cruz's (City) average diversion of about 800 gpm from Liddell Spring (Draft EIR Appendix. F, Section 5.5.2). For these reasons, the expanded quarry is expected to have no significant effect on the quantity or timing of springflow compared to existing conditions, and thus is expected to have no significant impact on the quantity or timing of Liddell Creek baseflows. Therefore, an Instream Flow Incremental Methodology (IFIM) study is not needed.

   The quarry diverts water from Plant Spring for use in dust control and cooling the crusher bearings. Plant Spring is located near the headwaters of the East Branch of Liddell Creek. Maximum level of existing (baseline) use can be characterized using current maximum rate of water use and flow data for Plant Spring and Liddell Creek. Available data for 2003, which was an average rainfall year, includes diversion amount (CEMEX), spring flow (CEMEX) and creek flow (City of Santa Cruz) in East Branch Liddell Creek downstream of the confluence with flow from Plant Spring and upstream of the confluence with flow from the City's Liddell Spring. The quarry's diversion from Plant spring does not occur year-round, it occurs during dry periods (typically June through October) with maximum diversion of approximately 21 gpm during August when maximum dust control is needed. The quarry's August 2003 diversion from Plant Spring represents approximately eleven percent of the spring flow and approximately eight percent of the creek flow as measured at the nearby location in the East Branch of Liddell Creek in August 2003. For comparison, according to a City of Santa Cruz report (Entrix 2004) the City diversion at Liddell Spring in August 2003 represents more than twice the flow from the entire remaining Liddell Creek watershed as measured on the mainstem downstream of the confluence with the West branch. Even so, according to the same report habitat structure in the anadromous reach did not change substantially under low flow conditions (October 2003) with the City's Liddell Spring Diversion in operation and not operating. The City report further states that hydrologic modeling results indicate that reduction in mean daily flow in the East Branch of Liddell Creek due to operation of the City's Liddell Spring #1 diversion in the months of August, September and October during a normal rainfall year is 88 percent, 93 percent and 86 percent, respectively. Therefore, based on the City's far greater diversion amounts and percentages and the reported lack of substantial habitat impacts as a result, the Quarry's temporary maximum diversion from Plant Spring is considered to have a less than significant impact on creek base flows or habitat for listed fish species. See Final EIR for Section 6.3.2.3 revised text.

Per the Initial Study (SCCPD, November 2001), the County senior civil engineer deemed that the capacities of the existing quarry runoff-retention and sedimentation basins were adequately sized for the existing and proposed quarry operation (Draft EIR Appendix. F, Sec. 3.2). As such, issues related to offsite drainage to Liddell Creek from the existing and proposed quarry runoff drainage system are not included in the Draft EIR scope (SCCPD, 2002). However, the Draft EIR does state that the existing drainage system could become inadequate if rainfall and runoff percolation into the karst subsurface beneath the quarry were disallowed as part of mitigation to address Liddell Spring turbidity (Draft EIR Appendix. F, Sec. 5.5.1) or site reclamation.

The karst aquifer does not extend continuously east into the San Vicente Creek watershed (Draft EIR, Appendix. F, Fig. 25). Thus, the baseflows of San Vicente Creek appear to be irrelevant to the proposed quarry expansion and an Instream Flow Incremental Methodology (IFIM) study is not needed.

2. The attached letter from Balance Hydrologics is addressed separately in Response to Comment Letter #III-A from the City of Santa Cruz.

   The expression "geologic/hydrologic study area" is not used in Draft EIR Appendix F. Boundaries used to define Liddell Spring hydrology in the Draft EIR Appendix F, from which the Draft EIR discussion is drawn, are based entirely on drainage divides and the hydrogeology. See response to III-A-101 for additional discussion.

   It is unclear from the comment how the study area boundary compromises the Draft EIR impact analysis on steelhead and coho salmon. The expansion project is located entirely within the Liddell Creek watershed. Therefore, the drainages and aquatic habitats of the San Vicente Creek watershed would be unaffected by the expansion project due to the hydrogeologic separation between the watersheds.

   As stated on pages 6-22 and 23 of the Draft EIR, Central coast steelhead occurs in the downstream reaches of Liddell Creek. The project's extension of water diversion at Plant spring for three additional years would continue current project effects on low summer base-flows for steelhead in Liddell Creek, but would not increase them. Plant Spring provides less water to Liddell Creek than Liddell Spring. Since its flow naturally drops in the summer, it may never have supplied substantial summer flow to Liddell Creek. It is unlikely that quarry diversion of Plant Spring flows in the summer by itself would adversely affect steelhead-rearing habitat.

   Given the small contribution of Plant Spring to base-flows of Liddell Creek, and the small quantity of water diverted from Plant Spring for quarry operations, the continued water use by the quarry under the proposed mining expansion project would not significantly impact steelhead habitat. See response to I-A-1.

3. The attached letter from Balance Hydrologics (Chartrand and Hecht) is addressed separately in response to comment letter III-A from the City of Santa Cruz. See response to III-A-73.

   Turbidity impacts on Liddell Spring are addressed in the Draft EIR. Mitigation Measures HYD-1, HYD-2, and GEO-3 would reduce turbidity levels at Liddell Spring to a less than significant level.

Stability of levees was assessed in the Draft EIR and Measure GEO-1 (p. 4-27) is specified to ensure stability under seismic conditions. With this measure, the potential for levee failure and subsequent release of sediment into the Liddell Creek drainage is reduced to a less than significant level. Therefore, water quality impacts and potential impacts upon listed fishes downstream would be less than significant.

4. As discussed in response to comment I-A-1, Draft EIR Appendix F does not conclude that the proposed quarry operation would have a significant effect on Liddell Creek baseflows. Furthermore, the quarry's current maximum rate of water use (21 gpm) diverted from Plant Spring represents a minor loss of flow downstream of the spring relative to average diversions of roughly 800 gpm from Liddell Spring by the City of Santa Cruz (Draft EIR Appendix. F, Sec. 5.5.2). Thus, an analysis of Liddell Creek baseflows by the Draft EIR is not warranted.

   Although portions of the San Vicente Creek watershed may lie within the Draft EIR overall study area, there appears to be no significant drainage, either surface or subsurface, between the quarry operation and the San Vicente Creek watershed (see response to comment I-A-1). The karst aquifer underlying the quarry does not extend into the San Vicente Creek drainage. Surface and subsurface drainage in the immediate quarry area drains to Liddell Spring and the Liddell Creek watershed, which is separated from the San Vicente Creek watershed by a drainage divide. Thus, the hydrology of the San Vicente Creek watershed is not relevant to the Draft EIR.

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Comment Letter II-A
Department of Conservation, Office of Mine Reclamation

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STATE OF CALIFORNIA, RESOURCES AGENCY ARNOLD SCHWARZENEGGER, GOVERNOR

DEPARTMENT OF CONSERVATION

OFFICE OF MINE RECLAMATION

801 K STREET • MS 09-06 • SACRAMENTO, CALIFORNIA 95814

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September 6, 2007

Todd Sexauer
County of Santa Cruz
Planning Department
701 Ocean St., 4th Floor
Santa Cruz, CA 95060

Dear Mr. Sexauer:

BONNY DOON LIMESTONE QUARRY BOUNDARY EXPANSION PROJECT AND RECLAMATION PLAN AMENDMENT DRAFT ENVIRONMENTAL IMPACT REPORT
CA MINE ID# 91-44-0005, SCH # 2001112115

The Department of Conservation's Office of Mine Reclamation (OMR) has reviewed the Draft Environmental Impact Report for the Bonny Doon Limestone Quarry Expansion Project and Reclamation Plan Amendment (DEIR). The applicant is proposing to expand an existing quarry by 17.1 acres, extending the operational life of the quarry by three years. The current approved reclamation plan would be amended. The quarry site is located approximately 1.5 miles east of the town of Davenport.

OMR observes that one of the biological resources mitigation measures proposed in the DEIR is, in effect, to abandon a proposed reclamation plan amendment (put forth in 2001 but never approved) that would have eliminated revegetation of three sensitive habitats. The approved 1996 reclamation plan and related conditions of approval are still in effect until an amended plan is approved. It is not clear that simply following the still-extant requirements of the existing reclamation plan constitutes mitigation for new habitat impacts. 1

The adequacy of the biological surveys is difficult to evaluate. No information is included as to the degree of effort, methods used, or qualifications of the surveyors. 2 In addition, the Biological Study Area as shown on Figure 32 is quite small with seemingly arbitrary boundaries. The reason for delineating such a study area is unclear: were sensitive species only considered if there were known occurrences 3 within this limited boundary? Such an approach is inadequate for purposes of evaluating potential impacts to sensitive species. 3

A *California Native Diversity Database* search of the *nine-quadrangle area* surrounding the Limestone and Shale Quarries reveals occurrences of 46 species of plants on list 1B of the California Native Plant Society (CNPS), 29 more than in Table 3 of Appendix C. Such species are considered rare in California and elsewhere, are eligible for listing, and potential impacts to their populations and habitats should be considered under CEQA. 4

Due to the inadequate survey methodology, sensitive plant species may have been overlooked. For example, a CNPS list 1B species potentially occurring in the project vicinity is Santa Cruz clover, *Trifolium buckwestorium*; it is known from at least two occurrences on the Davenport quadrangle, the same quadrangle on which the quarries are located. This species is not included among the potentials on Table 3, nor is the clover on the plant species list (Table 1) identified as to its species. All sensitive plant surveys should be floristic in nature, according to California Department of Fish and Game guidelines; this means that all plant species encountered must be identified at least to the level required to ascertain whether they are sensitive. 5

In its discussion of geology and soils, the DEIR identifies several significant impacts relating to slope stability. Mitigation measures are presented that would likely result in reduction of identified impacts to less than significant on quarry slopes within the Boundary Expansion Area, and for settlement basins receiving runoff from the Boundary Expansion Area. It should be noted that, unless reclamation has been substantially initiated in other portions of the quarry area, current State Mining and Geology Board Reclamation Regulations (Title 14 California Code of Regulations, § 3502(g)) require that the entire area governed by the new (amended) reclamation plan incorporate current reclamation standards. Therefore, if implementation of the proposed mitigation measures (i.e. revision of the slope stability analyses for the Boundary Expansion Area and affected quarry settlement basins) reveals currently approved quarry slope designs to be potentially unstable, then state regulations would require a reconsideration of all final slopes in light of the new slope stability analysis. 6

OMR looks forward to reviewing the amended reclamation plan for this project, and our staff are available to provide technical assistance in preparation of the plan. Upon submittal for formal review, please include a cover letter with a statement such as: "The Bonny Doon Quarry amended reclamation plan is enclosed for OMR's 30-day review. The County of Santa Cruz certifies that this submission is in compliance with the applicable requirements of Chapter 9 of Division 2 of the Public Resources Code, Article 9 of Subchapter 1 of Chapter 8 of Division 2 of Title 14 of the California Code of Regulations, and the County's mining ordinance." 7

If you have any questions on these comments or require any assistance with other mine reclamation issues, please contact me at (916) 323-8565.

Sincerely,

James S. Pompy, Manager
Reclamation Unit

Responses to Comment Letter II-A:
Department of Conservation, Office of Mine Reclamation

1. The approved 1996 reclamation plan requires revegetation of five communities for the Limestone Quarry and four communities for the Shale Quarry (see Table 6-3 of the Draft EIR). The proposed amendment to the 1996 plan (2001) would eliminate the direct replacement of three native vegetation communities (i.e., Maritime Chaparral, Needlegrass Grassland, and Diverse Native Grassland). Mitigation Measure BIO-3 (p. 6-30 of the Draft EIR) reinstates these species into the proposed revegetation plan since it has been demonstrated that they can be successfully established. Simply denying the proposed amendment to relying on the 1996 plan and conditions would retain the approach of planting climatic vegetation communities rather than the new approach of using only early successional species. Therefore, it is preferable to adopt the proposed amendment and carry forth the 1996 conditions that remain applicable as conditions of the amended plan.

2. Biological surveys on the project site were conducted by TRA Environmental Sciences (TRA). Qualifications of TRA biologists can be viewed on the company website at www.traenviro.com. They have degrees in biological sciences and are experienced in assessing habitat of various species of concern. TRA biologists prepare specialty analyses such as biological surveys and assessments, wetland delineations, endangered species habitat conservation plans, and constraints analyses. TRA has conducted many site-specific biological assessments, special status species surveys, and impact studies throughout the greater Bay Area. TRA staff is experienced in conducting project-specific surveys following U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Game (CDFG) protocols. TRA also has experience conducting pre-construction surveys.

   The Biological Resources chapter of the Draft EIR was prepared by TRA biologist's specializing in impact assessment. As stated on Page 6-1 of the Draft EIR, "Field surveys were conducted in August, October, and November of 2003, March of 2004, and February, May and June of 2006." The field surveys assessed the habitats in the study area, sensitive species occurrences in the proposed Boundary Expansion Area, and the status of reclamation in the Limestone and Shale Quarries. In addition to field surveys, TRA staff consulted the California Natural Diversity Database (CNDDB) and CDFG, and reviewed monitoring reports completed under the Bonny Doon Quarries Habitat Conservation Plan and the 1996 Reclamation Plan (p. 6-1 of the Draft EIR). Field reconnaissance was directed by Taylor Peterson and conducted by Patrick Kobernus (Senior Biologist), and Terese Kastner (Associate Biologist).

   Taylor Peterson: Ms. Peterson is a Program Director who has been with the firm since 1980. Ms. Peterson applies her technical expertise and management skills in assessing the impacts of a wide range of projects including sanitary landfills, materials recovery and transfer stations, quarries, housing developments, wastewater treatment plant expansion, water well development, and high-voltage transmission line alignments.

   In her capacity as Program Director, Ms. Peterson directs TRA staff in the technical analysis and preparation of environmental documents, prepares her own technical sections, and maintains contact with the client, project engineers, and the lead agency.

As such, she is familiar with every aspect of the preparation of environmental documents that must comply with CEQA. Several of the projects that she has managed have been controversial in nature, and she has extensive experience in responding to public concerns and comment.

Ms. Peterson has a background in biology and has been a long-time observer of California's natural history. She is experienced in identification of plant and animal species, in mapping plant communities, in mark/release/recapture work with butterflies, and in survey methods for the endangered San Joaquin kit fox. She is familiar with special habitats such as vernal pools, serpentine grassland, and riparian zones, and she is a trained wetland delineator. She has had much practice in the use of biological data sources such as the California Natural Diversity Database (CNDDB), the California Native Plant Society, agency and local contacts, and numerous field guides and floras.

Patrick Kobernus: Mr. Kobernus has a Master's degree in Ecology, from California State University, Hayward, and has been an Associate with Thomas Reid Associates (TRA) since 1995. He is familiar with the status and range of many state and federally protected wildlife species, and with biological data sources such as the CNDDB.

Mr. Kobernus has conducted biological assessment and surveys for the Mission blue butterfly, Callippe silverspot butterfly, San Bruno elfin butterfly, Smith's blue butterfly, monarch butterfly, steelhead, California tiger salamander, California red-legged frog, burrowing owl, and serpentine grassland species.

As a staff biologist for TRA, Mr. Kobernus has conducted endangered species surveys and biological impact assessments for several clients in the San Francisco Bay Area. He has conducted biological surveys in San Mateo, Alameda, Contra Costa, Marin, Santa Cruz, Monterey, and Santa Clara Counties. He has particular expertise conducting biological assessments for projects located on the San Mateo County coast side within the County's Local Coastal Program area. He has worked on projects for San Mateo County Parks and Recreation, Santa Clara Valley Water District, Kaufman and Broad, Cal-Trans, Canada Woods East project in Carmel, Stone Valley Oaks project in Alamo, as well as several others. Mr. Kobernus often works closely with developers, public utilities, government agencies, and individual homeowners in modifying projects to avoid or minimize biological impacts to sensitive species and the environment.

As a project manager for TRA, Mr. Kobernus manages the implementation of the San Bruno Mountain Habitat Conservation Plan. He supervises field crews on the Mountain conducting endangered species monitoring for the endangered mission blue, callippe silverspot, and San Bruno elfin butterflies. He also oversees the habitat management and grassland restoration program, and has assisted in developing volunteer stewardship with the Friends of San Bruno Mountain.

3. The biological study area was delineated to include both the Limestone and Shale quarries. The two quarries are separated by approximately 0.7 mile of land and are located in two distinct watersheds (Liddell Creek and San Vicente Creek). The study area includes the Shale Quarry for the purposes of amending the Reclamation Plan only. Direct impacts from quarry expansion would only occur within the 17.1-acre

expansion area. The study area consists of approximately 1,745 acres representing a substantial array of vegetation communities. The study area is roughly 100 times the size of the impact area and nearly four times the size of both the Limestone and Shale quarries combined. Although the study area has been delineated using a geometric configuration for the purposes of simplicity, it includes adequate radius around the project impact area necessary to analyze both direct and indirect impacts to biological resources associated with the project.

4. An additional 31 species found within the quadrangles searched have been added to Appendix C, Table 3. These species and sensitive vegetation communities are not expected to occur within the project site.

5. The Santa Cruz clover (*Trifolium buckwestorium*) was considered during site surveys and has been added to Appendix C, Table 3. Habitat for this species is not present in the Expansion Area and the species was not found during site surveys.

6. Comment noted. Current reclamation standards, based on the results of updated slope stability and liquefaction hazard evaluations, will be applied to all areas of the quarry where reclamation has not been substantially initiated. Implementation will occur prior to commencement of the project.

7. Comment noted regarding submittal of a cover letter with the amended reclamation plan.

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Comment Letter II-B
California Department of Forestry and Fire Protection

References

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Van Dyke, E., and K.DI Holl, 2001. Maritime chapparal community transition in the absence of fire. Madrono 48:221-229

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STATE OF CALIFORNIA—THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, Governc

DEPARTMENT OF FORESTRY AND FIRE PROTECTION
San Mateo – Santa Cruz Unit, Resource Management
6059 Highway 9
Felton, CA 95018
Website: www.fire.ca.gov
(831) 335-6740

Date: September 17, 2007
SCH#: 2001112115
DEIR, Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment

Todd Sexauer
Environmental Planner
County of Santa Cruz Planning Department
701 Ocean Street, Suite 410
Santa Cruz, CA 95060

Dear Mr. Sexauer:

The above referenced Draft Environmental Impact Report (DEIR) was reviewed by the Resource Management office of the San Mateo-Santa Cruz Unit of the California Department of Forestry and Fire Protection (CDF). Thank you for allowing our office the opportunity to comment on your document. The following points of concern or agreement were generated in our review of this document.

Conversion of Timberland

- The DEIR is correct in its statements that a Timberland Conversion Permit and a Timber Harvest Plan will be required for this project. Further review will be required for those permits. 1
- The DEIR discusses reclaiming quarry land and revegetating it. It discusses replanting conifers. As the land is proposed for conversion from timberland, with the project proponent be amenable to returning the reclaimed land to timberland status. This is an issue that should be explored further. 2
- Our review of the DEIR did not find significant discussion about the current timber harvesting in the affected watersheds (San Vincente – Liddell). It does discuss other uses such as farming, vineyards and residential development but it would be appropriate to disclose the timber uses in this area. 3

If you need any assistance or information, please write or call my office at the above listed address or telephone number.

Sincerely,

Richard Sampson
Division Chief - Forester II
Unit Forester and Environmental Coordinator
RPF #2422

Cc:
State Clearinghouse and Planning Unit
1400 Tenth St. P.O. Box 3044
Sacramento, CA 95812-3044

Allen Robertson
California Department of Forestry and Fire Protection
Environmental Protection,
P.O. Box 944246
Sacramento CA 94244-2460

Responses to Comment Letter II-B:
California Department of Forestry and Fire Protection

1. Comment noted regarding the requirement for a Timberland Conversion Permit and a Timber Harvest Plan.

2. Comment noted. Returning land to timberland status after conversion would be at the discretion of the landowner. It would take years of soil development before quarried areas could again support timberland species. In addition, the requirements of the amended Reclamation Plan would have to be met.

3. Two parcels located immediately to the south of the quarry property are zoned for Timber Production in addition to numerous parcels located immediately to the north and east. Section 9.1.1 of the Draft EIR discusses timber harvesting in Santa Cruz County (p. 9-1). Section 2.1 of the Draft EIR also states "Other land uses in the vicinity of the quarries include limited agricultural (cattle and horse grazing), timber harvest, and open space preserves."

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Comment Letter II-C
California Department of Fish and Game

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State of California – The Resources Agency
ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF FISH AND GAME
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October 26, 2007

Mr. Todd Sexauer
County of Santa Cruz Planning Department
701 Ocean Street, Fourth Floor
Santa Cruz, CA 95060
Via fax (831) 363-4849
todd.sexauer@co.santa-cruz.ca.us

Dear Mr. Sexauer:

Subject: Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment Draft Environmental Impact Report SCH # 2001112125

The Department of Fish and Game (DFG) has reviewed the Draft Environmental Impact Report (DEIR) for the subject project and have prepared the following comments. Thank you for the opportunity to provide these comments at this date. Our comments focus on the quarry expansion DEIR. However, we close with a discussion of broader wildlife concerns that should inform this and other permitting actions by the County of Santa Cruz (County) for the Bonny Doon Shale and Limestone Quarries operated by CEMEX.

CHAPTER 5 HYDROLOGY AND WATER QUALITY

DFG has concerns about the likely effects of quarry expansion on the Liddell Creek, and the currently proposed mitigations. 1

We commend the project applicant for acknowledging the likelihood of effect of quarry expansion on Liddell Spring 1 (LS1) water quality and quantity. However, the discussion of impacts to Liddell Spring is focused on effects to the City of Santa Cruz's spring box and not to downstream biota. The DEIR should provide further detail regarding the effects of potential water withdrawals at Liddell Spring and any alternate sites on federally threatened steelhead (*Oncorhynchus mykiss*) and other aquatic biota. 2

Flow ranges over yearly periods, as depicted in 5.1.1.2 Springs (page 5-4), do not address the effects of diversion during critical low flow periods (when need for dust control is likely to be the highest and juvenile steelhead are rearing in streams). This information was requested in June of 1996 in DFG's review of the Certificate of Compliance EIR (SCH #90030038), and again by NOAA Fisheries in response to the 2002 DEIR (included in Appendix A of the DEIR). The DEIR should include an evaluation of effects of diversion during low-flow periods. 3

As you are aware, LS1 is a significant water source (more than 7% of entire supply) for the City of Santa Cruz. The potential losses of water quality or quantity, however temporary, from Liddell Creek may increase demand at other City water sources on coastal anadromous streams and at diversions within the San Lorenzo River. These sources are currently being reviewed for their compliance with Federal and State Endangered Species Acts. Currently the effects of the City's diversion at Liddell Spring have not been fully evaluated. The DEIR should address the potential for cumulative impacts to stream flows in light of existing habitat conditions and foreseeable future water demands. 4

5.3.3.2 Ground Water Quantity

Measure HYD-1 is proposed to avoid impeding ground water recharge to LS1. This would retain surface drainage on the quarry floor and allow percolation for ground water recharge. Standing water could become an attraction and population sink for federally threatened California red-legged frogs (*Rana draytonii*) and other amphibians. This may be unlikely given the absence of vegetation in the quarry floor, but it remains a possibility. Breeding frogs have been observed in other relatively barren settlement ponds. The DEIR should take this into account and demonstrate that the project will avoid attracting frogs to the site and potential take of California red-legged frogs. 5

5.3.3.5 Impact on Spring Flow Production

It is commendable that CEMEX is attempting to anticipate quarrying impacts to LS1 and offers the possibility of various water transfers from other sources to supplement or replace lost flows. This section notes potential problems with sustainability, surface contamination, and changes in water rights, and proposes mitigation Measure HYD-3 (reviewed below). DFG concurs with the authors that diversions from Plant Spring or new detention basins would require new or altered water rights. Attempts to prevent Reggiardo or Laguna flows from recharging the highly conductive karst formation between these watersheds and that of Liddell would also be complex and would require environmental review of specific plans. The Laguna watershed is also currently the focus of conservation planning to re-establish flows necessary to keep aquatic biota in good condition. Consequently, the water redirection proposals in the DEIR are too conceptual to be considered viable mitigations. The DEIR should provide more detail for water redirection and adaptive management proposals. 6

5.3.4 Cumulative effects

Expansion of the quarry will increase the use of portions of the overall quarry facility. This will include greater use of Settlement Ponds 3 and 4 for runoff from the quarry 7 and vehicular use of the conveyor belt access road within the West Liddell Creek watershed. The latter effect will result in heavier use of Settlement Pond 2x. It is unclear whether the DEIR intends to mitigate for increased level of take by the existing HCP (see "Conclusions" below). 7

5.4 Mitigation measures

Measure HYD-1

The goal of this measure is to avoid or minimize fine sediment delivery and turbidity increases at Liddell Spring. It is difficult to assess the feasibility of creating barriers between up to 4.6 million cubic yards of quarry overburden and spoils across the entire floor of the quarry that will act as a filter for percolating surface water. Examples of successful implementation of similar methods would strengthen the presentation of this approach. Specifically in item #6 (page 5-36), the control of runoff through identification of all sinkholes, fractures, and dissolution cavities in order to prevent any precipitation or runoff capture should also be supported with examples from other sites. We are concerned about the feasibility and effectiveness of these measures. While the California Environmental Quality Act (CEQA) does not require fully engineered plans for public review, the current proposal approaches a deferred mitigation. The DEIR should include detailed design for review prior to certification. 8

Measure HYD-2

Although heavily reliant on a groundwater elevation monitoring regimen (monitoring in and of itself does not constitute mitigation), the approach here may be acceptable to DFG if the turbidity levels in question were specifically directed at impacts to aquatic organisms downstream of the City intake, rather than merely at the intake. 9

Measure HYD-3

While we appreciate the intent to work towards a cooperative approach to resource management with the City of Santa Cruz, an incomplete agreement with another party cannot serve as mitigation. As noted above, DFG's concerns are focused on water quality and quantity below the City intake, and an agreement between the City and CEMEX would not necessarily fully address biological impacts to downstream aquatic habitat 10

CHAPTER 6 BIOLOGICAL RESOURCES

Special status wildlife species

Marbled murrelet

We are concerned that the DEIR's determination that quarry expansion and quarry operation will not adversely affect marbled murrelet (*Brachyramphus marmoratus*) is not based on a thorough assessment. The marbled murrelet is as endangered by the State of California and as threatened under the federal Endangered Species Act.

Marbled murrelets have been detected in areas near the plan area within the Big Creek watershed and approximately 3.2 miles inland in the headwaters of Fall Creek. During the review of Timber Harvesting Plan 1-06-080 SCR, DFG determined that potential habitat exists about 2.5 miles northeast of the quarry. As we understand, CEMEX intends to complete protocol surveys to determine usage.

The key breeding habitat components for the murrelet are trees that support nest platforms. A suitable platform is a relatively flat surface at least 4 inches in diameter and 33 feet high in the live crown of a coniferous tree. Platforms can be created by a wide bare branch, moss or lichen covering a branch, mistletoe, witches brooms, other deformities, or structures such as squirrel nests. The presence of platforms appears to be the most important stand characteristic for predicting murrelet presence in an area. Marbled murrelets have occupied small patches of habitat within larger areas of unsuitable habitat, and large residual trees in low densities (sometimes less than one tree per acre). Within coastal redwood or Douglas-fir forests, any forested area with a residual tree component, small patches of residual trees, or one or more platforms should be considered potential murrelet nesting habitat. The DEIR indicates that more than 60% of the 17.1 acre expansion zone is comprised of redwood forest and acknowledges the presence of trees with ages of 125 years and greater. 11

If this habitat is occupied, the quarry expansion may result in take of murrelets through the destruction of habitat or disturbance of breeding. The latter form of impact should be reviewed in terms of quarry noise above baseline ambient decibel levels, and include consideration of flyways between ocean feeding areas and upland nesting areas.

According to the Noise section of the DEIR (page 8-4), ambient noise levels at the eastern and northern limits of the current quarry activity boundary are between 34 and 50 decibels. These levels may be attenuated to the east (due to the presence of vegetation) and may be significantly less at the eastern or outside boundary of the 12 proposed expansion area (which extends some 400 feet eastward from the current boundary, along a north-south axis of approximately 2000 feet). The eastward shift of all operations will result in a greater penetration of noise effects into the forest habitats. As described, site preparation, including removal of vegetation will occur over a two-year period before incremental mining of the limestone begins. The noise impacts are likely to fluctuate in relation to the portion of the newly exposed rock being mined, with sound to adjacent areas decreasing as successively deeper levels of material are reached and benched. Although the noise impacts of the expansion will be variable due to topography and the staged nature of the mining operation, it is inevitable that the basic activities of tree removal, rock excavation and removal will expose adjacent areas to decibel levels considered by the U. S. Fish and Wildlife Service's Guidelines (USFWS 2006) as High (81-90 decibels), or Very High (91-100 decibels) at certain periods. It is not clear from the DEIR if the current blasting siren regimen (105dBA, "Extreme") currently in use will need to be moved eastward to provide necessary safety for workers in the expansion area. 12

Proposed operations may result in take of marbled murrelets if suitable habitat on or within ¼-mile of the plan area is occupied and if operations occur within 300 feet of occupied areas or within ¼-mile of occupied areas during the breeding period. DFG recommends consultation with DFG to determine whether suitable habitat is present and, if necessary, appropriate survey methods and/or protection measures to avoid take of marbled murrelets. If the proposed project is determined to be likely to result in take of marbled murrelets, CEMEX will be required to obtain incidental take permits from DFG and the U. S. Fish and Wildlife Service (USFWS), 13

Please be advised that if marbled murrelets are detected at any time, the Applicant is requested to contact DFG and USFWS immediately. This could result in modification of the recommended mitigation measures described above, and would indicate the need for an incidental take permit ("CESA Permit"). 14

A CESA Permit must be obtained when a project has the potential to result in "take" of species of plants or animals listed under CESA, either during construction or over the life of the project. CESA Permits are issued to conserve, protect, enhance, and restore State-listed threatened or endangered species and their habitats. If the final CEQA document is to function as the environmental document for such a CESA permit, it should include all supporting material for that application (see Title 14 CCR Section 783 and Fish and Game Code sections 2050-2116). From the DEIR, it appears that the project Applicant has not considered the possibility of murrelet presence on CEMEX property or the potential need for a CESA permit. The applicant may want to reconsider this on the basis of future survey results. At a minimum the Applicant should apply avoidance measures for marbled murrelet, and thereby avoid violation of the CESA. 15

California red-legged frog

The California red-legged from is federally listed as threatened and is considered a Species of Special Concern by DFG. The heavier use and more frequent incursion into Settlement Ponds 3 and 4 (for sediment removal) has the potential to affect the local population (both ponds have had occurrences of adults and juveniles). Whether the current HCP (which expires in 2009) provides adequate mitigation for current and future impacts to the Liddell watershed population of this species is briefly reviewed in the Conclusion. 16

As noted in the Hydrology and Water Quality comments, the possibility of seasonal standing water in the Boundary Expansion Area should be considered an impact. The statement that "permanent water sources are needed to harbor habitat" is not entirely correct. These ponded areas may attract breeding frogs, but result in failed breeding attempts, if ponds drain prior to the completion of metamorphosis. The potential for standing water, in percolation ponds or other uses, to act as population sinks should be acknowledged directly in a revised management and mitigation proposal. 17

San Francisco dusky-footed woodrat

DFG has appreciated working with the County and CEMEX to develop the mitigation plan presented in mitigation Measures BIO-1 and BIO-2,which include avoidance, data collection, and both passive and active relocation of individuals prior to timber harvest or land clearing. There appears to be only one significant omission. All reporting that is presented to the County by CEMEX should also be copied to DFG. This correspondence should be sent to: Department of Fish and Game, Bay Delta Region, Habitat Conservation Program, Post Office Box 47, Yountville, CA, 94599. 18

Coho salmon and steelhead

Section 6.1.3.3 notes that coho salmon is federally endangered but neglects to note that it is also state listed as endangered. Coho are present in the nearby San Vicente system within the CEMEX area of operation. 19 As noted in the hydrology section above, DFG remains concerned about the cumulative and additive effects of the quarry operation and expansion on the quality and quantity of Liddell Creek water that bypasses the quarry and City of Santa Cruz operations. 20 The McGinnis (1996 and earlier) works describe past sediment transport conditions, but more recent studies are appropriate given the observed mobility of the stream profile in lower reaches and the significance of Liddell Creek as habitat for the federally threatened (and State species of special concern) steelhead. The additional importance of avoiding further impacts to steelhead is heightened due to the delays in mitigation for impacts to Liddell Creek and its species (see Conclusion). 21

1996 Reclamation Plan Amendment (Revegetation)

The combination of two distinctly separate elements of quarry operation, the 17.1-acre expansion of the limestone quarry and a reconsideration of the approved 1997 Reclamation Plan, is unique and somewhat problematic. Certain elements of the Reclamation Plan, which have been required, but not complied with since 1995 22 (see Conclusion), are likely to be affected by the final resolution of mitigation measures associated with overall quarry operation and expansion. It may therefore be in the County's interests to further address revegetation standards, in the event that outstanding mitigations remain unsettled.

While the desire to make the revegetation plan more attainable and "modest" is pragmatic, it is not clear how the difficulty of "direct replacement of these native vegetation communities" (page 2-9) releases the Operator from mitigation for spatial and temporal losses of the full range of communities present prior to impacts of the 23 mining operation. In particular, the mitigation of complete elimination of Needlegrass Grassland and Northern Chaparral (loss of 109.8 acres), and Northern Maritime Chaparral (loss of 2.6 acres) areas by establishing a more generalized Northern Coastal Scrub and Mixed Evergreen Forest (increase of 293.8 acres) is questionable. The DEIR improperly defines maritime chaparral as a "climax" community. It is more properly characterized as fire-dependent or early successional. This community is increasingly limited in the Central Coast due to fire suppression and development. 24 Maritime chaparral is defined by the California Coastal Commission as an Environmentally Sensitive Habitat Area (ESHA) and warrants special attention in Local Coastal Plans and CEQA review. Although we agree that quarried soils are not likely to be suitable for supporting full recovery of the former communities, it does not necessarily follow that a Plan upgrade should be based on a biotic simplification to six of those units, particularly at a static ratio of 1:1 (which fails to account for future habitat losses). DFG does not categorically deny the value of a more rapid reclamation rate of cover in some cases, the stated goal of the Plan Amendment, that will be achieved with greater investment in the faster growing coastal scrub and evergreen forest assemblages noted in Table 6-3. This pragmatic interest in cover, or 25 "quantity," simply needs to be complemented by attention to conservation of rare communities (such as native grassland and maritime chaparral), or "quality." Unfortunately, restoration of maritime chaparral may not be possible, particularly if the original seedbank has been lost (Hayes, personal communication). Mitigation for this community, and for needlegrass acreage, may be best addressed by alternative mitigations offsite in the Bonny Doon, or by securing conservation easements on other locations within the operative boundaries of CEMEX operations.

Nesting birds

The DEIR correctly notes the relevance of the Migratory Bird Treaty Act and DFG Codes Sections to the project. The most significant and binding text about this subject is Measure BIO-4. This measure should be a condition of approval. However, the accompanying text in the effectiveness discussion is somewhat misleading and should be changed. The second sentence emphasizes that the protection measure will decrease potential for impacts to special status raptors. While this is correct, it narrows the focus of the measure, which should be to protect all nests in accordance with Fish and Game Code Section 3503. Survey and protection measures should apply to all species. **26**

Streambed Alteration Agreements

The statement in Table 1-1 that there are existing DFG "Stream Alteration Agreements" for Disposal Area C and periodic Settlement Basin cleanout, and that therefore there will be "No change" needed is incorrect. Although CEMEX has applied for and secured Streambed Alteration Agreements (SAAs) in the past and in 2007, the most recent authorization (#1600-2006-0660-3) was limited to Ponds 2x, 3 and 4, and will expire by November 2007. DFG limited the term of the agreement (a five-year term had been requested) in order to see that mitigations related to impacts of quarry operation agreed to in 1995 will be settled (see Conclusion). **27**

CONCLUSION

It is our understanding that the overall use authorization by the County for the CEMEX operation is due for a permit compliance review. We support the initiation of this review. All past commitments by CEMEX for mitigations for past impacts should be met prior to approvals of further expansion. We look forward the opportunity to comment directly on these issues. The County is aware of many of our concerns addressed most of them in letters to Mr. Louis Schipper of CEMEX dated May 5, 2006 and June 15, 2006. We are grateful that the County has monitored the compliance of this applicant with obligations to DFG, NOAA Fisheries, and the USFWS. **28**

We have deliberately avoided discussion of the past commitments in our comments on the proposed expansion, but wish to discuss how the resources that may be impacted by the expansion were also previously impacted and are still due attention from this Applicant. We will reserve our concerns on other issues on the CEMEX property until requested to do so in the Permit Compliance Review process.

Liddell Creek

Our concerns about Liddell Creek, which may be further affected by the expansion project, are heightened because CEMEX has not fulfilled specific obligations to mitigate for impacts to the East Fork of the Middle Branch of Liddell Creek through the construction of Settlement Pond 2x in 1995 (SAA #849-95). Mitigations were to include the construction of a fish passage facility at the creek mouth. The proposal for 29
this project was not received until 2003. In response, a draft agreement was prepared by DFG the following spring (SAA #2003-5296-3), but the Applicant has still not secured necessary authorizations from the County to begin construction. Other mitigations included in the 1995 agreement (SAA # 849-95) have not been completed.

California red-legged frog, settlement ponds and the Habitat Conservation Plan

Our concerns about the settlement ponds, which will be used in the expansion project, are heightened because mitigation for impacts to wetlands at Pond 2x were to have been mitigated for by the construction, monitoring and maintenance of mitigation Ponds 1 and the "Liddell mitigation ponds" located adjacent to Middle Liddell Creek. This pond regimen was also used as mitigation in the HCP entered into for impacts at all seven settlement ponds (including Ponds 3 and 4, which will receive heavier use with the expansion) with the USFWS.

Although Ponds 2x, 3, and 4 continue to periodically cause potential problems to frog 30
populations by supporting weak breeding efforts in an unsuitable environment (thereby warranting the need for continued mitigation), the "Liddell mitigation ponds" are no longer in operation due to a change in property ownership. These ponds are no longer maintained for habitat and cannot be officially accessed by CEMEX staff. They therefore are no longer functioning for their intended purpose. They are no longer called "Liddell mitigation ponds," or "Liddell mitigation ponds" in project documents as they are on older documents prepared by CEMEX; they are now just the "Liddell ponds," if they appear at all. The HCP will expire in 2009, and the need for renewal with new mitigations may coincide with the permit compliance review.

Not all of the delays for implementation of the mitigations described above were the company's fault, and there has been an interest shown by this company since 2006 to seek resolution on these matters. Our recommendation to link the review of the expansion proposal with the overall permit compliance review is based on the 31
DFG's desire to work cooperatively with CEMEX. Experience indicates that some form of an agreement for a Letter of Credit may be necessary to ensure follow through on whatever mitigations are finalized. Adjustment of the Reclamation Plan may be a viable option.

We commend the County for aiding DFG staff re-establish the record of the past requirements, as well as working with us to help CEMEX meet their requirements. DFG staff will be available to provide technical assistance to the Bonny Doon Quarry to resolve issues pertaining to federally and State listed species and conservation planning. Please contact Serge Glushkoff, Environmental Scientist, at (707) 944-5597 sglushkoff@dfg.ca.gov; or Richard Fitzgerald, Senior Environmental Scientist, at (707) 944-5568, if you have any questions regarding these comments on the Bonny Doon Quarry Expansion Project.

Sincerely,

Charles Armor
Regional Manager
Bay Delta Region

cc: Susan Craig
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Responses to Comment Letter II-C:
California Department of Fish and Game

1. The project would not alter water quantity of Liddell Creek drainages. Expansion of the Limestone Quarry would result in the continuation of the existing diversion at current rates, which occur up to a maximum of 21 gpm. Base-flow quantities of Liddell Creek would be unchanged from current conditions. See also response to NOAA Comment Letter I-A.

2. Implementation of the proposed project would result in a continued diversion at Plant Spring at the current rate. The maximum diversion rate occurring is 21 gpm based on diversion records. The maximum rate occurs during summer months when the need for dust suppression is the greatest. Additional diversion is not proposed. Please see Section 6.3.2.3, Central Coast Steelhead/North Central Coast California Steelhead Stream Habitat (p. 6-22) of the Draft EIR for a complete discussion of project impacts to steelhead. See also response to comment to I-A-1.

   Appendix F of the Draft EIR did not address potential hydrologic impacts to the watershed downstream of the proposed quarry operation for the following reasons:

   a. The proposed quarry operation is not expected to significantly affect the quantity or timing of downstream baseflows (see response to comment I-A-1) or stormflows as long as complete quarry drainage to the subsurface continues, as proposed in the Draft EIR (see revised mitigation measure HYD-1).

   b. The amount of springflow bypassing the City's Liddell Spring diversion is but a fraction of the streamflow in the East Branch of Liddell Creek. As such, the downstream impact of potentially elevated Liddell Spring turbidity as a result of quarry operations is insignificant.

   c. Mitigation measure HYD-1 will reduce turbidity and sedimentation impacts to a less than significant level with respect to downstream conditions.

   d. Evidence of regularly occurring uncontrolled releases of clastic sediment from the Liddell Spring springbox is lacking (see Appendix I). The City's springbox functions as an efficient sediment trap that, in combination with new City procedures to reduce the amount of sediment released to Liddell Creek by springbox maintenance, will limit transmission of sediment downstream.

   e. Per the County's original EIR scope, off-site surface drainage through the sedimentation basins is not within the scope of the Draft EIR. The County Chief Engineer deemed the existing drainage system adequate for current and proposed conditions.

   f. Although one watershed study exists describing sediment conditions in the Liddell Creek watershed (Environmental Science Associates, 2001), that analysis lacks sufficient data to support its conclusions and is not useful for evaluating impacts.

Furthermore, the comment is in error regarding "potential water withdrawals at Liddell Spring" inasmuch as the existing and proposed quarry operation does not divert from the Liddell Spring, but rather diverts a maximum of 21 gpm from Plant Spring.

3. The Draft EIR does not evaluate the effects of diversion during low-flow periods because (a) the proposed quarry expansion does not involve any significant change in water use beyond its existing right to divert 21 gpm from Plant Spring, and (b) the proposed quarry operation would not significantly affect diversions from Liddell Spring by the City of Santa Cruz during low-flow periods. The current COC 89-0492 requires that the quarry operator implement water conservation measures to reduce summer diversions at Plant Spring. The maximum allowable diversion is an average of 21 gpm or 927,000 gallons per month at peak monthly usage. See also response to comment I-A-1.

4. Cumulative impact on streamflow is addressed in Hydrology Section 5.3.4 and in Biology in Section 6.3.4 of the Draft EIR. When Liddell Spring is turned out the City must rely on other sources to meet demand. This would be a management issue at this source regardless of the existence of the quarry operation. Based on the available data there is no evidence that turnouts have become more frequent or lengthy due to elevated turbidity. On the contrary, spring improvements resulting from the permit process have allowed more efficient management of this water source to maximize production, which would reduce reliance on water from other City sources. In addition, the proposed quarry operation is not expected to significantly alter the City of Santa Cruz's diversion operations at Liddell Spring compared to existing conditions.

5. Comment noted. The quarry drainage recommendations will reduce the incidence of impounded, standing water in comparison to existing conditions (see HYD-1). The pond would be seasonally drained during critical months. Due to the nature of the karst system underlying the quarry floor, excessive amounts of ponded water are not anticipated following the implementation of Measure HYD-1. Although low-lying portions of the quarry pit may contain greater moisture than surrounding areas, extended periods of open water are not anticipated.

6. Comment noted. Water redirection between watersheds or between streams has not been proposed as part of the Limestone Quarry expansion project or as project mitigation. Mitigation Measure HYD-1 addresses capturing surface runoff, which presently flows into the quarry and retains it in the Liddell Spring recharge zone. Measure HYD-1 serves to retain flows as they presently occur rather than allow the redirection which is planned under the existing reclamation plan final drainage plan.

7. The Limestone Quarry would continue to operate under the same maximum production rates specified by its Use Permit. The proposed expansion of the Limestone Quarry would extend the life of the operation without exceeding its permitted production limits. The expansion would not require increased vehicle travel on its access road beyond levels consistent with normal operations at maximum production rates.

   Pond 2X is located at the base of Disposal Area C. This pond does not receive drainage from the Limestone Quarry floor or the Boundary Expansion Area, and therefore would be unaffected by the proposed project. Pond 2X is governed by the

Bonny Doon Quarries Habitat Conservation Plan (HCP). The impact of pond maintenance activities on the level of take occurring at Pond 2X is addressed by the HCP and would be unaffected by the proposed project.

8. Proposed Mitigation Measure HYD-1 states that a detailed design shall be developed by CEMEX for approval by County Planning prior to public hearing of the project proposal. Filters can be constructed to geotechnical standards and are recognized in the geotechnical engineering industry as an effective means of removing sediment from groundwater. See revised mitigation measure HYD-1.

9. See revised mitigation measure HYD-2. The monitoring is not proposed to serve as mitigation in and of itself. Rather, it is a tool to promote compliance with County regulations requiring separation of mining from groundwater.

   HYD-2 addresses groundwater levels not turbidity. Downstream impacts to aquatic organisms are addressed in Section 6.3.2.3, Central Coast Steelhead/North Central Coast California Steelhead Stream Habitat (p.6-23). "Given the small contribution of Plant Spring to base-flows of Liddell Creek, and the small quantity of water diverted from Plant Spring for quarry operations, the continued water use by the quarry under the proposed mining expansion project would not significantly impact steelhead habitat."

10. Mitigation Measure HYD-3 has been revised to require compliance with the existing 1964 Agreement between the quarry operator and the City of Santa Cruz (See Final EIR for revisions to Section 5.4). The current 1964 Agreement has been included as a condition of approval for the proposed project. Therefore, specific thresholds outlined in the agreement are therefore a requirement of Mitigation Measure HYD-3. The 1964 Agreement has been attached in its entirety in Appendix J of the Final EIR. See revised mitigation measure HYD-3. No adverse impacts to downstream water quality are anticipated. Downstream impacts to aquatic organisms are addressed in Section 6.3.2.3 (See Final EIR for revisions to Section 6.3.2.3).

11. Comment noted. As stated on Page 6-5 of the Draft EIR, "Old growth stumps and fire scars show the historical management by burning after clearcutting in the Santa Cruz Mountains. These redwoods are most likely from 90 to 125 years old with a few older specimens." No old growth redwoods were observed during site surveys (p. 6-5 of the Final EIR). Appendix C, Page C-8 of the Draft EIR states the potential for marbled murrelet to occur in the Boundary Expansion Area is "Low, though the Expansion Area supports Redwood Forest vegetation, the size of these trees is not large enough for this species to nest. The species was not observed during wildlife surveys. The entire adjacent Coast Dairies property was clear-cut in the early 1900s, and there are no old growth trees remaining (Environmental Science Associates, June 2003). In addition, adjacent Coast Dairies property does not currently support nesting habitat for the species. … "The closest confirmed nesting site for marbled murrelets is at Big Basin Redwoods State Park (Environmental Science Associates, June 2003)" Noise impacts to the marbled murrelet are not anticipated due to the absence of breeding habitat on site and in the project vicinity.

12. As stated in response to comment II-C-11 above, noise impacts to the marbled murrelet are not anticipated due to the absence of breeding habitat on site and in the

project vicinity. Receptor parcels C3 and C5 (see page 8-6 and Figure 38 of the Draft EIR) are located along the northern quarry property boundary. Noise levels on the portion of these parcels immediately adjoining the Boundary Expansion Area would routinely exceed 75 dBA during site preparation activities. Although no impact would occur, this level is below the USFWS Guidelines.

13. See response to Comment II-C-11 above. No take of marbled murrelet is anticipated.

14. Comment noted. See response to Comment II-C-13.

15. Comment noted. See response to comments II-C-11 & 12.

16. Comment noted. As stated on page 6-21 of the Draft EIR, the proposed Boundary Expansion would not result in direct impacts to California red-legged frog (CRLF) breeding habitat. No modifications are proposed to the settlement basins or to the habitat maintenance requirements specified in the HCP for the Quarry settlement basins. Project implementation would not reduce the viability or management opportunities of CRLF in the region, and would not adversely affect the existing HCP. However, the boundary expansion could affect water quality and quantity in Liddell Creek and Settlement Basin 3. Thus, CRLF could be indirectly adversely affected by changes in water quality and/or quantity. However, impacts to water quality and water quantity are explained in Section 5.0 of the Draft EIR and would be fully mitigated through the implementation of Measure HYD-1. Erosion control measures are included in the mining plan to reduce sediment load to the settlement basins, and these basins are periodically dredged under a mitigation plan implemented through the HCP for the site.

    The July 28, 1999 HCP for the Bonny Doon Quarries Settlement Ponds allows periodic and emergency clearing of sediment and plant debris from drainage facilities to be conducted as necessary. The facilities consist of culverts, catch basins, and open drains that lead to Settlement Ponds 1 through 7. Although the Federal Fish and Wildlife Permit #TE844722-0 is set to expire in 2009, the permit is renewable and may be extended at the discretion of the U.S. Fish and Wildlife Service (USFWS).

17. See response to Comment II-C-5. A pond within the bottom of the quarry floor is not proposed. Therefore, ponded water is not anticipated. Saturated soils may occur for extended periods following rain events. However, Mitigation Measure HYD-1 requires the preparation of an engineered drainage plan that is intended to allow water to filter through engineered filter material placed on the quarry floor prior to draining into the karst system (See Final EIR for revisions to Section 5.4). Mitigation Measure BIO-3 (p. 6-30) requires the Mitigated 1996 Reclamation Plan Amendment to provide a suitable mix of hyrophytic species to address the potential for saturated soils in a portion of the quarry floor. No impacts to the CRLF are anticipated from ponded water.

18. Comment noted. All reporting from CEMEX to the County Planning Department will be copied to CDFG. Section 6.4 (pp. 6-29 & 30) of the Final EIR has been revised to reflect this change.

19. Comment noted. Section 6.1.3.3 of the Final EIR (p. 6-9) has been revised to include the Coho Salmon as state listed endangered. Section 6.1.3.3 (p. 6-9) of the Draft EIR

states, "The proposed mining expansion of the Limestone Quarry would not occur in the San Vicente Creek watershed and would not impact habitat values or water quality in San Vicente Creek.

20. See response to comments II-C-2, II-C-3, and II-C-4.

21. See response to comment II-C-2.

22. Comment noted. The proposed Mitigated 1996 Reclamation Plan Amendment would apply to both the Limestone and Shale quarries and not just the 17.1-acre Boundary Expansion Area. Permit compliance is addressed during the permit review process. A Certificate of Compliance review of quarry operations to ensure compliance with the conditions of the permit was completed in October 2008.

23. Comment noted. Mitigation Measure VEG-5 from the 1996 EIR for the Certificate of Compliance specifies minimum acreages for specific vegetation communities: Needlegrass Grassland (4), Diverse Native Grassland (12), Mixed Evergreen Forest (46), Northern Maritime Chaparral (4.5), Northern Coastal Scrub (2.5), Riparian (0.5), and Redwood Forest 1.5). Although a subsequent revegetation plan incorporating the 1996 EIR revegetation mitigation was never approved by the Planning Department, the proposed Mitigated 1996 Reclamation Plan Amendment includes the entire 71 acres of mitigation required by Measure VEG-5 (see p. 6-20 of the Draft EIR). Therefore, a loss of 109 acres of Needlegrass Grassland and Northern Maritime Chaparral would not occur because the proposed Mitigated 1996 Reclamation Plan Amendment would meet the mitigation requirements of the 1996 EIR and Certificate of Compliance.

24. Comment noted. Pages 1-2 and 2-10 of the Draft EIR were revised to clarify that the proposed Mitigated 1996 Reclamation Plan Amendment proposes the re-establishment of "impacted" vegetation communities with early-successional native vegetation communities more suited to post-quarried soils rather than the establishment of climax vegetation communities.

25. See response to Comment #II-C-23. The proposed Mitigated 1996 Reclamation Plan Amendment would establish the required number of acres of sensitive habitat (including 4.5 acres of Northern Maritime Chaparral) required under the 1996 EIR for the Certificate of Compliance. Thus, no offsite mitigation would be required for impacts to Northern Maritime Chaparral and Needlegrass Grassland. In addition, no Northern Maritime Chaparral would be impacted by the proposed project; and therefore, additional mitigation acreage would not be required.

26. Comment noted. Page 6-31 of the Final EIR has been revised to include migratory bird species under the "Effectiveness" discussion.

27. Comment noted. Table 1-1 is correct as drafted. At the time the Draft EIR was circulated, a valid Streambed Alteration Agreement was in place to maintain settlement basin cleanout. Settlement basin cleanout is an ongoing requirement for the existing quarry. Authorization from the CDFG for a Streambed Alteration Agreement will be required with or without the proposed project.

28. Comment noted. See response to comments II-C-29, -30, -31, below.

29. Although compliance with Streambed Alteration Agreement #849-95 is primarily a requirement of CDFG, it is also a requirement of the County Use Permit and COC. The Planning Department has informed CDFG of the results of our review of compliance status with the SAA, but no independent action has been taken by CDFG in response.

    Plans have been prepared for the fish passage improvements at the mouth of Liddell Creek. The improvements proposed include baffles in the culvert and tunnel beneath Highway 1 and the railroad tracks to assist fish passage through the culvert and tunnel. Permission from the railroad has been obtained to construct the improvements. Caltrans has not granted permission because they are concerned that the improvements would not have an adverse affect on their tunnel beneath Highway 1 due to higher flood water levels caused by the installation of the baffles. CEMEX is in discussions with Caltrans to resolve the hydrologic issues.

    On October 8, 2008 the County Planning Commission performed a review of the COC for the mine for compliance with existing conditions of approval. Following the public hearing the Planning Commission adopted the staff recommendations related to this issues as follows:

    No later than October 15, 2009, or prior to expansion of the quarry, should the proposed expansion be approved, whichever is sooner, commence construction of fish passage improvements at the mouth of Liddell Creek; or, with approval from CDFG and National Marine Fisheries Services (NMFS), commence construction of an equivalent alternative mitigation measure for the impacts associated with the expansion of Disposal Area C.

30. The settlement ponds at the Limestone Quarry provide habitat for the federally listed CRLF. An HCP for the Limestone Quarry Settlement Ponds was completed in 1999 and submitted to the USFWS. The HCP addresses operation of the settlement ponds while conserving habitat for CRLF. The permit from the USFWS expires in 2009. In addition to a number of other measures in the HCP to mitigate the impacts associated with the quarry settlement ponds, the HCP describes the additional benefits to CRLF as a result of deepening and maintaining the depth of the mitigation ponds discussed above, which also provides the opportunity to study habitat enhancement for CRLF. A habitat evaluation of the mitigation ponds will be included in the annual HCP monitoring report, along with a description of the use of the ponds by CRLF. In addition to providing breeding habitat at Pond 1 and/or the mitigation ponds, performance standards in the HCP require the maintenance of a deep pool in the lower mitigation pond and maintenance of the water supply diverted from Liddell Creek. This is not occurring, nor is the annual habitat evaluation.

    The mitigation ponds were installed with permission of the previous landowner Coast Dairies and Land Company (CDLC). In 1998 CDLC was acquired by the Trust for Public Land (TPL). CEMEX has informed the Planning Department that following the purchase TPL requested the quarry operator cease mitigation activities on CDLC property. CEMEX has been in discussions with TPL to resolve the issue of access rights to the mitigation ponds for the purpose of monitoring and maintaining the ponds, however, the issue has not been resolved.

Although compliance with the HCP is primarily a requirement of USFWS, it is also a requirement of the County Use Permit and COC and is incorporated by reference into the Reclamation Plan. The Planning Department has informed USFWS of the results of our review of compliance status with the SAA, but no independent action has been taken by USFWS in response.

On October 8, 2008 the County Planning Commission performed a review of the COC for the mine for compliance with existing conditions of approval. Following the public hearing the Planning Commission adopted the staff recommendations related to these issues as follows:

Diligently pursue an interim agreement with Coast Dairies and Land Company (owned by Trust for Public Land) to allow the required monitoring and maintenance of the wetland mitigation ponds, while continuing to perfect legal access to the ponds in perpetuity.

31. As noted above, on October 8, 2008 the County Planning Commission performed a review of the COC for the mine for compliance with existing conditions of approval. Following the public hearing the Planning Commission adopted the staff recommendations, which are designed to ensure full compliance with existing conditions of approval prior to the expansion of the quarry, should the proposed expansion be approved.

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Comment Letter II-D
California Coastal Commission

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STATE OF CALIFORNIA – THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, *Governor*

CALIFORNIA COASTAL COMMISSION
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October 2, 2007

Todd Sexauer
Santa Cruz County Planning Department
701 Ocean Street, 4th floor
Santa Cruz, CA 95060

Subject: ***Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment Draft Environmental Report (SCH#2001112115)***

Dear Mr. Sexauer:

Thank you for forwarding the Bonny Doon Limestone Quarry Boundary Expansion and Reclamation Plan Amendment Draft Environmental Impact Report (DEIR) to our office for review. The proposed project is the expansion of the current limestone quarry mining boundary by 17.1 acres, as well as a proposed amendment to the 1996 Reclamation Plan that would shift re-vegetation efforts away from the late successional vegetation communities towards early successional communities. We have the following comments on the DEIR:

Biological Resources: The certified LCP protects biological resources, including biological resources understood by the LCP to be sensitive habitats, also referred to as environmentally sensitive habitat areas (ESHAs). LCP Policy 5.1.7 requires protection of sensitive habitats from significant disruption of habitat values, and also requires that any proposed development within or adjacent to sensitive habitat areas must maintain the functional capacity of the habitat. LCP Policy 5.1.10 requires protection of rare, endangered, or threatened species. The purpose of the Sensitive Habitat Protection Ordinance is to "minimize disturbance of biotic communities which are rare or especially valuable because of their special nature or role in an ecosystem, and which could be easily disturbed or degraded by human activity." Furthermore, LCP Mining Regulation 16.54.050(6) requires that appropriate conditions be imposed to assure that mining operations and reclamation activities reasonably preserve sensitive habitats and sensitive species. In sum, the LCP requires that development avoid or minimize disruption of sensitive habitats. Proposed mining of the 17.1-acre Boundary Expansion Area would remove sensitive habitats that are protected by the LCP's Sensitive Habitat Protection Ordinance, including 2.5 acres of northern coastal scrub and 0.9 acre of coast live oak forest. In addition, the proposed project will result in loss of habitat for the San Francisco dusky-footed woodrat (SFDW), which is a California Species of Special Concern and whose habitat is found throughout the 17.1 acre area proposed for clearing and subsequent mining operations. As stated in the DEIR, the proposed project would result in the loss of 17.1 acres of SFDW habitat that contains 53 SFDW houses, 40 of which were active in June 2006, inconsistent with LCP Policies 5.1.7 and 5.1.10. As such, it is difficult to see how the proposed project, which results in the clearing of 17.1 acres of land, much of which appears to be sensitive habitat, can be found to be consistent with the habitat protection policies of the certified Santa Cruz County LCP. 1

Even if avoidable habitat impacts were allowed by the LCP, if mitigated, and if the proposed project could be found consistent with the habitat protection policies of the LCP, the proposed mitigation for the loss of sensitive habitat is problematic. Regarding the proposed re-vegetation 2

plan amendment, page 2-9 of the DEIR states: "By evaluating test plots and soil tests, the study concluded that two of the eight targeted vegetation communities, needlegrass grassland and the maritime chaparral, could not be successfully reestablished." However, Table 2-1 on page 2-11 states that three targeted plant communities (maritime chaparral, needlegrass grassland, and mixed grassland) could not be established given existing soil conditions. Please clarify this discrepancy. The proposed project will remove 11.4 acres of upland redwood forest, 2.5 acres
of northern coastal scrub, 2.3 acres of mixed evergreen forest, and 0.9 acres of coast live oak. 4
However, Table 2-2 on page 2-12 of the DEIR shows that only three vegetation communities are proposed under the reclamation plan amendment: mixed evergreen forest, northern coastal scrub and mixed evergreen forest, and riparian. Additionally, Mitigation Measure BIO-3 further
amends the reclamation plan to provide for 0.9 acres of coast live oak forest. However, given 5
the difficulties in previous reclamation attempts, what certainty is there that the coast live oak reclamation will be successful? Additionally, the loss of 11.4 acres of upland redwood forest will not be mitigated in an equivalent manner, i.e., the reclamation plan does not call for restoration
of upland redwood forest habitat. Thus, the loss of upland redwood forest habitat does not 6
appear to be mitigated.

The proposed mitigation measures include placement of a conservation easement over suitable SFDW habitat at a ratio of 1:1, and relocation of SFDW that are within the 17.1-acre proposed for clearing and subsequent mining activities. The proposed mitigation includes tracking of the
relocated animals with radio telemetry for a period of 30 days following their release to 7
determine the success of the relocation effort. Has successful relocation of this species been accomplished in other cases? If the monitoring determines that the relocation has not been a success, i.e. there is high mortality of woodrats, what additional mitigation would be proposed?

In sum, it is not clear to us that avoidable habitat impacts can be allowed consistent with the certified LCP, and it is not clear that the mitigation proposed (even if it were allowed to
compensate for avoidable habitat impacts) is sufficient. Please clearly detail in the final EIR the 8
manner in which the project can be found consistent with the LCP considering all applicable LCP policies. Also, please ensure that any offsite mitigation adequately compensates for any unavoidable impacts, including through requiring long-term maintenance and monitoring to ensure success.

Water Resources: The City of Santa Cruz operates a municipal drinking source (Liddell Spring)
in the area of the Bonny Doon Quarry. The DEIR finds that the proposed project would cause 9
increased sedimentation of Liddell Spring, inconsistent with a number of LCP Water Resources, Surface Water Quality, and Erosion policies. In addition, the proposed mitigations to protect the water quality of Liddell Spring are vague and potentially infeasible. For example, Mitigation Measure HYD-1 requires the preparation of an engineered drainage plan for use during the removal of overburden and during mining of the boundary expansion area. It is speculative however, to assume that a suitable drainage design can be developed and implemented that will mitigate the proposed project's water quality impacts. Similarly, Mitigation Measure HYD-3
does not address all the potential impacts of quarry expansion, including the loss of recharge 10
area, production and treatment impacts, etc. This mitigation measure also assumes that the City of Santa Cruz and the applicant will enter into a future agreement that will compensate for impaired water quality and quantity. This mitigation measure also calls for development of a memorandum of agreement between the applicant and the City of Santa Cruz. It is inappropriate, however, to make third-party agreements (which may never be finalized)

mitigation for the project's impacts on watery quality and water supply. Rather, and as with habitat concerns, impact avoidance is what is called for by the LCP. 10

Thank you for the opportunity to comment on this project. There appears to be a clear dichotomy between what is being proposed and the resource protection policies of the LCP. It will be incumbent on the CEQA documents to clearly explain such discrepancies and the legal and factual reasons, if any, supporting the project. We look forward to reviewing upcoming iterations of information in this regard, particularly as this matter moves through the coastal permitting process. 11

We appreciate the efforts of the County to coordinate its review of this project with us. We may have additional comments as more information is provided. If you have any questions or wish to discuss these matters further, please feel free to contact me.

Sincerely,

Susan Craig

Susan Craig
Coastal Planner
Central Coast District Office

c: State Clearinghouse

Responses to Comment Letter II-D
California Coastal Commission

1. Local Coastal Program (LCP) Policy 5.1.6 states, "Reduce in scale, redesign, or, if no other alternative exists, deny any project which cannot sufficiently mitigate significant adverse impacts on sensitive habitats unless approval of a project is legally necessary to allow a reasonable use of land." LCP Policy 5.1.3 also states that uses may be allowed if legally necessary to allow a reasonable economic use of the land, and there is no feasible less-damaging alternative. The entire Bonny Doon Limestone Quarry "Legal Mining Limit" is located within the Coastal Zone. Therefore, any expansion within the Legal Mining Limit would occur within the Coastal Zone. As stated on Page 10-5 of the Draft EIR, "The No Project Alternative eliminates the environmental impacts associated with the project and is the environmentally superior alternative. Although the No Project Alternative does not achieve the project objective of continuing the limestone mining operation, there are no other Project Alternatives available to the Quarry that can meet the project objectives." Page 3-15 of the Draft EIR states, "The Boundary Expansion Area contains habitat for the San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*; "SFDW"), a California Species of Special Concern (CSC). Impacts to this special status species is described in Chapter 6.0 Biological Resources. A Woodrat Mitigation Plan has been prepared and is incorporated into the Biological Resources chapter of the Draft EIR. A mitigation program has been developed in cooperation with CDFG (BIO-1 and BIO-2) to offset the impacts to the SFDW." Therefore, impacts to SFDW after mitigation would be consistent with LCP policies 5.1.3, 5.1.6 and 5.1.7 for habitat protection. The Draft EIR Section 6.3.2.3 (pg. 6-19) states that northern coastal scrub and coast live oak forest communities lost as a result of mining the expansion area would be replaced on the site under the Mitigated 1996 Reclamation Plan Amendment, which reduces the impact to less than significant. Also see response to II-D-5 below.

2. Comment noted. See response to comment II-D-1.

3. Table 2-1 was revised to state, "Test plot results were that vegetation types of two of the targeted communities (Maritime Chaparral and Needlegrass Grassland) could not be established given existing soil conditions (Table 2-2)."

4. Table 2-2 on Page 2-12 of the Draft EIR shows a total of five vegetation communities under the 1996 Reclamation Plan Amendment for the Limestone and Shale Quarries. These include Mixed Evergreen Forest, Northern Coastal Scrub, Northern Coastal Scrub & Mixed Evergreen Forest, Redwood Forest, and Riparian. The Mitigated 1996 Reclamation Plan Amendment (Table 6-3; p. 6-20 of the Draft EIR) also includes Needlegrass Grassland, Diverse Native Grassland, Northern Maritime Chaparral, and Coast Live Oak Forest.

5. Comment noted. Mitigation Measure BIO-5 on Page 6-32 of the Draft EIR provides performance standards for revegetation efforts. Performance standards include the use of test plots to determine the most appropriate planting procedures to be followed to promote successful implementation of the proposed revegetation plan. In addition, BIO-6 (p. 6-35 of the Draft EIR) includes amending the Reclamation Plan to include performance standards for Topsoil Salvage, Maintenance, and Redistribution.

6. The Mitigated 1996 Reclamation Plan Amendment proposes the planting of 1.5 acres of Redwood Forest at the Shale Quarry as required under the 1996 EIR for the Certificate of Compliance. Northern Coastal Scrub and Mixed Evergreen Forest are proposed. As stated on Page 6-18 of the Draft EIR, "The Upland Redwood Forest and Mixed Evergreen Forest are not designated as sensitive habitats. The area of these vegetation communities to be removed by the project is not significant when viewed in context of the abundant forested land containing these communities that remain in the project vicinity and throughout the Santa Cruz Mountains."

7. Comment noted. Mitigation for impacts to the San Francisco dusky-footed woodrat was coordinated with and approved by CDFG in 2007. Mitigation Measures BIO-1 and BIO-2 have been designed to reduce impacts to below a level of significance. Trapping and relocation of small mammals is common practice as a mitigation strategy. The Draft EIR prepared for the 2005 Long Range Development Plan for U.C. Santa Cruz specified trapping and relocation of San Francisco dusky-footed woodrats by a qualified biologist in accordance with CDFG requirements to reduce impacts to below a level of significance (U.C. Santa Cruz, 2005).

8. Comment noted. Please see response to comment #s II-D-1 and II-D-7. Table 3-1 beginning on Page 3-2 of the Draft EIR provides a list of relevant County General Plan Policies for the proposed project. Policies 5.1.3 and 5.1.6 have been added to Table 3-2 of the Final EIR. See response to Comment II-D-5 for a discussion of performance standards.

9. Section 5.4 of the Draft EIR finds that the impacts to Liddell Spring due to increased turbidity and sedimentation can be mitigated to less than significant levels.

10. See revised mitigation measures HYD-1 and HYD-3 in the Final EIR. The development and implementation of an integrated erosion control and runoff filtration plan is supported by current engineering practice and is not speculative. There will be no loss of recharge.

11. Comment noted. Chapter 3 of the Draft EIR addresses project consistency with the General Plan and Local Coastal Program.

Comment Letter III-A
City of Santa Cruz Water Department

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CITY OF SANTA CRUZ

Water Department 809 Center St. Santa Cruz, CA. 95060 (831) 420-5200

September 28, 2007

Mr. Todd Sexauer
Santa Cruz County Planning Department
701 Ocean St. 4th Floor
Santa Cruz, CA 95060

RE: Bonny Doon Quarry Expansion DEIR

Dear Mr. Sexauer,

As you may know, the City of Santa Cruz operates a municipal drinking water source (Liddell Spring – which is, from here forward referred to as "LS1" for brevity's sake) in the middle of Bonny Doon Quarry. The City has operated this source since 1913 – many years before the original owner of the Bonny Doon Quarry (Pacific Cement and Aggregates, or PCA) began operations. As a water purveyor to 90,000 customers with very limited supply and operational flexibility, we can not afford to sacrifice any of our water supply or quality. LS1, historically has been the most pure, low maintenance, and dependable City of Santa Cruz drinking water source in both drought and extreme winter weather, and is especially valuable to us.

Our concerns for quarry expansion are founded on the following facts,

- The spring's current water quality is degraded relative to pre-mining conditions
- Degradation is acknowledged to have been caused by mining
- The mitigation measures contained in the current draft EIR are similar to those prepared in support of the 1997 Certificate of Compliance, specifically, HYD 1 and HYD 1A, which call for an additional monitoring well and for RMC Lonestar to comply with its Agreement with the City regarding LS1 1
- These measures have not reversed nor stabilized the continuing decline in water quality.
- Over the past 10 to 15 years several attempts to negotiate a revised or new agreement between the quarry operator and the City have been made and in each case, were terminated due to the inability to agree on language that would require lost water to be replaced with an equal amount of water.

The City has reviewed the DEIR for the current Bonny Doon Quarry Expansion proposal. Unfortunately, the DEIR provides no assurance that water resources which serve the City of Santa Cruz (be it water quality or quantity) will not be impacted by this proposal. Even with 2

the implementation of key mitigations HYD-1 and 2 (which, in our opinion, are of 2
questionable utility), the DEIR authors point out,

> *"In any event, potentially significant impacts to water production from Liddell Spring may occur even with implementation of measures HYD-1 and HYD-2..."*

Therefore, HYD-3 is the only mitigation which is designed to reduced project impacts to a lower than significant level. However, this mitigation is ineffective in achieving this for the following reasons:

a) It is speculative in nature, in that there is no certainty that any agreement acceptable to the City will ever be worked out between the City and Cemex, and fails to include any performance standards that will ensure an adequate level of mitigation. For these reasons, Measure HYD-3 fails to meet legal requirements under the California Environmental Quality Act (CEQA).

   Though the City and Cemex are currently attempting to reach resolution of the issues at LS1, there is no guarantee that the future needs of both entities can be accommodated with any new agreement. Again, the City has been working on iterations of a new agreement with various quarry owners since at least the early 1990s, and negotiations have always broken down due to the respective quarry owners' inability to guarantee replacement water in perpetuity for any quarry- 3
   related water production loses the City may suffer in the future .

   Furthermore, there is absolutely no certainty that providing treatment for water resources impacted by quarry operations will ever be feasible, as investigations into the options for treatment have only recently been initiated.

b) It is vague, in that the few performance standards it includes do not address all the potential impacts of quarry expansion, including loss of recharge area, production impacts, treatment impacts, energy impacts, spring discharge-related, and other regulatory impacts, etc.

c) In short, HYD-3 is an example of what CEQA case law calls deferred mitigation, in that any agreement that will be worked out will likely take many years to formalize and implement. This is further complicated by the fact that mitigation for impacts of <u>existing</u> operations has yet to occur, several years after the impacts were identified (Chartrand 2005)

Assuming HYD-1 and HYD-2 will be refined for the FEIR, if HYD-3 is ultimately retained, we strongly believe that the FEIR should not be certified until the agreement it refers to, and the water treatment it requires, are completed to the satisfaction of the City. Because the Draft
EIR, on page 5-39, states that the agreement should be "submitted to the County prior to 4
issuance of the Use Permit amendment," it appears to us that the County may already intend the same result. We just want to go on record as stating our belief that no other approach would satisfy CEQA. We also recommend that any permit that this agreement might be attached to have stronger ramifications for non-compliance than the existing permit, as non-

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compliance with the existing permit has been ongoing for several years without any negative
ramifications for the quarry operators. Clearly, the current approach has not given the
applicant a sufficient reason to reach an agreement acceptable to the City, and nothing short of
a very draconian penalty for its continuing failure to do so is likely to create the incentive
needed to inspire the applicant to work with us in good faith. HYD-3 should therefore be 5
modified to expressly include language requiring such a penalty. Thus, we believe the
following or similar language should be added "...in the event production values specified in
the 1964 Agreement are not met due to reduction in the quantity or quality of from the spring,
Cemex would be required to cease operations immediately until lost production is replaced by
Cemex with an equivalent volume of water."

Finally with regard to HYD-3, as much as the City has benefited from having its historic
agreements with the prior quarry owners attached to previous quarry permits as conditions, it
seems to be an abrogation of the County's regulatory duties, and denial of the fact that other
regulatory entities have jurisdiction over Clean Water Act (CWA), California Fish and Game 6
Code, Porter-Cologne Water Quality Control Act, California Water Code and state and federal
Endangered Species Act (CESA/FESA, respectively) issues that the proposed project brings
up. We strongly suggest that the FEIR refine its analysis of impacts mitigation with regard to
these issues as well.

We would also like to submit the following more detailed comments for your review in preparation of the FEIR. Our comments are broken out into the following areas:

1) <u>CEQA</u>

2) <u>County Plans</u>

3) <u>Other Regulatory</u>

5 <u>Hydrology/Water Quality</u>

6) <u>Biotic</u>

Several historic documents may provide further detail on these comments, and are attached as appendices including:

Appendix A: Chartrand 2005, Recent City Correspondence on PELA studies and Quarry Operations Effects on Liddell Spring 7
Appendix B: Balance Hydrologics Comments on the DEIR

1) <u>CEQA</u>

The primary concerns that the City has with the mitigations proposed in the hydrology section are the following:

A. Mitigations are speculative, vague, deferred, and potentially infeasible 8

HYD-1 and HYD-3 are both speculative, vague, potentially infeasible and represent
deferred mitigation. There has been no detailed design for HYD-1 submitted for 8
review, and it thereby does not allow for any thoughtful analysis. Although CEQA
does not typically require an engineering level of detail, here more information is
needed for us to assess whether the proposed approach will actually be effective.
Similarly, HYD-3 is based on a future, potential agreement between the City and
Cemex, and treatment of polluted water. It is pure speculation that a) a suitable
drainage design can be developed and implemented which will offset the water quality
impacts per HYD-1, b) that the City and Cemex will ultimately agree to terms that are
amenable to both parties to compensate for impaired water quality and quantity, and c)
that a treatment plant can even be built that will handle the volume and quality of water 9
that is necessary. While early treatment tests have been met with limited success, they
have been focused on much smaller volumes of water than are present during typical
storm flows at LS1 and are generally focused on treating water to suitable standards for
treatment, rather than eliminating all pollution of the spring (as well as other springs
which they may be discharging to) in its entirety . Finally, it is unclear if the DEIR
requires HYD-1 to be complete before commencement of the project, or before
completion of the review of the DEIR, as conflicting statements are presented on pages 10
5-35 and 5-37 of the DEIR.

GEO-1 is also vague. Mitigation proposed in GEO-1 requires only that improved
levees be constructed "based on sound engineering design". This approach has
consistently been rejected by the courts, which require, at a minimum, some sort of
clear performance standard that will assure member of the public and other affected
parties (such as the City here) that agency officials will actually impose mitigation
sufficient to render impacts less than significant. (See, e.g., *Sundstrom v. County of
Mendocino* (1988) 202 Cal.App.3d 296, 308; see also *Endangered Habitats League v.* 11
County of Orange (2005) 131 Cal.App.4th 777, 793–794; *Defend the Bay v. City of
Irvine* (2004) 119 Cal.App.4th 1261, 1275–1276.) Knowledge of the levees' instability
goes back to 1991 (at least) and recommendations for improvement have been
(apparently) ignored. As with many other issues mentioned in this letter, it is curious
why more effort has not gone into developing this information in the years that
knowledge of this issue has existed. That issue aside, more specificity is necessary to
fully assess the relative offset of these impacts by proposed mitigations.

At this late date, the key mitigations for this project remain undefined. Drainage
design/feasibility analysis for HYD-1 has not been completed and made available for
review. HYD-3 – related development of a treatment plant at the quarry or a spring
locations is obviously problematic, as Graham Hill Treatment Plant upgrades are years
off and require a significant capital commitment of the City Council – which has not
happened to date. Development of an MOA between the City and Cemex may also be
years off, if mutually agreeable terms can even be found. As mentioned previously, the 12
City has been involved in negotiations with various quarry owners since (at least) the
early 1990s. Negotiations have always broken down due to the respective quarry
owner's inability to guarantee replacement water in perpetuity for quarry-related City
water production losses at LS1. Conditioning a use permit, let alone certification of an
EIR, based on things that may never happen is inappropriate, especially when the

quarry has ongoing impacts from their existing operations, (which the DEIR states will be extended by virtue of approval of the expansion) which have yet to be mitigated. 12

B. Monitoring is not "mitigation"

HYD-2 discusses the need for groundwater elevation monitoring, but never actually discusses the mitigation that the data is presumed to be informing. We assume that the
mitigation is prohibition on mining within 20 feet of seasonal high groundwater levels, 13
but that is not stated clearly in the document. Furthermore, sufficient detail is not present in the mitigation discussion to ensure the certainty of efficacious groundwater monitoring – and subsequent success of the (again, presumed) mitigation.

Furthermore, the City requested more intense groundwater monitoring in this area several years ago[1]. It is perplexing to us why a) there was not more storm-related, and geographically well-distributed groundwater monitoring conducted, b) why most, if not
all of the wells were actually outside the expansion area, and c) why the depth to 14
groundwater monitoring was conducted so infrequently, and only in a below average rainfall year – especially as PELA has stated so emphatically how difficult karst groundwater monitoring can be (PELA 2005).

Finally, given the discussion by PELA at the recent Davenport Geologic Society (DGS)
meeting (PELA 2007a) about how often Cemex encounters groundwater and the 15
subsequent problems at other quarries, faith that this mitigation will be meaningful in the long term –even if it were to be improved – is, again, speculative.

C. Mitigations that have been proposed in earlier discussions were not investigated. While the DEIR does briefly discuss potential other mitigations, there is at least one mitigation which was not discussed at all (and one which even PELA infers might be beneficial (PELA 2007b)[2]. The City has recommended previously that Cemex
investigate a prohibition on blasting in the winter time or during wet periods when 16
rainfall may exacerbate the effects of blasting on water quality. The DEIR makes no mention of this mitigation, nor any other comparable mitigation for blasting other than an onsite treatment system – which, again, has yet to be developed. Furthermore, as blasting impacts on water quality occur all year, such mitigation would need to be in place accordingly.

The City also discussed the dedication of open space and development of karst "protection zones" in areas which are hydrologically connected to LS1, "Liddell Spring
Protective Mining Measures" as well as the "Liddell Spring Protection Measures" 17
(PELA 2005) with Cemex in previous discussions of potential mitigations. The FEIR should also assess the viability of this proposal.

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[1] As early (if not earlier than) March 17, 1998, in the City's letter to the Planning Commission regarding proposed quarry expansion (Kocher 1998).

[2] PELA 2007b states that: "Of course when rainfall and blasting impacts occur simultaneously, the impact will be compounded..."

Finally, as the DEIR discusses, there are several other mitigations which may partially offset the quarry's impacts on LS1. These include the aforementioned mitigations above, as well as transfer of various Cemex water rights to the City. Given that mitigations were promoted in the DEIR that are of equally less certain feasibility, it seems appropriate that several of these other previously mentioned mitigations should warrant more exploration in the FEIR. 18

E. Alternatives Analysis:

Additionally, the alternatives analysis is misleading, in that it states that the no project alternative prohibits the implementation of mitigation measures for water quality impacts. This is not true, given the existing permit conditions and 1964 agreement obligations that *already require Cemex to remedy impacts to water quality*. It is also contrary to the statement made on page 5-38, that "to the extent the proposed quarry expansion would extend the life of the quarry operation in time, it would prolong the impacts of the current quarry operation." Futhermore, the no project alternative clearly states that there will be no further hydrologic impacts associated with it, but qualifies the impacts of the proposed alternative as being insignificant with mitigation. Given the questions about feasibility, vague and deferred nature of the mitigations. and DEIR statements about ongoing impacts even with implementation of HYD-1 and HYD-2, it is questionable whether the alternatives analysis is entirely accurate relative to the no project alternative. 19

F. Cumulative Impacts:

Given that loss in production at Liddell Spring requires use of other sources, there are several cumulative impacts issues raised. Among these are energy, water quality, biotic and impacts on agriculture resources. The City has previously discussed these issues with County staff on 12/18/06. In short, production changes at LS1 incurred as a result of quarry activities often result in: 20

i. City infrastructure failure, and sometimes, impacts to beneficial uses of water and special status species in other watersheds where our transmission lines are adjacent to waterbodies. These impacts occur due to pipeline breaks related to water pressure changes during turbidity-related turn-outs, and the need to bring in heavy equipment to complete repairs. 21

ii. The City's inability to use LS1 results in a need to use other water sources – which are generally fully-appropriated (and thereby, unavailable for additional diversion) or the quality is such that treatment cost and public health concerns are elevated (as compared to LS1). 22

ii. Loss of LS1 production also results in the need to divert more water from Loch Lomond Reservoir – the City's only storage facility. As most surface sources are dwindling (or dry) in the second year of a drought, Loch Lomond needs to remain the City's "savings account" and not be drawn upon routinely to make up for problems in other sources. 23

iii. The use of other sources, in all cases, results in a greater energy expenditure, as all of these sources must be pumped, and also generally require heavier treatment than LS1[3] to make them potable. 24

iv. The use of these sources incurs impacts on the respective streams when they would not ordinarily occur. As such, cumulative impacts span a much wider geographical range than just the immediate project vicinity. Reasonably speaking, it could be argued that the geographical range to be analyzed for biotic and water quality impacts should span from Liddell Creek to Soquel Creek and as far north as the headwaters of the San Lorenzo River. 25

v. Impacts to the City's north coast production can (obviously) have impacts on "raw" water customers on the north coast. The primary customer group who may be impacted by losses of north coast production is agriculture – as irrigation may be impossible during summer periods when north coast production is down due to infrastructure failures induced by a need to turn out Liddell Spring (as described above). 26

vi. Impacts to anadromous fisheries and aquatic habitat in W. branch Liddell Creek (WBLC) related to the conveyor belt and road infrastructure have not been assessed adequately. As the quarry infrastructure that drains to W. branch Liddell Creek will be utilized for this expansion and there are likely impacts associated with it, more detailed analysis of such should be included in the FEIR – particularly with regard to W. Liddell Creek hydrology, sediment transport and turbidity/sedimentation impacts on anadromous fish and aquatic habitat. 27

These water-related issues are extremely important to the City, which is facing a water supply shortfall in the period between 2015 and 2020, and which already is in a very vulnerable position during drought year conditions. CEQA case law requires a robust analysis here. (See *Santiago Water District v. County of Orange* (1981) 118 Cal.App.3d 818, 830-832 (EIR for mining project was invalid for failing to include sufficient information about the water needed for the project, and about how competing water users might be affected); *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 429-432, 436 (EIRs for water-consuming land use approvals should address all reasonably foreseeable effects due to anticipated water consumption, including how such approvals might create competition with other existing or potential water users for limited supplies and any possible environmental impacts that might result from shortfalls).) 28

D. DEIR preparation:

The City appreciates the County's efforts to include us in this EIR process. However, given the significant effort the City has put into defining the hydrogeology of the LS1 area, it is surprising how little of the recent correspondence between the City and 29

[3] when Liddell Spring is not turbid.

Cemex (which the County was copied on) was included in the DEIR reference list. We
firmly believe that all parties involved in this environmental review – the City included 29
– would benefit from the EIR consultants' review of this information. As discussed in
the introductory paragraphs of this letter, we have included several of these
correspondences in Appendix A of this letter.

E. Other CEQA Issues:

i. Climate Change. The DEIR does not include any analysis of climate change related 30
impacts of the quarry expansion.

ii. Energy Impacts. The DEIR does not include any analysis of energy impacts
associated with water treatment mitigations per HYD-3. With year-round treatment
of water provided at the quarry site and pumping of said water, there will 31
necessarily be increased energy impacts (and potentially other types of impacts)
associated with the mitigations proposed. (See CEQA Guidelines, Appendix F
(directives for addressing energy related impacts in EIRs).)

iii. Existing Permit Compliance. The DEIR does not include any discussion of
Cemex's compliance with existing permits, nor the fact that the previous permit was
conditioned with language that said, in effect, if there are impacts to water quality
resulting from mining then mining shall be abated until they are remedied. We are
currently seeing ongoing non-compliance with the existing permit[4]. Until such
compliance is forthcoming, this proposed expansion seems premature (see
Appendix A for more detail). Notably,"a project proponent's prior environmental
record is properly a subject of close consideration in determining the sufficiency of
the proponent's promises in an EIR." Thus, "in balancing a proponent's prior 32
shortcomings and its promises for future action, a court should consider relevant
factors including: the length, number, and severity of prior environmental errors and
the harm caused; whether the errors were intentional, negligent, or unavoidable;
whether the proponent's environmental record has improved or declined; whether he
has attempted in good faith to correct prior problems; and whether the proposed
activity will be regulated and monitored by a public entity." (*Laurel Heights
Improvement Assn. of San Francisco, Inc. v. Regents of the University of California*
(1988) 47 Cal. 3d 376, 420.). Here, the EIR should have discussed Cemex's bad
track record and should have addressed means by which a greater level of
compliance can be assured in the future. Given Cemex's past conduct, the County 33
should impose even tighter mitigation than would normally be required under
CEQA.

iv. Water Rights. As discussed in more detail below in the "Other Regulatory"
discussion, the water rights to LS2 may not be as clear as portayed in the DEIR.
This begs a number of questions regarding the impacts analysis. Among those that
are specifically CEQA-related is the question of the relative scope of the DEIR. 34
The FEIR will likely need to include an analysis of a broader scope of impacts if

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[4] See Chartrand 2005, March 14, 2006, July 24, 2006 letters from the City to Cemex – Appendix A

Cemex does not have a solid right to water in LS2, and is therefore forced to utilize alternative water sources for their expansion. 34

2). County Plans

General Plan *Section 5.5.8: Allowed Uses in Water Supply and Least Disturbed Watersheds* requires uses in Water Supply Watershed and Least Disturbed areas to be compatible with watershed protection policies and limited to open space uses or recreational and residential uses at the specified Watershed densities, unless otherwise exempted. While mining is classified as an open space use, it could be argued that, given the existing and foreseeable impacts to water resources and watershed functions, that mining is an incompatible land use with a water supply watershed such as Liddell. Furthermore, General Plan *Section 5.7.1*: *Impacts from New Development on Water Quality* prohibits new development "adjacent to marshes, streams and bodies of water if such development would cause adverse impacts on 35
water quality which cannot be fully mitigated. As discussed previously, it is not clear whether the impacts that quarrying can be fully mitigated. Finally, *Section 5.16.11: Quarry Operations to be Consistent with General Plan Policies* requires any future quarry expansion not already authorized under a Mining Approval to be consistent with all General Plan and LCP Land Use Plan policies, including resource protection policies. Given the aforementioned lack of consistency with water-supply-watershed related requirements, and County resource protection policies (County Code Chapter 16.24, etc), there is (again) conflict with County plans' concurrence with the proposed quarry expansion. These issues should be more thoroughly address in the FEIR.

<u>3) Other Regulatory</u>

A. Clean Water Act/Porter-Cologne Water Quality Control Act/County Water Quality Ordinance, California Department of Fish and Game Code, CESA, ESA Compliance.

The DEIR and correspondence from the City to Cemex (and the County) over the past several years irrefutably illustrate degradation of beneficial uses of water by quarry activities (see Appendices A and B for more detail). Even if Cemex is able to provide treatment for the City's historical volume of production onsite, there will be times when 36
they aren't able to treat the full volume of water that is discharging from LS1 (or the other springs which maybe impacted). There is existing data which shows that there will be ongoing discharges from LS1 (as well as potentially other springs) that will degrade beneficial uses of water downstream. Furthermore, turbidity and sedimentation impacts on anadromous fish, which have been discussed previously, will 37
be ongoing. Beyond any MOA or other agreement that is established with the City, Cemex should be required to be in compliance with the applicable water quality, California Fish and Game Code and Endangered Species Act requirements re: 38
discharge of turbid or sediment-laden water to Liddell Creek.

B. County 20 foot separation standard for mining.

Twenty foot separation may be appropriate for sand and gravel quarries where rapid 39
and extreme groundwater elevation changes may not be as rapid and extreme as in karst

systems. However with the communication between shallow groundwater (referred to as perched by the quarry consulting hydrogeologists (PELA 2005) and deeper groundwater, as well as the rapid and extreme elevation changes in groundwater level elevations seen in local karst systems, there is inevitably contamination of groundwater that occurs as a result of allowing mining in such close proximity to groundwater. 39

Many jurisdictions throughout the world have specialized karst-protection zones and planning regulations, particularly with regard to mining. Notably, in "Liddell Spring Protective Mining Measures" (PELA 2005, DEIR page 5-28) 50 foot buffers are discussed as being appropriate for karst features. Given that the quarry has already mined out features which are in communication with LS1 under the existing 20 foot separation standard, the wealth of information that the County now has regarding existing, and potential future impacts to water resources in this unique area, and the fact that other jurisdictions commonly have more protective requirements for land use in karst recharge areas, we recommend that the County revisit its 20 separation requirement and reassess its adequacy at protecting beneficial uses of water. 40

C. Water Rights.

Pre-1914 water rights often have complicated history associated with them. While the DEIR does illustrate this issue in its discussion of the difficulty of some of the formerly proposed mitigations –as they entail water rights ramifications – it does not address the following issues.

i. Groundwater. Under California water law, subterranean streams and underflow of surface waters are subject to the laws of surface waters and are regulated by the State Water Board. In the City's August 28, 2007 meeting with Cemex, PELA/Cemex staff noted how the groundwater in the quarry expansion area and existing quarry is a "virtual underground stream" with is tributary to LS1. This means that any interception or modification of groundwater flow - either intentional or unintentional - by the quarry operations will require concurrence with California water law. Furthermore, interception of groundwater that is tributary to LS1, otherwise interfere with the City's use of LS1 would be subject to historic agreements made between the City and the Coast Dairies and Land Company, and the City and PCA (and successors). 41

ii. Surface water. Quarry activities may, again, reduce the City's ability to utilize LS1. These impacts may stem from Cemex's water diversion at LS2 and quarry-related impacts on other springs - which are tributary to Liddell Creek (and subsequent impacts in Liddell Creek which increase the regulatory "burden" for the City regarding ESA and Fish and Game Code compliance), or direct impacts to LS1 (both water quality and quantity related) which interfere with the City's ability to use LS1. These impacts are also subject to historic agreements made between the City and Coast Dairies and Land Company, and the City and PCA (and successors). 42

iii. Furthermore, it is not clear that the water right associated with LS2, claimed by Cemex to be a riparian right in SWRCB filings, can be legally put to beneficial 43 use on the expansion area. The parcels in question have been subject to several ownership transfers and likely been subdivided since the original ownership by 43 the Coast Dairies and Land Company. Subsequently, not all parcels where the water is not intended to be put to use are now riparian parcels.

Finally, historic agreements between the Coast Dairies and Land Company indicate that riparian rights incident to any part of Liddell Creek flowing through Rancho Arroyo de la Laguna (including the expansion area) had their senior status forfeit in said agreements as part of the transfer of land and water rights at LS1 to the City. As such, the City has the senior water right on Liddell 44 Creek and would be able assert such status as necessary in the future in the event of a conflict. These water rights issues are proper subjects for a CEQA document for a project that could adversely affect the water rights of adjacent landowners or other parties. (See, e.g., *Save Our Peninsula Committee v. Monterey County Board of Supervisors* (2001) 87 Cal.App.4th 99, 131-134.)

For any number of reasons, as described throughout this comment letter, the City may need to assert this seniority. Obviously, these issues have substantial 45 bearing on the viability of the project as proposed, and should be explored more thoroughly in the FEIR.

4) Hydrology and Water Quality

A. Review of hydrogeologic characterization

The City also notes that the hydrogeologic analysis performed by NZA indicates clear connection between quarry activities, to the extent that NZA felt comfortable stating that "roughly 50% of the turbidity in Liddell Spring is a result of quarry activities". 46 Regardless of whether the quarry is responsible for 25, 50 or 75% of the turbidity, we take great interest in the fact that we are no longer debating whether, but rather, *how much* quarry activities impact water resources in the Liddell watershed.

The City has previously submitted comments on the PELA hydrogeologic characterization of Liddell Spring and Bonny Doon Quarry [5]. In short, while agreeing that the work performed resulted in a vast improvement in the ability to predict quarry-related impacts to LS1, there were several deficiencies with this analysis. While we 47 note several deficiencies with this analysis below, in lieu of repeating all of our historical concerns here in this discussion, we have attached historical correspondence in Appendix A. Interestingly, many of the issues noted in that correspondence are echoed by the County's EIR consultants.

The City shares the EIR team's concerns about the incomplete characterization of the karst in the vicinity of Liddell Spring. While well-recognized experts in karst 48 hydrogeology, in other regions, PELA is relatively new to Santa Cruz County and the

[5] See letter dated 8/25/05, 3/14/06, etc. attached in Appendix A.

highly unusual karst that is present here[6]. PELA has advanced the understanding of karst in this area vastly, however there are numerous examples of a) conclusions being drawn which are not supported by data, b) incorrect identification of karst features, c) 48
potential errors in mapping and data collection, d) exclusion of analysis in other areas which could be hydrologically linked to the aquifer discharging to LS1, etc. Among some examples of this are the following:

i. NZA and City review of PELA 2005 hydrogeologic characterization both found that conclusions were made which were not supported by data[7]. This is obvious in several locations, but notably in their analysis of communication between shallow and deeper groundwater in the recharge zone of LS1 and inferences of 49
hydrgeological pathways in the aquifer draining to LS1, analysis based on data which was obviously in error, and an overall report emphasis on selective restatement of historical data to support claims for lack of quarry impacts.

ii. DGS tour of the karst of Bonny Doon. Though it has previously shown obvious signs of being a subterranean stream reach (even in the winter months), on the recent tour the Reggiardo sinking stream (SS-1), this stream reach showed no evidence of being a sinking stream. This is especially unusual in a critically dry year, such as the one we're currently enduring – especially one in which significant 50
bedload (which might have plugged a karst feature which creates the sinking reach) did not move (as there were no storms in WY 07 which were of a magnitude necessary to move substantial bedload).

iii. SP30 is cited as producing 100 gpm (PELA 2005, etc.). Recent field reconnaissance performed by City staff did not reveal any spring which contributes such accretion to Laguna Creek anywhere in the reach of Laguna Creek between Ice Cream Grade and Smith Grade. Though we are currently in a "critically dry" water year, true "spring" flows do not respond to one year of dry weather by drying up as 51
surface water does. If a spring with flow of this magnitude exists, it would have likely been observed by City staff. Clarification of this issue and other spring characterization would be helpful in interpreting the DEIR and impacts analysis.

iv. Several seeps and reaches of gaining and losing flow have been observed by City staff in the reach of Laguna Creek between Ice Cream Grade and Smith Grade, including the persistently sinking stream reach at Ice Creek Grade (known as LS-1 in PELA 2005, etc., but not to be confused with Liddell Spring #1 – which, again, is referred to as LS1 in this letter) that is on City watershed property. LS-1 aside, these stream reaches are natural deposition zones (though may be influenced by 52
anthropogenic influences such as mine tailings and road building-related landslides, etc.) which are preceeded and followed by steeper, more confined channels. It is not unlikely that flow which is going subterranean in the lower gradient reaches is not entering karst features, but is merely percolating through the bed until it builds

[6] See NZA 2007 (DEIR Appendix F) for discussion.

[7] See DEIR Appendix F, 8/15/05 letter in Appendix A.

up head or encounters different substrate (i.e. bedrock) that is present in the steeper stream reaches upstream and downstream of the mapped sinking stream reaches.

Tracer tests didn't establish a breakthough curve for tracer detected at LS1 from Laguna Creek, nor does the hydrology at the City's Upper Laguna Creek stream gage (ULC) give any evidence that there is a strong hydrologic connection between the upper Laguna watershed. Given that more flow appears downstream of the sinking reach on Laguna Creek where it reappears, it seems unlikely that substantial amounts of water are being lost underground to LS1 in the sinking reach of Laguna below Smith Grade. The DEIR's focus on the connectivity between Laguna and LS1 begs the question of a water balance for both watersheds, not to mention the larger area of karst has yet to be investigated on Ben Lomond Mountain. Furthermore, the focus on the Laguna and Reggiardo watersheds is interesting, but really does not address the fact that the immediate impact to water resources at LS1 is obviously quarry activities. 52

v. There is a dye bag currently still in situ at CR-4 (Reggiardo/Laguna Creek confluence), though the May 2005 PELA report says that dye bags were put out and replaced weekly. Given that a bag must be retrieved to gather the tracer data, it is perplexing why this one was left behind – especially as Cemex hydrogeologists claim that Laguna is so closely connected to LS1. 53

vi. Mis-mapping of karst features identified in the various hydrogeologic analyses includes the following:

   a. Both LS1 and LS2 have been mapped in different locations in the various documents.

   b. Spring 13 was mis-mapped in PELA 2005, as detailed in memo from CGS (Huyette 2006). 54

   c. Though generally in the same vicinity and same size, previous PELA reports and several figures in the DEIR have drawn the expansion area differently.

   d. Sinking stream reaches identified along Laguna Creek in Figure 24, etc. do not correspond with City staff observations.

vii. Lack of analysis of potential for "noise" of poorly functioning septics to interfere with tracer results. Often optical brighteners are associated with septic-influenced groundwater (US EPA 2000). This could be expected especially in karst systems where travel time to ground water maybe relatively rapid, with little soil adsorption of such brighteners. In the DEIR (and PELA even moreso during the DEIR review process, though with the aid of analysis conducted outside the DEIR process) have theorized that septics are the primary source of nitrate at Liddell Spring. This raises the question of the potential for septic – related brighteners to have influenced the results of the tracer study. This is discussed further under the nitrate section (below). 55

viii. Lack of detail in hydrogeologic analysis of the actual expansion area.

a. As mentioned by others, there is a lack of detail in the analysis of groundwater data in the expansion area – primarily because there is very little groundwater data available. It is perplexing why more groundwater data has not been collected in this area, given that this issue was raised by several parties as early as 2002[8]. 56

Under the 1964 agreement and existing use permit, monthly groundwater monitoring is required for various parameters, including depth to groundwater. However, recent groundwater characterization work in the expansion area was limited to several wells around the expansion area which were monitored only twice during a relatively dry year. The aquifer in this area is dynamic and groundwater elevations may change rapidly and substantially during severe wet winters. 57

This has been discussed in detail previously by NZA, Balance and the City. Even Cemex has made note of the relative detriment of intercepting groundwater is on their operations. At the August 11, 2007 meeting of the DGS, PELA representatives (PELA 2007a) told the group repeatedly how often they intercept groundwater in their quarrying elsewhere and how problematic it is. Given that fact, as well as how detrimental it will be to the LS1 beneficial uses, proceeding in certifying an FEIR without more detailed groundwater elevation data in the expansion area seems unwise, as impacts analysis really can not be conducted without that information. 58

b. Perhaps most importantly (and in stark contrast to the analyses of background hydrogeology and existing impacts), there is virtually no analysis of the potential for the adequacy of the mitigations proposed. This is far from a routine environmental impact analysis, and simply including "BMPs" (or the equivalent) is not sufficient to provide confidence that mitigations are adequate. 59

viii. Lack of detail in the general hydrogeologic analysis.

a. Given the potential for the quarry to affect discharge quantity and quality of many springs in the vicinity of the LS1, the relative lack of data leaves many impacts-analysis questions unanswered. Specifically, it appears that LS2 provides the primary source of instream flow in E. Liddell Creek above the W. branch during most of the year (Berry personal observation). Among other things, the relative contribution of flow from LS2 to the anadromous reach of Liddell Creek has not been well characterized, and production-related diversion impacts, as well as turbidity/sediment discharge-related impacts from springs other than the limited analysis performed for LS1 have not been assessed. 60

[8] City EIR scoping letter, etc.

b. There is an incomplete characterization of aquifer/recharge area of Liddell Spring and adjacent springs, including a lack of review of karst features at similar elevations on the far side of the Ben Lomond Mountain surface topographic peak elevation. This information was provided to Cemex in August, 2005, along with other locations of karst features which had not previously been identified by PELA, and is also discussed by Balance Hydrologics in Appendix B of this letter. 61

c. NZA mischaracterize the City's historic data collection at LS1. The City's biweekly water quality monitoring is conducted regardless of whether the source is in production or not. Therefore, as the City pointed out in its August 2005 letter to Cemex[9], the historic biweekly data is very useful at describing baseline turbidity during periods which are uninfluenced by rain events. Obviously this data is not as useful for describing turbidity dynamics during rainfall events as continous data is – which was the primary motivation for improving monitoring in 1997 and subsequent years. 62

Also, the DEIR repeatedly makes reference to "hourly" turbidity data. We can only assume that is a reference to a previous PELA memo (which does not appear to be referenced in the DEIR) which compiled City turbidity data from LS1. The City has never collected hourly turbidity data. If hourly turbidity data has been collected, it should be made a part of the public record. The City commented on the inappropriate use of hourly data in its August 2005 letter to Cemex (which the County was copied on). Please, again, see Appendix A for more detail.

B. Nitrate

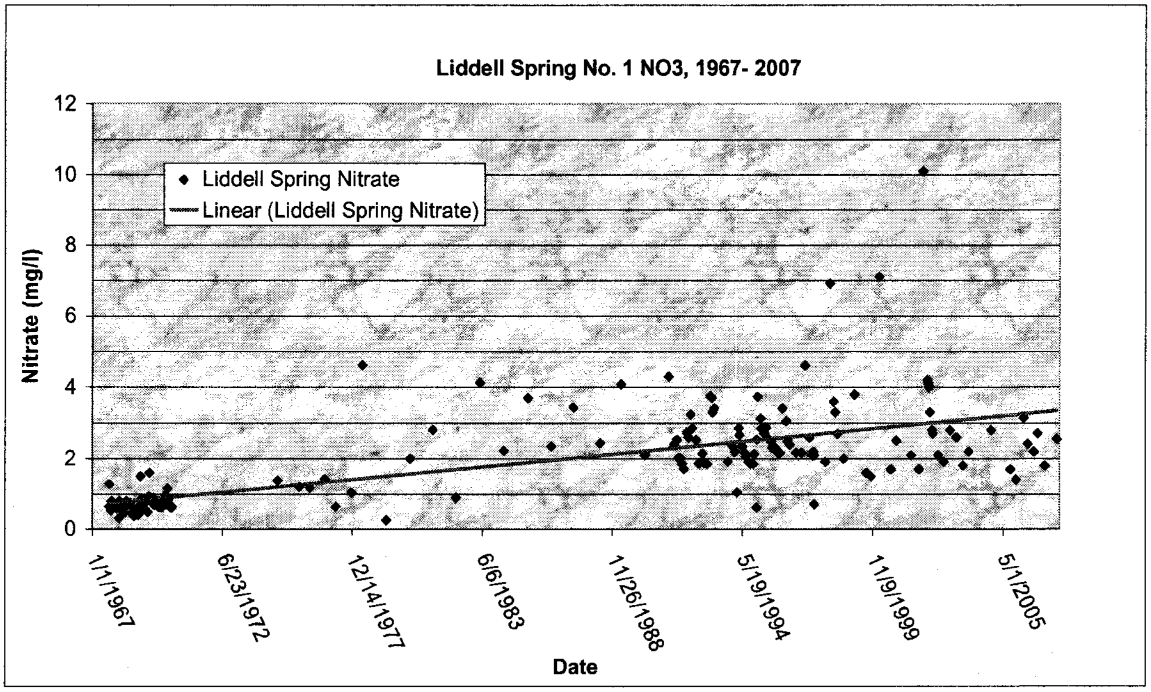
The nitrate spikes at Liddell Spring are unusual in magnitude and increasing trend. Furthermore, the noise of septics (if they are the source of such nitrate, as proposed recently by PELA) incurred on tracer studies calls into question the results of the tracer studies. 63

PELA recently made a presentation to the City that pointed to the increase in onsite wastewater disposal systems in Bonny Doon as the primary source of nitrate. Unlike other Bonny Doon watersheds however, Liddell Spring shows nitrate levels which are highly variable. Also the nitrate at Liddell Spring is higher than other nearby watersheds, and sometimes higher than levels recorded in the San Lorenzo River – which is notable in that the San Lorenzo is characterized by having the highest septic system density in the State of California and is a Clean Water Act Section 303(d) "TMDL" watershed for nitrate. The pattern and magnitude of nitrate levels at Liddell Spring suggest a discrete, nearby source – which would be unlikely to be a septic system, and is more likely related to quarry activities. 64

[9] Again, see Appendix A.

The City notified Cemex of this issue in our August 2005 comment letter on the PELA hydrogeologic characterization (PELA 2005), and has only recently become aware of any new analysis regarding potential sources for the nitrate (and that is analysis which was not included in the DEIR and not reviewed by the hydrologists working for the CEQA team). Beyond the DEIR's stark lack of information on nitrate, it is perplexing why, given the several years of notice of this problem, there has not been more work conducted to characterize this issue. 65

The DEIR is incorrect when it states that there has been no increase in nitrate at Liddell Spring. In fact, our data (below) do show an increase in nitrate levels during the last few decades of quarry operation – with an appreciable increase during the last 10 years. 66



The DEIR is correct in stating that there is insufficient evidence that quarry expansion will increase nitrate levels at Liddell Spring – primarily because *no work has been done to characterize this issue for the DEIR.* Given that we've already see obvious changes in the pattern and magnitude of nitrate variations since the onset of quarry activities, it seems a likely conclusion that increased quarry activity upgradient of LS1 <u>will</u> result in more nitrate impacts. Without analysis proving otherwise, the City can only view this as a significant unavoidable impact which has had no mitigation proposed. 67

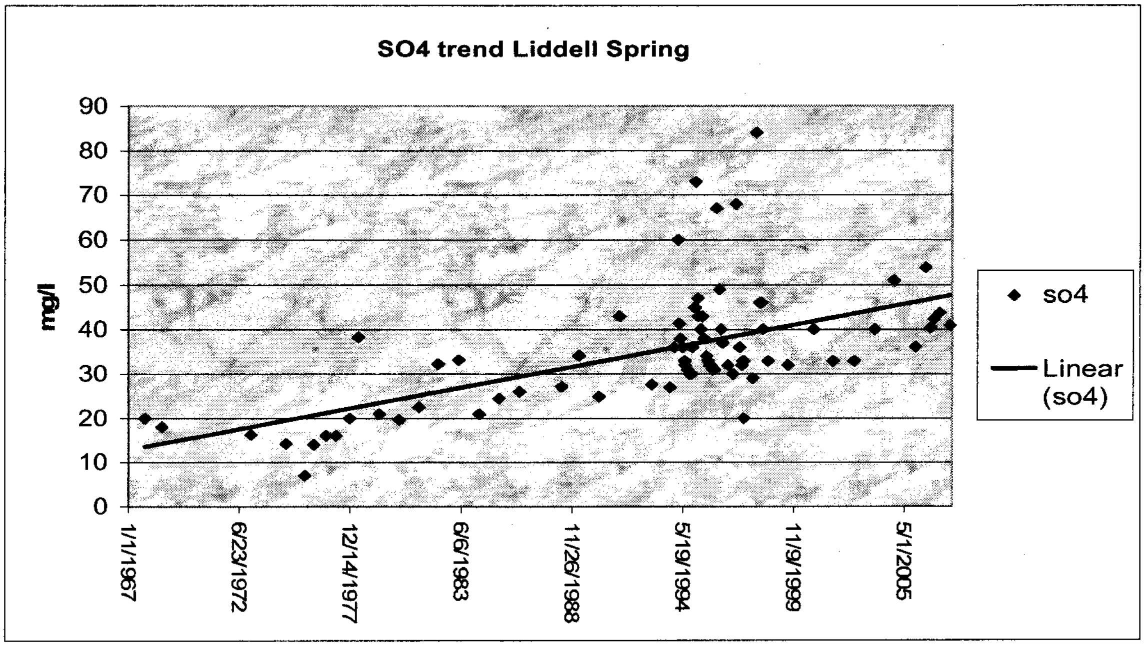
C. Other water quality

i. There are other water quality parameters which may be influenced by quarry operations which not been discussed in the DEIR.

Among these are sulfate. Elevated sulfate levels in downstream receiving waters are a common impact of mining (Peplow and Edmunds 1999) and levels are obviously climbing in LS1 since the onset of quarry activities. Sulfate,- at the levels shown in the figure below, does not cause detrimental health effects in humans, however elevated sulfate is often associated with elevated dissolved metals concentration – which are obviously harmful to both aquatic biota and human health. 68

Evidence of elevated iron-reducing bacteria presence is also obvious below the settlement ponds 3 and 4 in the tributaries that drain immediately to Liddell Creek (Berry personal observation 2004, etc. Iron oxide, by itself, is known to reduce the diversity and density of aquatic macroinvertebrates. (Young 2003, Fish 1999) and may have some direct toxicity to fish and amphibians (i.e. resident rainbow trout and California red-legged frog) which are likely present immediately downstream of the settlement ponds. Futhermore, elevated iron levels are further evidence of the dissolved metal issue described above. 69

It is our recommendation that the FEIR include a more comprehensive analysis of these water quality issues related to current and proposed quarry operations.



ii. The DEIR fails to address water quality degradation and polluted discharges from other springs to Liddell Creek that result from quarry activities. The Hydrology section discusses briefly that LS2 turbidity does not seem to track well with hydrograph peaks, though that it is generally more turbid in the winter time. Given what we've learned about the hydrogeology of this area in recent years, it can be expected that quarrying impacts on water quality are present not only at LS1, but 70 are likely present through the karst system influenced by quarry activities. More thorough analysis of this issue should be included in the FEIR. 70

5) Biotic

The analysis on fisheries impacts is very limited. Furthermore it is out of date, for two reasons:

A. Steelhead have been listed as "threatened" under the federal Endangered Species Act (FESA) since the time of the last quarry permit process, and thereby warrant a greater level of impacts analysis than occurred with the original permit process. For example, an analysis of water diversion rate on steelhead passage, spawning and rearing may be appropriate, given the increased regulatory requirements of FESA listing. 71

B. More recent information collected since the previous quarry EIR was conducted indicates that the information provided in the current DEIR is not entirely correct. The Coast Dairies Existing Conditions Report (ESA 2003), as well as draft City of Santa Cruz HCP-related field studies, have shown that one of the primary limiting factors in Liddell Creek is the extreme sedimentation that is present there. Contrary to McGinnis findings, x-ray diffraction and related analysis of sediment in LS1 indicate that this sediment may be of quarry origin (Chartrand 2007, etc.). 72

   Beyond the ongoing mobilization of sediment through the various springs (which are tributary to Liddell Creek) through various quarry processes, quarry settlement ponds may also deliver sediment to the creek. There has been a history of levee failure[10], and lack of settling efficiency in ponds (ESA 2003). While GEO-1 proposes to improve this situation, the fact that these have been known to be problematic for at least 16 years (Golder 1991) and (apparently) no improvements have been made is a point of concern. 73

   Sediment discussion aside, NZA, the City, and even Cemex[11] clearly state that turbidity discharge to Liddell Creek is elevated as a result of quarry activities. While this is obviously an issue of Porter-Cologne Water Quality Control Act and Clean Water Act compliance, there are also known turbidity effects on anadromous fish and hence, ESA compliance implications associated with this phenomenon. Numerous researchers have found that chronic turbidity, even at low levels can have serious deleterious effects on anadromous fish (Newcombe 2003, Rosetta 2004, Trush 2005, etc.). As described above in the water quality discussion, there may be other water quality effects on aquatic biota that have not been assessed either. The DEIR needs to address the full range of potential impacts on anadromous fisheries (and other aquatic biota for that matter), and provide appropriate mitigation with enough detail to ensure that "take" of endangered species does not occur as a result of the quarry operations. 74

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[10] For example, during the week of February 26 to March 2, 2001 the lower of the two ponds failed and sediment discharge from the ponds covered the creek bed downstream (ESA 2003)

[11] Cemex letter to the City of Santa Cruz 9/18/06 which states: "Since Cemex agrees that its quarrying activities do impact water quality at Liddell Spring, and the only issue of contention between Cemex and SCWD is the extent of the impact…"

C. As discussed in the hydrology comments above, LS2 may provide the majority of baseflow in Liddell Creek above the west branch during much of the year, and certainly in drought years. The effects of the quarry's diversions on anadromous fisheries and other aquatic biota are largely unknown, though NOAA's EIR scoping letter recommeneded that this analysis be conducted. Though wetted-usable-area (WUA) is thought to be less limiting in Liddell Creek than habitat degraded by excess sedimentation, impacts of the quarry's diversions should be more thoroughly addressed in the FEIR, as there is potential for impact on these resources as well as the City's conservation strategy for the North Coast HCP planning area which could result from ongoing diversions at LS2. 75

D. During recent surveys, W. Branch Liddell Creek had the high numbers of the critically important "1+ " and "2+" steelhead (Bean, Berry, Finstad and Henkel 2007), though habitat was severely degraded by high sedimentation. While the stream appears to have naturally high sedimentation rates, it also appears to be experiencing downcutting (and subsequent wasting of streambanks) due to increased runoff rates, excess bedload filling most pools and embedding riffles, and related imbalances that are likely due to upper watershed processes. As the quarry infrastructure which is likely to play a role in these impacts (conveyor, road infrastructure, settlement ponds,etc.) will be utilized for the expansion, these issues should be more thoroughly addressed in the FEIR. 76

E. As stated in the CEQA - Cumulative Impacts discussion, the biotic analysis is also overly simplified in that it, in no way, analyzes the impacts on anadromous fisheries (or other aquatic species such as California red-legged frog) incurred by the City's loss of production at LS1. In a nutshell, the City is forced to rely on other water sources more heavily as a result of lost production at LS1. Obviously this triggers a host of other impacts throughout the City's supply system. Analysis of impacts incurred to aquatic species in other watersheds (where flow, rather than sedimentation, may be a more primary limiting factor) influenced by City of Santa Cruz operations changes incurred as a result of quarry activities, should be included in the FEIR. 77

In closing, the great value of LS1 to the City of Santa Cruz customers cannot be measured solely by the 8-10% of total supply that it provides annually. For example, in this critically dry year, even though overall north coast production is only 60% of normal, production from LS1 is essentially normal, making up 66% of the total. This attribute is not unique to this year, rather LS1 has historically been the only source to maintain near - normal production consistently during multi-year droughts. Historically, in wet weather LS1 has also been the only City water source in production, and consistently provided the bulk of production when other surface sources were too turbid to treat [12]. It is notable that City leaders had the foresight to be concerned about impacts on water resources at LS1 when quarry activity first started, as letters to the Sentinel[13], internal letters to City files, and the "1964 agreement" between PCA (and successors) and the City demonstrate. At this point we have incurred ongoing impacts to 78

[12] During the historic El Nino storm of January 1982, Liddell Spring was back in service within 35 hours after turnout; well within the 48 hour >2ntu turbidity limit described by the 1964 agreement, and well before other sources were able to be turned back into service.

[13] Water Commission Chair Daniel Meaney May 12, 1964 letter to Mayor Lezin, etc.

water resources at the Spring and are certain of only one thing; that current impacts will persist, if not worsen, with quarry expansion as described in the DEIR. 78

Thank you for accepting these comments. Please feel free to contact me at 420-5200 if you have any questions about these comments.

Sincerely,

Digitally signed by chris berry
DN: cn=chris berry, o, ou=water, email=cberry@ci.santa-cruz.ca.us, c=US
Date: 2007.09.28 16:09:18 -07'00'

for Bill Kocher

Attachments:
Appendix A: Chartrand 2005, Prior Recent Correspondence from City to Cemex.
Appendix B: Balance Hydrologics Review of DEIR.
Appendix C: City staff references

cc: DFG, NOAA, USFWS, RWQCB, WAC, Board of Supervisors, read file

Balance Hydrologics, Inc.

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September 11, 2007

Mr. Chris Berry
Water Resources Program Manager
Water Department, City of Santa Cruz
715 Graham Hill Road
Santa Cruz, California 95060

Dear Mr. Berry:

Thank you for the opportunity to review and comment upon the following documents related to the proposed Bonny Doon Limestone Quarry expansion.

- Bonny Doon Limestone Quarry, Boundary Expansion Project and Reclamation Plan Amendment, Draft Environmental Impact Report, TRA Environmental Sciences, July 2007 (DEIR).
- Geologic, Hydrologic, and Hydrogeologic Technical Appendix F of the Bonny Doon Limestone Quarry Draft Environmental Impact Report, Nolan Associates and Nicholas M. Johnson, February 13, 2007.

Per your request, we have reviewed these documents for technical merit and adequacy in identifying and addressing potential hydrologic and water quality impacts to Liddell Spring, the karst aquifer, and other receiving waters related to the proposed quarry expansion. Our review of Technical Appendix F suggests that it is a strong contribution to the local literature and sheds light on many previously unaddressed questions about the system. On the other hand, we believe that the DEIR could be substantially strengthened with specific respect to (1) the proposed hydrologic/water quality mitigation measures, and (2) development of an enhanced systems based analysis of potential impacts associated with the proposed quarry expansion. Specifically, we would highlight the following major points from our review of the DEIR: 79

1. The DEIR could be <u>substantially</u> strengthened with respect to potential water quality impacts at Liddell Spring as a result of future clearing and grubbing within the proposed expansion area. Previous water quality impacts associated with clearing and grubbing at the Bonny Doon Quarry in 1969 and 1970 seem to be firmly established (DEIR page 5-20, 5-30, and 5-35). Despite these findings, the DEIR does not provided adequate conceptual erosion control/clearing and grubbing plans for review by qualified professionals. Rather, the DEIR provides a written description on pages 5-35 and 5-36 of what these plans must address. While the written descriptions seem fairly complete, there are real questions about how these measures are to be implemented within a working quarry environment. For example, using movable plastic membranes throughout the quarry area will, in our opinion, be very difficult to implement effectively; secondly, by what means will runoff in disturbed areas be directed 80

away from sinkholes or otherwise obvious fractures? What if the slopes around these features are steeper than 1:1 (45 degrees) and bottomed on bedrock? We believe that the DEIR is <u>not specific enough</u> with respect to how this potentially significant impact to Liddell Spring water quality is to be mitigated and we believe that the present level of mitigation 80
described (HYD-1) will not necessarily result in a less than significant impact – we do believe however that a well developed and conceived erosion control/clearing and grubbing plan for the clearing and grubbing phase could offer the requisite level of protection and mitigation.

2. The DEIR could be substantially strengthened with respect to further considerations of mitigation measure HYD-2. Making and supporting a case to proceed with a project as described without necessary information to assess a potential impact is worrisome and sets a bad precedent for future proposed projects within the County of Santa Cruz. Mitigation measure HYD-2 (DEIR page 5-37) proposes to concurrently monitor groundwater conditions within the proposed quarry expansion area as mining occurs. The intent of the monitoring program would be to assess whether or not mining has occurred to within 20 feet of the local maximum ground water elevation(s), or if mining has uncovered a sizable vadose zone water body. We believe issues implicit in this situation could be resolved at the County level by possibly drafting new ordinance language which recognizes that karst aquifers are not well-described by ground-water conditions typical of local sedimentary aquifers (i.e. the 20 foot offset). As it is very unlikely that a new ordinance could play any role in the present project, 81
we would suggest that monitoring wells be drilled immediately in the proposed expansion area and those data collected prior to the commencement of mining be re-evaluated in relation to the proposed activity – this could be simply accomplished by making such actions a condition of the use permit. Alternatively, the County could permit the project to some depth higher than 750 feet (perhaps 850 feet) and assess groundwater conditions as the project proceeds and as data is collected. This type of permit condition would provide more protection for the vadose zone and provide for other review mechanisms in relation to the surprising apparent data gap. The apparent data gap in monitoring of groundwater conditions within the proposed expansion area begs the question of why has this data not been collected before now given that plans for the expansion have been in the works for some time?

Our full comments on the DEIR and Appendix F are provided below and have been organized according to the two separate documents and broken down within into general or global comments as well as specific comments. We have attached 15 figures and 1 table to this letter to add to, supplement, or 82
otherwise question points highlighted in Appendix F. We have also provided our own substantial citation list at the end of this letter which we believe is wither lacking from the DEIR and/or Appendix F.

Bonny Doon Quarry Proposed Expansion Draft EIR Comments.

<u>General Comments</u>

A regional perspective. Amongst the many pages, there is no mention of:

- The role that Liddell Spring plays in meeting the water-supply needs of Santa Cruz County,
and its special role in dry years and sustained droughts, as well as its importance in event that 83
the San Lorenzo watershed sources are temporarily lost to contamination or other closures.
Although the City operates the Liddell Spring diversion, the area served from Liddell Spring 84

extends well beyond the City limits to include most of the population between Santa Cruz and Capitola, as well as areas west and north of the City. Details are available on the City's website. 84

- Other springs in the Santa Cruz Mountains, and what might be learned from their attributes or management; among them are Skyline Quarry (Crystal Springs), Tunnel Spring (La Honda), or any number of springs in the Santa Margarita outcrop of central Santa Cruz County. There is only passing mention of Liddell Spring being one of the major springs of the Santa Cruz Mountains; in fact, it is by far the largest, and perhaps most constant in its yield, with little explanation of how the aquifer processes combine to make this the case. 85

- Despite the primacy of water supply in environmental and natural-resource planning in Santa Cruz County, the DEIR does not consider a major sustainable resource in the 'Energy and Natural Resources' chapter (9.0), nor the energy costs of alternative supplies or additional treatment associated with the project; without this information, it seems quite difficult to evaluate the discussion of impacts, alternatives, or potential mitigation and mitigation-monitoring measures, 86

- Similarly, the regional search for additional instream flows to protect aquatic habitat and sensitive species is a major ongoing change at the regional level. The quarry drains to Liddell Creek, a known salmonid and stream and CRLF corridor for which habitat-restoration activities – including design and construction of a fish ladder beneath Highway 1 – are now underway. 87

- Substantial investigation into many biological, hydrological, and cultural dynamics has been completed on the adjoining Trust for Public Lands' property. One of these is the Existing Conditions Report developed by ESA. It is a substantial document recently developed for lands within the same watershed that is not used in any of the named sections, nor does it appear in the bibliography. We believe that substantial work on adjoining properties on watershed issues should be included in the background and evaluative sections of the DEIR, and politely inquire why this was not done. 88

A systematic watershed perspective and analysis appears to be missing from the DEIR.

Watershed planning with watershed analysis is one of the cornerstones of public policy in the county. There is no systematic analysis of the effects of the project (and especially the reclamation plan) on flows: 89

- For dry, critically dry, normal and wet years at Liddell and Plant Springs, 90

- For design flows (such as the storm events with expected recurrences of 10 and 100 years) at key nodes in the hydrographic net downstream from the quarry floor, such that effects of releasing water to Pond 3 and thence to the Liddell Creek drainage network can be evaluated vis a vis retaining the water on the quarry floor, 91

Mr. Chris Berry
September 11, 2007
Page 4

- Integrated discussion of storm runoff and sediment sources and/or sediment transport on channel downstream from the quarry, such that effects on sedimentation and sediment transport of stormflow releases from the quarry might be evaluated, 92

- Considering which episodic events might affect the watershed, and how the proposed project might affect flows and sedimentation downstream; for example, replacing redwood forest with grassland and chaparral vegetation sharply increases the frequency of fire and of post-fire channel sedimentation and related water-quality constraints, 93

- Induced erosion (generally expressed as channel incision or bank retreat) associated with greater storm water peaks that might emanate from the quarry; our own work in the Arana Gulch watershed, a similar-sized catchment a few miles to the east, suggests that somewhat over half of the sediment entering the harbor derives from erosion of the channel downstream from where the storm-water hydrograph has been modified. Similar effects have been observed throughout the region, and are increasingly being regulated by the RWQCBs in the so-called C(3)(f) provisions of recent discharge permits, being phased in statewide. 94

A sense of consistency with other EIRs prepared by Santa Cruz County for hard rock quarries.

One way of evaluating potential gaps in this DEIR is by comparing it with CEQA documents developed for other hard-rock quarries in the region. Santa Cruz County completed the Felton Quarry EIR in 1978 – nearly 30 years ago. This EIR (Environ, 1978, p. 43 ff) contained provisions recognizing that:

- Mining of the rock means removal of aquifer material, resulting in less water emanating from the aquifer with perhaps less reliability,

- Removal of aquifer material leads to disproportionately greater effects during dry years,

- Measures to provide compensatory water or good quality to downstream users was both merited and feasible, 95

- The potential effects of removing aquifer materials on the water supplies of downgradient water districts merits continuous monitoring,

- Known and potential water-quality effects must also be monitored,

- While all of this quarry was topographically in one watershed, the possibility that it might affect adjoining watersheds warranted monitoring flows and water quality in the adjoining watersheds.

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It seems to us that each of these conditions applies in some degree to the proposed project. While no
two projects are the same, these impacts and corresponding mitigation or mitigation-monitoring 96
measures might be considered for inclusion in the Final EIR.

A critical look at prior data used for this DEIR.

The only substantive discussion we could find of sediment originating from the quarry and its potential effects on salmonids downstream of the quarry is a paragraph in section 6.1.3.3, which reads:

> *"McGinnis (County of Santa Cruz, 1996a&b) sampled sediments in the settlement basin and in*
> *the creek downstream of the basins and tested them for content of limestone and granite with the*
> *purpose of determining whether the quarry was contributing most of the sedimentation to Liddell* 97
> *Creek. The results were that the settlement basins were capturing most of the sediment and that*
> *the quarry was contributing a small amount to the downstream watershed. The embeddednesss*
> *in Liddell Creek was attributed mainly to natural erosion and weathering in the watershed, as*
> *opposed to surface runoff from quarry operations." [p. 6-10]*

Several of the mitigation measures or alternatives can affect the rate and volume of releases to the stream system downstream from the quarry. It appears, though, that no independent work on sediment and its effects on Liddell Creek downstream of the project has yet been conducted for this DEIR. This is important because:

- It does not address downstream effects of the quarry operation on flows consistent with the
  regional literature on induced ('hydromodification' or 'hydrograph-modified') sedimentation, 98
  and
- Unfortunately, there is no record that Sam McGinnis, a biology professor, is or has ever been
  a registered geologist in California. Yet it appears that he reached a conclusion on
  mineralogic determination of sediment sources that seems to require geologic licensing in
  California. We were wondering if reliance of the DEIR on this quotation might possibly
  compromise the defensibility of the DEIR. Or, if perhaps TRA might be able to locate other,
  properly credentialed and accredited assessments, would that not help strengthen the 99
  document? Unfortunately, it is not feasible within the limited time available to locate and
  check the original documents to assess what was done, or to evaluate whether the cited work
  conforms to prior standards of care for mineralogical assessment in Santa Cruz County. We
  do note, though, that all other geologic and hydrogeologic work in Appendix F is not only
  carefully done and documented, but is also clearly performed by registered professionals.

Our search indicates a prior history of breaches and spills, and data which may conflict with the
McGinnis finding. For example, Creegan and D'Angelo Consulting Engineers (1984, Table 18)
sampled the stream emanating from Liddell Spring as well as others in the Liddell watershed. The
sampling was conducted on June 10, 1982, approximately 60 days following the last runoff- 100
generating rainfall of the season. They reported turbidities of 840 NTUs below Liddell Spring, while
other streams in the watershed – including East Branch Liddell – had readings of 2.5 to 3.5 NTUs on
that date.

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Specific Comments

1. Page 5-1, 3rd paragraph – Geologic/Hydrologic Study Area

The "geologic/hydrologic study area" (hereafter, G/HSA) defined in the DEIR is helpful in some respects and misleading in others. It has arbitrary boundaries, defined by roads, that have little to do with hydrology. While it may be useful for limited purposes such as estimating recharge or illustrating concepts, it has no basis in the watershed sciences. Its use is inconsistent within the document. 101

- The rationale for the G/HSA is that "surface water and ground water originate beyond the boundaries of the quarry property and flow through the quarry to areas downstream, it has been necessary to study a large area around the quarry. ". Yet the downstream limit of the G/HSA is Liddell Spring, neglecting the remainder of the watershed and the aquifer system(s) extending to the coast – and probably beyond. The G/HSA simply excludes many areas, significant hydrologic elements and impacts, and makes it harder to realize some of the potentially beneficial hydrologic aspects of the project. 102
- The G/HAS discourages analysis of potential effects on Mill and San Vicente Creeks, despite including a substantial area within their topographic watershed. In fact, the County has made protection of aquatic habitat (especially the coho run) a high priority. This is documented in a 2002 proposed Board of Supervisors' resolution, and the present proposal to restore the San Vicente ponds funded through under the IWRP in which the County is participating). Subsurface conditions north of the quarry are clearly conducive to flow toward Mill Creek, and a small change in gradient or water levels could alter the direction of flow from a substantial area north of the quarry away from or towards Mill Creek. Similarly, a small change could alter the direction toward which a substantial volume of recharge flows, either toward or from Mill Creek. Yet there is no mention of these processes or their potential effects on water use, water quality or sensitive species of the Mill/San Vicente system in the EIR. there is no focused mention, let alone assessment of potential effects on coho, or of CRLF or other beneficial uses in the San Vicente watershed. (see California SWRCB, Jan 31, 2003 notice). 103
- This G/HSA ignores the remainder of the karst complex of the general Bonny Doon area, which also includes substantial areas in the Mill Creek, San Vicente Creek, and portions of the San Lorenzo watershed. The Bonny Doon karst complex also includes linked and large sinkholes southeast of Laguna Creek, in areas mapped as Lompico formation. The complex is likely interlinked in complicated ways. Changes in flows in one area can result in changes in flows in the adjoining watersheds. Effects can be much more extensive than the limited area from which individual molecules of water flow toward Liddell or Plant Springs – which is the important but limited information that a dye study delineates. 104
- The EIR needs to make it very clear that not all areas within the arbitrarily designated study area necessarily drain (above or below ground) toward the proposed project, and that substantial areas beyond the study area likely contribute to Liddell and Plant Springs, directly[1] or indirectly. It might be worth noting that the inferred contributing area identified by the applicant's consultants expanded substantially during the course of the investigations, and that their most recent findings 105

[1] Such as the eastern half of the Laguna watershed, which is specifically cited as being a direct contributor to flow beneath the quarry property.

identify direct contributions from beyond the G/HSA. The indirect effects on contributing area are even more widespread. It would be an unfortunate and very incorrect legacy if watershed management or 'watershed sanitary survey' programs were regulated under the assumption that the County designates this area as the Liddell Spring watershed. We suggest the term 'core area for G/H study' rather than G/HSA. 105

2. Page 5-35 to 5-37 , Mitigation Measure HYD-1

In addition to our comments provided on page 1 and 2 of this letter with respect to mitigation measure HYD-1, we offer the following comment related to structural loading of the karst beneath the quarry pit. One aspect of the problem which is not addressed by the DEIR includes the possible affect of surcharging the quarry pit with spoils to 15 foot depths and further loading due to ponding of water on the pit floor to at least several feet of additional depth. Given that the finished floor elevation of the quarry pit could be relatively close to the phreatic zone, and that the karst beneath quarry pit has a history of applied stress through routine quarry activities, what is, if any, the possible affect of these actions on shifting or settlement within the karst and temporarily affecting drainage to Liddell Spring? It could be that this potential impact is small relative to the others identified but it should be considered. 106

3. Page 5-37 to 5-38 , Mitigation Measure HYD-2

We would re-iterate point 2 highlighted on page 2 of this letter made with respect to mitigation measure HYD-2. 107

4. Alternative Mitigation Measure and a Proposed Mitigation Monitoring Element

There is at least one additional mitigation measure which should be considered with regards to hydrology and water quality and one element to consider for inclusion into the mitigation monitoring plan for the project. These include: 108

- Alternative Winter Blasting Schedule: We are certainly cognizant of the difficulties in work flow related to possibly altering blasting activities with relation to climatic conditions. Despite the apparent operational hurdles, it may be worthwhile to explore the notion of a adaptive blasting schedule for wet or prolonged wet periods when it is likely that potential water quality impacts could be elevated. We note that recent data related to this might suggest that there is no clear pattern in the magnitude of water quality impact associated with blasting during the winter months and wet periods, but there have been instances when blasting during wet periods has resulted in significant turbidity responses. Therefore, would it be at all feasible to adapt blasting schedules during very wet periods when blasting could compound turbidity responses at Liddell Spring? PELA (2007) has previously reported that blasting related impacts to Liddell Spring water quality will of course be compounded or elevated during wet conditions. Wet periods or conditions could easily be defined based on the antecedent precipitation index as discussed in citation 7 provided at the end of this letter. 109

- Coordinated Mitigation Monitoring at Liddell Spring during the Clearing and Grubbing Phase of the Expansion: An additional measure might include coordinated monitoring at Liddell 110

Spring during periods of overburden removal and during at least the first several significant rainstorms of the year(s) following the clearing and grubbing process. It seems to us that potential water quality impacts associated with clearing and grubbing will be very difficult to mitigate and in the end may need to be addressed by some other mitigation related mechanism. 110

Bonny Doon Quarry Proposed Expansion Draft EIR Technical Appendix F Comments.

General Comments

Technical Appendix F is a great addition to the local hydrologic literature and adds greatly to our understanding and conceptualization of the Liddell Spring aquifer system. While we have provided numerous comments outlined below, it is our opinion that the report does not contain serious flaws or technical omissions that would otherwise require substantial rethinking or additional substantial analysis. We believe our comments will close some of the gaps highlighted in the report and should provide additional support and evidence for some of the major questions addressed by the report. 111

Prior to providing specific comments we would like to point out that Appendix F, in many cases, is either missing citations or has provided slightly misleading citations. While this point is minor in nature it does suggest that perhaps the authors were not provided all of the recent materials developed in relation to Liddell Spring - if this is the case if does not have appeared to have hampered the authors abilities to develop a fairly robust technical report. Regardless of whether this is the case or not, for documentation purposes we have provided proper citation information where needed for future uses and users of the information. 112

Specific Comments

A. Page 2, Section 1.3, Discussion of available data for hydrogeologic review

While we recognize that the authors reviewed tremendous volumes of material in support of their analysis and reporting, we find that many of the references to available data within Table 1 are not fully correct and thus provide the following specific references of Balance work at Liddell Spring and other local systems to more fully document existing literature. It should be noted that careful review of the below referenced work will reveal that data gaps in any records are clearly identified in those reports. Table 1 in many cases misrepresents existing data through incorrect data period citations: 113

- Liddell Spring: Balance has monitored Liddell Spring since WY[2]2001 at varying levels of scope for the quarry operator, the County of Santa Cruz and more recently solely for the City of Santa Cruz. For WY2001-2003 and partial WY2004, we documented roughly monthly and storm conditions of Liddell Spring primarily with respect to water quality. Since mid-year WY2004 we have more formally monitored Liddell Spring through the use of telemetered monitoring equipment and also have continued monthly and storm monitoring visits. We are presently in the process of finalizing WY2005 and WY2006 data reports for Liddell Spring. Monitoring is presently conducted on behalf of the City 114

[2] WY represents water year which is defined as the period of October 1st through September 30th of the following year. For example, WY2006 covers the period October 1, 2005 through September 30, 2006.

of Santa Cruz Water Department. See citations 1 through 8 at the end of this letter for a list of Balance work developed for Liddell Spring. 114

- Liddell Creek: Balance installed the East Branch Liddell Creek gage during WY2001 and installed the Anadromous Liddell gage during WY2004. We have maintained and operated the East Branch Liddell gage since WY2001 for the City of Santa Cruz and maintained and operated the Anadromous Liddell gage for WY2004 only – since then the City has taken over gage operation responsibilities for Anadromous Liddell. We have completed six (6) water year data reports for the East Branch Liddell station and completed one water year data report for Anadromous Liddell. See citations 1 through 5 and 9 through 10 at the end of this letter for a list of Balance work developed for Liddell Creek. 115
- Laguna Creek: Balance installed the presently active Laguna surface water gaging stations (Upper, Lower and Anadromous stations) in WY2003 and have maintained and operated the gages for the City since that time. We have completed three water year data reports for the Laguna Gages since WY2003 and monitoring presently continues at all three gaging stations. See citations 11 through 13 at the end of this letter for a list of Balance work developed for Laguna Creek. 116
- Majors Creek: Balance installed the presently active Majors surface water gaging stations (Upper, Lower, and Anadromous stations) in WY2004 and maintained and operated the gages for that water year only. Starting in WY2005, the City took over responsibility for maintaining and operating the Majors Creek gages. See citation 14 at the end of this letter. 117
- X-ray diffraction: Balance has also collected and previously reported x-ray diffraction results for suspended sediment collected at Liddell Spring during WY2002 and WY2005. The WY2002 data is reported within citation 1 provided at the end of this letter and the WY2005 data is reported within citation 7. Please also see comment Q provided below. 118

B. Page 8, 1st paragraph

"A sustained yield of 50 gpm or more would suggest that this zone is part of the "marble aquifer…"

The findings of Appendix F, among other evidence, suggests that water moves downward thru the vadose and perched-water zones in the marble to Liddell Spring, generally but not exclusively through one or more continuous saturated zones. The concept of a 'water table' in this system is questionable; using such criteria to consider whether the spring is protected is misleading, as is the notion that conforming with state- or county-wide regulations intended for many different geologic settings is equivalent to protection of a unique water body. Appendix F and other recent technical documents have fundamentally changed the understanding of how water, sediment and contaminants may move through this system. The DEIR should make a finding whether the 20-foot separation from high water table is appropriate or sufficient in this setting, based on what is now known about it, to minimize water quality risks. If new criteria are warranted, then it should be proposed. One suitable measure for resolving disparities between the ordinance – written based on superseded information – and what should be done at this site would be recommended changes in the ordinance, perhaps specific to karstic settings. 119

C. Page 24, 2nd paragraph

"The hydrologic studies at the site indicate that eh landslide mass is trapping water…"

The discussion of previous investigators conclusions/findings lacks a citation. Pacific Geotechnical Engineering and others, 2002, suggests something similar to that stated by the authors. A more accurate representation of these specific previous findings would include the conclusion that groundwater in the landslide is likely sourced from shallow groundwater moving downward from the slope north of the landslide and also from groundwater moving out of fractures in the marble and into the landslide debris. Based on the mapped fault at the base of the landslide, it was concluded that it is very likely that groundwater, and sediment transported through the landslide debris could discharge to (1) Liddell Spring, as well as (2) at the base of the landslide - as is evidenced by the occurrence of a very well developed seasonal seep located there. 120

D. Page 25-26, last and first paragraphs respectively

"PELA (May 2005) described the local karst system as including two semi-distinct…"

We agree with the conceptualization of hydrologic connection between the vadose and phreatic zones of the local marble aquifer. Starting in WY2001 with monitoring conducted at the Liddell Spring landslide, we have documented consistent specific conductance spikes in response to storm events for both groundwater in the Liddell Spring landslide as well as discharge from Liddell Spring. The spikes suggest that more mineralized water is transported through and to these features during and in response to head changes in the aquifer associated with the storms. Perhaps the most appropriate citation to support this line of reasoning is that of Toran and others, 2005 (citation 15 at the end of this letter). Based on the documented specific conductance responses, we have concluded in part that vadose zone water could be responsible for the specific conductance spikes. Other mechanisms might include sections of the near phreatic zone which store groundwater annually but which require threshold local head gradients to mobilize the groundwater. Groundwater which is not in active transport to the spring at all times yet which resides in marble would logically become increasingly mineralized with more time spent in the marble. The attached **Figures 1** through **3** provide some data to support these claims. 121

E. Section 2.8, Pages 24-26

Although consistent with the last paragraph of the Karst Processes section, it would be helpful to mention that karst extends well beyond the areas considered into (1) the outcrop of Lompico sandstone south of Smith Grade, where multiple large sinkholes are developed in sandstone members with calcareous cementation and westward beyond Mill and San Vicente Creek (c.f., Weber, 2004). Portions of these areas lie below 750 or 800 feet in elevation and could potentially be affected by conditions within the general quarry area. 122

F. Page 27, 2nd paragraph

"Annual data are typically expressed in water years. For example, water year (WY) 2006..." 123

Typo: (WY) 2006 should read (WY) 2005.

G. Page 31, 1st paragraph

"...the anomalous water-level drop on February 23..." 124

At the bottom of page 30 the authors cited February 24th as coinciding with the anomalous water drop. Figure 11 of Appendix F suggests the drop occurred on the 23rd.

H. Page 31, mid-way through 2nd paragraph

"...; furthermore, the pond and streamflow hydrographs were of generally similar shape,..."

The springflow hydrographs as presented in the Technical Appendix are inaccurate, as the authors allude to on page 34 (2nd paragraph). An algorithm is needed to compute Liddell Spring flows including a complete record of corresponding flow for the East Branch of Liddell Creek, and ideally a complete record of City maintenance activities for their diversion at Liddell Spring and their North Coast diversion pipeline. Additionally, it is important to conduct field visits to document overflow from the springbox at the head of the East Branch tributary. The authors discuss two of these three informational items on page 34 (2nd paragraph). We have developed one possible Liddell Spring flow algorithm in the process of completing water year data reports for Liddell Spring for the years 2005 and 2006. **Figure 4** of this letter illustrates the computed WY2005-2006 Liddell Spring flow record. The dissimilarity of the springflow record to that of the turbidity and cited streamflow record may be cleared up by utilizing the attached computed springflow records. The Liddell Spring flow algorithm is provided as **Figure 5** to this letter and is reported within citation 7 noted at the end of this letter. 125

I. Page 33, 1st paragraph

"The City of Santa Cruz resumed gaging of Laguna and Majors creeks in 2003." 126

See comment A above for a full listing of citations related to the City of Santa Cruz gaging program.

J. Page 34, 2nd paragraph

"A corrected record of total springflow should be possible using detailed diversion and maintenance..." 127

See comment E provided above.

K. Page 38, last paragraph

"This assertion cannot be tested given that hourly turbidity data have only been collected since 1997."

It is unclear which turbidity data you are referring to in this statement. Since at least mid-year 2004, turbidity has been collected at the 15-minute interval. This statement unfortunately greatly misrepresents monitoring efforts at Liddell Spring. 128

L. Page 48, last paragraph

"Based on an estimated average saturated thickness of 40 ft and an assumed average specific yield of 16 percent..."

The stated average specific yield value of 16 percent seems low compared to conventional values. How was this value determined? No citation or reasoning is provided. 129

M. Page 50, 4th full paragraph

"PELA (May 2005) estimated sinking-stream capacities between 0.5 and 1.0 cfs..."

A combined annualized flow of roughly 1000 acre-feet of water per year for both sinking sections of Reggiardo and Laguna creeks would be more equivalent to an average annual flow sinking rate of 1.3 to 1.4 cubic feet per second. It is unclear how 1000 acre-feet of water was arrived at from flows in the range of 0.5 to 1.0 cubic feet per second? 130

N. Page 51, 1st full paragraph

"These attributes suggest that streamflow captured by the swallow holes flows to the springs..."

The tendency, as stated by the authors, for karst systems to cut down to near base level is attributed by the authors as resulting from the process of karst systems to minimize flow energy through a reduction in average slope of the highly conductive groundwater features (i.e. conduits or solution-widened fractures, etc.). This hypothesis seems to miss geochemical aspects of the marble as well as the geologic history component of the region. Limestone and marble are highly soluble rock types. Solubility of the rock around the margins of conduits could easily explain the notion that the relatively deep zones of the karst system have cut down to near base level due to dissolution along those conduits for many of thousands of years. Additionally, downcutting likely slows down greatly in response to reaching near-base level elevations of the system in order to continue to provide drainage for the system. Secondly, at Liddell Spring, the depth of the relatively deep zone could be an artifact of the system having previously adjusted to a much lower base level, for instance during the most recent low sea level stand (~ 15,000-18,000 years before present). 131

O. Page 52, 2nd paragraph

"Liddell Spring's increased mineral concentration (>600uS/cm) following storms..."

It is important to point out that Toran and others, 2006 (citation 15 at the end of this letter) used the same reasoning in observing specific conductance spikes following rain events. This point has previously been contested by P.E. LaMoreaux & Associates during meetings with the City of Santa Cruz and CEMEX. It is the most basic explanation for the process driving the specific conductance spikes recorded at Liddell Spring in relation to rain events. This characterization is largely true for the WY2005 and WY2006 records as illustrated in the **Figures 1** and **2** of this letter. 132

P. Page 52, last paragraph

"A seep near Liddell Spring (SP-2) and two seeps near Plant Spring (SP-4 & -6) differ isotopically..."

We have collected stable isotopic data at Liddell Spring and other locations since the beginning of WY2007 and will continue to do so into WY2008 in order to add to data collected by PELA. Data collected within our monitoring program also suggests that groundwater within the Liddell Spring landslide is isotopically different to that discharged at Liddell Spring. This information is illustrated in **Figure 6** of this letter. The data and analysis of is draft in nature and subject to change at completion of the WY2007 data report for Liddell Spring. 133

Q. Page 59, 1st paragraph

"Table 31 summarizes general mineral analyses for about 20 different sources of water..."

We have previously published Piper Plots of waters sampled from Liddell Spring, the Liddell Spring landslide, and the East Branch of Liddell Creek. Those results are presented in Pacific Geotechnical Engineering and others, 2002. We have included those Piper Plots with this letter as **Figures 7** and **8**. Our data agrees well with your results and thus supports your conclusions. 134

R. Page 60, 2nd paragraph

"Figure 36a illustrates the direct, albeit rough, correlation between the spring's specific conductance and discharge."

We have found that daily maximum specific conductance of Liddell Spring is strongly correlated to the Antecedent Precipitation Index[3] (A.P.I.) as defined by Linsley 1958[4]. The correlation to A.P.I. is much more well defined than the equivalent linear relationship to discharge and is more representative of transient head conditions in the watershed. **Figure 9** illustrates this relationship and 135

[3] A.P.I. is defined as the current day precipitation plus the previous day precipitation multiplied by a recession constant k. For Liddell, a value of 0.90 was chosen as the recession constant based on the range of values for k cited by Linsley and others.

[4] Linsley, R.K., Kohler, M.A., and Paulhus, J.L., 1958, *Hydrology for Engineers*, McGraw-Hill Book Company, New York, New York.

confirms the earlier conclusion that specific conductance is dependent upon head conditions in the system. 135

S. Page 62, 2nd, 3rd and 4th paragraphs

"Liddell Spring (-5.9$\delta^{18}O$, -34 δD) plots midway between groups 1-2..."

There is recurrent misuse of isotope terminology within paragraphs 2, 3 and 4 of page 62. It is generally advised to avoid use of the terms "enriched" and "depleted" unless the author is sure to 136 indicate enrichment or depletion relative to some other material and that the resulting enrichment or depletion is the result of x or y process (Kendall and McDonnell, 1998[5], page 56). Numerous sentences in the referenced paragraphs do not conform to the suggested standards.

T. Page 64, 4th paragraph

"Mineralogical analysis has been used to assess the source of Liddell Spring's sediment load."

We also collected suspended sediment samples for x-ray diffraction analysis in WY2005. These 137 results are included in the Draft WY2005 data report for Liddell Spring, as cited in item E above. The 2005 data agree well with our previously reported 2002 data as well as that reported by the authors. The 2005 data collected by Balance Hydrologics is provided in **Table 1** to this letter.

U. Page 65, 2nd paragraph

"We found that our finest grained prepared samples of loose material from the quarry..."

We also agree with the conclusion that it is not reasonable to rule out the quarry as a possible source of turbidity to Liddell Spring because of the low levels of calcite observed in the x-ray diffraction results. From a geochemical perspective, one would expect to observe low levels of calcite in the suspended load of Liddell Spring given that small particle sizes of calcite will be more susceptible to 138 dissolution due to the increased surface area relative to volume characteristic of small grains sizes. See **Table 1** provided with comment Q above with regards to levels of calcite observed in our samples collected in WY2002 and WY2005 – they agree reasonably well with a value of about 10% calcite.

V. Page 66, 2nd paragraph

"Lewis (2003) documented the relation between turbidity and the concentration of..." 139

[5] Kendall, C., and Caldwell, E.A., 1998, Fundamentals of Isotope Geochemistry, in Kendall, C. and McDonnell, J.J., eds., Isotope Tracers in Catchment Hydrology. 1998, Elsevier, Amsterdam, Netherlands.

We have developed a turbidity - suspended sediment rating curve[6] for Liddell Spring utilizing Spring data we have collected since WY2005. The relationship we have developed differs from any of those provided on page 66, but that is not surprising and we acknowledge the effort conducted by the authors to arrive at some estimate of suspended load discharge from Liddell Spring. The present Liddell Spring turbidity – suspended sediment rating curve developed from our data is provided in **Figure 10** to this letter. The lower end of the curve is best described by a non-linear function while the upper end of the curve is best described by a linear function. The linear function equates to approximately a factor of 1.3 applied to the turbidity data to compute corresponding suspended sediment load – this value does not fall within the cited range of 1.8-3.5 cited by the authors. This difference may be a function of a spring system verses a surface water system. We have applied these curves to compute estimated annual suspended loads for Liddell Spring for WY2005 and WY2006. We computed a total suspended load of 16.9 tons for WY2005 (citation 7 provided at the end of this letter) and 28.3 tons for WY2006 (citation 8 provided at the end of this letter). 139

W. Page 68, last paragraph

"*Some iron-stained fine- to medium-grained subrounded quartz sand was present...*"

Photomicrographs provided to Balance by DCM Science Laboratory, Inc.[7] indicate the occurrence of some iron oxides in suspended sediment samples collected from Liddell Spring on December 8, 2004. The occurrence of iron oxides in the samples supports the reported observation of iron stained quartz grains present in the northeastern part of the quarry, as reported by the authors on page 68. We have scanned several of the photomicrographs including the associated discussion of the sample by DCM Science Laboratory director, Ron Schott for your review and included here as **Figure 11**. The consistency of these results support the conclusion that the quarry pit is an (not the only) active source of sediment to Liddell Spring. An important confirmation of the author's conclusion which now has multiple lines of evidence to support it. 140

X. Page 77, 1st sentence carried over from page 76

"*...discharge hydrograph are difficult to interpret because of apparent data anomalies...*"

The data anomalies present in your records represent inaccurate flow records for Liddell Spring stemming from use of the raw Liddell Spring flow record, rather than use of an algorithm which incorporates the East Branch of Liddell records, as well as maintenance records of pipeline work. See comment E above and **Figure 4**. 141

[6] The rating curve was developed from total suspended solids concentrations reported by Soil Control Lab of Watsonville, California and the associated Liddell Spring recorded turbidity at the time of sampling. There are differences between the Soil Control Lab reported turbidity values of the collected samples and those recorded in the field by the Liddell Spring instrumentation. In most cases the differences occur during periods of elevated turbidity at the Spring and in all but one case the onsite turbidity instruments record a lower turbidity value than that reported by Soil Control Lab. The differences likely can be accounted for by the method of measuring turbidity at Soil Control Lab which includes re-suspension of suspended material in the collected samples by mechanical agitation. As indicated above, the rating curve has been developed from the turbidity values recorded by the Liddell Spring instrumentation at the time of sampling.

[7] DCM Science Laboratory, 12421 W. 49th Ave. Unit 6, Wheat Ridge, CO. Letter report to Balance Hydrologics dated April 13, 2005. Pages 3 and 4 of letter provided as Figure 11 of this letter.

Y. Page 82, last bullet point on page

"Even at peak rates, the hydraulic power of the spring's discharge may be insufficient..." 142

Your reasoning here is unclear.

Z. Page 84, mid-way down page

"PELA (May 2005) estimated sinking-stream capacities from 0.5-1.0 cfs for both..." 143

The 1,000 acre-feet per year value does not follow from the average flow values cited by the authors. See comment J above.

AA. Pages 91-92

For what it is worth, we have completed a full analysis of blasting related turbidity responses at Liddell Spring for WY2005 and WY2006 associated with development of Liddell Spring data reports for those two years. The analysis has been completed under the criteria of no precipitation for 24 hours and 48 hours prior to and following the date and time of blasting. For WY2005, 48 blast events and for WY2006 49 blast events appear to have resulted in a measurable and discernable turbidity response at Liddell Spring in the absence of rainfall for 24 hours prior to and following the date and time of blasting. **Figures 12** and **13** present a time-series plot of the WY2006 turbidity record including quarry blasts without rainfall for 24 and 48 hours prior to and following the date and time of blasting. Figures 12 and 13 confirm the strong trend during WY2006 related to quarry blasts and subsequent turbidity responses at Liddell Spring. **Figure 14** illustrates one blast event and the associated turbidity rise recorded at Liddell Spring a few hours later – the characteristics of the response (excluding the response time) illustrated in **Figure 14** is consistent with many of the blast generated turbidity responses recorded at Liddell Spring during WY2005 and WY2006. Additionally, **Figure 15** illustrates a frequency of exceedance curve for blast generated turbidity responses at Liddell Spring under the 24 hour criteria for WY2006. Figures 12 through 14 clearly demonstrate a strong causal linkage between normal quarry operations and Liddell Spring water quality dynamics while Figure 15 quantifies the blasting related impact using one measure of water quality for Liddell Spring flows. Because of this linkage and the additional ones demonstrated by the Nolan and Johnson Appendix F, we hope that the Final EIR does a more substantial job in developing mitigation measures HYD-1 and HYD-2, specifically, to provide for a more robust level of water quality protection of flow discharging from Liddell Spring. 144

BB. Page 95, 5th conclusion

"The bulk volume of sediment needed to account for Liddell Spring's turbidity..."

The authors seem to generally lack the data to quantitatively support the conclusion that quarry operations alone could account for observed turbidity events at Liddell Spring. While the authors clearly demonstrate a linkage between the quarry pit ponds and turbidity response at Liddell Spring, there is no data or analysis provided to reasonably hold quarry operations accountable for the entire turbidity load of the Spring. What is more important is that a linkage has been established between the quarry pit ponds and turbidity response at Liddell Spring, albeit through indirect methods. This finding in and of itself further strengthens the argument that blast related turbidity responses at 145

Liddell Spring clearly highlights a hydrologic connection between quarry operations and Liddell Spring water quality – a finding which highlights the extreme necessity of planning any quarry expansion very carefully on all possible fronts. It is our opinion that the DEIR could be strengthened significantly by more fully addressing this potential impact, as we have discussed above. 145

Closing

We are pleased to have the opportunity to provide these comments to the City regarding the Bonny Doon Expansion and Reclamation Plan Amendment DEIR. Please do not hesitate to contact us with questions or comments regarding our letter.

Sincerely,

BALANCE HYDROLOGICS, Inc.

Shawn M. Chartrand

Shawn Chartrand, Geomorphologist/Hydrologist
PG 7817, CEG 2442

Barry Hecht

Barry Hecht, Principal
CEG 1245, Chg 50

Enclosures: 15 Figures and 1 Table

DEIR and Non-numerated Comment Related References

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b. *California State Water Resources Control Board, 2003, Notice of application to appropriate water by permit: Division of Water Rights Notification for Application 31352, Jan. 31, 2003.*

c. *Creegan and D'Angelo Consulting Engineers, 1984, Watershed analysis: San Vicente Creek, Mill Creek, Liddell Creek, East Branch Liddell Creek: Consulting report prepared for Lone Star Industries, Multipaged with appendices.*

d. *Environ, 1978, Draft environmental impact report for proposed operations, Felton Quarry, Felton, California: Prepared by Environ for Santa Cruz County, 88 p.*

e. *Greene, H.G., Orange, D., and Barry, J.P., 1993, Geologic diversity of cold seep communities, Monterey Bay region, central California, USA (abs.). Trans. American Geophysical Union, v. 74 (43), p. 578*

f. *Greene, H.G., Barry, J.P., Hasimoto, J., Fujiwara Y, Kochevar, R.E, and Robison, B.H., 1997, A submersible-based comparison of cold-seep regions in Sagami and Monterey Bays, JAMSTEC Journ. Deep Sea Research, v. 13, p. 395-415*

g. *P.E. LaMoreaux & Associates, 2007, Long-term trends in the dry season base-level turbidity of Liddell Spring based on data from the City of Santa Cruz Water Department. Consulting report prepared for CEMEX. 12p.*

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Appendix F Comment Related References

1. *Pacific Geotechnical Engineering and Balance Hydrologics, 2002, Landslide investigation, Liddell Spring Landslide, Bonny Doon Quarry, Santa Cruz County, California. Consulting report prepared for the County of Santa Cruz Planning Department. February 28, 2002. 70p. + tables, figures, and appendices.*

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3. *Chartrand, S., and Hecht, B., 2002, Liddell Spring landslide and East Branch of Liddell Creek Streamflows, Bonny Doon Quarry, Santa Cruz County, California—Data report for water year 2002: Balance Hydrologics, Inc. consulting report prepared for County of Santa Cruz, 11 p.*

4. *Chartrand, S., and Hecht, B., 2003, Annual hydrologic record for the East Branch of Liddell Creek and the Liddell Spring Landslide, Santa Cruz County, California—Data report for water year 2003: Balance Hydrologics, Inc. consulting report prepared for the County of Santa Cruz, 11 p.*

5. *Hastings, B., Chartrand, S., and Hecht, B., 2006, Annual hydrologic record for Liddell Creek, Santa Cruz County, California: Data report for water year 2004 – East Branch and Anadromous gaging stations: Balance Hydrologics, Inc. consulting report prepared for City of Santa Cruz Water Department, 15 p.*

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Responses to Comment Letter III-A
City of Santa Cruz Water Department

1. Comments noted. An exhaustive review of all the available information was conducted in preparing the Draft EIR. While there is anecdotal information about some temporary effects of mining on water quality in Liddell Creek, there is insufficient evidence to demonstrate that the spring's water quality is degraded relative to pre-mining conditions. Other specific concerns are addressed in subsequent responses.
2. The Draft EIR concludes that the existing and proposed quarry operation has some effect on the quality of Liddell Spring, mostly with regard to turbidity. However, the current and future impact to the City's diversion operations is difficult to quantify given the City's existing capacity for water treatment and a data record that is inadequate to demonstrate a definitive causal, before-and-after relation between quarrying and springflow turbidity. Despite more than 30 years of concurrent quarry and City-diversion operations, there is no evidence of quantified procedural or financial impacts to the City's operations. The efficacy of mitigation measures cannot be estimated for impacts that cannot be quantified.
3. Comment noted. See revised mitigation measure HYD-3.
4. Measures HYD-3 has been revised. See Text Amendments. HYD-3 now relies on the terms of the 1964 Agreement that was signed by the City of Santa Cruz and the quarry operator, which provides mutually agreed-upon standards for judging turbidity increases (see Appendix J of the Final EIR). No new agreement is being proposed. Implementation of the 1964 Agreement is also a part of the Certificate of Compliance review for existing quarry operations.
5. Compliance with the existing permit regarding the issues at Liddell Spring involves implementation of the 1964 Agreement between the quarry operator and the City, which is incorporated as a condition of approval of the existing Use Permit. Implementation of the 1964 Agreement involves calculation of a contribution by the quarry operator toward treatment costs and additional compensation when turbidity levels do not meet the agreed standards. Although the City would be expected to complete this calculation as the party to the 1964 Agreement with the relevant data, for purposes of permit compliance the County has developed an appropriate methodology and completed the relevant calculations using data provided by the City. The quarry operator would not be expected to complete the relevant calculations, but would be expected to compensate the City accordingly, which the quarry operator is willing to do. Therefore, the suggested additional punitive language is not appropriate.
6. Comment noted. Measure HYD-3 has been revised in the Final EIR and relies on the terms of the 1964 Agreement that was signed by the City of Santa Cruz and the quarry operator, which provides mutually agreed-upon standards for judging impacts to water quantity and quality (see Appendix J of the Final EIR). The 1964 agreement between the City of Santa Cruz and the quarry operator provides mutually agreed-upon standards for judging turbidity increases. That document states that turbidity shall not

exceed 0.5 NTU except for a period of 48 hours following a rainstorm, at which time it may range up to 2.0 NTU. For water exceeding these turbidity levels, the agreement requires some form of mitigation or compensation to the City. Also see response to III-A-2.

7. Referenced documents from Chartrand and Balance Hydrologics have been reviewed and incorporated into the CEQA record for the EIR. However, the Chartrand 2005 correspondence does not comment on the Draft EIR, and therefore does no warrant responses. Responses to the content of the Balance Hydrologics comments are presented in response to comments III.A-79 through 145.

8. See revised mitigation measures HYD-1, HYD-2, and HYD-3. Under HYD-1, CEMEX shall prepare an engineered drainage plan for use during removal of overburden and mining of the Boundary Expansion Area. Appendix G provides a conceptual design describing the feasibility of constructing a granular filter over the karst system. To prevent mining from intercepting the groundwater table, HYD-2 would require CEMEX to augment the existing and proposed water level monitoring program with at least two additional wells drilled to coincide with the planned northeast corner of the floor of the Boundary Expansion Area and the western side of the Boundary Expansion Area. Measure HYD-3 has been revised in the Final EIR and relies on the terms of the 1964 Agreement that was signed by the City of Santa Cruz and the quarry operator, which provides mutually agreed-upon standards for judging impacts to water quantity and quality (see Appendix J of the Final EIR).

9. See response to III-A-8

10 See revised mitigation measure HYD-1. HYD-1 has been revised to state; " The design shall be peer reviewed and approved by the County Planning Department prior to public hearing of the project proposal." This is consistent with the language on Page 5-35 of the Final EIR.

11. See revised mitigation measure GEO-1. It is inappropriate to specify analytical techniques for analysis of the levee stability as part of the EIR, or to provide design recommendations, especially prior to the analytical demonstration of a need to redesign the levees. There are relevant standards of practice for the analysis and design of the levees in common use. Mitigation measure GEO-1 provides for peer review of the recommended analysis and engineering design, to insure that both the analysis and design (if required) would satisfy the public interest. The measure further requires that such analysis and design be reviewed and approved prior to the issuance of the permit to mine the Boundary Expansion Area.

12. Comment noted. See response to comments III-A-4 and III-A-8.

13. See revised measure HYD-2. The monitoring has not been proposed as a mitigation measure. The monitoring has been proposed to promote compliance with the County regulation requiring a 20-foot separation between mining and groundwater.

14. Comment noted. Please refer to the revised measure HYD-2.

15. See revised mitigation measure HYD-2. The difficulty of defining a water table in karst terrain complicates enforcement of the 20-foot separation requirement. In practice, it has been possible to maintain the required 20-foot separation from

groundwater in the existing quarry. Measurement of water levels in drill holes in the existing quarry bottom (NZA, PELA-1, & PELA-2) in Water Year (WY) 2004 showed relatively constant water levels ranging from about 38' to 96' below the quarry bottom. These water levels were recorded in the winter and fall of WY 2004 and showed fluctuations of only one to two feet between the winter and fall measurements in each hole. In the Boundary Expansion Area, mining would take place from the top down, so there would be time to collect and analyze additional groundwater data from the Boundary Expansion Area (to supplement existing water level data) prior to reaching depths where there is a possibility of encountering groundwater.

16. The revised HYD-1 and HYD-3 would mitigate elevated turbidity, whether rain related or blasting related. Most previous investigators have acknowledged that some increase in turbidity occurs as a result of some blast events. These responses are highly varied, however, similar to Liddell Spring's range of responses to storm events. Analysis of turnout, turbidity and blast data for three recent water years shows only one occasion when elevated turbidity caused by a blast was the sole and definitive reason for a spring turnout. During this event on 10/24/06 spring turbidity was elevated above the City's threshold for a spring water turnout (25 NTU) for approximately fifteen minutes and the spring water was turned out for approximately 30 minutes. This represents an extremely minor impact during a dry period. While blasting may have some effect on water quality during the wet season, based on the available data there is no evidence that turnouts have become more frequent or lengthy due to elevated turbidity resulting from blasting at any time of year. On the contrary, spring improvements resulting from the permit process have allowed more efficient management of this water source to maximize production. The available data provides no evidence of any actual impact at the Graham Hill Water Treatment Plant (GHWTP) as a result of Liddell Spring turbidity attributable to quarry operations. Therefore, the suggested prohibition on blasting during the wet season is unnecessary.

17. The preparation of the EIR is based on a review of relevant background information, including PELA 2005. The EIR evaluates potentially significant impacts of the proposed project and recommends mitigation measures intended to mitigate those significant impacts. Other measures are considered either unnecessary or inappropriate considering the scope of the proposed project and the potential impacts that have been identified.

18. Comment noted. Despite more than 30 years of concurrent quarry and City-diversion operations, there is no evidence of quantified procedural or financial impacts to City operations. Please see response to comment III-A-2.

19. The comment is incorrect. The alternatives analysis states in Section 10.2 (pg. 10-3), "Project mitigation designed to reduce turbidity impacts at Liddell Spring would not be implemented." The No Project Alternative would not prohibit the implementation of mitigation specified under the current Use Permit for the quarry. Also, see response to III-A-8.

20. Evidence for loss of production at Liddell Spring is lacking (see response to comment III-A-2). On the contrary, spring improvements resulting from the permit process have

allowed more efficient management of this water source to maximize production. Also see Appendix H for more discussion on this topic.

21. See response to III-A-20.

22. See response to III-A-20.

23. See response to III-A-20.

24. See response to III-A-20.

25. See response to III-A-20.

26. See response to III-A-20.

27. No changes to the conveyor belt and road infrastructure and subsequent impacts to W. Branch of Liddell Creek hydrology are planned as part of the Boundary Expansion Area mining.

28. See response to III-A-20.

29. Comment noted. Those correspondences have been included in the Final EIR under comment letter III-A.

30. An assessment of climate change impacts associated with the project has been added to the Air Quality impact assessment in the Final EIR. The impacts are not significant. See Text Amendments in Chapter 7.0 if the Final EIR.

    The proposed quarry expansion does not entail changes in water use susceptible to the effects of climatic change within the proposed operational period. Trends exhibited by Santa Cruz County historical records indicate warming of 0.1° to 0.2° F per decade (mostly from rising nighttime temperatures) and rainfall increasing 1 to 2 percent per decade (N.M. Johnson, personal files). The quarry's continued diversion of 21 gpm from Plant Spring during the projected life of the expanded quarry is unlikely to be impacted significantly, or significantly contribute to other cumulative impacts, as a result of climate change.

31. Treatment and pumping are no longer proposed. See revised mitigation measure HYD-3.

32. On October 8, 2008 the County Planning Commission performed a review of the existing mining operation for compliance with existing conditions of approval. Based on a comprehensive review of the mining permits, staff concluded that the quarry is in substantial compliance with the Conditions of Approval of 89-0492 and Use Permit 3236U Parts III and IV, but more work needs to be done to achieve full compliance prior to expansion of the mine, should the proposed expansion be approved. Following the public hearing the Planning Commission adopted the staff recommendations intended to ensure full compliance prior to expansion of the mine. It should be noted that the existing permit does not state that in the event that water quality is impacted by mining activities, mining shall be abated until such impacts are remedied.

33. Comment noted. Refer to response to comment 32. The mitigations proposed in the EIR are considered appropriate to ensure potential impacts are reduced to a less than significant level.

34. The Draft EIR is not in a position to address speculated water-rights disputes absent relevant findings by the California Division of Water Rights. Based on the hydrogeologic interpretation presented in Draft EIR Appendix F, it is reasonable to assume that the quarry operation could obtain a replacement water supply of 21 gpm from an on-site well if its ability to divert from Plant Spring were curtailed.

35. Although a portion of the site is located within a "Water Supply Watershed" for Liddell Spring, the mining use is pre-existing with a vested mining right to expand into the 17.1-acre expansion area.

    As stated in Chapter 1.0 of the Draft EIR, "The County determined that the mining plan expansion, while covered under vested rights, is subject to environmental review under CEQA. The County's authority under vested rights, is described in a letter from County Counsel to the Board dated March 11, 2002.

    "…as previously acknowledged by the County, and out of respect for the vested rights which RMC does possess, and consistent with the County Code, the County will impose additional conditions or restrictions only in the Case that the stricter standards are necessary to mitigate a potentially significant environmental impact, and/or to protect public health or safety, and/or to respond to a public nuisance. Should additional limitations be found to be necessary to prevent significant environmental impacts or threats to public health and safety, the risks associated with these impacts must be weighed against the effects of such restrictions on quarry operations to ensure that they do not unreasonably constrain the permit holder from exercising their vested rights."

    Response to Comment III-A-2 states, "The Draft EIR concludes that the existing and proposed quarry operation has some effect on the quality of Liddell Spring, mostly with regard to turbidity. However, the current and future impact to the City's diversion operations is difficult to quantify given the City's existing capacity for water treatment and a data record that is inadequate to demonstrate a definitive causal, before-and-after relation between quarrying and springflow turbidity. Despite more than 30 years of concurrent quarry and City-diversion operations, there is no evidence for quantified procedural or financial impacts to its operations. The efficacy of mitigation measures cannot be estimated for impacts that cannot be quantified." Based on the available data and a review of all studies completed to date regarding turbidity at Liddell Spring the quarry's contribution to Liddell Spring turbidity appears to be of little importance in terms of quality, reliability and treatment cost. Based on the available data there is no evidence that turnouts have become more frequent or lengthy due to elevated turbidity. The available data shows no loss of production. On the contrary, spring improvements resulting from the permit process have allowed more efficient management of this water source to maximize production, which would reduce reliance on water from Loch Lomond. Implementation of measures HYD-1, HYD-2 and HYD-3 would reduce the potential hydrology, water quality and water quantity impacts of the mining expansion project to a less than significant level. Therefore, project impacts to Liddell Spring and its watershed would not result in a significant environmental impact that would warrant constraining the permit holder from exercising their vested rights.

36. The Draft EIR interprets that some water quality degradation occurs as a result of quarry operations, but does not "irrefutably illustrate" losses of beneficial use. Average annual City diversions from Liddell Spring, its preferred source of water under most circumstances, does not appear to have been affected by quarry operations. Potential impacts from offsite surface drainage and sediment transport are not within the scope of this EIR.

37. With mitigation, impacts to anadromous fish would be less than significant. See mitigation measures HYD-1, GEO-1 and GEO-2.

38. It is not the role of the Draft EIR to determine or enforce compliance with the regulatory requirements of other agencies. See also response to III-A-74.

39. Appendix F of the Draft EIR discusses site-specific limitations regarding the County ordinance requirement for a 20-foot separation between groundwater and quarrying (Draft EIR Appendix F, Sec. 6.6.1). The difficulty of defining a water table in karst terrain complicates enforcement of the 20-foot separation requirement. In practice, it has been possible to maintain the required 20-foot separation from groundwater in the existing quarry. Measurement of water levels in drill holes in the existing quarry bottom (NZA, PELA-1, and PELA-2) in Water Year (WY) 2004 showed relatively constant water levels ranging from about 38 feet to 96 feet below the quarry bottom. These water levels were recorded in the winter and fall of WY 2004 and showed fluctuations of only one to two feet between the winter and fall measurements in each drill hole. The Draft EIR also acknowledges that active pathways appear to exist between quarry runoff and sediment and the underlying groundwater (Draft EIR Appendix F, Sec. 5.6.3). Draft EIR Appendix F concludes that the quantity of groundwater and downgradient springflow would not be significantly impacted because of the high capacity of the quarried area to intercept recharge. With regard to water quality, the Draft EIR acknowledges existing and potential impacts to groundwater from quarry operations but is unable to characterize a correlation between quarry-groundwater separation distance and water quality impact.

40. The Draft EIR acknowledges that potential water-quality degradation occurs as a result of existing and proposed quarry operations. However, available information does not indicate that a particular quarry-groundwater separation distance would be preferred compared to the 20 foot required by current County ordinance. Under site conditions, the quarry-groundwater separation metric is of limited relevance. The recommended implementation of appropriate, site-specific mitigation measures as a result of the EIR process does not require modification of County ordinance, nor is there a cause for applying standards developed for other situations in other locals in lieu of the analysis and mitigation developed as part of the Draft EIR.

41. The comprehensive hydrogeologic interpretation presented in Draft EIR Appendix F does not support characterizing the quarry subsurface as one or more "subterranean streams." The karst aquifer system appears to be highly distributed, complex, chaotic, and poorly defined by existing data upgradient of Liddell Spring (e.g., see Fig. 24, Draft EIR Appendix F). Nevertheless, neither this interpretation nor that of the applicant representative (who referred to the quarry Boundary Expansion Area as a "virtual underground stream") weigh sufficiently to challenge the water-rights status

quo absent relevant findings by the California Division of Water Rights. Addressing speculative water-right concerns is not within the scope of this EIR.

42. City diversions from Liddell Spring average approximately 38 times greater than the quarry's diversion of 21 gpm from Plant Spring. Thus, the City's concern that quarry diversions would be the causal factor leading to diversion restrictions by CDFG seems unfounded. With implementation of mitigation Measures HYD-1, HYD-2 and HYD-3 the Draft EIR concludes that the proposed quarry operation would not significantly affect Liddell Spring.
43. Addressing speculative water-right disputes is not within the scope of this EIR.
44. See previous response to comment III-A-43.
45. See previous response to comment III-A-43.
46. See response to comment III-A-2. Although a small amount of Liddell Spring turbidity may be attributable to quarry blasting, there is no evidence for quantified procedural or financial impacts to the City's operations despite more than 30 years of concurrent quarry and City-diversion operations.
47. Comment regarding PELA's work noted. No response required.
48. Comment regarding PELA's noted. No response required.
49. Comment regarding PELA's noted. No response required.
50. Recent evidence of the variability of sinking-stream conditions in the quarry area is not inconsistent with the hydrogeologic interpretation presented in Draft EIR Appendix F.
51. The spring identified by PELA as SP-30 is roughly 1.5 miles northeast of the proposed quarry boundary expansion area. Except in the broadest context of characterizing the quarry area hydrogeology, this spring is not relevant to the Draft EIR given its distance away, the complexity of the area hydrogeology, and the relatively small amount of flow in question (100 gpm) relative to the overall water balance (roughly 4,000 gpm; Draft EIR Appendix F, Sec. 4.5). Further details regarding this spring are not expected to affect the Draft EIR conclusions. However, for the record, we did observe a spring with a flow probably in the range of 100 gpm in the vicinity of SP-30 shown on the PELA map. We located the spring slightly downstream from the PELA location (see Plate 1 of Appendix F). Our field traverse was conducted in the wintertime during a period of wet weather. While experience with other springs might indicate that such a high flow spring should be perennial and persistent, it is also possible that the spring is seasonal and responds directly to rainfall.
52. The comment asks for both broader and narrower hydrogeologic focus by the Draft EIR. Appendix F of the Draft EIR presents and supports an interpretation of Liddell Spring hydrology that encompasses portions of upgradient Reggiardo and Laguna creeks. The spring water balance is presented in Draft EIR Appendix F Section 4.5. There is no indication or reason to interpret significant interaction between Liddell Spring hydrology and karst hydrologic features in either San Vicente or Fall Creek watersheds (see response to III-A-104 for more discussion). The amount of alluvial fill in the Laguna Creek channel at any location is minor, and it is unlikely that any significant amount of underflow exists anywhere along the stream. Field mapping for

the Draft EIR identified numerous, previously unrecognized marble outcrops along the creek (some of which are coincident with mapped springs). It is more likely that the stream is losing and gaining flow due to karst processes. Evidence of spatial and temporal variability and uncertainty discussed in the comment do not contradict the hydrogeologic interpretation presented in Draft EIR Appendix F.

53. This comment is directed at a third party (PELA). Dye bags were put out and collected weekly. It would appear that the last dye bag put in place at this site was not collected. This does not impact the study results, as all interpretation and analysis is based on the laboratory results from many months worth of collected samples from sites all around the quarry.

54. Uncertainty or minor errors regarding the mapped locations of various features is acknowledged (e.g., approximation, geologic variability). However, resolution of the cited uncertainties would not significantly change the Draft EIR conclusions.

55. Draft EIR Appendix F Section 4.4.2 also discussed various caveats and uncertainties associated with the previous tracer tests. In this case, samples taken immediately prior to any dye injection were used to establish background concentrations of the constituent dyes. The notion that "optical brighteners" from septic systems that precisely mimicked the signatures of the many different dye compounds used in the tracer studies would suddenly appear and disappear during the course of the tracer test is highly unlikely, at best. However, in any event, the tracer test results provided only one of several lines of hydrogeologic information upon which the hydrogeologic interpretation was based. Any remaining uncertainties in the dye tracer tests would not significantly change the Draft EIR conclusions.

56. Comment noted. Please see revised mitigation measure HYD-2.

57. There's little or no argument against additional data to help understand the quarry area hydrogeology. However, the entire body of available information was sufficient to support the hydrogeologic interpretation and conclusions presented in Draft EIR Appendix F and the mitigation recommendations in the Draft EIR.

58. The potential risks and impacts to groundwater quantity and quality as a result of exposing karst groundwater features during mining are addressed in Draft EIR Appendix F Section 5.6. Although additional boring and groundwater-level data may be useful, the probable value of any single additional data point is small given the complex karst hydrogeology. The Draft EIR hydrogeologic interpretation was formulated based on a large and varied set of available information sufficient to support the Draft EIR conclusions. Nevertheless, risks associated with remaining uncertainties would be addressed through additional data collection. See the revised HYD-2.

59. Please see revised mitigation measures HYD-1 and HYD-2.

60. There is no evidence to support an interpretation that quarry operations impact springs other than (a) Liddell Spring, (b) diversions up to 21 gpm from Plant Spring, and (c) relatively minor springs and seeps potentially associated with wastepile drainage. During months of peak use, quarry diversions from Plant Spring average 21 gpm. The proposed quarry operations are not defined by a water-use increase. Plant Spring has

an upgradient surface watershed of more than 50 acres and is hydrogeologically interconnected with an upgradient karst aquifer encompassing nearly a square mile. It flows at an average rate of 150 to 200 gpm. Downstream of Plant Spring, additional springs and groundwater discharge contribute to streamflow in the East Branch of Liddell Creek, including Liddell Spring. In this context, the Draft EIR did not deem the quarry diversions hydrologically significant. The analysis performed for the Draft EIR indicated that the existing quarry has not impacted discharge quantity at Liddell Spring. The proposed mitigation measures included in the Draft EIR would ensure that recharge to the karst aquifer in the quarry area is maintained. Therefore, discharge quantities from springs draining the aquifer would not be impacted, be it Liddell Spring, Plant Spring, or other minor springs below the quarry.

In terms of water quality, Liddell Spring is used as a proxy for water quality produced from springs below the quarry. The proposed mitigation measures to control erosion and limit infiltration of turbid water in the quarry would reduce the amount of suspended sediment entering the aquifer in comparison to the apparently minor quarry contributions occurring at the present time, which is expected to effectively mitigate water quality concerns in springs downstream (see response to comment III-A-35.

61. It is not necessary to specify every detail of the groundwater flow regime on Ben Lomond Mountain in order to evaluate impacts of quarrying in the Boundary Expansion Area. There is no reason to exclude the possibility of such connection; however such an interpretation is not critical to an accounting of Liddell Spring hydrology sufficient to support the impacts analysis. We acknowledge that additional information would help complete the hydrogeologic characterization of the area; however, such information is not critical to supporting the Draft EIR conclusions. In any case, a significant connection between the relatively minor karst features on the east flank of Ben Lomond Mountain requires: 1) a significant subsurface continuity through permeable karst features crossing two miles of terrain underlain by schist; and 2), flow up-gradient, as the dye tracer studies have shown that flow in the karst system is southward directed, from at least as far north as Ice Cream Grade. Neither of these conditions is plausible. See additional discussion for comments III-A-101 through 104

62. Correction accepted regarding the City's biweekly raw water quality monitoring regardless of whether the diversion is actively occurring. The Draft EIR interpretation of this and other available information (e.g., continuous data loggers), however, was sufficient for drawing the report's conclusions.

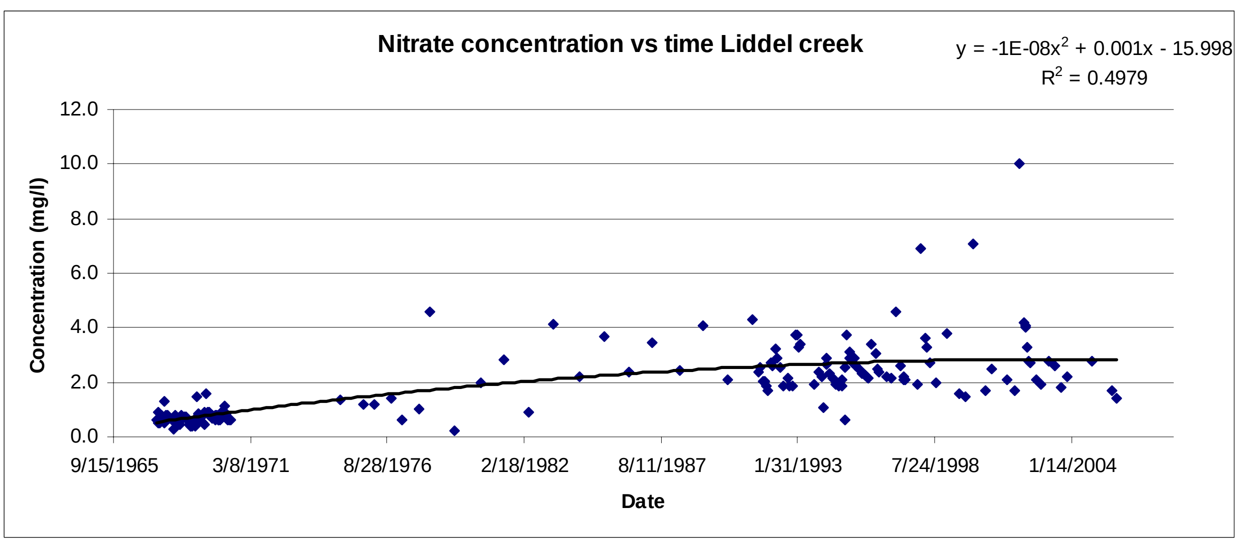
    The Draft EIR's erroneous reference to "hourly data" was intended to represent the data recorded by loggers using a sampling increment of typically one hour or less (e.g., 15 minutes). Please see the revised text in Section 5.1.1.3 of the Final EIR. This slight mischaracterization of the analyzed data has no effect on the Draft EIR conclusions, as the analysis is based on inspection of the actual data, whatever the sampling frequency.

63. Draft EIR Appendix F attributes Liddell Spring nitrate concentrations to a variety of potential sources (Section 4.6.4). Remaining uncertainties regarding these data and the results of available tracer tests are not sufficient to significantly change the Draft EIR conclusions.

64. As stated in Section 5.3.3.4 of the Draft EIR, and Section 5.6.3 of Draft EIR Appendix F, the proposed quarrying may have an ongoing influence on the concentration of nitrate in groundwater. However, rising trends in Liddell Spring nitrate concentration are poorly defined by the available data; Liddell Spring nitrate concentrations rarely peak higher than 10 percent of the drinking-water standard, and never more than 25 percent of the standard; and, identified sources other than the quarry may be as or more responsible. Thus, there is insufficient evidence to conclude that quarrying of the proposed Boundary Expansion Area would significantly worsen conditions regarding Liddell Spring nitrate concentrations.

65. The Draft EIR considered all available nitrate information and deemed it sufficient as the basis for its conclusions.

66. The Draft EIR does acknowledge an apparent increase in Liddell Spring nitrate concentrations: "The nitrate concentrations of the City's diversions … were <2 milligrams/liter (mg/L) prior to 1977 and have since typically ranged from about 1 to 5 mg/L, with a few spikes occurring up to 5 to 10 mg/L" (Draft EIR Appendix F, Sec. 4.3.5). However, the available data do not appear to support the comment's claim of an "appreciable increase during the last 10 years." The linear relationship depicted on the figure in the City's comment letter is misleading. Visual inspection of the data set indicates that the relationship is not linear, that is, while there appears to have been an increase in nitrate concentration between the data clusters circa 1968 and circa 1994, there does not appear to be any increase from the early 1990's to the present. A first order polynomial fit provides better correlation with the data set than the linear fit and is more reflective of the actual data trend, as shown below. If the Draft EIR were examining the potential impacts of another 30 to 40 years of mining, nitrate concentrations might deserve more scrutiny. However, the Boundary Expansion Area is expected to extend the life of the quarry only a few more years. Given the present trend of nitrate concentrations (no increase), mining of the Boundary Expansion Area is not considered to present a significant impact with respect to nitrate concentrations.



67. Because the proposed quarry operations are representative of a continuation of quarrying rather than an increase in quarrying, the Draft EIR projects no substantial change in quarry-related nitrate loading. No impact to City water production as a result of existing nitrate levels in Liddell Spring is apparent and the impact would therefore be less than significant.

68. An apparent upward trend in Liddell Spring sulfate concentration is acknowledged. Concentrations are generally less than 20 percent of the recommended secondary drinking water standard, while peak concentrations range up to nearly 40 percent of this standard. As stated in the comment, these concentrations do not pose health risks. Data indicating that elevated metals present a health concern are lacking.

69. Evaluation of offsite surface drainage and sediment transport from continued use of the existing quarry drainage system is not within the Draft EIR scope (see response to comment I-A-1). Nevertheless, it has been known since at least the late 1980's that iron levels are elevated at sampling points downstream of the sediment basin (2X) below Disposal Area C and below sediment basins 3 and 4. Whether these iron levels are a natural phenomenon or influenced by the mine has not been established with certainty. An investigation of iron levels was completed by Emcon Associates in 1994 and concluded that the data reviewed indicate that groundwater containing natural levels of iron emerges as seeps near the sampling points. When Regional Water Quality Control Board (RWQCB) monitoring requirements for the site were updated in 1994 iron was dropped from the requirements. When Disposal Area C was expanded into this wetland area, subdrains were constructed to collect the seepage into a concrete pipe. Currently, the most noticeable iron levels are found in the discharge of the concrete pipe at the current toe of Disposal Area C. Prior to the expansion of Disposal Area C an assessment of the habitat suitability of the wetland area in the impact zone did not express any concern regarding evidence of elevated iron levels (H.T. Harvey and Associates, 1994). Both USFWS and CDFG have completed site visits and issued permits for activities associated with the expansion of Disposal Area C with no requirements related to concern regarding elevated iron levels. Recent work by a consultant for the City of Santa Cruz (Entrix 2004) indicates that iron discharge to the creek is unlikely to influence conditions downstream in the anadromous reach.

70. Evidence of significant impacts from quarry operations does not exist for springs other than Liddell Spring and some small springs and seeps potentially associated with wastepile drainage. Draft EIR Appendix F concludes that Plant Spring is relatively isolated from the quarry operation as a result of relatively direct flow paths between stream swallow holes east of the quarry and Plant Spring. Liddell and Plant springs account for more than 95 percent of all springflow within and downgradient of the quarry.

71. As stated on pages 6-22 and 23 of the Draft EIR, Central Coast steelhead occurs in the downstream reaches of Liddell Creek. The project's extension of water diversion at Plant Spring for three additional years would continue current project effects on low summer base-flows for steelhead in Liddell Creek, but would not increase them. Plant Spring provides less water to Liddell Creek than Liddell Spring. Since its flow naturally drops in the summer, it may never have supplied substantial summer flow to Liddell Creek. It is unlikely that quarry diversion of Plant Spring flows in the summer

by itself would adversely affect steelhead-rearing habitat. See also response to comment I-A-1.

Given the small contribution of Plant Spring to base-flows of Liddell Creek, and the small quantity of water diverted from Plant Spring for quarry operations, the continued water use by the quarry under the proposed mining expansion project would not significantly impact steelhead habitat.

72. Evaluation of offsite surface drainage and sediment transport from continued use of the existing quarry drainage system is not within the Draft EIR scope (see response to comment I-A-1). The comment does not cite specific information in the Draft EIR that is incorrect. Nevertheless, the comment is selective in its citation. The Existing Conditions Report for the Coast Dairies Property (ESA 2001) notes that based on geology and erosion hazard rating, Liddell Creek is expected to provide bed material that is less suitable for salmonids than San Vicente or Laguna creeks. In addition to natural processes, the Coast Dairies report states that roads, mining and the City of Santa Cruz pipeline could be significant sediment sources and acknowledges that water quality monitoring information from the quarry sediment basins was not available for the preparation of the report. The quarry operates under the General Permit for Storm Water Discharges Associated with Industrial Activities and submits annual reports of monitoring activities to the RWQCB. Copies of these reports are included in the quarry's annual reports to the County. Since approval of the COC in 1997, water quality monitoring, as required by the General Permit, indicates that implementation of the Erosion Control Plan, including upgrades to the sediment basins, has been effective in preventing siltation of watercourses downstream of the quarries. Typically, storm water runoff is held in the ponds to allow sediment settlement, then released through valves in between storms. It should be noted, however, that the mining operation has contributed sediment to the creek in the past.

Prior to the 1997 COC water quality monitoring downstream of sediment basins in the Limestone Quarry indicated that erosion and sediment control facilities and practices were inadequate resulting in siltation of watercourses downstream. During the COC process an Erosion Control Plan was developed for the Limestone and Shale quarries to address this impact. Recommendations of the Erosion Control Plan are summarized in a series of documents incorporated by reference into the COC. Based on a review of Planning Department files and a site inspection, all relevant aspects of the Erosion Control Plan have been implemented including upgrades to sediment pond standpipes. In March 2001, the drainage pipe beneath Sediment Pond 4 failed causing discharge of sediment into the watercourse downstream of the pond. A problem with the drainage pipe was identified one year earlier, which prompted the implementation of interim measures to divert drainage from Pond 4 pending a full repair. After the March 2001 failure permanent repairs to the drainage system and levees were completed. As mitigation for the damage caused to downstream aquatic habitat from the sediment release, the RWQCB, accepted the quarry operator's proposal to enhance fish habitat in Liddell Creek. Subsequently, the quarry operator pursued an acceptable, equivalent alternative to the original proposal to the RWQCB by contributing quarry rock to the Department of Public Works to construct fisheries enhancement aspects of a culvert replacement project on Liddell Creek.

73. The comment is incorrect, there is no history of levee failure. See response to comment III-A-72.

74. The component of the total turbidity at the spring contributed by the quarry operation cannot be quantified. However, the available data indicate that any impact on the Liddell Spring as a result of quarry operations is likely limited to a very small increment of poorer quality water. Liddell Spring flow bypasses the City diversion (flows down the natural channel) during high flows and turnouts. Reasons for turnouts are elevated turbidity associated with rainfall or maintenance. Variable portions of high flows and rainfall-related turnouts would contain elevated turbidity, but would also be associated with elevated turbidity in receiving waters. Spring flow turned out for maintenance is not associated with elevated turbidity. With implementation of the proposed mitigation measures, the Draft EIR has concluded that downstream impacts associated with elevated turbidity levels in Liddell Spring flow related to overburden removal and mining of the Boundary Expansion Area would be less than significant.

75. During months of peak use, quarry diversions from Plant Spring have averaged no more than 21 gpm. Additionally, the proposed quarry operations would not increase this water-use. As discussed above, the Draft EIR does not deem the quarry diversions hydrologically significant. See response to comment I-A-1.

76. Assessing the effects of quarry offsite surface drainage and sediment transport through the existing surface drainage system on downstream watershed and wildlife conditions is not within the Draft EIR scope (see response to comment III-A-72). This is because the existing surface drainage system is deemed adequate under existing mining regulations to accommodate runoff from the proposed expansion area. Existing quarry infrastructure is addressed through both the process of the recent Planning Commission review of the existing permit and the Draft EIR for the expansion project. As a result of Planning Commission action during the review of the existing permit, an additional Condition of Approval addresses the conveyor crossing over the W. Branch of Liddell Creek, and the stability of levees for Sediment Ponds 3 and 4 is addressed in mitigation Measure GEO-1 of the Draft EIR.

77. We have reviewed no data indicating a loss of production at Liddell Spring. In fact, City records indicate use of this water sources has increased in recent years (Appendix H). See revised mitigation measure HYD-3.

78. Comment noted. The water-resource value of Liddell Spring to the City water supply is described in Draft EIR Appendix F Section 3.5.

79. Comment noted. Responses to this introductory paragraph are provided under responses 80 through 145.

80. Please refer to the revised mitigation Measure HYD-1.

81. See response to comment III-A-13 and III-A-15. Please refer to the revised mitigation Measure HYD-2.

82. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

83. See Section 5.1.1.3 of the Final EIR, and Appendix F Section 3.5 of the Draft EIR, which provides a detailed description of the role of Liddell Spring in the City's water supply.
84. Comment noted. See response to Comment III-A-83.
85. Draft EIR Appendix F presents a comprehensive explanation of how "aquifer processes combine" to account for Liddell Spring. A study of other springs in the Santa Cruz Mountains is not relevant to the scope of the Draft EIR.
86. Liddell Spring is acknowledged as a major sustainable resource. Based on the available data and a review of all studies completed to date regarding turbidity at Liddell Spring the quarry's contribution to Liddell Spring turbidity appears to be of little importance in terms of quality, reliability and treatment cost. Based on the available data, there is no evidence that turnouts have become more frequent or lengthy due to elevated turbidity. The available data shows no loss of production. On the contrary, spring improvements resulting from the permit process have allowed more efficient management of this water source to maximize production, which would reduce reliance on water from other sources, including Loch Lomond.
87. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
88. The Existing Conditions Report for the Coast Dairies Properties (ESA, 2001) has been used as a reference source and has been added to the list of references.
89. Draft EIR Appendix F provides a comprehensive hydrologic analysis of the watersheds and aquifers contributing to Liddell Spring. Appendix F of the Draft EIR did not address potential hydrologic impacts to the watershed downstream of the proposed quarry operation for the reasons listed in the response to comment II-C-2. No changes are being proposed to the existing drainage system and therefore downstream hydrology would not be affected by the proposed mining amendment. The effects of quarry operations on springflow, while potentially significant in a water-supply context (i.e., Liddell Spring turbidity), are interpreted as less than significant in the context of the overall downstream watershed. The Draft EIR does recommend a change to the reclamation plan that involves retaining and filtering runoff within the quarry, both during mining and following the end of mining (HYD-1). The retention system would reduce direct discharge to Liddell Creek in favor of recharging runoff to groundwater and sustaining flow at Liddell Spring (as well as other springs). Filtration of this runoff would reduce water quality impacts. Pre-existing topography in the quarry area consisted of short, interconnected valleys intercepted by sinkholes. The proposed retention plan, in our opinion, would more closely model the pre-quarry drainage conditions than diverting runoff directly to settlement basins feeding Liddell Creek. See the revised mitigation measure HYD-1 and Appendix G for additional discussion.
90. See response to Comment III-A-89.
91. See response to Comment III-A-89.
92. See response to Comment III-A-89.

93. See response to Comment III-A-89.
94. See response to Comment III-A-89.
95. A study of other quarries in Santa Cruz County was beyond the Draft EIR scope. Bonny Doon Quarry is located in a unique hydrogeologic setting which was evaluated comprehensively in Draft EIR Appendix F.
96. Refer to comment III-A-95.
97. Comment noted. See response to Comment III-A-72.
98. As explained in Draft EIR Appendix F Section 5.5.1, the existing and proposed quarry pit has no outlet for surface drainage. Runoff from approximately 125 acres of quarry and upgradient drainage area percolates into the karst aquifer through fractures and solution cavities on the quarry walls and across the quarry floor. Hydrogeologic interpretation indicates that this recharged groundwater migrates southward before discharging from Liddell Spring roughly 1,000 feet from the quarry operation (Draft EIR Appendix. F, Sec. 4). Therefore, evaluation of offsite surface drainage and sediment transport from continued use of the existing quarry drainage system is not within the scope of this Draft EIR (see responses to comments I-A-1 and III-A-72).
99. Comment noted. See response to comment III-A-72. The citation on Page 6-10 of the Draft EIR was changed from McGinnis 1996a&b to McGinnis 1991. See methodology for sediment sampling below.

    "Bottom sand and silt samples were taken at selected sites in all creek systems. Each sample was given a coded label and then sent to the Forensic Analytical Specialties, Inc. Laboratory in Hayward, California, for "blind" analysis. After all organic materials was burned off in 500° C oven, the samples were analyzed both quantitatively and qualitatively for mineral content. After combustion the soil was acidified with HCL, which converted all carbonate (limestone) present to a calcium chloride solution. The resultant suspension was then filtered and the filter paper ashed at 500° C for two hours. The weight of the soil after the second heating was compared to that after the first to give the % carbonate present. Qualitative analysis for other minerals was accomplished by polarized light microscopy (McGinnis 1991)."
100. The 1984 report by Creegan and D'Angelo is referenced repeatedly by Draft EIR Appendix F. Particular data values for June 10, 1982 were not specifically cited in Draft EIR Appendix F and are not interpreted to affect the Draft EIR conclusions. There is any number of possible causes for a single high turbidity reading.
101. The geologic/hydrologic study area (G/HSA) boundaries are not arbitrary. The expression "geologic/hydrologic study area" is not used in Draft EIR Appendix F. Boundaries used to define the quarry area hydrology in Draft EIR Appendix F are based entirely on drainage divides, lithologic units and their corresponding properties, geologic structure, hydrology, and hydrogeology. The description of the G/HAS provided at the beginning of Chapter 4 in the Draft EIR was intended only to orient non-technical readers with easily recognized landmarks. The technical basis for the study area description presented the Draft EIR is provided in detail in Chapter 4 of Technical Appendix F.

102. The hydrogeologic interpretation presented in Draft EIR Appendix F encompasses the complete hydrologic system upgradient of the quarry and Liddell Spring in support of its conclusions. The G/HAS includes those elements of the local surface water/groundwater regime considered necessary to evaluate the quarry expansion's effects on water quality and water quantity in the local surface water/groundwater regime.

103. As presented in Draft EIR Appendix F Section 4.2.5, the configuration of the shallow groundwater system north of the quarry is fairly consistent until nearly approaching the existing quarry pit, at which point it drops precipitously. It is reasonable to assume that the proposed quarrying would have a similar, localized effect, in which case shallow groundwater drainage to Mill Creek and the San Vicente Creek watershed would be essentially unchanged. The karst areas are effectively decoupled from the groundwater regime upgradient by the sudden, sharp increase in hydraulic conductivity at the marble contact, as shown by the rapid drop in groundwater elevation at the contact. With no impact on groundwater gradients up stream from the quarry, there can be no impacts on base flows, or, by extension, on fisheries in Mill and San Vicente creeks.

104. Uncertainties associated with the hydrogeologic complexity of the general area are acknowledged. Draft EIR Appendix F focuses on the hydrogeology that is interpreted to be essentially relevant to the hydrologic system encompassing Bonny Doon Quarry and Liddell Spring; this excludes the San Vicente Creek and San Lorenzo River watersheds, given an interpreted lack of significant hydraulic communication between them, as discussed below.

     The metamorphic rock bodies on Ben Lomond Mountain, which consist primarily of schist and marble, are remnants of a once laterally extensive, very thick body of sedimentary rocks. Remnants of this layer are recognized in the Santa Lucia and Santa Cruz Mountains over an area about 90 miles long and 35 miles wide. These rocks were buried at great depths (on the order of five miles or more) and then intruded from below by molten rock. The molten rock eventually cooled to form large bodies of granitic rock beneath the sedimentary rocks, and the sedimentary rocks themselves were transformed by heat and pressure into their metamorphic counterparts of schist and marble, among other constituents. Over the course of tens of millions of years, uplift and gradual erosion removed most of the metamorphic rocks, exposing the granitic rock. The erosional remnants of the metamorphic rocks now exist as small, disconnected bodies of rock embedded in the tops of the granitic masses. As such, most of the metamorphic rock bodies in the Santa Lucia and Santa Cruz mountains are isolated masses, separated by granitic rock. And, the marble and schist bodies are not deep rooted—they bottom out in granitic rock before very great depth (for example, see cross sections by Clark, 1981).

     The outcrop of marble in San Vicente Creek is separated from the marble body in the quarry by over a mile of continuous outcrop or subcrop of granitic rock. These are separate marble bodies, and there is no possibility of a meaningful karstic connection between them. The other large karst aquifer on Ben Lomond Mountain underlies the University of California at Santa Cruz. This marble mass is also separated from the marble mass at Bonny Doon Quarry by continuous granitic rock outcrop. Again, there is no potential for significant hydrologic connection between the two karst aquifers.

Operations at Bonny Doon Quarry would only have a potentially significant effect on areas down gradient from the quarry. Marble bodies on the other side of Ben Lomond Mountain, in the San Lorenzo River watershed, are distant, are not connected to the quarry by continuous marble outcrop, and occur at the roughly the same elevation as the quarry. There is no likelihood of significant groundwater flow from the quarry to these distant outcrops, counter to the existing groundwater gradient north of the quarry (the dye tracer studies show that the groundwater gradient north of the quarry is south directed), across a major topographic divide, and to springs at or near the same elevation. There has been no evidence observed or presented that the quarry has had a significant impact on groundwater levels or flow immediately surrounding the quarry, much less on an area miles away, with little or no hydraulic gradient between the two locales.

We have been provided with anecdotal evidence of small marble outcrops in Laguna Creek, east and southeast of the quarry. We noted a number of previously unmapped, small marble bodies in the reach of Laguna Creek between Ice Cream Grade and Smith Grade, so the existence of additional marble outcrops in lower Laguna Creek is not surprising. These outcrops are not located immediately down gradient of the quarry and are not associated with any regionally significant springs comparable to Liddell Spring. It is possible that these outcrops are in hydraulic communication with the marble mass underlying the quarry. However, in our opinion, even if these small outcrops are connected to the marble mass underlying the quarry by karst conduits, any impacts at springs issuing from these small marble bodies due to quarrying would be highly attenuated in comparison to impacts at Liddell Spring, for two reasons: 1) they are not located directly down gradient from the quarry, and 2) Liddell Spring (and to a lesser extent, Plant Spring) account for the majority of the groundwater budget in the quarry area and therefore serve to focus groundwater flow in the vicinity of the quarry.

As demonstrated in Draft EIR Appendix F, a reasonable understanding of the quarry and Liddell Spring hydrology does not require that the hydrologic system extend significantly into either the San Vicente Creek or San Lorenzo River watersheds. A study of adjacent watersheds and/or groundwater subareas is not necessary to evaluate the potential impacts of the proposed quarry expansion.

105. Again, the study area is not arbitrarily designated. The Draft EIR Appendix F Section 4 demonstrates that the hydrology of the quarry and Liddell and Plant springs is reasonably accounted for by surface water and groundwater processes occurring within an approximate 5.3-square-mile area encompassing the upper watersheds of Laguna and Reggiardo creeks and upper-watershed portions of the East Branch of Liddell Creek upgradient of the two springs.

106. The quarry has had 200 to 300 feet of relatively solid marble removed as a result of quarrying. In comparison, the load imposed by 15 feet of compacted soil and any depth of ponded water is minor and would have no impact on the underlying karst aquifer.

107. See revised mitigation measure HYD-2

108. Comment noted. See responses to Comments III-A-109 and 110.

109. Turbidity impacts from blasting would be mitigated by the mitigation measures provided in the EIR. It is our understanding from the quarry operator that blasting cannot reasonably be scheduled around the weather without significantly interfering with operation of the quarry. However, we would urge the SCCWD to broach this subject independently with the quarry operator if it would facilitate the City's operation. See also response to III-A-16.

110. In our opinion, the recommended mitigation measures, if properly implemented, would mitigate turbidity and sedimentation impacts at the spring. However, coordinated monitoring between the City, the County, and CEMEX can facilitate problem recognition and communication between the different parties should issues arise.

111. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

112. The corrections to the citation list are noted. The Draft EIR team pursued several data requests since preparation began in 2003. The results and status of concurrent studies never began to flow freely to the project, despite these efforts. Toward the end of the Draft EIR process, attention was focused on completing the analysis with information at hand and/or provided without solicitation. This information and independent analysis sufficiently supports the conclusions presented in Draft EIR Appendix F. There are no plans to revise Appendix F. The citation information is appended to the Final EIR through these comments.

113. The compilation of well-documented data from historical and ongoing sources was a challenging task that was sufficiently accomplished for completion of the comprehensive hydrogeologic analysis presented in Draft EIR Appendix F.

114. The improved documentation of monitoring and sampling activities performed by Balance Hydrologics is acknowledged.

115. See response to Comment III-A-114.

116. See response to Comment III-A-114.

117. See response to Comment III-A-114.

118. See response to Comment III-A-114.

119. The comment's referenced quote is provided out of context. This quote is referring to the applicant's proposed quarrying procedures. The comment pertains to issues addressed in Section 5.6.1 of Draft EIR Appendix F. See the revised mitigation measure HYD-2.

120. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

121. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

122. The existence of additional karst features in the area is acknowledged, although no change to Draft EIR conclusions is warranted. To elaborate on the response to III-A-104, we concur that there are several large masses of marble on Ben Lomond

Mountain that form local karst aquifers, as well as numerous smaller marble masses with karstic features. We disagree with the notion that all these areas are, or could be, interconnected. Many of the marble bodies are surrounded, in whole or in part, by granitic rock outcrop that precludes any communication with other areas of karst. In general, areas of schist also present a barrier to karst circulation, although inclusion of marble layers within the schist can promote local rapid flow, possibly aided by flow along major fractures or faults in the schist. Therefore, the statement that "it would be helpful to mention that karst extends well beyond the areas considered..." is not correct in the sense that it implies that the karst is necessarily continuous between these areas. Marble masses of significant size, such that they form karstic aquifers are easily identifiable, since they are associated with distinctive karst terrain, visible at the surface as concentrations of sinkholes and disrupted surface drainage. Theses areas are clearly not continuous across Ben Lomond Mountain. It is possible that karstic marble aquifer extends southward from the area of the quarry under Tertiary sedimentary cover, such that it would not be readily visible at the ground surface. However, there are no major springs downstream from Liddell Spring, indicating that it is the principal terminus for flow through quarry area aquifer.

123. Typo noted.

124. The minimum water level associated with this drop occurred near midnight February 23-24, 2004, as can be seen in the referenced figure.

125. In response to data requests, the Draft EIR was provided with data as it appears in Appendix F, which noted various limitations associated with the data record. Corrected data records, as described in the comment, were not provided. Draft EIR Appendix F makes best use of the information that was available at the time of analysis, which sufficiently supports its conclusions.

126. Clarification of the monitoring activities performed by Balance Hydrologics is acknowledged.

127. See response to comment III-A-125.

128. The results of recent monitoring efforts at Liddell Spring, such as they were available at the time of analysis, are fully represented in Draft EIR Appendix F. "Hourly" was intended to represent various time intervals used by data loggers equal to an hour or less; a need for more specificity is acknowledged.

129. The estimated specific yield derives from experience related to several aquifer tests of the same sandstone formation performed and/or analyzed by the co-author responsible for the hydrogeologic interpretation presented in Draft EIR Appendix F. The estimate is within the range of "textbook" values and is appropriately used in Draft EIR Appendix F to make a rough, "ballpark" estimate of groundwater storage. The Draft EIR conclusions would not significantly differ if an alternate specific yield (e.g., from 12 to 20 percent) were used in this case.

130. PELA (2005) estimated sinking flow at four locations in the Reggiardo and Laguna creek drainages during low flow conditions. These are:

SS-1	150gpm
SS-2	30 gpm

SS-5	40 gpm
SS-8	240gpm
Total	460gpm ~ 1cfs ~ 724 acre-feet per year

Sinking flow at higher stages would be greater. PELA estimated sinking flow at SS-1 of 300 gpm with medium flow in the creek. For the purposes of the water balance, a range of 0.5 to 1.0 cfs (362 to 724 acre-feet per year) was assumed for each watershed. The combined total was rounded to 1,000 acre-feet per year.

131. Comment noted. A reasonable understanding of the solubility of marble and the potential impacts of cyclical base level fluctuations on karst formation is fully reflected in Draft EIR Appendix F.

132. Comment noted. Comment cites recent data and analysis that independently support the hydrogeologic interpretation presented in Draft EIR Appendix F.

133. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

134. Comment noted. Comment cites previous data presentation consistent with the hydrogeologic interpretation presented in Draft EIR Appendix F.

135. Comment noted. Comment cites recent data analysis consistent with the hydrogeologic interpretation presented in Draft EIR Appendix F.

136. Comment noted. Comment suggests alternative data terminology to provide clarification. Nevertheless, the meaning appears to be sufficiently clear in the context used by Draft EIR Appendix F.

137. Comment noted. Comment cites other data analysis consistent with the hydrogeologic interpretation presented in Draft EIR Appendix F.

138. Comment noted. Comment concurs with the hydrogeologic interpretation presented in Draft EIR Appendix F and cites other, consistent data analysis.

139. The comment presents independent estimates of Liddell Spring suspended sediment load (equivalent to about 90 to 150 lbs/day) that correspond reasonably well with the rough, “mid-range” estimate used by Draft EIR Appendix F (125 lb/day).

140. Comment noted. Comment cites other data analysis consistent with the hydrogeologic interpretation presented in Draft EIR Appendix F.

141. In response to data requests, the Draft EIR was provided with data as it appears in Appendix F, which noted various limitations associated with the data record. Corrected data records, as described in the comment, were not provided. Draft EIR Appendix F makes best use of the information that was available at the time of analysis and its conclusions are sufficiently supported.

142. Turbidity in the spring discharge may be due to resuspension of sediment within the karst system during the rising limb of the spring hydrograph or to introduction of turbid water into the karst system from surface sinks. Resuspension of sediment within the karst system takes place as the flow velocity increases in response to surface flow entering the system, which may vary from storm to storm. The size and sharpness of the turbidity spike seen in the spring data suggests introduction of

turbidity from a fairly specific and well-defined source nearer to the spring. Flow paths in karst range for miles, as indicated by the dye tracer studies. If the turbidity were due simply to resuspension of the finest-grained sediment in the karst conduits, the turbidity response would be broader and more sustained due to the large range in travel time for the turbidity pulses coming from different parts of the system. Please see responses to comments IV-A-93 through IV-A-100 for more discussion of this topic.

143. See response to comment III-A-130.

144. Comment noted. Please see revisions to HYD-1 and HYD-2 in the Final EIR.

145. The sediment loading estimate in the Draft EIR Appendix F is meant only to show that the Liddell Spring suspended sediment load is of the correct order of magnitude to be attributable to quarry-influenced sources. The estimates of suspended sediment load at Liddell Spring (page 66 of the technical report), as confirmed by Balance's evaluation of suspended sediment load (comment 139 of the Balance letter), indicate that the amount of sediment loading at the spring can be accounted for with a very small volume of sediment. It is not our intention to attribute all of the sediment and turbidity at the spring to the quarry operation, but to point out that the relatively small volume of sediment responsible for the suspended sediment load could easily be produced by the quarry. The comment concurs with the nature of quarry-aquifer connectivity described in Draft EIR Appendix F.

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Comment Letter III-B
County of Santa Cruz, County Supervisor Neal Coonerty

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III-B

County of Santa Cruz

BOARD OF SUPERVISORS

701 OCEAN STREET, SUITE 500, SANTA CRUZ, CA 95060-4069

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JANET K. BEAUTZ	ELLEN PIRIE	NEAL COONERTY	TONY CAMPOS	MARK W. STONE
FIRST DISTRICT	SECOND DISTRICT	THIRD DISTRICT	FOURTH DISTRICT	FIFTH DISTRICT

September 17, 2007

Todd Sexauer
Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060

RE: BONNY DOON LIMESTONE QUARRY BOUNDARY EXPANSION PROJECT AND RECLAMATION PLAN AMENDMENT - DRAFT ENVIRONMENTAL IMPACT REPORT

Dear Mr. Sexauer:

Thank you for the opportunity to comment on the above mentioned Draft Environmental Impact Report (EIR). Overall, I thought the document contained a good deal of important and relevant information.

The following are my comments on the Draft EIR:

PAGE 2-8 - The DEIR refers to Figure 9 as containing the final mining configuration. However, both this figure and Figure 10 are very difficult to read and understand. It would be helpful to the public if the Final EIR included a more comprehensible site plan for the proposed project. 1

PAGE 3-19 - COUNTY PLANS AND POLICIES - SETBACKS - The DEIR refers to a 150 foot setback standard in the Mining Ordinance but discussion of the application of this standard is not included in the Mining Ordinance discussion starting on page 3-5. Further, the DEIR states that the 25 foot setback of the current Use Permit is "considered reasonable" due to the vested rights CEMEX has. Does the County have the legal ability to impose the 150 foot setback requirement based on the Mining Ordinance provision, if it determined that the current standard setback is necessary to protect the public? 2

PAGE 3-23 - DUST CONTROLS - The DEIR states that the existing Use Permit requirement of no dust blowing onto adjacent properties is impractical and that it should be changed to only require that the State ambient air quality 3 standard be met. The DEIR doesn't analyze the impacts of dust blowing on adjacent properties in the Air Quality section, although this is a legitimate issue for the EIR to consider even if the project meets federal and State air quality standards. This should be considered in the Final EIR. 3

PAGE 4-28 - MEASURE GEO-2 - The DEIR requires the applicant to prepare an updated slope stability analysis to assure that landsliding impacts are sufficiently reduced. Please include when this analysis must be presented to the Planning Department. 4

PAGE 5-37 - MEASURE HYD-2 - The DEIR requires that "at least one additional monitoring well" be drilled to better determine the distance from groundwater to the project. This mitigation measure should be more specific. The Final EIR should specify the number of wells that should be constructed and their general locations. In addition, the Final EIR should make clear that quarrying should be done only when there is sufficient well data to determine that the work will not intrude within 20 feet of the water table. 5

PAGE 5-38 - MEASURE HYD-3 - This measure requires CEMEX to enter into a Memorandum of Agreement (MOA) with the City as a condition of approval of the project for the purpose of reducing potential project-generated turbidity at Liddell Spring to acceptable levels. This mitigation measure as written needs more specificity; in particular, it should include the performance standards that will be established by the MOA and how conformance and/or non-conformance with these performance standards will be monitored by the County. 6

PAGE 6-5 - BIOLOGICAL RESOURCES - UPLAND REDWOOD FOREST - The first paragraph of this section says that most of the redwoods in the expansion area are from 90 to 125 years old "with a few older specimens." Please specify if these older specimens are old growth redwoods, how many trees fall into this category, whether harvesting these older redwoods would constitute a significant impact, and if so, proposed mitigation measures. 7

PAGE 6-29 - MEASURE BIO-2 - This mitigation calls for the relocation of the woodrats to their new, "suitable" habitat. Given how difficult is can be to relocate species, there should be some discussion in the Final EIR of how the relocation will be monitored and what should be done if it fails. 8

Thank you very much for the opportunity to comment on this draft document. I look forward to the responses to these and others' comments in the Final EIR.

Sincerely,

NEAL COONERTY, Supervisor
Third District

NC:lg

cc: City of Santa Cruz Water Department

1026F3

Responses to Comment Letter III-B
County of Santa Cruz, County Supervisor Neal Coonerty

1. Figures 9 and 10 are available in electronic format online at the link provided below. They can be viewed at greater than 100 percent scale for legibility. Full size maps are also available at the County of Santa Cruz Planning Department upon request. http://www.sccoplanning.com/html/env/bonnyeir_index.htm
2. The discussion of the application of the setback standard is included on page 3-19 of the Draft EIR. The County's authority under vested rights is included on page 1-1 of the Draft EIR. Based on the analysis in the Draft EIR specifically the analysis of potential noise and air quality impacts the 25-foot setback standard is reasonable; therefore, additional setback limitations are not necessary or appropriate given the vested rights the quarry operator does possess.
3. Comment noted. Page 3-23 of the Draft EIR states, "The Use Permit requirement of no dust blown onto adjacent land is technically impractical to meet on the north property line boundary." The statement only applies to the "north property line boundary," which is owned by CEMEX. Page 7-11 Section 7.3.3 of the Draft EIR states, "The existing Quarry operation has been found to be in conformance with existing Use Permit conditions and applicable County mining regulations. Based on the Desert Research Institute (DRI) findings PM_{10} emissions from the quarry were concluded not to result in violation of an ambient air quality standard." In addition, Page 3-16 Section 3.3.2 of the Draft EIR states, The Bonny Doon Quarries operate under air quality permits issued by MBUAPCD. No new equipment or point source emissions are proposed as part of the mining expansion project. No new permits from Monterey Bay Unified Air Pollution Control District (MBUAPCD) are required. Expansion of the limestone quarry mining operation boundary would result in fugitive dust emissions as a continuation of existing air quality impacts of the quarry operation. Excessive dust emissions could occur if the overburden removal work areas exceed the acreage limits identified by MBUAPCD. With existing control measures in place as required by the Mining Regulations, COC Conditions of Approval, and project mitigation limiting the size of the overburden removal phases (AQ-1), the project effects on air quality is determined to be less than significant (see Air Quality discussion in Section 7.0). With this mitigation, the project complies with the MBUAPCD Air Quality Management Plan and therefore complies with GP/LCP Air Quality Policy 5.18.1." No significant impacts on adjacent residences from dust emissions are anticipated.
4. Comment noted. See revised mitigation measure GEO-2. The language on Page 4-30 of the Draft EIR, "Updated stability evaluations shall be submitted to County for review and approval prior to commencement of project" has been changed to read "prior to inception of mining in the Boundary Expansion Area" in the Final EIR. CEMEX is currently preparing the updated Slope Stability Analysis.
5. Comment noted. See revised mitigation measures HYD-2.
6. Comment noted. Mitigation Measure HYD-3 on Page 5-38 of the Draft EIR has been revised in the Final EIR. The measure no longer requires a Memorandum of Agreement between the City and CEMEX. The measure now relies on the existing

1964 Agreement that has been included as a condition of approval in the Certificate of Compliance. See revised mitigation measures HYD-3.

7. Please see response to Comment II-C-11. No old growth redwoods have been identified within the proposed Expansion Area. The entire area is composed of second growth redwoods; hence, the observation of “old growth stumps.”

8. Please see response to Comment II-D-7.

Comment Letter III-C
Association of Monterey Bay Area Governments

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AMBAG
ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS

September 14, 2007

Mr. Todd Sexauer
County of Santa Cruz Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060

**Re: MCH# 20070811 – Draft Environmental Impact Report
Bonny Doon Limestone Quarry Boundary Expansion Project**

Dear Mr. Sexauer:

AMBAG's Regional Clearinghouse circulated a summary of notice of your environmental document to our member agencies and interested parties for review and comment.

The AMBAG Board of Directors considered the project on **September 12, 2007** and has no comments at this time. 1

Thank you for complying with the Clearinghouse process.

Sincerely,

Nicolas Papadakis
Executive Director

SERVING OUR REGIONAL COMMUNITY SINCE 1968
445 RESERVATION ROAD, SUITE G ✦ P.O. BOX 809 ✦ MARINA, CA 93933-0809
(831) 883-3750 ✦ FAX (831) 883-3755 ✦ www.ambag.org

Response to Comment Letter III-C
Association of Monterey Bay Area Governments

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

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Comment Letter III-D
Monterey Bay Unified Air Pollution Control District

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MONTEREY BAY
Unified Air Pollution Control District
serving Monterey, San Benito, and Santa Cruz counties

AIR POLLUTION CONTROL OFFICER
Douglas Quetin

24580 Silver Cloud Court • Monterey, California 93940 • 831/647-9411 • FAX 831/647-8501

February 14, 2008

Mr. Todd Sexauer, Project Planner
County of Santa Cruz
Planning Department
701 Ocean Avenue, 4th Floor
Santa Cruz, CA 95060

SUBJECT: DEIR FOR BONNY DOON QUARRY

Dear Mr. Sexauer:

In response to your request for comments from the Air District prior to the County's redrafting and recirculating a Draft EIR for the Bonny Doon Quarry's expansion, it suggests the following for your consideration:

Table1-1 Permit Requirements, Pg. 1-3 – The table indicates no change. While the District permits may not be revised, proposed District Rule 440, as described below, would become an operational requirement for all quarries in the air basin.

Rule 440, Mineral Processing – Proposed District Rule 440, Mineral Processing Facilities is scheduled for adoption by the Air District Board in March 2008. The rule would require that the operator apply due diligence in mitigating the off-site drift of fugitive dust, such that opacity beyond the property line does not exceed 5% for three minutes in any given hour. In addition to standard work practices, the operator would be given discretion to apply specific measures he finds most appropriate for the circumstance to stay within this limit. This includes limiting offsite drift of fugitive dust following blast events. If the Board adopts the rule as proposed, the following requirements would apply:

PART 3 REQUIREMENTS AND STANDARDS [Text from proposed Rule 440] 1

3.1 Visible Emissions

Visible emissions shall not exceed 5% opacity or equivalent Ringelmann 1/4 for a period or periods aggregating more than three minutes in any given hour beyond the property line of the facility.

3.2 Work Practice Standards

The following work practice standards shall be followed:

3.2.1 For all plant operations, including stockpiles, sufficient natural or added moisture shall be contained in process materials to prevent excessive fugitive dust emissions.

3.2.2 *Haul roads, access roads, and general plant areas shall be paved, sprayed with chemical stabilizers, kept sufficiently moist, or otherwise maintained to prevent excessive fugitive dust emissions from on and off road equipment.*

3.2.3 *Limit vehicular speed on unpaved roads to prevent excessive fugitive dust emissions.* 1

3.2.4 *Sweep or wash down paved areas, or install wheel washers to reduce track out to prevent excessive fugitive dust emissions.*

3.2.5 *Control spills in bulk loading areas to prevent excessive fugitive dust emissions.*

Air Quality, Pg. 2-14 (Ozone) – The section refers to consistency with the 2000 AQMP. Please note that the current AQMP is the 2004 AQMP, which is scheduled to be updated again in 2008. 2

Air Quality, Pg. 2-14 (PM10) – Since the time of the Initial Study in 2001, the District adopted a plan to make progress toward meeting the State standard for PM_{10}. The plan, entitled "Senate Bill 656 Implementation Plan, 2005 Report on Attainment of the California Particulate Standards in the Monterey Bay Region." The plan was adopted by the District in December 2005. Fugitive dust from quarrying operations was identified as an air quality concern in the plan, which included the adoption of a control measure for mineral processing facilities (Rule 440 described above). Compliance with Rule 440, which limits fugitive dust, should be added to the paragraph describing air quality concerns. In addition to the requirements of proposed Rule 440, the Air District suggests that the quarry operator implement the following mitigation measures to control fugitive dust: 3

- Apply chemical soil stabilizers on inactive construction areas (disturbed lands within construction projects that are unused for at least four consecutive days)
- Apply non-toxic binders (e.g., latex acrylic copolymer) to exposed areas after cut and fill operations, and hydro-seed area.

Air Quality, Pg. 2-14 – The District's September 13, 2002 comment letter responding to the County's September 4, 2002 Notice of Preparation for this project asked for evidence that the expansion would not create significant PM_{10} impacts on nearby residents.

As a result of long standing concerns about fugitive dust and possible exceedances of the State PM_{10} standard, the applicant previously commissioned an extensive monitoring and modeling study (ref. DRI 1999, pg. 7-4) of the project area to determine whether or not existing operations significantly contribute to PM_{10} levels or exceedances of the PM_{10} standard at the nearest offsite residential receptors. Results of the year long study demonstrated that there were no exceedances at the nearest residential locations, including days with intensive blasting. Although data from the blast days indicated short term increases in PM_{10} lasting several minutes near the quarry rim, the contribution to the 24-hour average was inconsequential at the rim and nearest residence. Peak 24-hour concentrations were half the 24-hour standard. Highest annual averages were also half the current annual standard, which has been downwardly revised from 30 to 20 ug/m3. These are typical, if not lower than PM_{10} levels monitored elsewhere in the air basin. The DEIR indicates that the best management practices for limiting fugitive dust from blasting, quarrying, and other activities on unpaved areas that were in effect during the study are to continue with the continuing operations. 4

Because the residents nearest to the expanded quarry area (closest 1,320' per Table 7-1) are no closer to the operation than the nearest residents were during the DRI study (former Sola residence ~300 meters or 1,000' NE of pit, now CEMEX Parcel C5), and this project represents a continuation of existing operational levels, impacts are not expected to be any higher than they were during the study period. This study adequately addresses District concerns that the continuing operation would not cause significant PM_{10} impacts on nearby residents and that the PM_{10} standard will be maintained in the project area. 4

7.1.2.1 Particulate Matter (PM10), Pg. 7-1 to 7-2. - A paragraph should be added at the end of this section to indicate that in 2003 the Air Resources Board adopted an annual $PM_{2.5}$standard. The NCCAB is one of the few areas in the State to be designated an Attainment area for this standard. Also, the title of this section should be revised to indicate "Particulate Matter (PM_{10} and $PM_{2.5}$)" since the section actually discusses both. 5

7.3.2 Site Preparation, Pg. 7-10 – Mitigation Measure AQ-1 proposes to limit ground clearing to 8.2 acres per day and overburden stripping to 2.2 acres per day, thus limiting soil disturbance to the District's significance threshold. As standard practice, all areas to be disturbed should be watered as much as possible to mitigate the generation of fugitive dust. 6

§ 7.3.4. Diesel Particulate TACs, Pg. 7-12 – The health risk analysis described in the DEIR, as well as the recent October 2007 Health Risk Assessment, indicate that if the operation were to continue for 70 years, an increased cancer risk could occur in off-site areas near the quarry due to emissions of Diesel Particulate Matter (DPM). The October 2007 assessment is based on diesel equipment subject to District permits, such as crushers, screens, drill rigs and generators but not on-site mobile vehicles, such as loaders, bulldozers and trucks. The results indicate that the excess cancer risk due to DPM from quarry engines may exceed 1 in 100,000 in off-site areas near the property line, although this is reduced to 0.2 in 100,000 at the nearest resident. The Recirculated DEIR should assess the risk from DPM to the nearest resident from both stationary and mobile sources. Emissions of DPM could be substantially reduced by installing diesel particulate filters, using biodiesel fuels or incorporating a combination of these measures. 7

Thank you for the opportunity to comment on the document.

Sincerely,

Jean Getchell
Supervising Planner
Planning and Air Monitoring Division

cc: Bob Nunes, Planning and Air Monitoring Division
Lance Ericksen, Engineering Division

Response to Comment III-D:
Monterey Bay Unified Air Pollution Control District

1. Comment noted. Table 1-1 on Page 1-3 of the Final EIR has been revised to include a note to notify the reader that MBUAPCD Rule 440 was adopted in March of 2008 and is discussed in detail in Section 7.2.3 of the Final EIR.
2. Reference to 2000 Air Quality Management Plan (AQMP) has been revised to reflect the 2008 AQMP. See Text Amendments.
3. MBUAPCD Rule 440 is referenced under Air Quality on Page 2-14. In addition, a discussion describing the purpose and requirements of Rule 440 has been added on Page 7-8 under Section 7.2.3 Monterey Bay Unified Air Pollution Control District (MBUAPCD).
4. Comment noted. The MBUAPCD concurs with the Draft EIR conclusion that the proposed boundary expansion project would not cause significant PM_{10} impacts on nearby residents and that the PM_{10} standard would be maintained in the project area. No additional response is required.
5. A paragraph has been added to Section 7.1.2.1 Particulate Matter (PM_{10} and $PM_{2.5}$ that discusses the adoption of the $PM_{2.5}$ standard by California Air Resources Board in June of 2002. The title of Section 7.1.2.1 was changed to include Particulate Matter $PM_{2.5}$.
6. Comment noted. The standard practice of watering disturbed areas to mitigate the generation of fugitive dust is required under COC Condition of Approval III.G.2.
7. The October 2007 study "California Air Toxics "Hot Spots" Program, AB2588 Health Risk Assessment for RMC Pacific Materials dba CEMEX , Davenport, California," was not prepared for the Draft EIR circulated for public review in July 2007, but as a requirement of AB2588. The Air Toxics "Hot Spots" Act is designed to provide information to state and local agencies and to the general public on the extent of toxic air contaminant emissions from "stationary" sources and the potential public health impacts of those emissions. As a result, this study focuses on stationary sources of emissions. Section 7.3.4 of the Draft EIR addresses mobile sources of emissions and virtually all of the stationary sources of emissions. In addition, the analysis in the Draft EIR uses larger annual emissions for Diesel Particulate Matter (DPM). Based on a very conservative analysis the Draft EIR concludes that DPM emissions would represent a less than significant impact at the nearest sensitive receptor. This is consistent with the conclusions of the October 2007 Health Risk Assessment.

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Comment Letter IV-A
CEMEX

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CEMEX
700 Highway 1•Davenport, California 95017
(831) 458-5700 •Fax (831) 458-5779

Hand Delivered

October 1, 2007

Mr. Todd Sexauer
County of Santa Cruz Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060

Re: CEMEX Comments on Draft Environmental Impact Report for the Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment

Dear Mr. Sexauer:

Please find attached comments prepared by CEMEX on the Draft Environmental Impact Report (DEIR) for the Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment for consideration in preparing the Final Environmental Impact Report (FEIR). CEMEX very much appreciates the County's extensive efforts in preparing the analysis and conclusions for the DEIR, especially with the complexities of the issues contained therein.

CEMEX suggests that the County Planning Department schedule a technical meeting to include the County Planning Department and the County's consultants, the City of Santa Cruz Water Department and their consultants, as well as CEMEX and their consultants. The purpose of the meeting will be to discuss and clarify the various technical conclusions and interpretations relating to Liddell Spring from both the City's and CEMEX's perspective. We believe this will help the County's consultants to prepare the FEIR. 1

Please give me a call at (831) 458-5711 if you have any questions or need additional information. We look forward to moving this process forward to the FEIR and a decision on the permit amendment approval.

Sincerely,

Robert Walker
Quarry Manager

Cc: Satish Sheth
Janet Krolczyk
Louis Schipper

IV-A

CEMEX COMMENTS SUBMITTED TO COUNTY OF SANTA CRUZ PLANNING DEPARTMENT

October 1, 2007

Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment Draft Environmental Impact Report

State Clearinghouse #2001112115

Comments on Summary of Project Impacts and Mitigation Measures

Mitigation Measure	CEMEX Comments	
Measure GEO-1: Update seismic stability evaluations for the settlement basins that will be receiving runoff from the quarry and modify the levees as needed based on recommendations.	• CEMEX agrees. • The evaluations will be completed by Murray Engineers, Inc. and submitted to the County Planning Dept. (*See Attachment 1).*	2
Measure GEO-2: Update the slope stability analysis of the cut slopes using methods for jointed rock slopes and update the slope stability analysis for the overburden cut slopes using methods appropriate for soft rock or soil slopes. All project slopes shall be redesigned as needed to achieve the minimum safety factor.	• CEMEX agrees. • The analysis will be completed by Murray Engineers, Inc. and submitted to the County Planning Dept. *(See Attachment 1).* • It is anticipated that the configuration of the final benches will be designed in conjunction with the revised drainage plan required by HYD-1.	3
Measure GEO-3: Prohibit placement of quarry waste on the slopes surrounding Liddell Spring. Control drainage in areas above Liddell Spring and prevent runoff from flowing across the landslide mass and older quarry spoils above the spring.	• CEMEX agrees. • CEMEX has been implementing this measure since mid-year 2000. • CEMEX will continue to follow this practice.	4
Measure HYD-1: Design an engineered drainage plan, which supersedes the approved Final Drainage Plan. Dispose of overburden and spoils across the entire floor of the quarry pit with an engineered graded filter or other sediment barrier beneath to prevent sediment from reaching the karst aquifer through fractures and other pathways. Design the fill to retain and slowly infiltrate drainage from the quarry from the quarry pit into the karst aquifer. Limit retention pond depths to avoid retaining water year-round. Direct any un-retained water to settlement basins. Establish drainage and erosion controls for use in the Boundary Expansion Area during overburden removal.	• CEMEX agrees to design and install an engineered drainage system as described in HYD-1 as a proactive measure. • However, CEMEX strongly disagrees that sediment from the quarry floor is the cause of sediment and turbidity at Liddell Spring at the impact levels suggested by the County's consultant based on supporting tests and studies presented by CEMEX's karst hydrology experts. *See CEMEX Hydrology Comments, and Attachment 2.*	5
Measure HYD-2: Augment the water level monitoring program with at least one additional well drilled to coincide with the planned northeast corner of the floor of the Boundary Expansion Area. Install continuously reading water level data loggers in monitoring wells. Continue monitoring through the mining period, or at least until water levels during consecutive significantly higher than average rainfall seasons are recorded.	• CEMEX agrees to install the one additional well. • CEMEX agrees to install continuous reading water level data loggers in all four (4) monitoring wells within and around the Proposed Expansion Area.	6

Mitigation Measure	CEMEX Comments	
Measure HYD-3: CEMEX shall enter into a written agreement with the City of Santa Cruz for the purposes of reducing project generated turbidity at Liddell Spring to acceptable levels set by the EPA.	• CEMEX agrees to enter into a written Memorandum of Agreement with the City of Santa Cruz for purposes of reducing project generated turbidity at Liddell Spring as described in the CEMEX Comments on Hydrology. • However, CEMEX requests the County Planning Dept. to require that a signed Agreement be executed no later than the date of the hearing before the Planning Commission. If such agreement is not executed by said date, then the County should impose an alternative mitigation measure commensurate with the performance standards as discussed in *CEMEX Hydrology Comments*. A written agreement between two parties is too speculative to be the only mitigation measure and may involve unnecessary delays to the project. • Additionally, CEMEX strongly asserts that it is inappropriate to apply EPA drinking water standards at Liddell Spring prior to water treatment at the Graham Hill Water Treatment Plant (GHWTP). The EPA values apply to water after it has been filtered for turbidity/sediment and treated for other contaminants (such as fecal and total coliform) at a water treatment plant. The water from Liddell Spring is eventually commingled with other untreated North Coast water sources prior to delivery to the GHWTP. The water is then treated to meet strict EPA drinking water standards and then delivered to customers. *See CEMEX Hydrology Comments for further clarification.*	7
Measure BIO-1: Assess three identified sites to determine which site has best suitable SFDW habitat. Collect additional data on habitat conditions and use in the Boundary Expansion Area to determine: a) whether the a typical redwood forest habitat is suitable for long-term use by SFDW and can be used for the conservation easement; and b) how many acres of SFDW habitat will require replacement at the 1:1 ratio. Based on assessment, select the preferred site and place a habitat conservation easement over suitable SFDW habitat at a ratio of 1:1.	• CEMEX agrees to implement this measure if deemed necessary by the county after further evaluation of comments submitted by CEMEX's consultant, Dana Bland. *(See Attachment 4.)*	8

Mitigation Measure	CEMEX Comments	
Measure BIO-2: Actively relocate up to 40 SFDW from the Boundary Expansion Area prior to land clearing activities in accordance with a SFDW Mitigation Plan. Passively relocate any remaining SFDW.	• CEMEX agrees to implement this measure if deemed necessary by the county after further evaluation of comments submitted by CEMEX's consultant, Dana Bland. *(See Attachment 4.)*	9
Measure BIO-3: Revise the proposed 1996 Reclamation Plan Amendment to incorporate sensitive habitats, reinstate a test plot system and to update the vegetation maps by incorporating the 2005 Alternative Revegetation Plan approach. Also, revise the 1996 Reclamation Plan Amendment to include the hydrophytic species necessary to revegetate the quarry floor with water tolerant (seasonal wetland) species.	• CEMEX agrees to implement this measure.	10
Measure BIO-4: Prohibit tree removal or land clearing that removes nesting habitat during nesting season from February 15 to August 30. Alternatively, conduct pre-construction nesting surveys prior to disturbance during nesting season. If nesting birds are detected within the construction zone, develop methods of avoiding active nest sites in coordination with the CDFG.	• CEMEX agrees to implement this measure if deemed necessary by the county after further evaluation of comments submitted by CEMEX's consultant, Dana Bland. *(See Attachment 4.)*	11
Measure BIO-5: Implementation of the Performance Standards outlined in Section 16.54.055 of the County Code. Incorporation of Revegetation Performance Standards into the revised Revegetation Plan component of the 1996 Reclamation Plan Amendment (see Bio-3).	• CEMEX agrees to implement this measure after consideration by the county of comments submitted by CEMEX's consultant, Biotic Resources Group. *(See Attachment 4)*.	12
Measure BIO-6: Implementation of the Performance Standards outlined in Section 16.54.055(h) of the County Code.	• CEMEX agrees to implement this measure.	13
Measure BIO-7:	• This measure is mentioned on Page S-3, but there is no discussion of BIO-7 in Section 6.4 of the DEIR. We believe this may be a typographic error and should be removed.	14
Measure AQ-1: CEMEX shall limit active work areas for site preparation to less than 8.2 acres for vegetation clearing or 2.2 acres for overburden stripping at any point in time.	• CEMEX questions the reasoning for this measure as the measure is typically required for construction activity. • CEMEX requests the County to review this measure with the MBUAPCD to determine if this measure is necessary for our activity.	15

COUNTY PLANS AND POLICIES

3.3.3 Conformance with Mining Regulations

Page 3-19, Setbacks

1. The 25-foot setback discussion should be corrected to include the following description of the property boundary.

    a. On the east boundary of the Proposed Boundary Expansion Area, there is an existing 1,000 foot buffer zone between the proposed boundary expansion area east boundary line and the ultimate CEMEX property boundary line. This provides a 1,000 foot setback from the CEMEX proposed boundary expansion area from the ultimate CEMEX property line that is adjacent to non-CEMEX owned properties and roadways. 16

    b. On the north boundary of the Proposed Boundary Expansion Area, CEMEX owns the property immediately adjacent to the Proposed Boundary Expansion Area north boundary line. Therefore, the Proposed Boundary Expansion Area boundary actually exceeds the 150 foot setback in the County ordinance.

GEOLOGY AND SOILS

4.3.3.1 Liquefaction Hazard

Page 4-16, paragraph 2

1. Recommended improvements to Sediment Basin 4 were completed in 2001 and 2002 under the direction of the Santa Cruz Planning Department. Plans were signed by the County Geologist.
2. A copy of the plans should be available in the county files.
3. Accordingly, please correct this information in the DEIR.

17

4.3.4.1 Stability Evaluation of Proposed Limestone Quarry Boundary Expansion

Pages 4-19 through 4-21, slope stabilities

1. Previous studies that were completed and accepted by the County were conducted under the regulatory requirements in effect at the time of the study. Tighter regulations are now in place, so the conclusion that the existing studies are in error is not correct. *See comments from Murray Engineers, Inc., Attachment 1.*
2. Accordingly, please correct the statement regarding the error in the studies by stating that new regulations have been promulgated that now impose stricter requirements.

18

4.3.4.2 Summary of Quarry Slope Stability Impacts

Page 4-23, 3rd full paragraph, 2006 landslide

1. This landslide is wholly within the current quarry limits and its plane movement was along an inactive fault shear that daylights above the upper haul road. The fault is truncated to the north by the east-west oriented fault. The majority of the amendment area is not affected by this condition.
2. Accordingly, please correct this information.

19

4.3.4.3 Liddell Spring Landslide

Page 4-24, first full paragraph

1. The "more recent" debris flows were actually caused by failure of a haul road to A Dump in the 1970's. This road was constructed with fill material comprised of overburden material. 20

2. Accordingly, please correct this information.

4.4 Mitigation Measures

Mitigation Measure GEO-1

1. This measure will be completed by Murray Engineers, Inc. See *Attachment 1* for Murray's comments. 21

Mitigation Measure GEO-2

1. This measure will be completed by Murray Engineers, Inc. See *Attachment 1* for Murray's comments. 22

2. It is anticipated that the configuration of the final benches will be designed in conjunction with the revised drainage plan called for in HYD-1.

Mitigation Measure GEO-3

1. This measure has been in effect since mid-year 2000. CEMEX will continue to follow this practice. 23

HYDROLOGY AND WATER QUALITY

5.1.1 Hydrologic Setting

Page 5-2, last paragraph

1. This paragraph refers to Figure 23, which references SH3 as being a sinkhole location and this is incorrect.
2. The PELA study suggests that SH3 is not a sinkhole. SH3 is likely to be a historic "borrow" pit. 24
3. Accordingly, please correct this reference to SH3.

5.1.2.1 Hydrogeologic Units

Page 5-8, 1st paragraph (water bearing rocks)

1. Caution should be exercised in the evaluation of the drill logs referred to in this paragraph. These holes were drilled by several different methods (core, reverse-circulation, tri-cone rotary, etc.). The holes were also logged by people of varying experience ranging from high school students to Registered Professional Geologists. What was described as a void could be anything from an actual karst solution void to poor drilling circulation. This fact could have bearing on Nolan's overall porosity calculation. 25
2. Accordingly, please re-evaluate and make the appropriate corrections.

Page 5-8, 2nd paragraph (ground water levels)

1. Deep ground water does not necessarily mean "rapid and deep drainage". 26
2. Much of the ground water that feed Liddell Spring enters the karst system at locations that are 2 miles away. 27
3. The shallow wells that are typical of Bonny Doon are screened in the overlying Santa Margarita formation. Shallower wells are cheaper to drill and complete and to pump, and typically will provide sufficient water. 28

5.1.2.4 Conceptual Ground Water Model

1. Please revise the conceptual ground water model to reflect PELA's comments to the DEIR Chapter 5, Hydrology and Water Quality and the Technical Appendix. [See PELA's comments in *Attachment 2*.] 29

2. Please advise if you would like to schedule a technical meeting with the County's consultants and CEMEX consultants to discuss these issues further to ensure that the FEIR reflects the correct information. 30

3. Some of the main points set forth by the PELA comments are as follows:

   a. Karst development in the area is controlled by both structure and lithology. The lithologic control creates contact zones between the marble and the non-karst rocks, which constitutes the boundary water inputs into the marble. The boundary conditions should be adequately addressed in discussions of groundwater flow and sediment transport in the system. 31

   b. It is not appropriate to combine the water levels in the Santa Margarita Sandstone and perched water levels in the marble to create one set of contours. Moreover, the numerous perched zones in the marble are controlled by the sporadic occurrence of irregular lenses of interbedded schist and are not part of a single, shallow groundwater aquifer. Rather, they are isolated and independent zones leaking downward. The shallow groundwater contours and the conclusions therein should be revised. 32

   c. The water percolation through the quarry floor results from the removal of several hundred feet of marble and the blasting in the quarry. An open connection between the unsaturated and saturated zones at the normal ground surface is not supported by the isotope ratio analysis, water level measurements over several years, and two separate tracer tests. Many fractures on the quarry walls are in the process of being filled or have already been filled, and are not open pathways for recharge 33

5.3.2 Hydrologic Impacts

1. Please correct the information and conclusions in the DEIR Chapter 5, Hydrology and Water Quality, and the Technical Appendix to reflect PELA's comments in *Attachment 2*. Some of the main points set forth by the PELA comments in *Attachment 2* are provided below. 34

   a. Many sources contribute to sediment and turbidity at Liddell Spring, including the local sinking streams, the sinkhole plain, the quarry floor, and the landslide. Different responses of turbidity, discharge, and specific conductance to various 35 storms indicate the initial turbidity spike is caused by re-suspension of sediments already in the conduits not direct transport from the quarry floor. 35

b. When both turbidity and discharge responded to rainfalls, the initial increase of turbidity is at approximately the same time as the initial increase of the discharge. This is not related to the arrival of any muddy water from any source, local or distant. It is simply the mobilization of fine grained sediment which was stored in the conduit system during low flow. The actual water which is sinking in the creek bottoms does not arrive for some time, days or weeks depending on the source, but the instantaneous pressure pulse immediately increases the flow velocity and the associated turbidity. This rapid turbidity response was a part of many of the conclusions about the quarry floor as a major source for turbidity. These conclusions should be revised in light of an appropriate understanding of the processes involved. 36

c. The relationship between discharge, turbidity, and specific conductance at Liddell Spring strongly suggests that the rising limb of the hydrograph recorded at the spring is not composed of recently added storm water. Rather, the water that first arrives at the spring is that flushed out of the conduits and adjacent fractures. The fact that most turbidity peaks preceded the timing of the specific conductance maximum indicates that the primary source of the turbidity is re-suspension of sediments already in the conduits. 37

d. The lack of a relationship between discharge and turbidity, as a result of phase difference and turbidity hysteresis, is characteristic of many karst springs and not evidence that the quarry pit is the main source of turbidity at Liddell Spring. 38

2. Please revise the conclusion that suggests that the quarry pit is the major source of turbidity as explained in the PELA comments in *Attachment 2* and as supported by well-documented hydrodynamic principles in karst systems. The PELA comments provide the following main points. 39

a. Two trials of a turbidity infiltration test were conducted at the quarry floor, one at the southern end of the quarry and another at the northern end. The test results indicate that the quarry floor is not a source of more than negligible turbidity at Liddell Spring, even though infiltration from the quarry floor does occur. 40

b. The direct comparison of the dye tracer test at NZA to the natural percolation of particle-laden water from the quarry flow ignores the facts that the dye was introduced into a fracture zone approximately a hundred feet below the bottom of the quarry. The dye travel time (~7.5 hours) is not in any way equivalent to the flow time from the quarry bottom, nor to the transport of particulate matter. 41

c. The similarity between the water level fluctuations in a small pond in the quarry floor and the turbidity fluctuations at Liddell Spring does not prove a cause-and-effect relationship, just as the similarity between the hydrograph at Majors 42

Creek, which is totally outside of the karst area, and the turbidigraph at Liddell Spring does not prove a cause-and-effect relationship between those processes. 42

d. An analysis of the turbidity spikes (sensor 1720-C) caused by blasting events for the years 2004 through 2007 shows that approximately 24% of blasts caused a turbidity increase of more than 2 NTU and only 2.5% caused a turbidity increase of greater than 25 NTU, the threshold used by the Santa Cruz Water Department to turn out the Liddell Spring source. 43

e. A summary of the turbidity spikes caused by blasting events from November 2004 through July 2007 is outlined below. The data is derived from the Santa Cruz Water Department's data collected at Liddell Spring. 44

Water Year	Blast Events	Increase ≥ 2 NTU	Increase ≥ 25 NTU
2005 11/1/04 - 9/30/05	68 Blasts	17 (25%)	None
2006 10/01/05 – 9/30/06	86 Blasts	28 (33%)	2 (3%)
2007 10/1/06 – 7/26/07	50 Blasts	7 (14%)	3 (6%)

Note: The blasting-induced turbidity spikes typically last less than 10 hours.

5.4 Mitigation Measures

Mitigation Measure HYD-1

1. CEMEX agrees to design and install an engineered drainage system as described in HYD-1 as a proactive measure.

2. However, CEMEX strongly disagrees that sediment from the quarry floor is the cause of sediment and turbidity at Liddell Spring at the impact levels suggested by the County's consultant based on supporting tests and studies presented by CEMEX's karst hydrology experts and further clarified in the PELA comments summarized herein and provided in *Attachment 2*. 45

Mitigation Measure HYD-3

1. CEMEX agrees to enter into a written Memorandum of Agreement with the City of Santa Cruz to address reducing project generated turbidity at Liddell Spring with conditions as set forth in the following comments. 46

2. CEMEX requests the County Planning Dept. to require that a signed Agreement be executed no later than the date of the hearing before the Planning Commission. If such agreement is not executed by said date, then the County should impose an alternative mitigation measure commensurate with the performance standards as discussed in *CEMEX Hydrology Comments*. A written agreement between two parties is too speculative to be the only mitigation measure and may involve unnecessary delays to the project. 47

3. CEMEX strongly asserts that it is inappropriate to apply EPA drinking water standards at Liddell Spring prior to water treatment at the Graham Hill Water Treatment Plant (GHWTP). The EPA values cited (<1 NTU all the time, and 0.3 NTU in 95% of the samples) stem from the Interim Enhanced Surface Water Treatment Rule (IESWTR) published at 40 CFR 141.170 - 141.175 (1998). As of January 1, 2002 all public water systems serving > 10,000 people must meet these values for their combined "filter effluent" (water coming out of their filters).

   These standards apply to treatment of surface water or ground water under the influence of surface water. The values apply specifically to water that has been "filtered". There are no standards for turbidity in the water coming into the plant. However, if the surface water treatment plant wanted to avoid providing filtration, then the turbidity must be less than 5 NTU (in addition to other requirements for fecal and total coliform). This is not the case for the water from Liddell Spring in that the Liddell Spring water commingles with the other untreated North Coast water sources prior to delivery to the GHWTP. The water is then treated to meet strict EPA drinking water standards and then delivered to customers. 48

   In addition, under the feasibility section of this measure, Rob Walker was completely misquoted as he never stated that CEMEX was attempting to clean the Liddell Spring water to EPA drinking water standards. Rob Walker advised the County Planning Department by e-mail dated July 31, 2007 about this incorrect statement contained in the DEIR, including the wrong date of the personal communications on this subject.

   Accordingly, please remove the following requirements from the DEIR: 1) to meet EPA standards at Liddell Spring; 2) to meet specified water quality levels in the MOA; and 3) to cease quarry operation until the specified level of treatment is achieved (page 5-39).

4. After extensive evaluations, CEMEX asserts that it is inappropriate to require any installation of a turbidity filtration system at Liddell Spring based on the following technical reasoning. 49

   a. The standards cited in the DEIR (1 NTU and 0.3 NTU) are water treatment standards, and should be applied as such, as described above in Item #3. It would not be appropriate to apply these drinking water standards to the quality of Liddell Spring exiting the hillside. 50

b. It is our understanding that the SCWD has consistently demonstrated that the water from Liddell Spring can be treated at the GHWTP to meet all relevant EPA standards. Only on a limited number of occasions has turn-out of Liddell Spring waters become necessary. Hence providing a filtration process to treat Liddell Spring is not a judicious use of resources. 51

c. To construct a water filtration plant at Liddell Spring will result in significant resources being spent on peripheral matters that do not result in an increase in water quality or quantity. These include siting issues, geotechnical issues, permitting issues, additional environmental impact issues, excess energy consumption issues, obtaining access, slope stabilization, etc... The "unit cost" of this type of construction project ($ spent per gallon treated) will be unreasonably high. 52

d. The percentage of time that treatment is required is believed to be very small compared to the percentage of time that Liddell Spring flows very clean as supported by the turbidity data collected at Liddell Spring by the City of Santa Cruz and summarized in the PELA comments in *Attachment 2*. Constructing a full scale filtration plant to treat Liddell Spring water all the time, when treatment is only required for a small portion of the time, makes little practical or economic sense. Furthermore, as provided by the CEQA Guidelines, a mitigation measure must be "roughly proportional" to the impact it seeks to address. (CEQA Guidelines § 15126.6(a)(4)(B).) CEMEX believes a full-scale treatment plant to mitigate for small, infrequent and temporary water quality impacts is not a proportional mitigation measure. 53

e. Even if CEMEX was to provide pristine quality drinking water after treatment, the water would still be combined with other untreated water sources (Laguna and Majors Creeks) before being transported to the GHWTP for treatment. Turbid suspended matter from Laguna/Regiardo and Majors Creeks could still settle out in the North coast transmission pipeline, even if Liddell Spring waters are treated at the source. The Liddell Spring water would essentially be treated twice, which would unnecessarily consume additional natural resources and be a waste of chemicals, energy and manpower. 54

f. Removing turbidity at Liddell Spring will have no net positive effect on treatment efficiency or results at the GHWTP. There will not be any significant reduction in chemical use, sludge production, chlorine demand, etc at the GHWTP even if distilled water quality was produced at Liddell Spring. Given these factors, the money spent on a treatment system at Liddell Spring would be better invested in the overall betterment of the North Coast system. 55

5. CEMEX has already conducted a pilot test for filtration and verified that the water is filterable, but the cost of filtration treatment at Liddell Spring will be cost- 56

prohibitive as discussed above. Therefore, please remove any reference to CEMEX conducting any future pilot tests for a filtration system. 56

6. CEMEX agrees to enter into a Memorandum of Agreement with the City of Santa Cruz that includes the following performance standards as set forth in the letter to the City of Santa Cruz, dated September 24, 2007. A copy of this letter is included in *Attachment 3*. 57

   a. CEMEX proposes to design, install, operate and maintain a sediment trap at Liddell Spring to effectively remove particles that otherwise would settle out in the SCWD's transmission pipelines. The sediment trap installation at Liddell Spring will be a benefit to the SCWD in that it will treat all sediment exiting the spring that is contributed by all sediment sources, which include limited sediment from the quarry operation. The cost of this measure is estimated to be around $630,000. 58

   b. CEMEX intends to install and maintain an engineered drainage system within the quarry floor to prevent sediment from reaching the underlying Karst aquifer through fractures and other pathways as described as Mitigation Measure HYD-1 in the DEIR. This measure is estimated to cost approximately $300,000. 59

   c. CEMEX intends to implement all the recommendations set forth in Mitigation Measure HYD-1 in the DEIR to establish appropriate drainage and erosion controls for use in the Boundary Expansion Area during overburden removal and subsequent mining phases. 60

   d. CEMEX intends to implement the recommendations set forth in Mitigation Measure HYD-2 to install one additional monitoring well and implement continuous water level monitoring to ensure that the quarry maintains a minimum of 20 feet above the water table. 61

   e. With the above measures being implemented, the only turbidity impacts contributed from the mining operation will be those related to quarry blasting. Accordingly, CEMEX proposes to compensate SCWD a reasonable amount annually that can be used by SCWD for water treatment costs or infrastructure improvements. This amount would be sufficient to adequately compensate the SCWD for any additional treatment costs for blasting-induced turbid water from the spring, and positively contribute to the overall betterment of the SCWD. 62

CEMEX suggests that the County include the above performance standards in the FEIR as the conditions to the agreement between the City of Santa Cruz and CEMEX to meet the requirement in the DEIR for executing an agreement. 63

BIOLOGICAL RESOURCES

6.4 Mitigation Measures

BIO-1 and BIO-2

1. These measures are addressed in comments submitted by Dana Bland in *Attachment 4*. 64

BIO-3

1. This measure is addressed in comments submitted by Kathleen Lyons of Biotic Resources Group in *Attachment 4*. 65

AIR QUALITY

7.4 Mitigation Measures

AQ-1

1. The project would only be considered to have a significant impact if the PM10 emitted was over 82 lbs/day. This impact could be mitigated by operating a water truck or dust suppressant. The 1999 Desert Research Institute study of the quarry showed a tremendously low value of PM10 from the quarry operations. With the operation of a water truck the project would not exceed the 82 lbs./day; and therefore, a limit of 2.2 acres per day should not apply to this project. 66

2. In addition, the project should not be considered a construction project that imposes an acre limitation. The applicable limitation is the 82 lbs/day as outlined in the MBUAPCD's guideline for operational impacts. According to the 1999 DERI initial study, the CEMEX operations will be significantly below this threshold limit of 82 lbs/day. The District does not have a limit on vegetation removal/clearing. 67

3. Accordingly, please review this issue further with the MBUAPCD and reconsider the requirement for this mitigation measure. 68

ATTACHMENT 1
Geology and Soils

CEMEX Comments
Prepared by
Murray Engineers, Inc.

MURRAY ENGINEERS, INC. GEOTECHNICAL SERVICES

September 25, 2007
Project No. 721-1L1

CEMEX USA
700 Highway 1
Davenport, California 95017

Attn: Mr. Robert C. Walker

RE: **RESPONSE TO GEOLOGIC MITIGATION MEASURES, BONNY DOON LIMESTONE QUARRY EXPANSION PROJECT & RECLAMATION PLAN AMENDMENT, DRAFT ENVIRONMENTAL IMPACT REPORT, BOONY DOON QUARRY, SANTA CRUZ COUNTY, CALIFORNIA**

Dear Mr. Walker:

In accordance with our proposal, dated September 12, 2007, we have reviewed and provided a response to portions of the Draft Environmental Impact Report (DEIR) dated July 2007 relating to the Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment, at the Bonny Doon limestone quarry site in Santa Cruz County, California. As you know, an evaluation of the stability for the final quarry slope configuration (including the expansion) was performed by Jo Crosby & Associates (JCA) in July of 1997. Subsequently, Nolan Associates (NA) and Pacific Crest Engineering, Inc (PCEI) provided a peer review of the JCA report, the results of their findings which are included in Section 4 of the DEIR. The purpose of this letter has been to review Chapter 4.0 entitled "Geology and Soils" and provide a formal response to the three geologic mitigation measures presented in Section 4.4 of the referenced DEIR. 69

Section 4.4 of the DEIR presented three numbered mitigation measure items. Our responses to these comments are presented below in corresponding order:

1) Measure GEO-1: Upon authorization by CEMEX USA, our firm will perform a seismic slope stability evaluation and liquefaction hazard evaluation for Settlement Basins 3 and 4 based on current state of knowledge and standards of practice. Specifically, such work will involve the review of the Golder Associates (1991) report and past pertinent investigations conducted at the limestone quarry site by JCA, site reconnaissance and engineering geologic mapping, subsurface exploration, laboratory testing, computer-aided slope stability and liquefaction hazard analyses, and report preparation. The results of our findings will include mitigation measures, if necessary, to reduce the potential for seismic induced ground deformation associated with the referenced settlement basins and embankment structures based on standard of practice procedures and engineering judgment. 70

2) Measure GEO-2: As stated above, Jo Crosby & Associates performed a stability evaluation of the final quarry slope configuration and presented their findings in a report dated July 24, 1997 entitled "Report on the Geology and Geotechnical Studies Regarding the Amendment to the Mining Plan for the Bonny Doon Limestone Quarry, Davenport, 71

California". Mr. John Stillman, our principal geotechnical engineer was involved in this project while working for the firm of Jo Crosby & Associates. In our opinion, the procedures used by JCA in evaluating the stability of the final rock and overburden slopes were significantly detailed and appropriate for the scope of work proposed at the time the investigation was performed and accepted in concept by the County of Santa Cruz Planning Department. We agree that recent changes in standards of practice relating to seismic slope stability evaluation that occurred subsequent to the time the JCA report was 71
issued will warrant an updated seismic slope stability evaluation for the proposed final quarry slopes, including the boundary expansion area of the limestone quarry. Our updated investigation will also include slope mitigation recommendations, as necessary, to improve longterm stability of the final quarry slopes. Such recommendations may involve placement of an engineered fill utilizing screened quarried rock fines and overburden material to help buttress the face of portions or all of the exposed rock slopes and/or flattening the rock quarry slope face in areas deemed appropriate as was initially proposed during the time of the JCA investigation.

In summary, we strongly disagree with a significant portion of the comments raised by Nolan Associates (NA) and Pacific Crest Engineering, Inc (PCEI) during their peer review of the referenced JCA report. The specifics of our rebuttal to their comments will 72
be addressed in our forthcoming update slope stability investigation.

3 Measure GEO-3: We understand that this condition has been mitigated and no quarry waste or other soil or rock has been placed in this general area of the quarry since May of 2000. In addition, recent efforts have been made to reduce concentrated runoff towards 73
the Liddell Spring Landslide or across older quarry spoils above Liddell Spring.

We trust that this letter adequately addresses the intent of our firm to comply with the mitigation measure items raised in Section 4 of the referenced DEIR. If you have any questions or comments concerning this letter, please call.

Sincerely,

MURRAY ENGINEERS, INC.

REGISTERED PROFESSIONAL ENGINEER
JOHN A. STILLMAN
No. GE2523
Exp: 12-31-08
STATE OF CALIFORNIA

John A. Stillman, G.E., C.E.G.
Principal Geotechnical Engineer

JAS:ADM

Copies: Addressee (3)

MURRAY ENGINEERS INC

ATTACHMENT 2
Hydrology and Water Quality

CEMEX Comments
Prepared by
P.E. LaMoreaux & Associates, Inc.
(PELA)

PELA

Comments on the **Draft Environmental Impact Report**
For the Bonny Doon Limestone Quarry Boundary Expansion Project
And Reclamation Plan Amendment (DEIR)
Dated July 30, 2007

Prepared by:
P.E. LaMoreaux & Associates, Inc.
106 Administration Road, Suite 4
Oak Ridge, Tennessee 37830
Tel: (865) 483-7483
Email: bbeck@pela-tenn.com

P.E. LaMoreaux & Associates, Inc. (PELA), consultants for CEMEX, Inc., would like to offer the following comments on the **Draft Environmental Impact Report for the Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment** (DEIR), dated July 30, 2007. In particular, these comments generally refer to Section 5.0 Hydrology and Water Quality, based on Appendix F, **Geologic, Hydrologic, and Hydrogeologic Technical Appendix for EIR, Bonny** 74
Doon Quarry Proposed Expansion by Nolan Associates and Nicholas M. Johnson (Nolan and Johnson). Some of the additional work presented in this appendix is very helpful in expanding upon the work begun by PELA in their technical report to CEMEX, **Karst Investigation Report, Delineation of Capture Zone of Liddell Spring, Santa Cruz, California** (2005). In particular, the lineament analysis of the area is useful in defining probable flow paths for the karst aquifer.

Unfortunately, the technical appendix includes several interpretations that do not fully take into account the unique way that a karst flow system functions, and these were incorporated into the DEIR. Rather than provide line-by-line comments, or corrections of typographical errors and misspellings, which are really of little consequence, PELA would like to address our comments to the major issues regarding understanding the karstic groundwater flow and sediment transport. PELA's comments address almost all of the sub-topics included in the Hydrologic Setting (5.1.2), 75
particularly the Conceptual Ground Water Model, and the Ground Water Response to Quarrying. Because of the broad implications of not fully understanding the relevant karstic principles, it is impossible to associate these comments and corrections with specific sections. Moreover, PELA's clarification of these misunderstandings also affects the Project Impacts (5.3) and in particular the Hydrogeologic Impacts (5.3.3). PELA will list these comments in a logical order, based on the karst flow processes. Most of these misunderstandings pervade the entire section on Hydrogeology and will necessitate some revisions.

Boundary Conditions and Nature of Recharge from the Santa Margarita Sandstone

A critical characteristic of the karst aquifer is its strong connections with several local surface streams. The multiple sources of water flowing to Liddell Spring and the various velocities of the water flow, as characterized by PELA's tracer tests, are incorporated into the conceptual model. With additional data from Nolan and Johnson's fracture trace analysis, the groundwater flow paths are well depicted. While such a conceptual model emphasizes the importance of fractures on conduit development in the marble aquifer, it overlooks another important factor that also controls the karst devel- 76
opment in this area—the lithology. Karst is differentiated from other geomorphic systems by the dominant importance of bedrock dissolution processes. The principle consequence of this rock solubility is that waters are directed underground through karst features rather than running off in surface channels. A further consequence of that relationship is that both lithologic and structural conditions within the rock exert a profound effect on the evolution of the hydrodynamic systems.

The lithologic control on karst development creates contact zones between the marble and the non-karst rocks including schist, granite, quartzite, granodiorite, sandstone, and mudstone. These non-karstic, but hydrologically connected rocks are referred to as "borderland." Surface runoff from the borderlands drains through surface streams 77
that flow onto the karst area. Some of these streams sink underground at the margin of the marble or as they flow over the contact zones. These are the sinking stream inputs to the karst groundwater system. They are one type of boundary condition for the karstic marble aquifer.

A contact zone also occurs beneath the Santa Margarita sandstone north or northeast of the existing quarry (Table IX-1, PELA, 2005). The contact zone between the overlying sandstone and the marble forms one recharge boundary to the marble aquifer. This allogenic recharge consists of vertical infiltration from the base of the overlying beds, which is often focused to drainage shafts (vertical fractures) in the marble. 78
Moreover, there is also an input of recharge along the boundary between the marble and the adjacent granitic rocks beneath the sandstone. Where the sandstone is underlain by granitics, vertical recharge is minor and groundwater in the sandstone moves laterally. However, at the contact between the granitics and the marble beneath the sandstone aquifer, all of the lateral flow infiltrates downward along the boundary.

The allogenic waters flowing into the marble area represent an import of energy capable of both mechanical and chemical work. The sinking streams focus the water collected from a broad drainage area into a direct route through the vadose zone in the marble via vertical, or stair-step conduits. These drain into the deeper conduit drainage 79
system and feed the springs directly. The caprock funnels water into the karst in much the same way as solution dolines, except that the recharge points are hidden beneath the covering strata. Inputs of this kind favor the development of large shafts beneath the overlying non-karstic aquifer. Water inputs through these contact zones are in hy-

draulic connection with the aquifer, but the pressure head in these zones is not in equi-
librium with that in the aquifer itself. This distinction is essential in generating ground- 79
water contours and interpreting the spring responses to storm events.

The water level contours for the shallow groundwater and the deep groundwater (Nolan and Johnson, Figure 25) did not separate the boundary inputs from the groundwater flow in the marble, and did not consider the nature of the perched water levels in the marble. That is, water levels in the Santa Margarita Sandstone and perched water levels in the marble are combined in one set of contours, even where the sandstone overlies the marble. Moreover, there are numerous perched zones within the marble aquifer. These are controlled by the sporadic occurrence of irregular lenses of schist
interbedded with the marble. As such, these perched zones are not part of a single, 80
shallow groundwater aquifer but rather are isolated and independent zones leaking downward. It is inappropriate to combine the water level data from all these independent perched zones into one map, nor is it appropriate to combine the water levels from the Santa Margarita Sandstone and the marble into one set of contours. As a result the shallow groundwater contours and the conclusions therefrom should be revised.

The lack of a continuous shallow groundwater body is also confirmed by the permanent lack of water in well M1A even though this shallow monitoring well is screened at 750-760 feet amsl. The shallow groundwater contours from Figure 25 would indicate water far above this level at this location, yet this well is always dry.

Perched and Deep Groundwater in the Karstified Marble Aquifer

By the same logic as discussed above, the water level data at well M5A should not be used to plot the *deep* groundwater contours (Figure 25 of Technical Appendix). It is true that M5A is hydrologically connected to the saturated zone and Liddell Spring; however, it is located within the contact zone and the connection is generally in the vadose zone. Just as the water levels in Reggiardo Creek or Laguna Creek cannot be used for contouring the deep groundwater levels, even though they are connected to the groundwater system, the water level in M5A cannot be used for this purpose either. The water level in well M5A should not be included in plotting the deep water level because of the following facts:

81

M5A and M5B were nested wells. They were sited just south of the dipping contact between the marble body and the granitics. The location was on the trend of a photolinear flexure in the topography. M5A was drilled to 410 feet below ground surface (bgs) and the average measured water level during the karst study was 898 feet above mean sea level (amsl) (Table IV-2, PELA, 2005). M5B was drilled to 480 feet bgs and the water level recorded on the well log was 730 feet amsl, approximately 170 feet lower than M5A. Well M5B later collapsed, so continued water level measurement was not possible. Because the water levels were measured at different times, they are not exactly comparable. However, the water level difference between them was far more than natural fluctuation in this aquifer. M5B was probably in the saturated zone and M5A was perched in the unsaturated zone from which the water flow is more vertical. The local contact between the granitics and marble in the subsurface is shown in Figure II-3 of PELA (2005).

M5A is a few hundred feet north of the existing quarry and the measured water level is approximately 150 feet higher than the bottom of the quarry pit. The lack of continuous water flow along quarry walls and at the bottom of the quarry suggests that the water in M5A does not flow laterally; it is not part of the deep aquifer. Because of the inclusion of the water level from well M5A, the deep groundwater contours were forced to curve around the quarry. This is inconsistent with the fracture tracer analysis and our understanding of a karst aquifer. The dominant fracture pattern is orientated northeast, as shown in Figures 20 and 24 of the Technical Appendix, and the deep groundwater flow continues beneath the quarry to Liddell and Plant Springs. 81

The Connection Between Perched (Unsaturated) and Deep Groundwater

The majority of the water accumulated in the quarry pit drains to the saturated zone of the marble aquifer, and the percolation rate can be large (4-5"/day) at locations where open fractures are present. This hydrologic connection has resulted from the removal of several hundred feet of marble and the blasting in the quarry. A rapid connection between the unsaturated zone near the ground surface, some 300 feet above the quarry floor, and the deeper saturated zone has also been inferred from anecdotal accounts from 1969-74 that link instances of Liddell Spring sedimentation and elevated turbidity with the removal of overburden (Technical Appendix). Unfortunately, there is no actual data available to clarify and verify such statements. Data collected in PELA's karst study did not indicate a rapid connection between the vadose (unsaturated) zone and Liddell Spring during winter storm events, or at any other times, in the marble aquifer under natural conditions. In some karst aquifers, the unsaturated zone is hydraulically connected with the saturated zone through discrete and open subcutaneous drains or shafts. PELA has investigated this possibility, and the results did not support such an open connection. 82

- Stable isotope data collected in the karst study (Chapter VI, PELA, 2005) show that the wells screened above the regional water table have at least one isotopic signature different from the wells in the saturated zone. The water in the unsaturated zone must have had a long residence time to produce a different isotopic signature. 83

- Two tracer tests were conducted at sinkhole SH-11, just above the quarry. The first was conducted on March 23, 2004 and the second on August 17, 2004. The second tracer test was conducted to confirm that the negative detection of the injected dye from the first test was still valid under a different tracer design and groundwater flow conditions. A much larger volume of dye was used in the 84

second test, five gallons. To avoid the potential absorption of the injected dye
by clayey sediments, approximately 16,000 gallons of water were also injected
to flush the dye injection in the second test. If we assume a sinkhole dimension
of 20 feet by 15 feet (PELA, 2005) and a porosity of 5% in the marble (Techni-
cal Appendix), this volume of water would create a groundwater mound of more
than 100 feet beneath the sinkhole. This very significant head would certainly
push the dye into the saturated zone if any reasonably open connection was
present. However, no dye was detected in any of the monitoring wells, nor at 84
Liddell Spring or Plant Spring. If there was an active hydraulic connection be-
tween the unsaturated zone and the saturated zone, a positive detection would
be expected at least in well M1B, which is only a few tens of feet away from SH-
11 and screened in the saturated zone. Nor was any dye detected at M1A,
which was screened in the unsaturated zone. This sinkhole was selected as the
dye injection point because a quick connection would most likely be detected
from this location, if there was one. No connection whatsoever was docu-
mented.

- Groundwater levels measured in previous studies and in the present karst study
further support the poor connectivity. Table 1 provides the water level data from
January, 2003 to August, 2007. Water was present in most of the monitoring
wells in the unsaturated zone. However, the water levels in the monitoring wells
in the unsaturated zone were irregular (perched) and often significantly higher
than those in the saturated zone. If there were an open hydraulic connection 85
between the unsaturated and saturated zones, the perched water in the unsatu-
rated zone would not exist for any length of time after rainfall ceased. However,
all the BD wells screened in the unsaturated zone (BD40, BD41, BD42, and
BD44 which were designated as perched by the County) have *always* had
measurable water levels, even during the dry season (Tables IV-1, 2, PELA,
2005).

- This poor connection is also reflected in the nested wells.

    - Monitoring well M3A was drilled to 470 feet bgs and was screened
    over the bottom 10 feet. The average water level at M3A was 702
    feet amsl. M3B was paired with M3A, and it was only drilled to 320
    feet bgs. The water level in M3B showed a variation of approximately
    100 feet, ranging from 794 feet amsl to 894 feet amsl. In repeated
    measurements the water level difference between this pair of wells
    has been between 100 feet and 200 feet. Obviously they are not well 86
    connected.
    - Monitoring well M2B was drilled to 480 feet bgs and was screened over the bottom 10 feet. The average water level measured at M2B was 697 feet amsl. M2A was paired with M2B and drilled to 350 feet bgs. M2A was dry sometimes, and the average water level in M2A was 770 feet amsl when water was present, 73 feet higher than the

water level in M2B. Although M2A does drain, the fact that it commonly contains water indicates that it is not very openly connected to M2B.

- Monitoring well M1A was screened at 750-760 feet amsl and was dry during all measurements. Its paired well M1B was screened at 600-620 feet amsl. The water level at M1B ranges from 724 to 754 feet amsl. When the water level in M1B was above the screened interval in M1A, M1A should have contained water if the two were reasonably 86
connected. However, water was never observed in M1A.
- Monitoring well M6A was screened at 610-630 feet amsl, and its water level ranged from 735 to 767 feet amsl, which is also higher than the screened interval of 730-740 feet amsl in paired well M6B. If the two were openly connected, pressure equilibrium would bring the water in M6A and M6B to similar levels. However, the average difference in water level between M6A and M6B is approximately 45 feet, again indicating a poor connection.

It should be pointed out that poor connectivity does not mean that the unsaturated zone is not hydraulically connected to the saturated zone at all. The water in the unsaturated zone in the marble body slowly recharges the saturated zone and eventually discharges at the springs. From a karst development perspective, it is not uncommon that a karst aquifer has a deep aquifer underlying a perched one, because of the existence of the epikarst zone, the highly fractured and weathered upper portion of the marble riddled with dissolved voids and cavities resulting from the role of dissolution processes in aquifer development. Fractures are widened by solution in the epikarst 87
zone but close with increasing depth because of reduced dissolution and increasing overburden pressure. As a result, the epikarst zone is often separated from the saturated zone by a dry, inactive, relatively waterless, and less permeable interval of bedrock. Groundwater can be present in both the epikarst zone and the saturated zone, interconnected by sporadic drainage shafts. If the drainage shafts are plugged, the connection may be very poor. In this case the perched zones may be partially due to the development of an epikarst zone, but also to the presence of sporadic stringers and lenses of schist which interrupt the continuity of downward recharge.

Because PELA's tracer tests indicate the occurrence of conduits in the marble aquifer, Nolan and Johnson suggest that "it is reasonable to infer that such conduits formed continuously while the area has undergone tectonic uplift, leaving a network of interconnected, older voids above those currently forming (p. 80, Technical Appendix F)." Such an inference does not take into account the fact that karst development is a dynamic process. As new karst features develop at deeper levels, groundwater circula- 88
tion shifts deeper, and the older, shallower voids become filled and less active. It is true that the quarry walls expose numerous fractures. However, many of the fractures are shallow and the result of recent blasting. Older fractures are often filled with residuum and sandy clay. Figure 1 shows a recent picture of a small, filled cave on the west quarry wall. The small cave was completely filled with stratified fine sand and

clay. The opening which is visible at the top of the sediment formed as a result of moisture loss after exposure by quarrying. The cave is at an approximate elevation of 760-770 feet amsl. Nearby fracture zones were also seen to be infilled with similar clay and fine sand. Clearly, these karst features and many others on the quarry walls are in the process of being filled or have already been filled, and are not open pathways for recharge.

Although Nolan and Johnson's borehole log analysis does not indicate any significant vertical zonation of the marble's macroporosity (PELA reviewed the data during the karst study and did not use this data to draw conclusions on karst zonation because 88
the data from the historical well logs was questionable), the karst development is not continuous. Formation of the series of uplifted marine terraces along the southwest slope of Ben Lomond Mountain suggests strongly that the tectonic uplift is episodic rather than continuous. During the relatively stable periods when the terraces were forming, karst would have more time to develop at appropriate horizons. During uplift, however, the opportunity to develop karst features at other levels was much less. The existing data does not allow us to identify the less permeable zones; nevertheless, the assumption of a continuous network of older and newer voids in the marble aquifer is not supported.

Infiltration from the Quarry to Liddell Spring

In the Technical Appendix, the tracer test results from well NZA were interpreted as evidence of a rapid connection (~7.5 hours) from the quarry bottom to Liddell Spring. This interpretation of the data does not fully take into account all the details of how the tracer test was conducted and how a karst aquifer functions. As part of PELA's karst study, three monitoring wells were drilled in the existing quarry. A rudimentary slug test was performed in each of the wells. Monitoring well NZA was selected as the dye injection well because of its high capacity for accepting water. Video-logging performed at this well revealed that the borehole lost water at approximately 654 feet amsl, as indicated by air bubbles and mud seams, which corresponds closely with the zone where water was being produced during drilling, 658-656 feet amsl (PELA, 2005). This fracture zone is more than 20 feet below the measured water level, and approximately 89
100 feet below the quarry floor.

The fluorescent dye (FD&C Red 3) was introduced directly at the level of the fracture zone in the well by using a garden hose. Immediately after the dye injection, a small amount of water (<500 gallons) was used to create a head to push the dye into the aquifer. The objective of the test was to determine if a quick hydrologic connection exists between this fracture intercepted by well NZA and Liddell Spring. The dye was introduced directly into the deep fracture zone on purpose. PELA hypothesized that this fracture might be linked to the conduit path feeding the spring. **This is totally different from the natural percolation of particle-laden water from the bottom of the quarry through more than a hundred feet of marble to the water level, then into**

the fracture zone. The dye travel time (~7.5 hours) is not in any way equivalent to the flow time from the quarry bottom, nor to the transport of particulate matter. The City's 89
turbidity data at Liddell Spring indicate that the drilling activities at NZA had no impact on the turbidity at Liddell Spring.

Furthermore, the similarity between the water level fluctuations in a small pond in the quarry floor and the turbidity fluctuations at Liddell Spring (Appendix F, Section 3.2, p. 30-32) does not prove a cause-and-effect relationship, just as the similarity between the hydrograph at Majors Creek, which is totally outside of the karst area, and the turbidigraph at Liddell Spring does not prove that there is a cause-and-effect relationship between those processes. It is true that the turbidity response at Liddell Spring shows a similarity to the runoff hydrograph. However, it also relates to the runoff hydrographs 90
at all recharge points including Reggiardo Creek, Laguna Creek, the Sinkhole Plain, and existing quarry pit. The quarry pit should not be considered as a main source of turbidity because the flow increase at Liddell Spring is more related to the existing stored water, rather than the newly recharged water (see explanation below). This is clearly demonstrated by the different responses of turbidity and specific conductance to storm events, when these are analyzed in view of recently-documented karst principles.

To further confirm this conclusion, PELA conducted two percolation tests using highly turbid water infiltrating through the bottom of the quarry. Figures 2 and 3 summarize the turbidity infiltration tests and their results. Because the tests were conducted in the dry season and there was no precipitation 30 days prior to the tests, the impact from the infiltration of highly turbid water ponding on the quarry floor could not be confused with the turbidity spike transmitted through the conduits due to rainfall.

The first test was conducted at the southeast corner of the existing quarry floor, in close proximity to the small water pond in which Nolan Associates measured the water level. Because of the very dry weather, turbidity was at base level (0.1 NTU on the 1720-C sensor). On the late afternoon of August 27, approximately 5,500 gallons of water were dumped into the pond in one to two hours, using a CEMEX water truck. The turbidity of water in the pond was as high as over 5,000 NTU. The maximum wa- 91
ter level created was approximately 6". The turbidity data from the more sensitive 1720-C sensor at Liddell Spring increased a barely detectable amount from 0.1 NTU to 0.2 NTU during the initial water dumping and again 4 hours after the dumping.

Because this turbidity change is within the resolution range of the sensor, a second, larger amount of water was used late on the afternoon of August 29, 2007 after the pond had dried out. In this second test, approximately 18,000 gallons of water was introduced, which created a pond 70' by 60' with a maximum water level of 11.4". This maximum water level is comparable to the maximum water level measured by Nolan and Johnson, as reported in the Technical Appendix (Figure 11). The massive discharge of water onto the floor caused a high turbidity in the resulting pond, up to 1,500 NTU during the water dumping. If we assume the relationship between suspended sediment concentration and turbidity, as shown in Figure 41 of the Technical Appendix, is applicable to the data at Liddell Spring, this water pond contained several cubic feet of suspended materials. Leakage or infiltration from the pond occurred as documented by Nolan and Johnson, *circa* 4.5" per day initially and somewhat less subsequently. However, no turbidity values greater than 0.2 NTU were observed within the time frame (6-7 hours) suggested in the Technical Appendix. **In fact, no turbidity values greater than 0.2 NTU were observed within 48 hours.**

There were two very small turbidity spikes (Figure 2), one in the afternoon of August 28 and the other in the afternoon of August 31. These small spikes were undoubtedly related to blasts that occurred several hours prior to their occurrence, within the characteristic response time. However, there is a slight possibility that these spikes are the compound effect of the infiltration tests and the blasts. The spike which occurred after the second, more substantial infiltration test, was more than 48 hours after the water was introduced, and the maximum magnitude was a mere 0.3 NTU, certainly not what Nolan and Johnson were suggesting. 91

Because of the heterogeneity of the marble aquifer, data at one single point may not represent the entire quarry floor. A second infiltration test was conducted in the northwest corner of the quarry. The pond was in a low area with a berm constructed to hold a large amount of water. Approximately 18,000 gallons of water were dumped into the pond within one hour. The maximum water level was 12" with a wetted area of 98' by 30'. The water was agitated, and the average turbidity was 800 NTU during the water introduction. The percolation rate for the first day was estimated to be 4"/day. Although the pond drained (infiltrated) completely within a few days, **there was no turbidity peak generated at Liddell Spring**. Approximately a day following the discharge of the water onto the quarry floor the turbidity did change from a stable 0.1 NTU to 0.2 NTU for a few individual measurements, and it then resumed the stable 0.1 NTU baseline. Such sporadic excursions of 0.1 NTU occur elsewhere in the turbidity data, and one cannot even certainly ascribe this negligible variation to the infiltration trials. A blast on September 13 did not cause any turbidity change at Liddell Spring either (Figure 3). **Infiltration from the quarry floor, although it does occur, is not a source of more than negligible turbidity at Liddell Spring, based on two trials of this test, one at the southern end of the quarry and another at the northern end!**

The Landslide As A Source of Turbidity

Based on the earliest turbidity response at Liddell Spring to storm events, ranging between 2 and 10 hours and averaging about 5-7 hours, Nolan and Johnson conclude that "this timing is too slow for a source immediately nearby (e.g. a sinkhole or the landslide), and yet too quick for travel from the Reggiardo and Laguna creek swallow holes." 92
It is explained below, that it is *not* too quick for travel from Reggiardo Creek and Laguna Creek because of the pressure pulse transfer. It is also not too slow for the landslide to be a turbidity source. Previous observations from leakage of a water

pipe and drilling activities, and from PELA's tracer tests, proved that the landslide is hydrologically connected to Liddell Spring (positive detection at monitoring well QM5). PELA's tracer test also estimated the groundwater velocity in the landslide at 70 feet/day based on first arrival of the dye and 40 feet/day based on the peak dye arrival 92
time (Table VIII-7, PELA, 2005). If 70 feet/day is used, the travel distance within 5-7 hours ranges from 15 feet to 20 feet. Considering that Liddell Spring is surrounded up-gradient by the landslide debris, the response time is not too slow for the landslide to be one of the turbidity sources.

The Pressure Pulse from Sinking Streams and Turbidity Transport

Possibly the most important misunderstanding, which will require the revision of several conclusions, regards the transmission of a pressure pulse through the water saturated karst conduits. The DEIR states (p. 5-16):

> "Following peak precipitation, Liddell Spring turbidity peaked nearly as quickly as stream discharge (measured at Majors Creek) (Figure 29). Among all the responses evaluated, the timing of precipitation, peak stream discharge, and peak spring turbidity were the most closely and consistently linked. The peak stream discharge is a measure of how rapidly rainfall collects and flows 93
> into streams. The fact that peak turbidity occurs at more or less the same time and shows the same sharp peak as peak runoff in streams indicates that the turbidity peak is linked to the same surface runoff process. Dye tracer tests indicate that several days or more are needed for water to travel to Liddell Spring from the Reggiardo and Laguna creek swallow holes. In contrast, turbidity peaks about 15 hours after onset of precipitation. Therefore, the turbid runoff responsible for initial peaks in spring turbidity must be entering the ground water system closer to the spring."

Much of this discussion is based on the averages shown in Figure 29 of the DEIR (Figure 53 of Technical Appendix F), and a comment on that data is necessary before explaining the misinterpretation of the theory. The basic spring discharge data (Figures 45-52) appears to be faulty in many instances. If one examines the graphs of the basic data from which the average was derived, one sees that the recording instrument appears to move in steps or plateaus. It stays at one level until some threshold value is exceeded and then it jumps up to the next level where it remains level until either it jumps back down to base level or jumps to a higher plateau. Most of the spring dis- 94
charge data is of this nature. However, this data was averaged which then produces a curve which appears valid. If this is the data that was used, the average is probably not valid. For instance, on page 5-16 they talk about steep versus gradual rising and falling limbs. Given the nature of the basic data that was averaged, this would be impossible to tell. The jump from one plateau to the next is nearly instantaneous. There is no information on whether it is steep or gradual. Moreover, if the peaks being recorded in this fashion are asymmetrical, the mathematics of averaging these plateaus

will make them symmetrical. Such information could be misleading. This is a significant problem, and it impacts all the discussion based on the nature of the spring discharge. 94

What is more important is that the discussion of turbidity at Liddell Spring did not take into account the known principles of transport through karst conduit systems. Most of the conduit system is below the water table and therefore the flow is a "pipe full" phenomenon. That portion of the flow from the stream swallet down to the water table is normally vadose flow, but under high streamflow conditions some, or all, of this portion may become pipe full. Sediment is added to this flow system through the sinking stream, through scattered sinkholes which are tributary to the system, and from the actual dissolution of the limestone leaving behind the insoluble residue, which is minor. Sediment moves through the karst system in pulses, driven by precipitation events. Between such events, sediment is temporarily stored in the conduit system, to be mobilized when the next pulse occurs. Coarse sediment is stored in the main channel and is generally of two sub-populations: that which moves during normal rainfall events, generally sand and finer, and that which moves only rarely in abnormal precipitation events, gravel and coarser. Very fine grained sediment, such as moves in suspension, is stored as a fine coating on all surfaces of the conduits, not just the bottom (Herman and others, 2006).

When a significant rainfall occurs the following sequence of events takes place. First, overland runoff moves through small tributaries to the local streams or to sinkholes. 95
None of the sinkholes located and described in the area have significant drainage areas flowing into them, so this component is minor. Data from Majors Creek, provided by Nolan and Johnson, shows that the local stream flow peaks about six hours after precipitation becomes significant and about four hours after precipitation peaks. The flow that is moving down Reggiardo and Laguna Creeks to the swallets probably has similar timing. When this peak flow reaches the sinking point, the formerly vadose channels are flooded and a pressure head is imposed upon the deeper conduits. Flow conditions in the conduit system are a function of the pressure gradient, and when this increased head is rapidly imposed on the system, the flow velocity immediately responds *throughout the system* (Ford and Williams, 1989). Discharge velocity increases from the sinking point to the spring.

This suddenly increased discharge velocity immediately entrains the fine sediment that had been stored on the surfaces of the conduit, and turbidity increases almost as quickly as the discharge did. Although the turbidity peak does not occur at the same time as the discharge peak occurs (this will be explained below), the starting time of the turbidity increase is essentially the same as the starting time of the discharge increase. Review of the turbidigraphs and discharge hydrographs for 88 rain events (46 of them included in PELA, 2005 and the rest included in Appendix A), indicates that when both turbidity and discharge responded to rainfalls, the initial increase of turbidity is at approximately the same time as the initial increase of the discharge. **This has absolutely nothing to do with the arrival of any muddy water from any source,**

local or distant. It is simply the mobilization of fine grained sediment which was stored in the conduit system during low flow. The actual water which is sinking in the creek bottoms does not arrive for some time, days or weeks depending on the source, but the instantaneous pressure pulse immediately increases the flow velocity and the associated turbidity. 95

Unfortunately, this rapid turbidity response was a part of many of the conclusions about local sources for turbidity, such as the quarry floor. These conclusions should be revised in light of an appropriate understanding of the processes involved.

Transport of Turbidity and Dissolved Solids Are Generally Different in Karst

In the Technical Appendix Nolan and Johnson used the different responses of turbidity and specific conductance to storm events (Figures 44 through 53) as another piece of evidence that the quarry floor is a main contributor to turbidity at Liddell Spring. The following discussion explains that these different responses are characteristics of many karst springs, regardless of whether a quarry exists or not. The relationship between discharge, turbidity, and specific conductance at Liddell Spring strongly suggests that the rising limb of the hydrograph recorded at the spring is not composed of 96
recently added storm water. Rather, the water that first arrives at the spring is that flushed out of the conduits and adjacent fractures. This flushing effect accompanies the pressure pulse transmitted through the aquifer to the spring, as frequently observed in other karst aquifers (Hess and White, 1988) and explained above.

The DEIR (p. 5-13), based on Technical Appendix F, utilizes the relationship between "bank storage" within the aquifer during high flow conditions and the discharge of mineralized water at Liddell Spring, to explain these variations, which is not an appropriate conclusion based on the flow processes. Under high flow conditions the pressure head in the conduits is quickly raised and water is forced upward from the conduits into pores and fractures in the surrounding aquifer, as stated by Nolan and Johnson. However, it is the water discharging from the conduit that is feeding Liddell Spring, not the "overflow" forced upward out of the aquifer as they hypothesize[1]. The highly mineralized water that is rapidly discharged after a heavy rain is that water which was resident 97
in the conduits and adjacent fractures before the pressure pulse was imposed. Like a piston, the pulse of precipitation-generated stream flow pushes through the conduit system forcing the resident and mineralized water out ahead of it. However, as documented by the dye traces, it takes a significant length of time, varying from four days to many weeks, for the new, fresh, unmineralized water to flow through the conduits all the way to the spring. Thus, the immediate response to the rainfall peak is a sudden increase in velocity and discharge as the pressure pulse is imposed on the conduits, an immediate increase in turbidity and sediment transport as the sediment stored in

[1] There is no path for such overflow to find its way to the spring orifice? The conduits are the flow path and the discharge point at the spring. The process explained on page 5-13 of the DEIR does not fit the known principles of karstic flow.

the conduits is mobilized, and a discharge of highly mineralized, resident water that is being forced out of the conduits by the peak inflow. 97

In most responses to storm-related recharge, the turbidity peak preceded the timing of the specific conductance maximum. This indicates that the primary source of the turbidity is resuspension of sediments already in the conduits by the pressure pulse. If the turbidity peak were caused by water infiltrating from the quarry floor, the addition of the new water would dilute the spring water and cause a *decrease* of specific conductance because the rain water has very low specific conductance. The phase difference between the turbidity peak and the specific conductance maximum suggest this is not
the case. Because the discharge increase is associated with the "old" existing water in 98
the system, the turbidity spike is more likely caused by resuspension of deposited sediments already in the system. In fact, a synchronous change in turbidity and specific conductance only occurs at springs that drain very small watersheds, a system often referred to as a "direct transfer." If the majority of the suspended solids at the spring were of quarry floor origin, the arrival of turbidity conditions should coincide with a minimum of specific conductance. However, this is not the case, and the rise in turbidity preceded the arrival of any storm-diluted groundwater.

Conceptually, the spring responses to storms can be divided into three stages: flushing, dilution, and recovery. The flushing stage marks the initial response in the spring to storms. It begins within several hours following the most intensive portion of the rainstorms and lasts from one day to several days. The beginning of this stage is signaled by the increase of the slope of the discharge and turbidity. The new rain rapidly recharges the aquifer through sinking streams and sinkholes and portions of the quarry floor with open fractures, and displaces older water that has been residing in the conduits and smaller fractures and pores out of the aquifer. This older water is at or near equilibrium with the marble, but the new water is not. The old water, because it has resided in the aquifer for a relatively long time, would have a higher conductivity than the base flow spring water. A certain volume of water must be displaced out of the system before enough new, relatively dilute water can reach the spring. For each
individual event, this volume should be presented by the total discharge that occurs 99
from the time of initial increase in discharge until the peak in the conductivity curve (Hess and White, 1988)

The dilution phase begins with the peak in the conductivity curve and ends when the conductivity minimum is reached, if there is one, as suggested by Desmarais and Rojstaczer (2002). The start of the conductivity decrease represents the first arrival of storm water at the spring. If the newly added water carries additional suspended solids, additional turbidity spikes may occur. The time when these additional spikes occur depends on dominant water sources contributing to the discharge at Liddell Spring. The Technical Appendix showed a two turbidity peak model in response to rainfalls (Figure 53) and explained that the second minor peak was probably related to the newly recharged water. Review of the turbidigraphs and discharge hydrographs for 88 rain events indicates that this may be an oversimplification of the turbidity responses to rainfalls. The turbidity response may consist of one, two, three or more peaks in response to a rainfall, depending on the characteristics of rainfall event and antecedent flow conditions. A two-peak turbidity model is not a general rule.

The length of the dilution phase is very much related to the various recharge sources at difference distances. The recovery phase begins when the minimum is attained in
conductivity. During this phase conductivity tends to increase or level off, depending 99
on how the continuously recharged water from sinking streams mixes with the water stored in small channels, fractures, and pores that supply the surrounding conduits during period of low recharge. The conduits create a low gradient groundwater trough so that the water exchange between the conduits and storage system is lateral as well as vertical.

Relationship, or Lack Thereof, Between Turbidity and Discharge.

Springs with a small watershed may show a direct correlation between discharge and turbidity. For springs with large watersheds such as Liddell Spring, a direct correlation between discharge and turbidity does not usually exist for two reasons—the phase difference between the discharge hydrograph and the turbidigraph, as discussed above and a phenomenon called turbidity hysteresis. The lack of a relationship between discharge and turbidity is characteristic of many large karst springs. It is not appropriate to use the lack of such a relationship (Figure 36 of Technical Appendix) as evidence that the quarry pit is the main source of turbidity at Liddell Spring.

It is true that the shape of the turbidigraphs at Liddell Spring looks much like a typical storm hydrograph, in which the rising limb is steep and the falling limb tapers off relatively slowly. Tracking the succession of turbidity measurements through each of the 15 individual storms as a function of discharge (Table 40 of Technical Appendix), it becomes evident that higher turbidity values are often observed on the rising limb of
the hydrograph as compared to similar discharge values on the falling limb. This is a 100
phenomenon often referred to as turbidity hysteresis. The graphs (Figures 4 to 6) show a clockwise or positive loop of the hysteresis curves, which is indicative of sediment resuspension by pressure transfer. This has been demonstrated in many karst springs (Valdes and others, 2005; Fournie and others, 2007). This loop generally occurs during an increase of water discharge. The shape of these hysteresis curves varies significantly, suggesting that the complex relationship between discharge and turbidity can be further complicated by the antecedent groundwater flow conditions and the characteristics of each rainfall.

Clearly, the turbidity is not directly correlated to the spring flow. The discharge hydrographs are normally distributed over a much longer time scale than the suspended sediment response. The peak concentration of suspended solids tends to precede peak spring flow and have a much shorter duration, a relationship that has been observed in other karst springs (Mahler and Lynch, 1999; Townsend and Macfarlane, 2003). The turbidity peak at Plant Spring precedes its discharge peak for some storm events as well (PELA, 2005). It is not the presence of the quarry that makes the turbidity peak precede the flow peak.

Hysteresis curves are often used to describe sediment transport in surface streams (Ongley, 1996). Recently, they have been used to describe the characteristics of suspended solids at karst springs (Valdes and others, 2005; Fournie and others, 2007). The following explain the occurrence of turbidity hysteresis at Liddell Spring:

- The most intensive transport processes in the system occur during the pressure transfer caused by a flood pulse. The flood pulse causes a highly unsteady flow regime, which causes resuspension and transport of deposited sediments. The increased intensity in the rising limb is caused by the flood pulse overtaking the baseflow. It has been demonstrated that turbulence intensities are generally larger in the rising limb of a hydrograph than in the falling
  limb, and the turbulence intensity becomes larger as the unsteadiness of the 100
  hydrograph increases (Sutter and Verhoeven, 2001). These findings suggest strongly that sediment transport is the strongest in the rising stage when the flow is the most unsteady. It is the flow velocity and the acceleration of the flow that provide the turbulent intensity to resuspend the particles in the water.
- Rapid depletion of sediments that can be resuspended occurs for the storm events analyzed in the Technical Appendix. The most mobile sediments are those recently deposited. Compacted sediments, even of fine grain size, require stronger basal shear stresses to mobilize than uncompacted sediments. Larger storms are required to resuspend the compacted or larger sediments temporarily stored in the system. Thus the turbidity does not increase as the discharge increases, once the more mobile sediments have been entrained.

Liddell Spring Turbidity and Quarry Blasting Using Data from the 1720-C Sensor

PELA (2005) has conducted extensive analysis of the relationship between Liddell Spring turbidity and blasting in the existing quarry. The turbidity data used in previous analyses was collected from turbidity sensor SS-6, which was generally calibrated to cover a range of 2-1,000 NTU. In the Technical Appendix, the SS-6 data was also
used for their discussions. In late 2004, the 1720-C sensor was installed at Liddell 101
Spring to provide more accurate data in a range from 0-20 NTU. When turbidity is low, the measurements from 1720-C should be more accurate. Analysis of the 1720-C data further confirmed PELA's conclusions from SS-6 data: the *average* impact of blasting is less than 2 NTU and lasts less than 24 hours (PELA, 2007).

Based on 1720-C turbidity data, the maximum blasting impact from November 2004 to July 2007 was 29.8 NTU. A summary of the turbidity spikes caused by blasting events
for the years 2004 through 2007 is outlined in Table 2. Approximately 85% of the 102
blasts caused some turbidity increase at Liddell Spring. A much smaller percentage of blasts, approximately 24%, caused a turbidity increase of more than 2 NTU. Only 2.5%

of all the blasts (5) caused a turbidity increase of greater than 25 NTU, the threshold used by the Santa Cruz Water Department to turn out the Liddell Spring source.

In water year 2005, the maximum turbidity change was 23.8 NTU, which was in response to a blast at 8D (floor level of the quarry, northeast corner). Rain occurred 24 hours preceding the blast as well as within 24 hours after the blast. The result, then, was a combination of rainfall and blasting. However, in water year 2005 there was no incident where blast-related turbidity caused the City to turn out the Liddell Spring supply.

In water year 2006, there were two blasts that were related to a turbidity increase greater than 25 NTU. The first incident occurred on 8/21/06 with a blast at Top D (ground level, northeast corner). One anomalous data point (29.8 NTU) was recorded
within 24 hours after the blast. Rain occurred 2-5 days preceding the blast but there 102
was no rain after the blast. This is probably an outlier and not related to the blast. However, sensor SS-6 also showed high turbidity values after this blast. Because no other causes were obviously related to this spike, it is included in the table. The second incident occurred on 9/6/06 at location 8F (floor level, southeast corner). The maximum turbidity change was 27.6 NTU. There was no rain that was associated with this blast. That is, in water year 2006, there were only two incidents where blast-related turbidity caused the City to turn out the water supply from Liddell Spring.

In water year 2007, 3 blasts recorded a turbidity change of greater than 25 NTU. They are all associated with blasts at location 8F (floor level, southeast corner). The maximum changes for the three incidents are similar, ranging from 26.2 to 29.8 NTU. The increased turbidity spikes in 2007 were possibly the result of blasting on the lowest bench and closer to the saturated zone feeding Liddell Spring. However, these impacts are not typical and have occurred only 5 times out of 204 blasts, from November 2004 to July 2007: only 2.5% of the blasts. It is significant to note that the Proposed Boundary Expansion Area is situated further away from the area of blasting associated
with these increased turbidity spikes. The blasting impacts will likely decrease as min- 103
ing moves into the Boundary Expansion Area.

Additional Comments

PELA would also like to note that there are instances where the DEIR does not fully explain some statements, which then may create a misimpression. For instance, in discussing the depth to the water table, the DEIR (p. 5-8) states, "Such great depths are rare in the region, and reflect the extraordinarily rapid and deep drainage of ground
water into the karst system supplying Liddell Spring. Water supply wells in the Bonny 104
Doon area up stream of the quarry have water levels typically less than 60 feet deep." This contrast is misleading because wells in the Bonny Doon area are almost all in the overlying sandstone aquifer, not the deeper karstified marble.

In the discussion of water quality and turbidity as related to Liddell Spring and the kar-
stic flow system, the DEIR states (p. 5-14) "the Interim Enhanced Surface Water Treat-
ment Rule requires that drinking water turbidity never exceed 1 NTU and not exceed 105
0.3 NTU in 95 percent of a month's daily samples." It does not explain that this rule
applies to the treated water, not the raw water such as the flow from Liddell Spring.

Under *Ground Water Response to Quarrying*, a discussion of 22 blasting events in
2004-05 is summarized. The DEIR states (p. 5-20), "peak turbidity levels range from 2
to 78 NTU." No other quantitative data is provided. This gives the reader an impres-
sion of an average somewhere in the middle, *which is misleading*. The average of 106
those 22 turbidity peaks is only 14, according to Nolan and Johnson. Only three of
those peaks actually exceed 25 NTU, which is the value above which the City cannot
use the water: only three out of twenty-two.

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Table 1. Measured Water Levels at Monitoring Wells

Well ID	Measuring Point (ft amsl)	1/16-1/19, 2003		2/21-2/25, 2003		4/1-4/4, 2003		4/12-4/14, 2004	
		Depth to water (ft)	Water elev. (ft)	Depth to water (ft)	Water elev. (ft)	Depth to water (ft)	Water elev. (ft)	Depth to water (ft)	Water elev. (ft)
BD-40	1100							94.1	1005.9
BD-41	1150			291.82	858.2	292.44	857.6	291.1	858.9
BD-42	1212			216.36	995.6	216.57	995.4	216.61	995.4
BD-44	1092							192.35	899.7
BD-45	821.6	176.32	645.3	177.72	643.9	179.1	642.5	176.5	645.1
DH-3	592.5			11.3	581.2				
Liddell Spring			588		588		588		588
M1A	1132.5			Dry		Dry		Dry	
M1B	1132.5			393.65	738.9	391.52	741	400.3	732.2
M2A	1082.5	Dry		Dry		Dry		312.28	770.2
M2B	1082.5	384	698.5	384.11	698.4	384.2	698.3	385.6	696.9
M3A	1072.5	367.24	705.3	396.16	676.3	367.38	705.1	369.9	702.6
M3B	1072.5	178.08	894.4	279	793.5	180.22	892.3	187.15	885.4
M5A	1162.5			262.88	899.6	263.38	899.1	264.55	898
M6A	1132.5			375.96	756.5	375.85	756.7	374.3	758.2
M6B	1132.5			331.25	801.3	331.51	801	331.7	800.8
NZA	778.75							98.45	689.3
PELA1	756.85							40.9	711.95
PELA2	756.2							58.7	693.5
PELA4	1176.5							459.75	713.75
PELA3	1182.5							284.5	893
Plant Spring			700		700		700		700
QM1	728.8	50.54	678.3	50.26	678.5	51.24	677.6	50.85	678
QM2	779.5	141.06	638.4	141.7	637.8	141.76	637.7	141.15	638.4
QM3	810.6	61.6	749	62.31	748.3	62.7	747.9	62.9	747.7
QM4	806.6	113.16	693.4	113.82	692.8	116.55	690.1	131	675.6
QM5	595.5	10	585.5	10.03	585.5	10.25	585.3	10.35	585.2

PELA

Well ID	Measuring Point (ft amsl)	10/7-10/10, 2004		06/20-06/22, 2005		07/13-07/14, 2005		02/20-02/21, 2006	
		Depth to water (ft)	Water elev. (ft)	Depth to water (ft)	Water elev. (ft)	Depth to water (ft)	Water elev. (ft)	Depth to water (ft)	Water elev. (ft)
BD-40	1100			92.33	1007.67	92.13	1007.87	91.3	1008.7
BD-41	1150			291.29	858.71	291.21	858.79	293.31	856.69
BD-42	1212			216.05	995.95	216.05	995.95	216.35	995.65
BD-44	1092			193.17	898.83	193.47	898.53	193.44	898.56
BD-45	821.6	180.21	641.39	177.63	643.97	179.11	642.49	173.31	648.29
DH-3	592.5			11.65	580.85	12.12	580.38	measurements not taken	
Liddell Spring			588		588		588		588
M1A	1132.5			dry		dry		dry	
M1B	1132.5	401.9	730.6	398	734.5	399.55	732.95	391.55	740.95
M2A	1082.5			312.88	769.62	312	770.5	312.08	770.42
M2B	1082.5	388	694.5	384.92	697.58	385.25	697.25	380.35	702.15
M3A	1072.5	369.8	702.7	368.41	704.09	369.02	703.48	destroyed by landslide	
M3B	1072.5			185.19	887.31	183.95	888.55	destroyed by landslide	
M5A	1162.5	267.5	895	263.12	899.38	264.05	898.45	261.92	900.58
M6A	1132.5	378.3	754.2	372.74	759.76	372.97	759.53	371.8	760.7
M6B	1132.5			330.24	802.26	330.47	802.03	327	805.5
NZA	778.75			98.81	679.94	98.95	679.8	destroyed by mining operations	
PELA1	756.85			40.19	716.66	41	715.85	39.89	716.96
PELA2	756.2	destroyed by mining operations							
PELA4	1176.5			458.24	718.26	459.27	717.23	452.55	
PELA3	1182.5			281.55	900.95	281.53	900.97	281.75	
Plant Spring			700		700		700		700
QM1	728.8	51.9	676.9	49	679.8	49.15	679.65	49.4	
QM2	779.5	141.9	637.6	141.54	637.96	141.72	637.78	140.45	
QM3	810.6			59.35	751.25	59.55	751.05	49.45	
QM4	806.6			108.37	698.23	108.88	697.72	108.13	
QM5	595.5			10.16	585.34	dry		measurements not taken	

Well ID	Measuring Point (ft amsl)	03/22-03/23, 2006		06/03-06/09, 2006		10/25 -10/27, 2006		11/9-11/10, 2006	
		Depth to water (ft)	Water elev. (ft)	Depth to water (ft)	Water elev. (ft)	Depth to water (ft)	Water elev. (ft)	Depth to water (ft)	Water elev. (ft)
BD-40	1100	90.6	1009.4	91.48	1008.52	92.94	1007.06	91.5	1008.5
BD-41	1150	291.62	858.38	293.45	856.55	296.1	853.9	296.96	853.04
BD-42	1212	215.95	996.05	215.91	996.09	216.16	995.84	216.26	995.74
BD-44	1092	192.38	899.62	191	901	192.84	899.16	193.49	898.51
BD-45	821.6	165.08	656.52	178.49	643.11	181	639.1	180.01	641.59
DH-3	592.5			11.11	581.39	11.29	581.21	11.85	580.65
Liddell Spring					588		588		588
M1A	1132.5	dry		dry		dry		dry	
M1B	1132.5	378.25	754.25	394.54	737.96	405.57	724.43	405.63	726.87
M2A	1082.5	311.9	770.6	313.63	768.87	314.84	767.66	dry	
M2B	1082.5	357.7	724.8	383.42	699.08	383.14	696.86	384.4	698.1
M3A	1072.5	destroyed by landslide							
M3B	1072.5	destroyed by landslide							
M5A	1162.5	256.48	906.02	261.87	900.63	264.71	895.29	264.5	898
M6A	1132.5	365.7	766.8	373.49	759.01	375.54	754.46	376.1	756.4
M6B	1132.5	328.35	804.15	331.2	801.3	332.81	799.69	331.1	801.4
NZA	778.75	destroyed by mining operations							
PELA1	756.85	33.72	723.13	42.1	714.75	43.63	710.37	42.13	714.72
PELA2	756.2	destroyed by mining operations							
PELA4	1176.5	439.1	737.4	454.46	722.04	465.25	709.75	465.58	710.92
PELA3	1182.5	280.81	901.69	280.36	902.14	blocked at 233'			
Plant Spring			700		700		700		700
QM1	728.8	49.3	679.5	47.895	680.905	49.25	679.55	49.96	678.84
QM2	779.5	136.52	642.98	142.66	636.84	142.8	635.2	141.8	637.7
QM3	810.6	56.86	753.74	56.38	754.22	60.14	750.46	60.12	750.48
QM4	806.6	103.15	703.45	104.72	701.88	108.64	697.96	108.68	697.92
QM5	595.5			9.9	585.6	11.58	583.92	10.45	585.05

Well ID	Measuring Point (ft amsl)	1/17 - 1/18, 2007 Depth to water (ft)	1/17 - 1/18, 2007 Water elev. (ft)	5/22 - 5/23, 2007 Depth to water (ft)	5/22 - 5/23, 2007 Water elev. (ft)	6/26 - 6/29, 2007 Depth to water (ft)	6/26 - 6/29, 2007 Water elev. (ft)	8/12, 2007 Depth to water (ft)	8/12, 2007 Water elev. (ft)
BD-40	1100	94.11	1005.89	94.2	1005.8	94.1	1005.9		
BD-41	1150	297.38	852.64	297.3	852.7	297.41	852.59		
BD-42	1212	216.55	995.45	216.91	995.09	216.59	995.41		
BD-44	1092	194.42	897.58	195.21	896.79	195.67	896.33		
BD-45	821.6	180.37	641.23	179.65	641.95	180.5	641.1	181.28	640.32
DH-3	592.5	11.56	580.94	12.38	580.12				592.5
Liddell Spring			588		588		588		588
M1A	1132.5	dry		dry		dry	dry	dry	dry
M1B	1132.5	401.12	731.38	399.32	733.18	397.67	734.83	403.85	728.65
M2A	1082.5	dry		313.04	769.46	313.58	768.92		
M2B	1082.5	387.8	694.7	386.58	695.92	386.62	695.88	388.35	694.15
M3A	1072.5	destroyed by landslide							
M3B	1072.5	destroyed by landslide							
M5A	1162.5	265.59	896.91	264.08	898.42	265.21	897.29	266.33	896.17
M6A	1132.5	396.94	735.56	376.44	756.06	377.15	755.35		
M6B	1132.5	334.09	798.41	334.04	798.46	334.7	797.8		
NZA	778.75	destroyed by mining operations							
PELA1	756.85	39.98	716.87	41.42	715.43	42.15	714.7	42.3	714.55
PELA2	756.2	destroyed by mining operations							
PELA4	1176.5	blocked around 370'							
PELA3	1182.5	blocked at 233'							
Plant Spring			700		700		700		700
QM1	728.8	50.65	678.15	49.39	679.41	49.68	679.12		
QM2	779.5	141.7	637.8	141.48	638.02	141.64	637.86		
QM3	810.6	61.17	749.43	61.63	748.97	62.65	747.95		
QM4	806.6	dry		dry		dry	dry		
QM5	595.5	10.35	585.15	10.3	585.2	10.32	585.18		

Table 2. Summary of 1720-C turbidity data related to blasting

Water Year	Number of Blast Events	Turbidity Increase ≥25 NTU	Turbidity Increase ≥ 2 NTU	Turbidity Increase ≥ 0 NTU
2005 (11/10/04~9/30/05)	68 Blasts	None	17 (25%)	66 (97%)
2006 (10/1/05~9/30/06)	86 Blasts	2 (3%)	28 (33%)	68 (79%)
2007 (10/1/06~7/26/07)	50 Blasts	3 (6%)	7 (14%)	39 (78%)

Figure 1. A small cave filled with interbedded sand and clay on west quarry wall at elevation of 760-770 feet amsl

PELA

TURBIDITY INFILTRATION TEST #1 AT QUARRY PIT

Location: Southeast corner of existing quarry pit
Date: August 27 and 29, 2007
Duration of water dumping: 16:45—17:42 on August 27
15:05—17:35 on August 29
Amount of water: 5,500 gallons on August 27
18,000 on August 29
Maximum dimension of wetted area: ~70'X60'
Maximum water level: ~11.4"
Average turbidity during water dumping: ~1,500 NTU
Turbidity measured next day: 5 NTU
Turbidity measured by: Portable turbidity meter LaMotte 2020e
Estimated first day percolation rate: ~4.5"/day

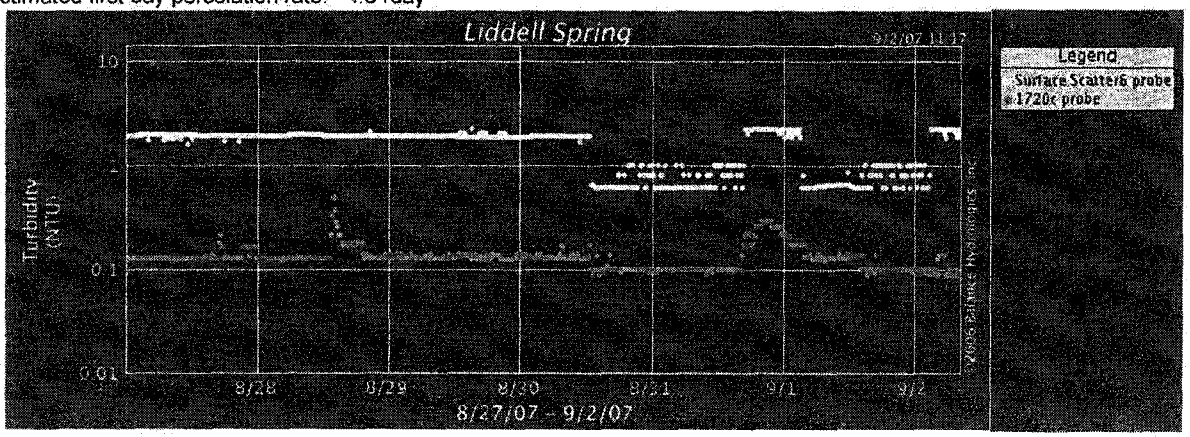
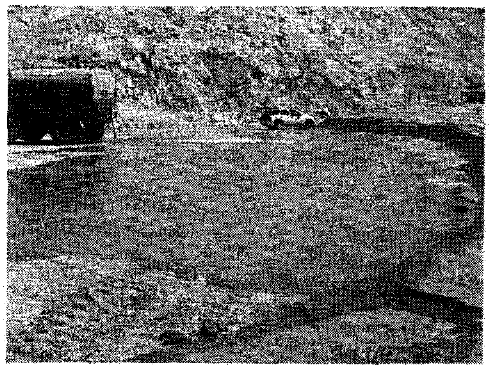


Figure 2. Turbidity infiltration test #1 at southeast corner of quarry pit

TURBIDITY INFILTRATION TEST #2 AT QUARRY PIT

Location: Northwest corner of existing quarry pit
Date: September 11, 2007
Duration of water dumping: 11:30—12:30
Amount of water: 18,000 gallons
Maximum dimension of wetted area: ~98'X30'
Maximum water level: ~12.0"
Average turbidity during water dumping: ~800 NTU
Turbidity measured next day: 9 NTU
Turbidity measured by: Portable turbidity meter LaMotte 2020e
Estimated first day percolation rate: ~4"/day



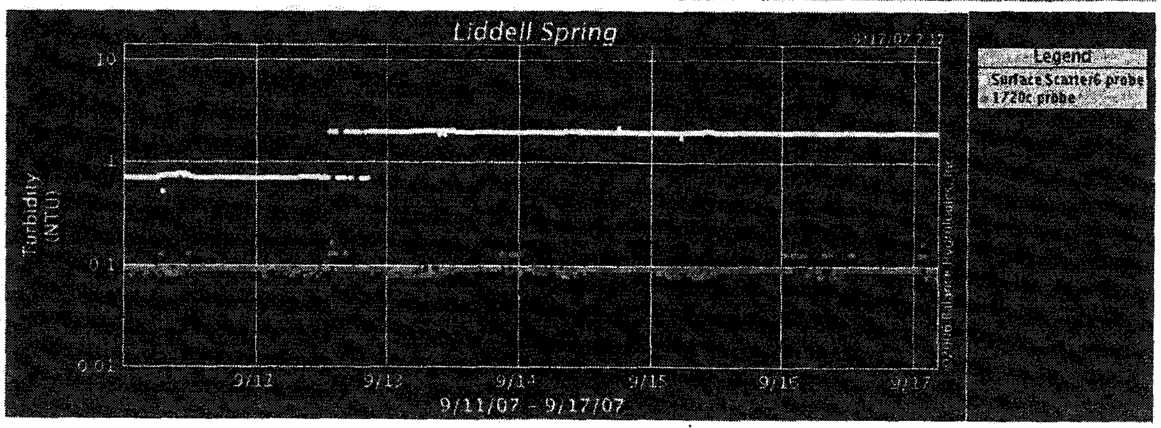


Figure 3. Turbidity infiltration test #2 at northwest corner of quarry pit

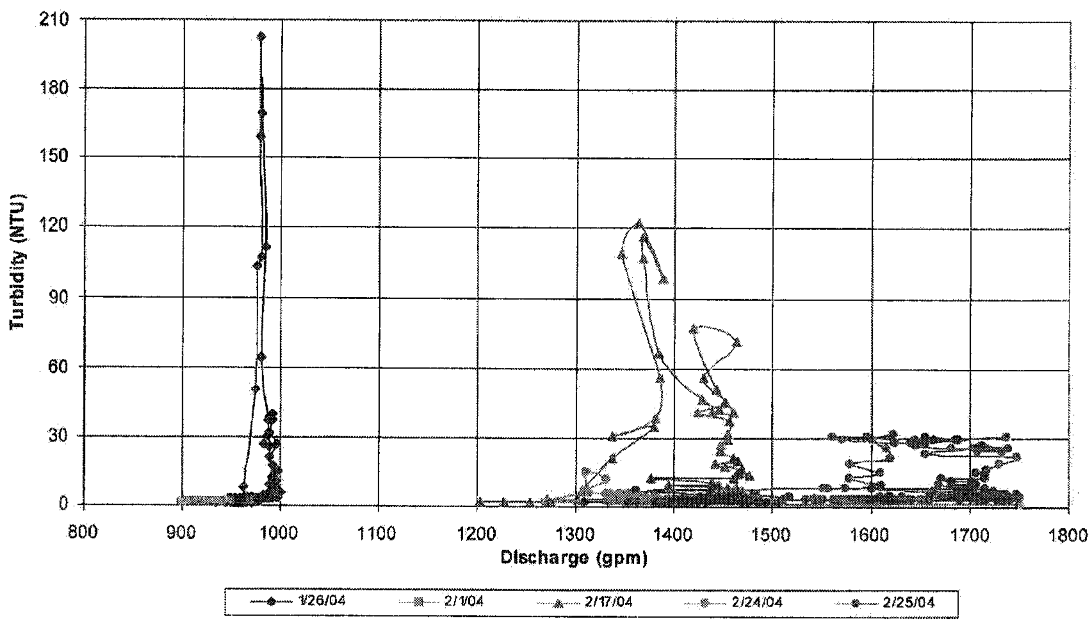


Figure 4. SS-6 turbidity hysteresis at Liddell Spring for storm events 1-5 in Table 40 of Technical Appendix

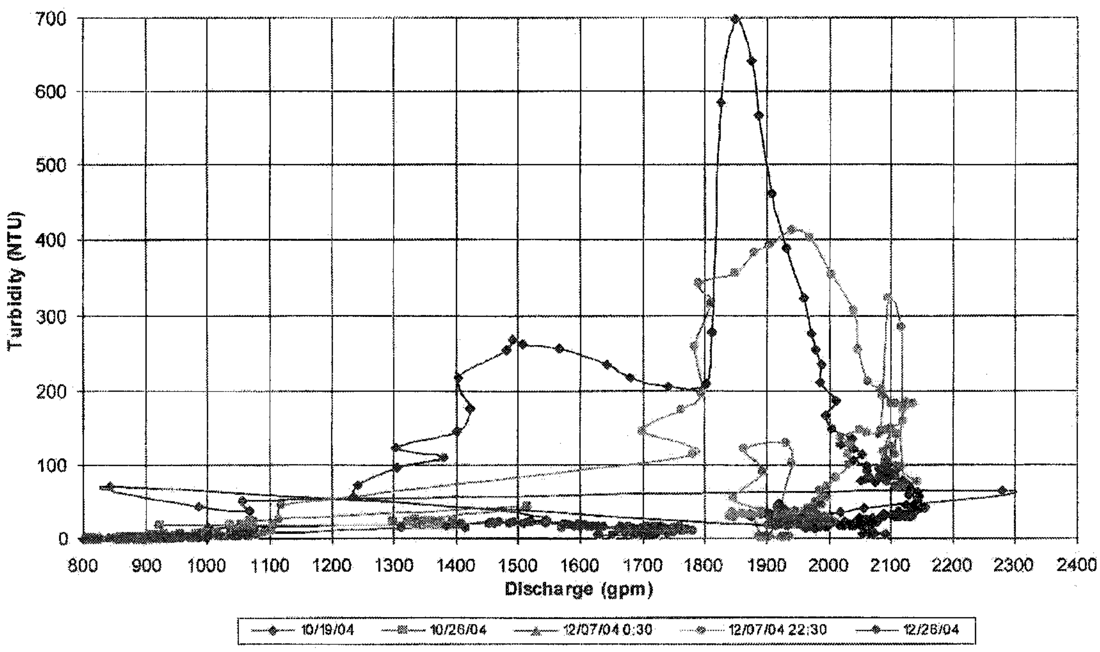


Figure 5. SS-6 turbidity hysteresis at Liddell Spring for storm events 6-10 in Table 40 of Technical Appendix

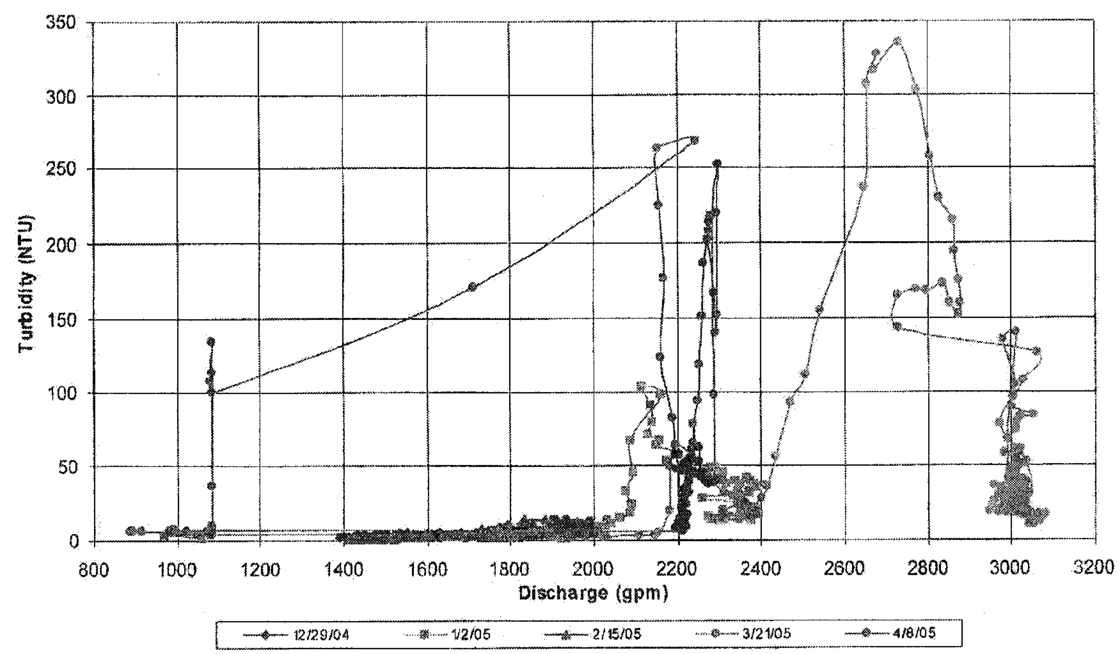
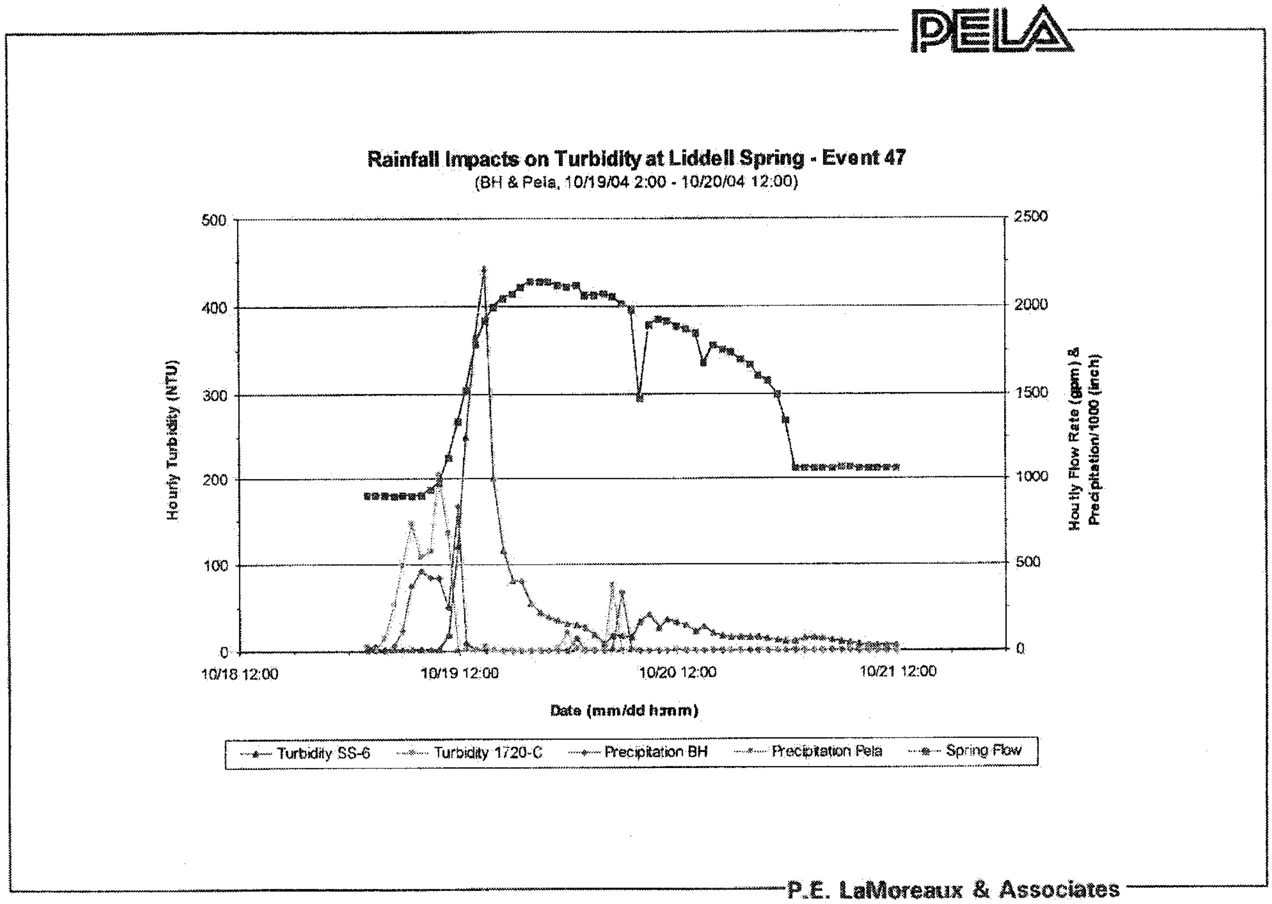


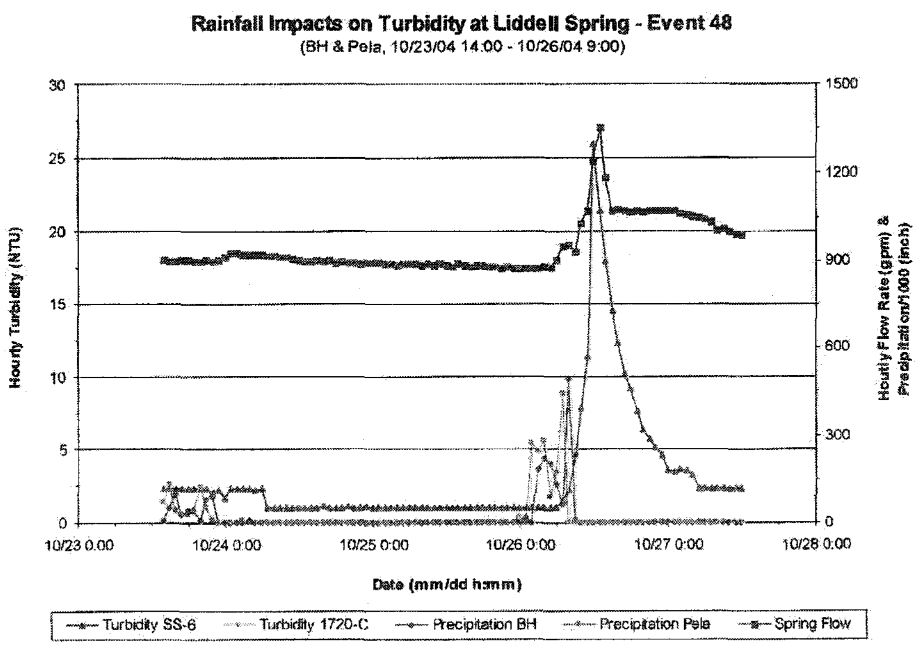
Figure 6. SS-6 turbidity hysteresis at Liddell Spring for storm events 11-15 in Table 40 of Technical Appendix

APPENDIX A
TURBIDIGRAPHS, DISCHARGE HYDROGRAPHS AT LIDDELL SPRING FOR 42 RAIN EVENTS FROM OCTOBER, 2004 TO FEBRUARY, 2007
(THE RAIN EVENTS FROM 1 TO 46 WERE INCLUDED IN PELA (2005))

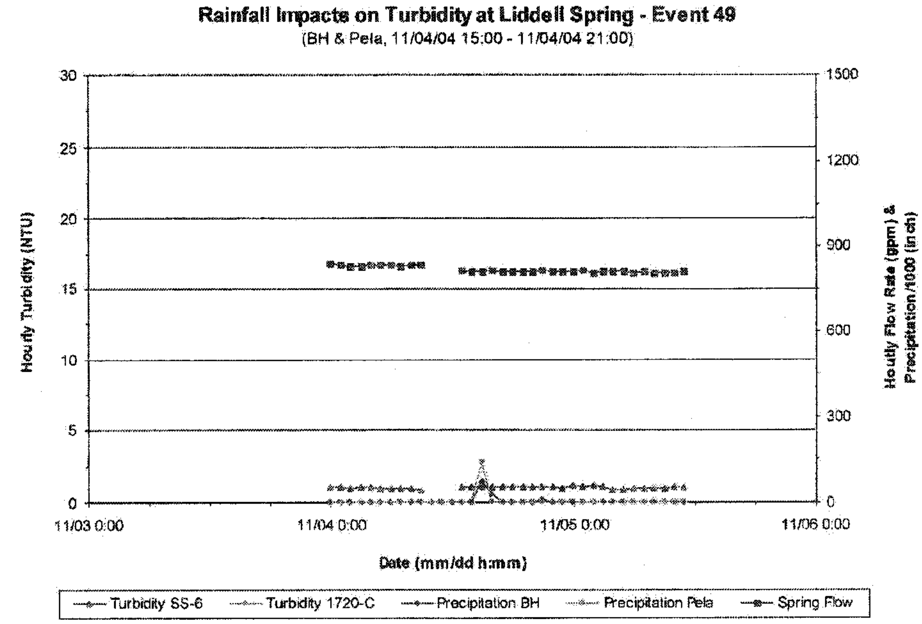
P.E. LaMoreaux & Associates



PELA
Rainfall Impacts on Turbidity at Liddell Spring - Event 47
(BH & Pela, 10/19/04 2:00 - 10/20/04 12:00)
500
400
300
200
100
0
2500
2000
1500
1000
500
0
Hourly Turbidity (NTU)
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
10/18 12:00
10/19 12:00
10/20 12:00
10/21 12:00
Date (mm/dd h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow
P.E. LaMoreaux & Associates

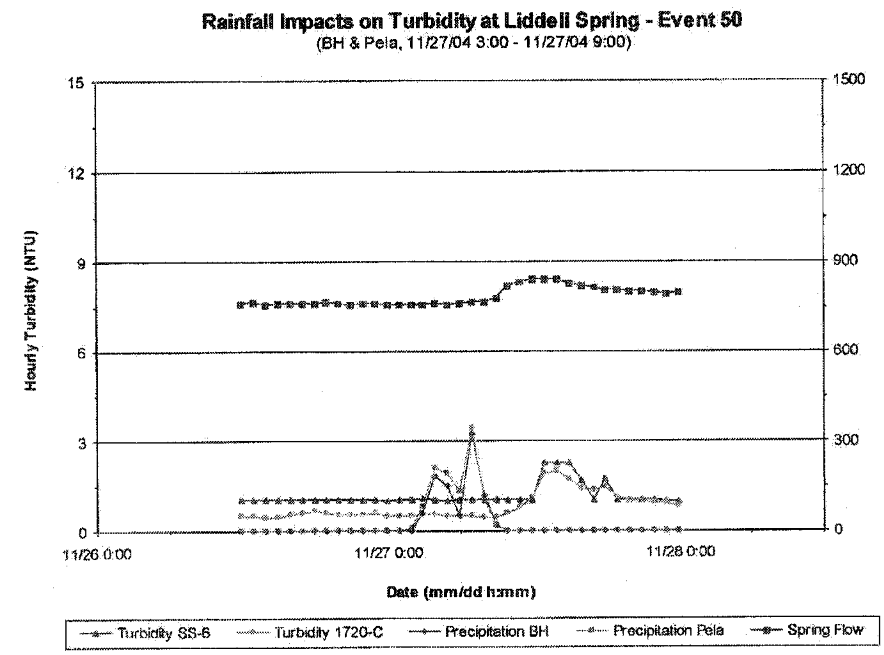


P.E. LaMoreaux & Associates

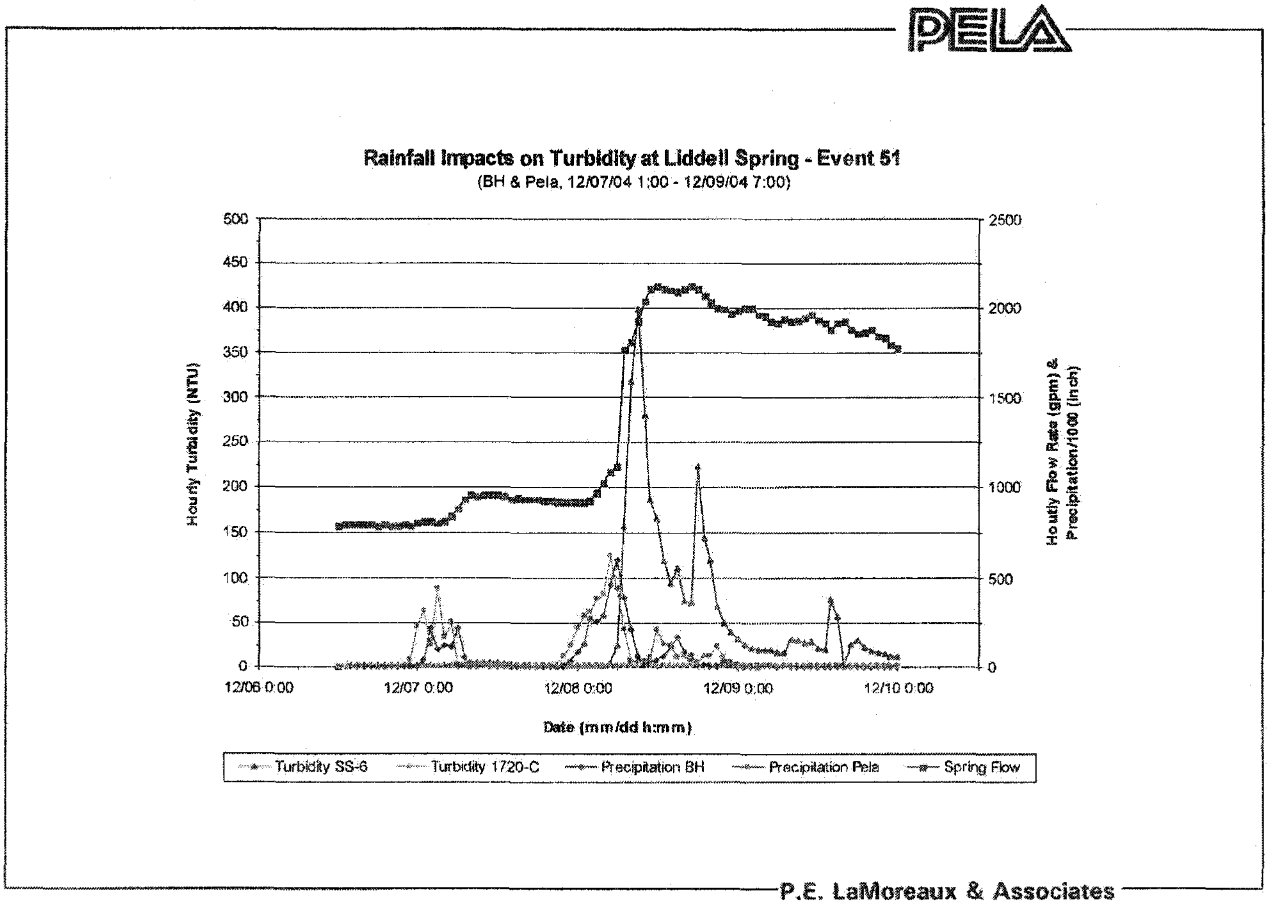


P.E. LaMoreaux & Associates

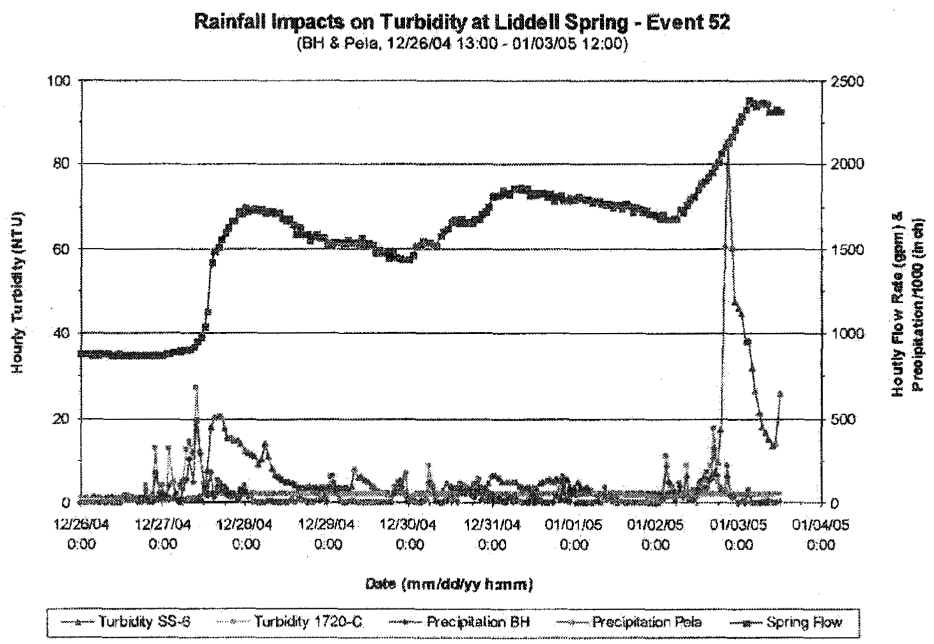
PELA



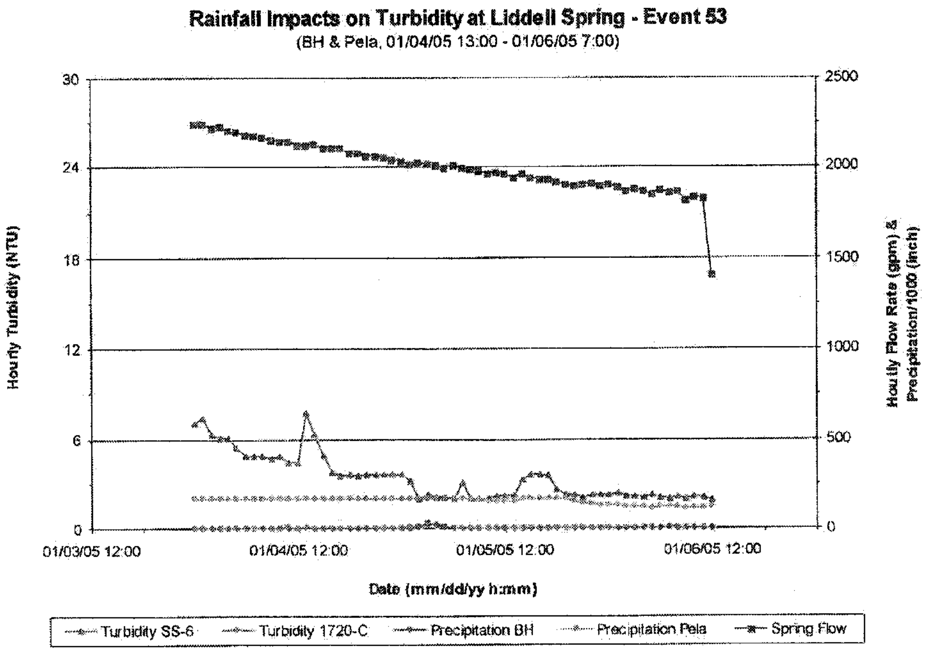
P.E. LaMoreaux & Associates


PELA
Rainfall Impacts on Turbidity at Liddell Spring - Event 51
(BH & Pela, 12/07/04 1:00 - 12/09/04 7:00)
Hourly Turbidity (NTU)
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
Date (mm/dd h:mm)
12/06 0:00
12/07 0:00
12/08 0:00
12/09 0:00
12/10 0:00
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow
P.E. LaMoreaux & Associates

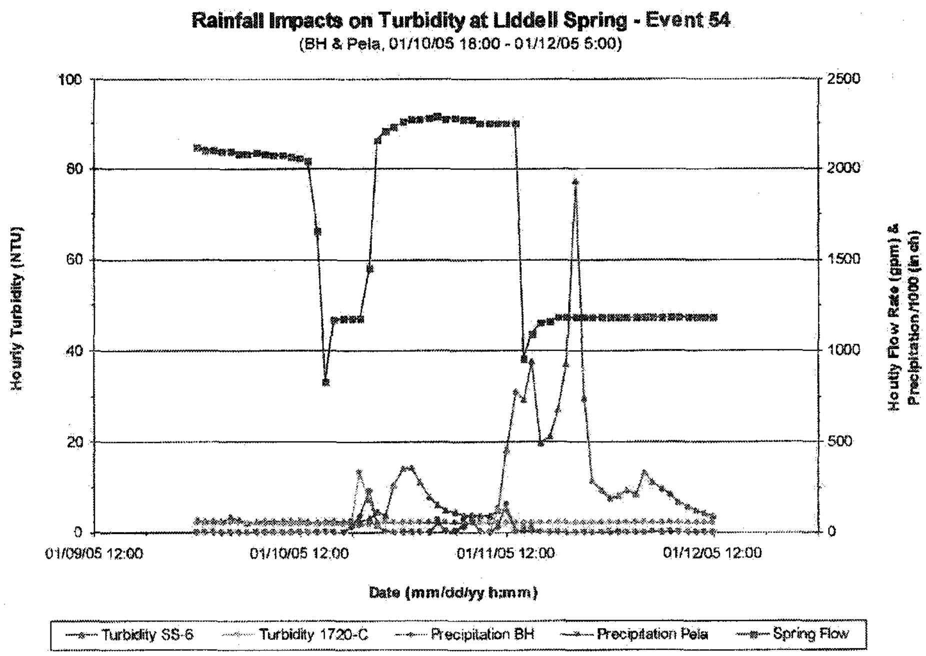
PELA



P.E. LaMoreaux & Associates

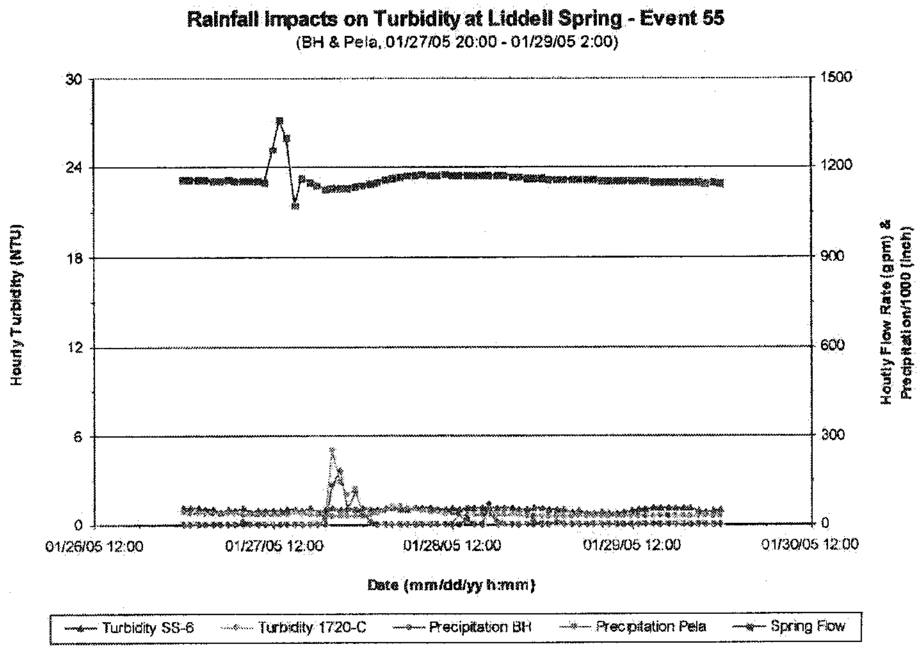


P.E. LaMoreaux & Associates

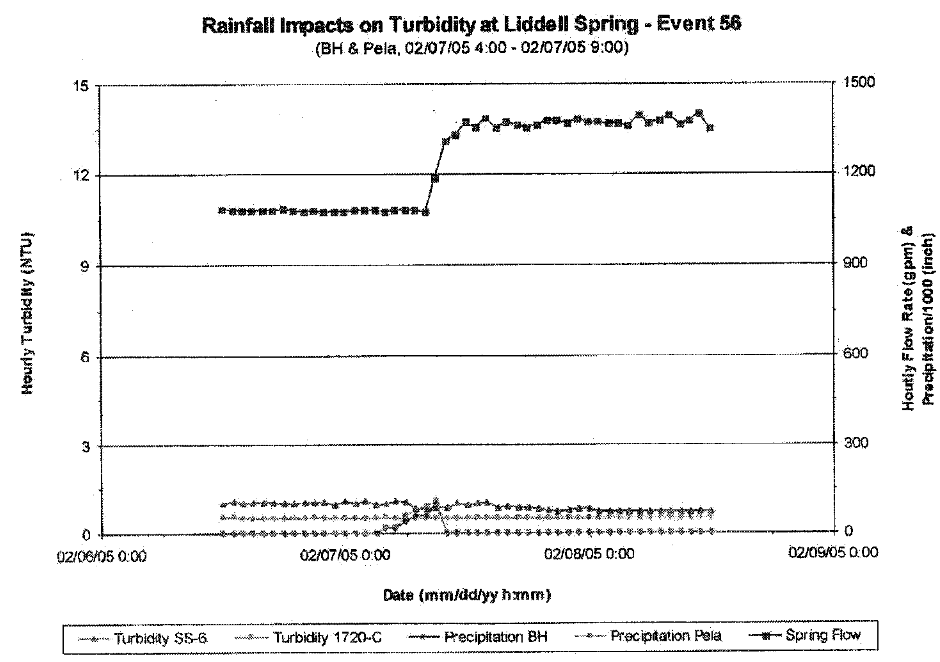


P.E. LaMoreaux & Associates

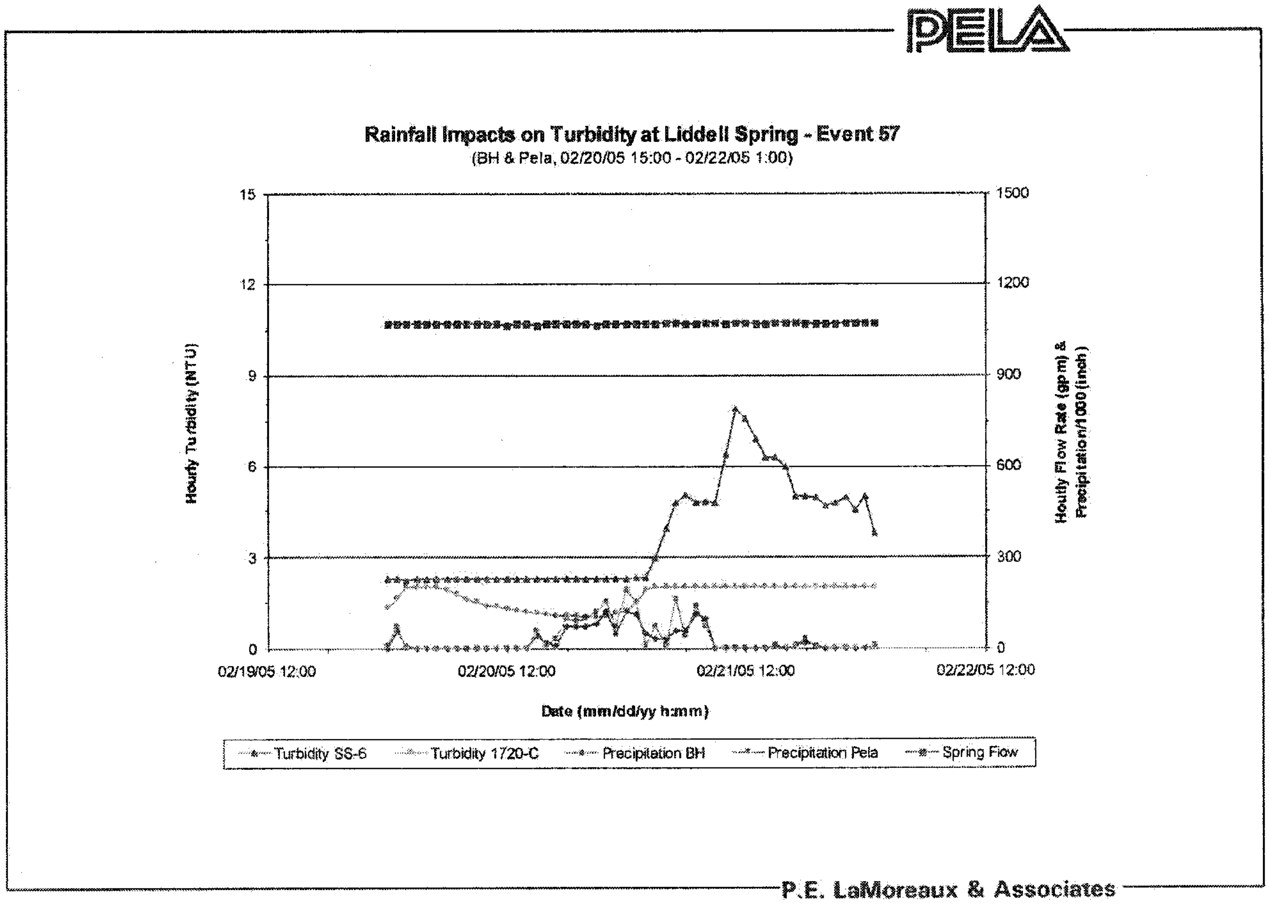
PELA



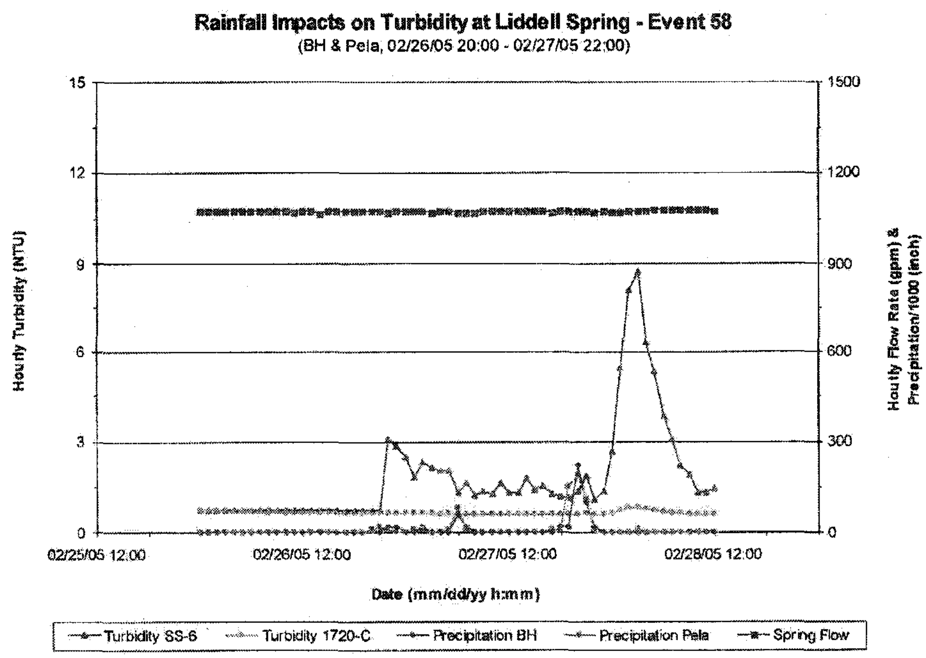
P.E. LaMoreaux & Associates

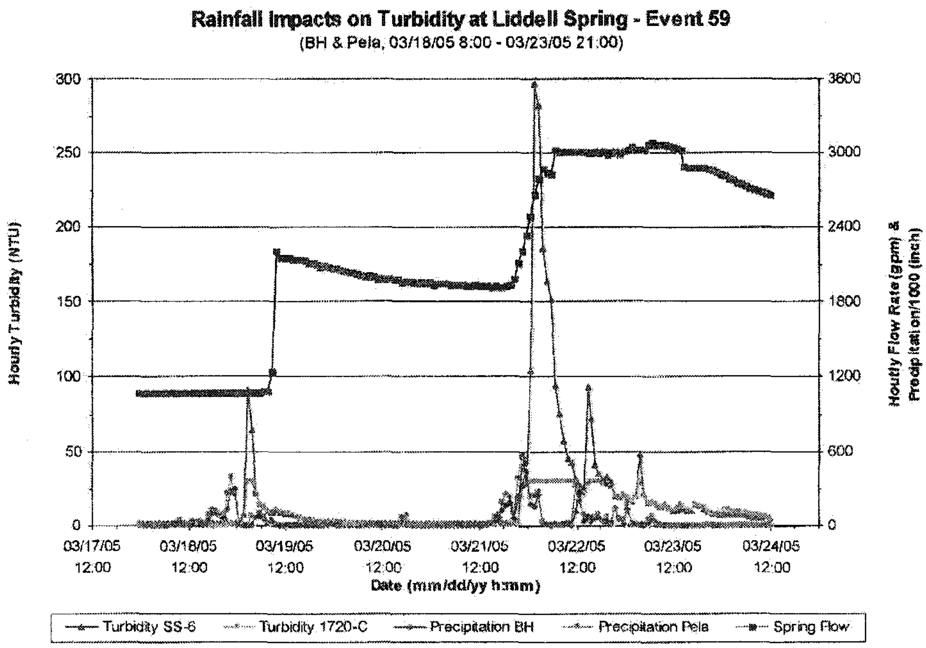


P.E. LaMoreaux & Associates

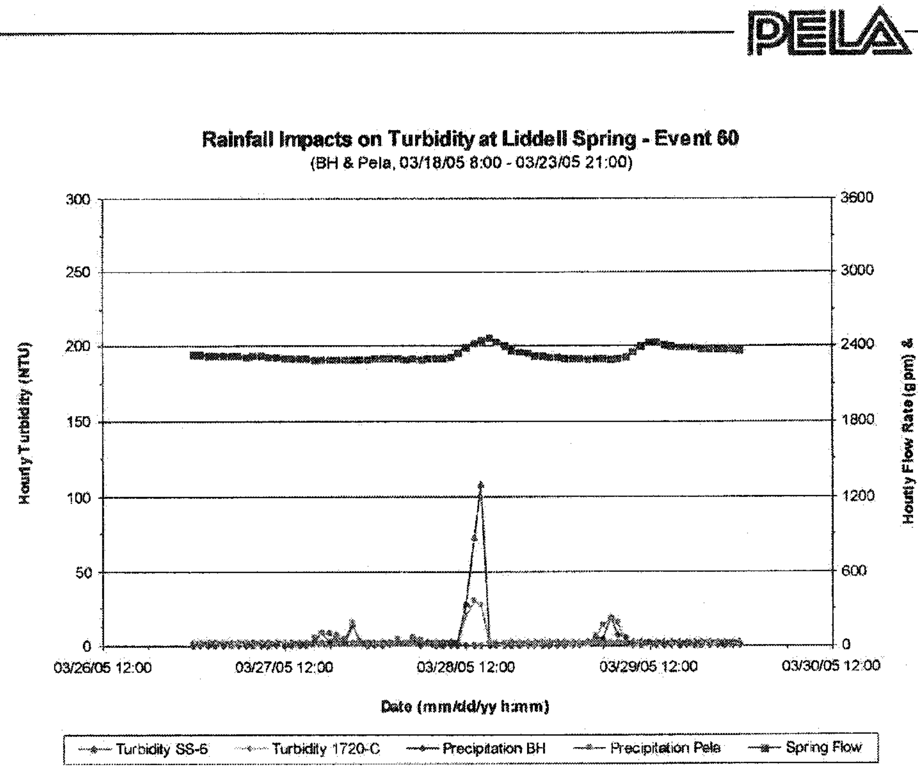


PELA
Rainfall Impacts on Turbidity at Liddell Spring - Event 57
(BH & Pela, 02/20/05 15:00 - 02/22/05 1:00)
Hourly Turbidity (NTU)
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
15
12
9
6
3
0
1500
1200
900
600
300
0
02/19/05 12:00
02/20/05 12:00
02/21/05 12:00
02/22/05 12:00
Date (mm/dd/yy h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow
P.E. LaMoreaux & Associates


Rainfall Impacts on Turbidity at Liddell Spring - Event 58
(BH & Pela, 02/26/05 20:00 - 02/27/05 22:00)
Hourly Turbidity (NTU)
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
15
12
9
6
3
0
1500
1200
900
600
300
0
02/25/05 12:00
02/26/05 12:00
02/27/05 12:00
02/28/05 12:00
Date (mm/dd/yy h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow

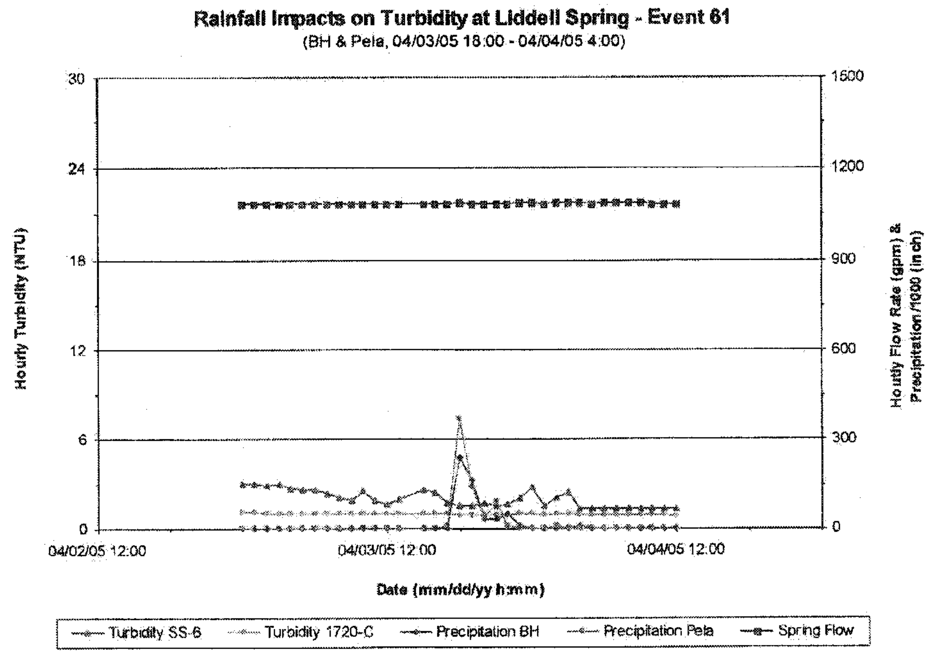


P.E. LaMoreaux & Associates

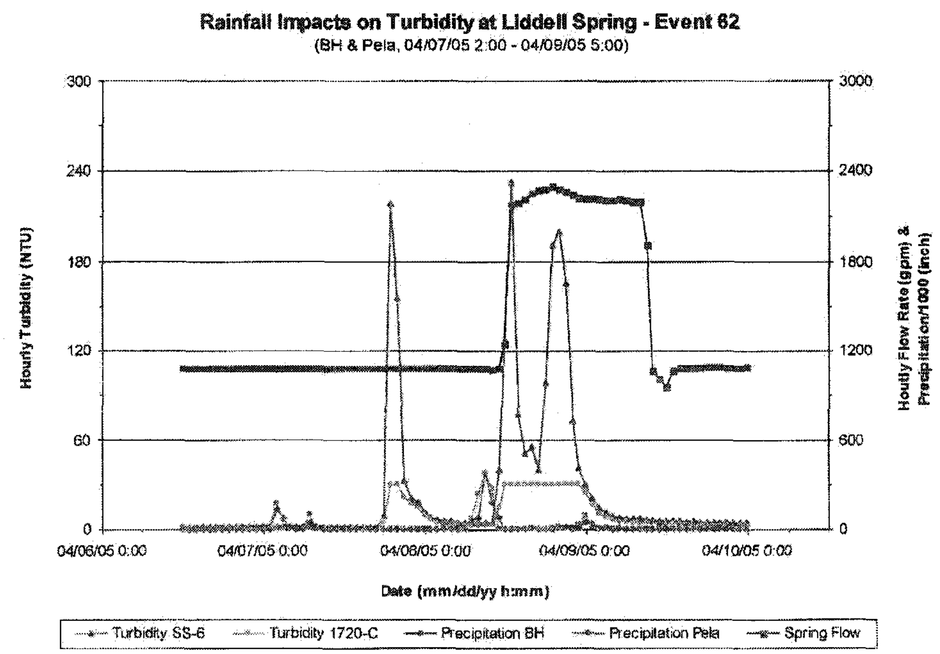


P.E. LaMoreaux & Associates

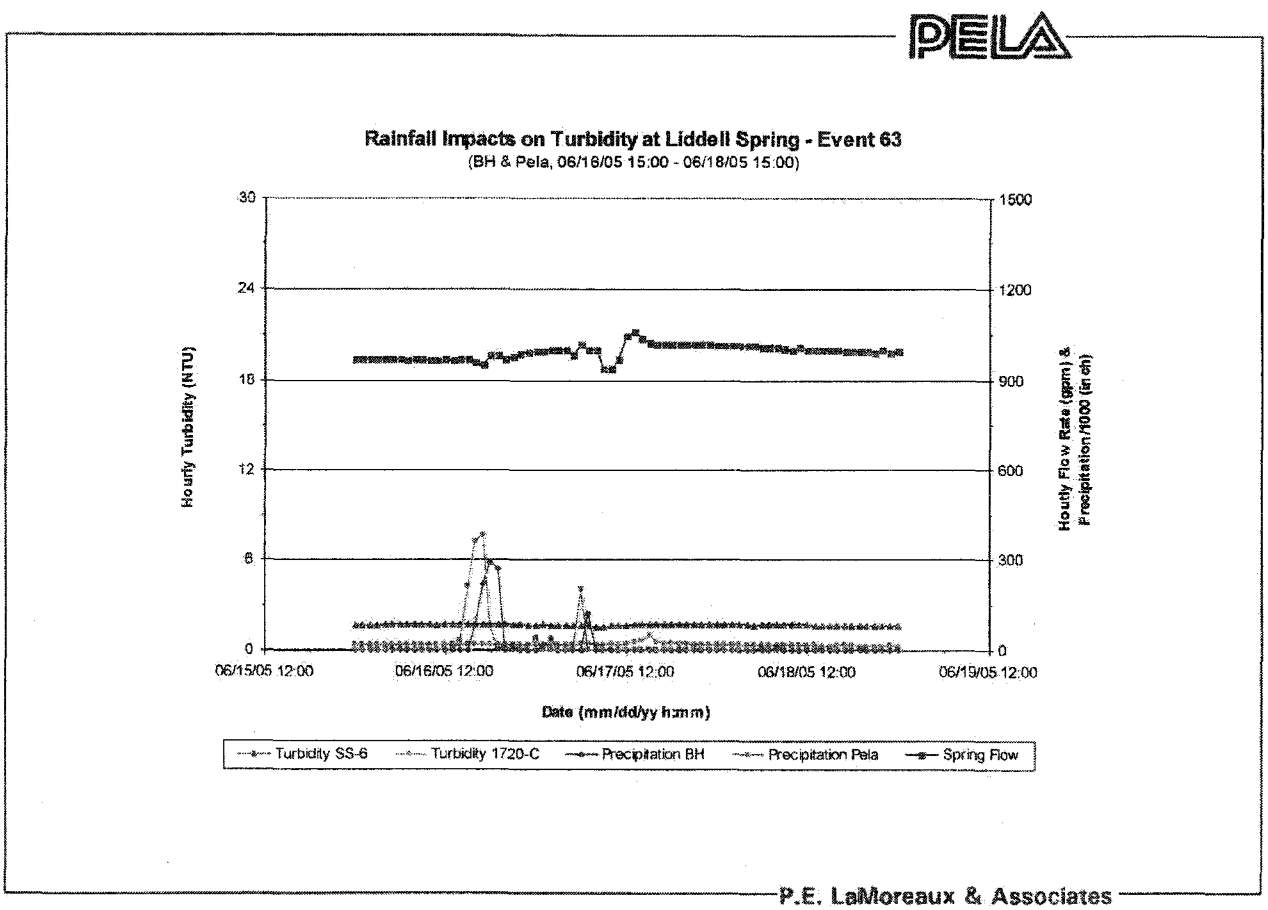
PELA

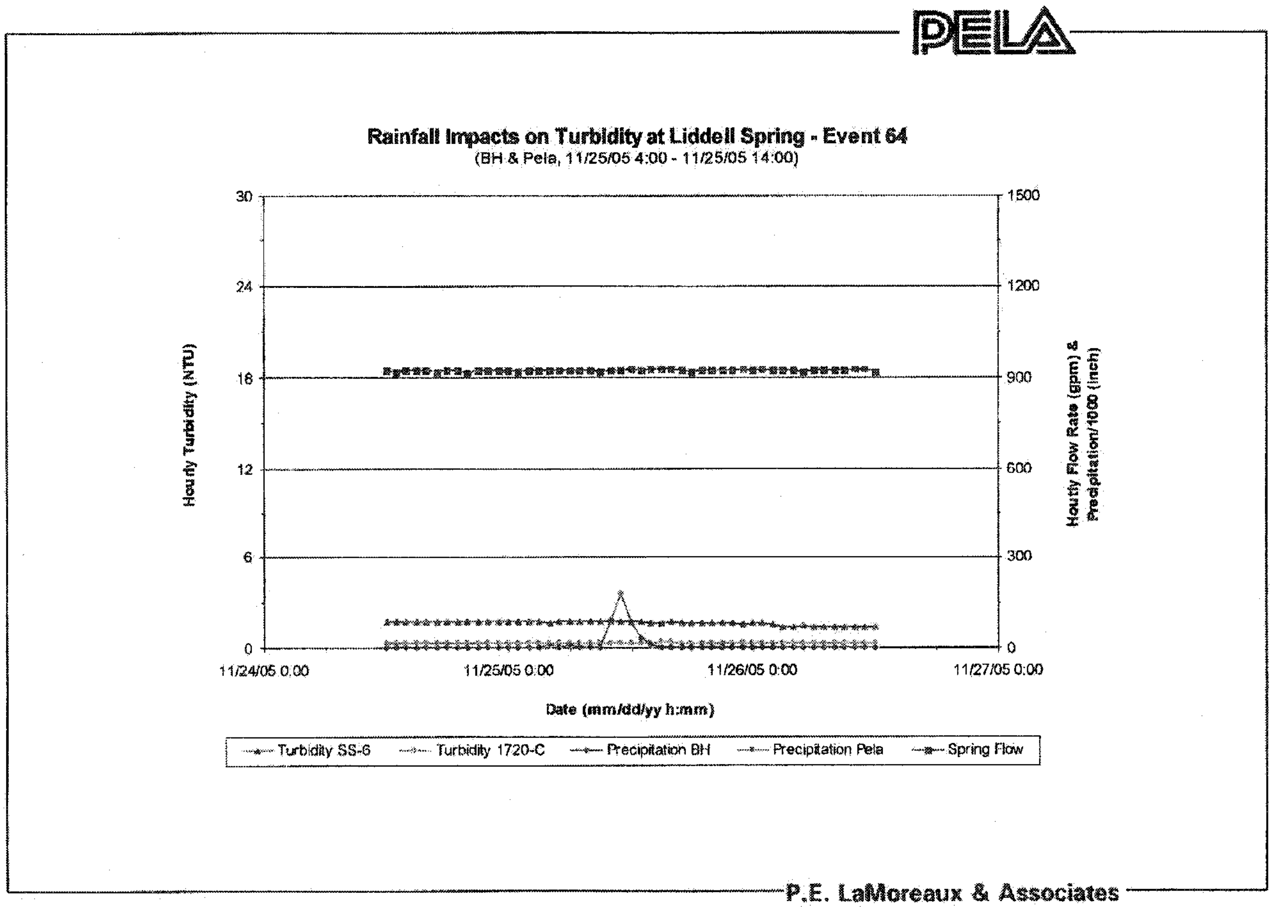


P.E. LaMoreaux & Associates

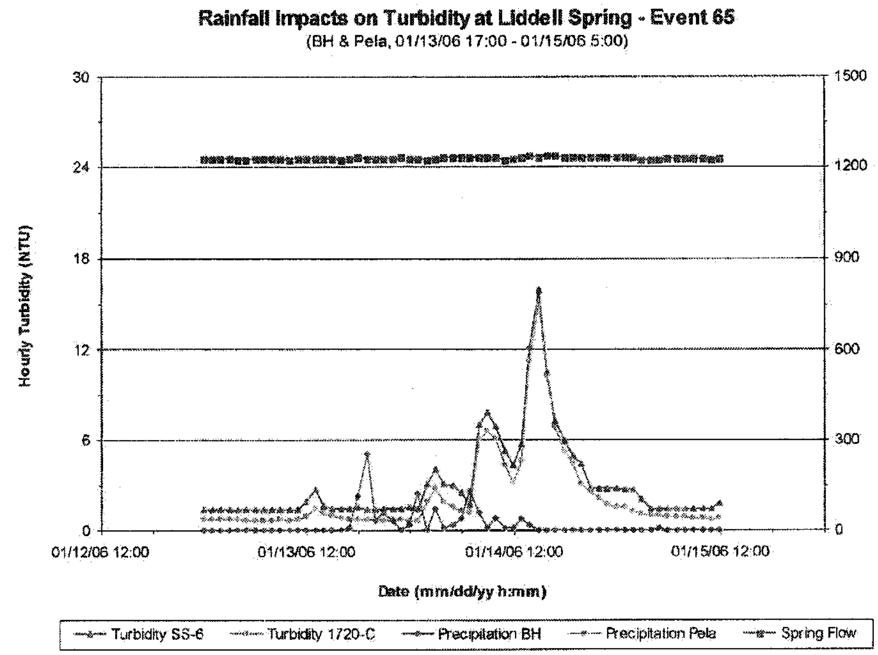


P.E. LaMoreaux & Associates

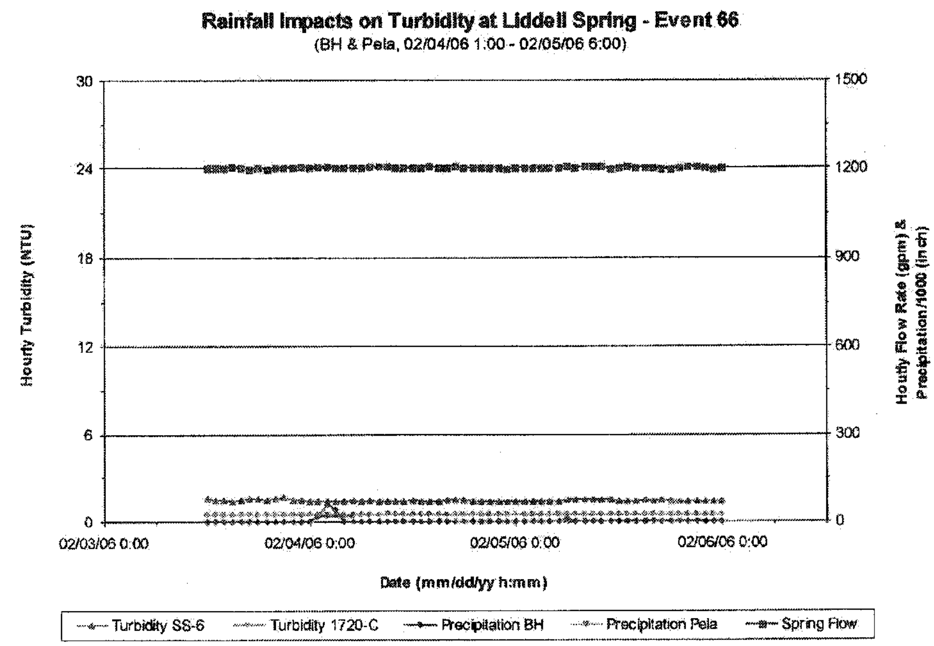

PELA
Rainfall Impacts on Turbidity at Liddell Spring - Event 63
(BH & Pela, 06/16/05 15:00 - 06/18/05 15:00)
Hourly Turbidity (NTU)
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
30
24
18
12
6
0
1500
1200
900
600
300
0
06/15/05 12:00
06/16/05 12:00
06/17/05 12:00
06/18/05 12:00
06/19/05 12:00
Date (mm/dd/yy h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow
P.E. LaMoreaux & Associates



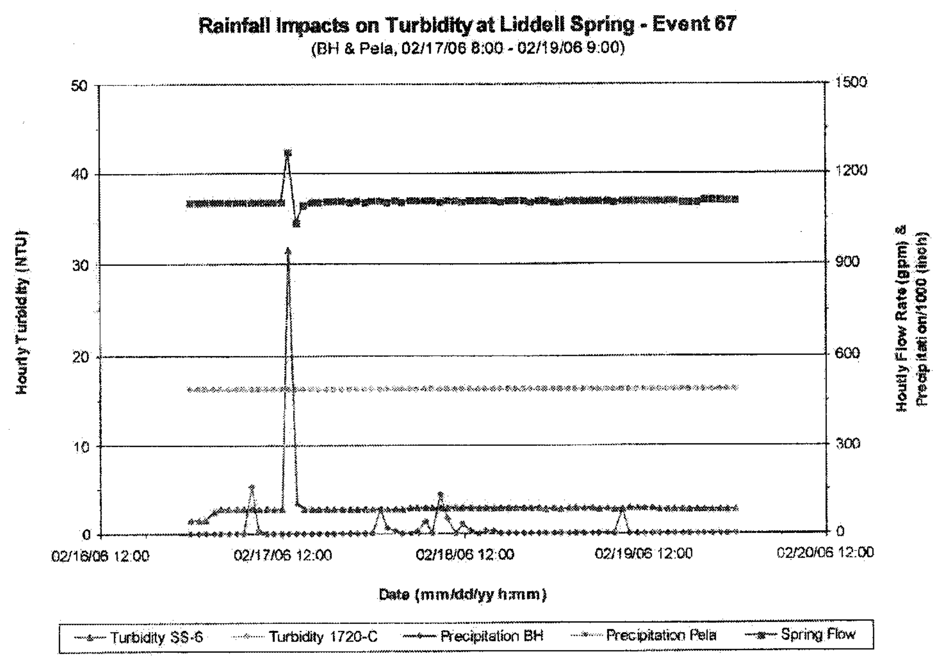
PELA
Rainfall Impacts on Turbidity at Liddell Spring - Event 64
(BH & Pela, 11/25/05 4:00 - 11/25/05 14:00)
Hourly Turbidity (NTU)
30
24
18
12
6
0
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
1500
1200
900
600
300
0
11/24/05 0:00
11/25/05 0:00
11/26/05 0:00
11/27/05 0:00
Date (mm/dd/yy h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow
P.E. LaMoreaux & Associates



P.E. LaMoreaux & Associates

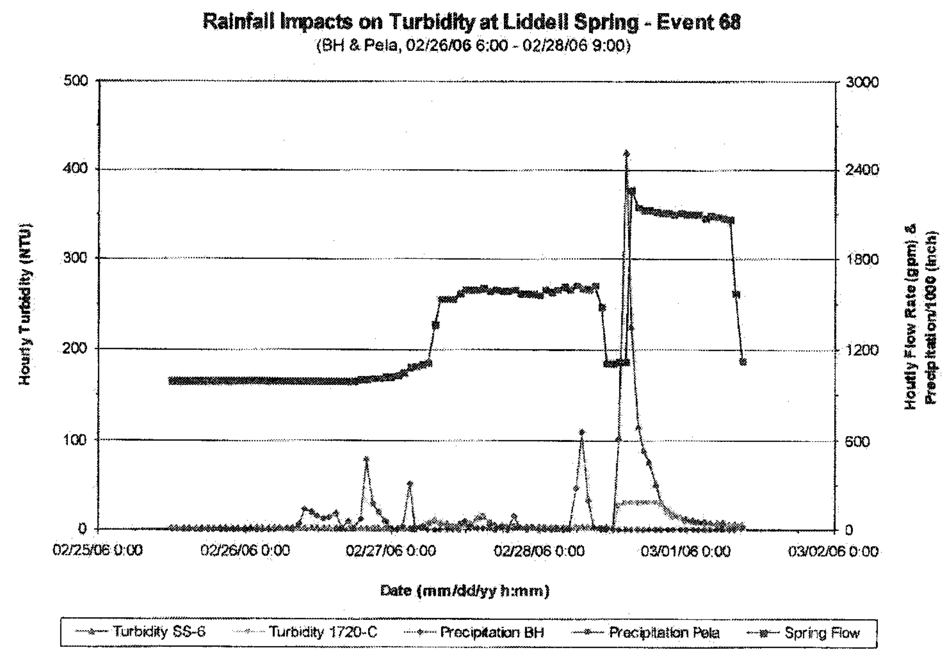


P.E. LaMoreaux & Associates

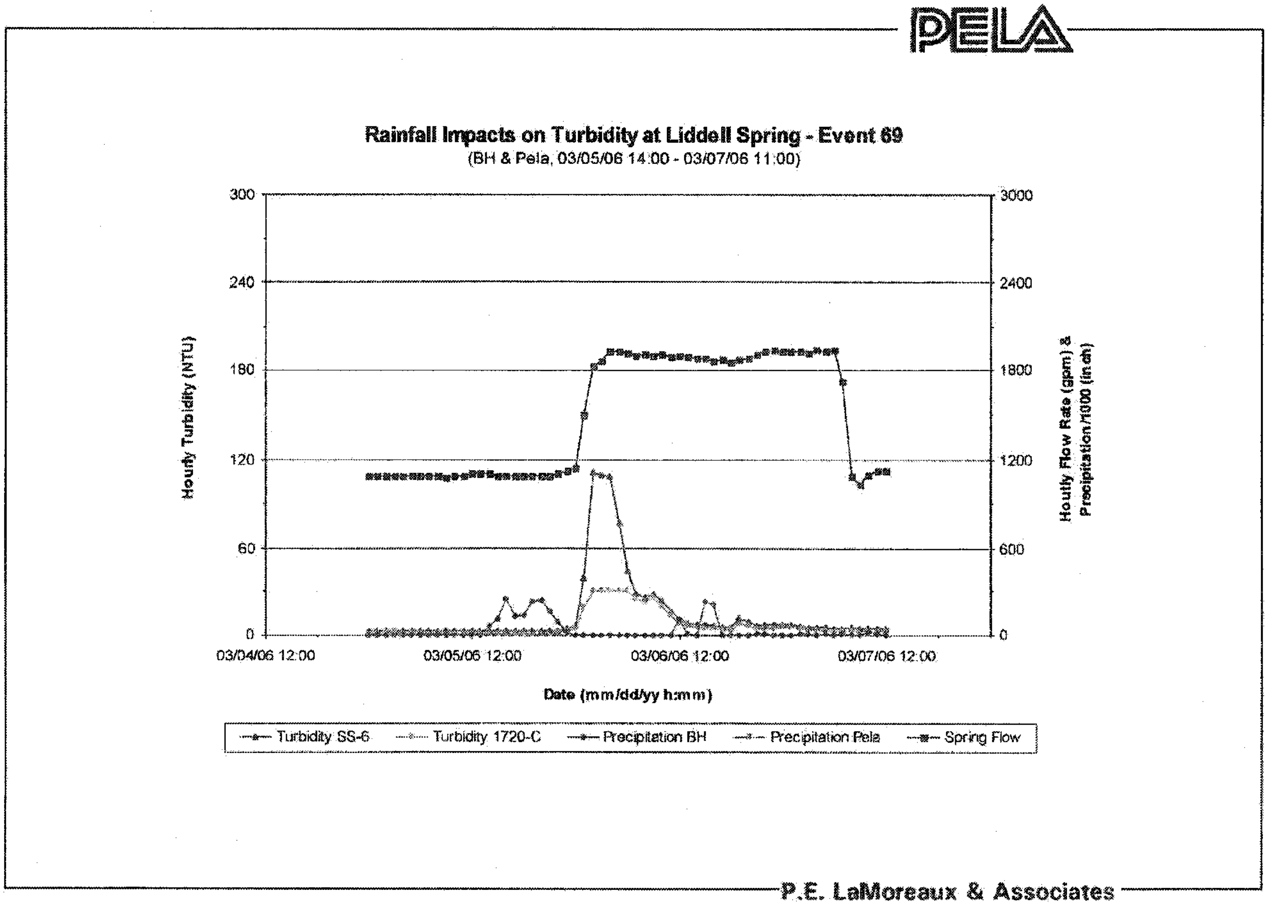


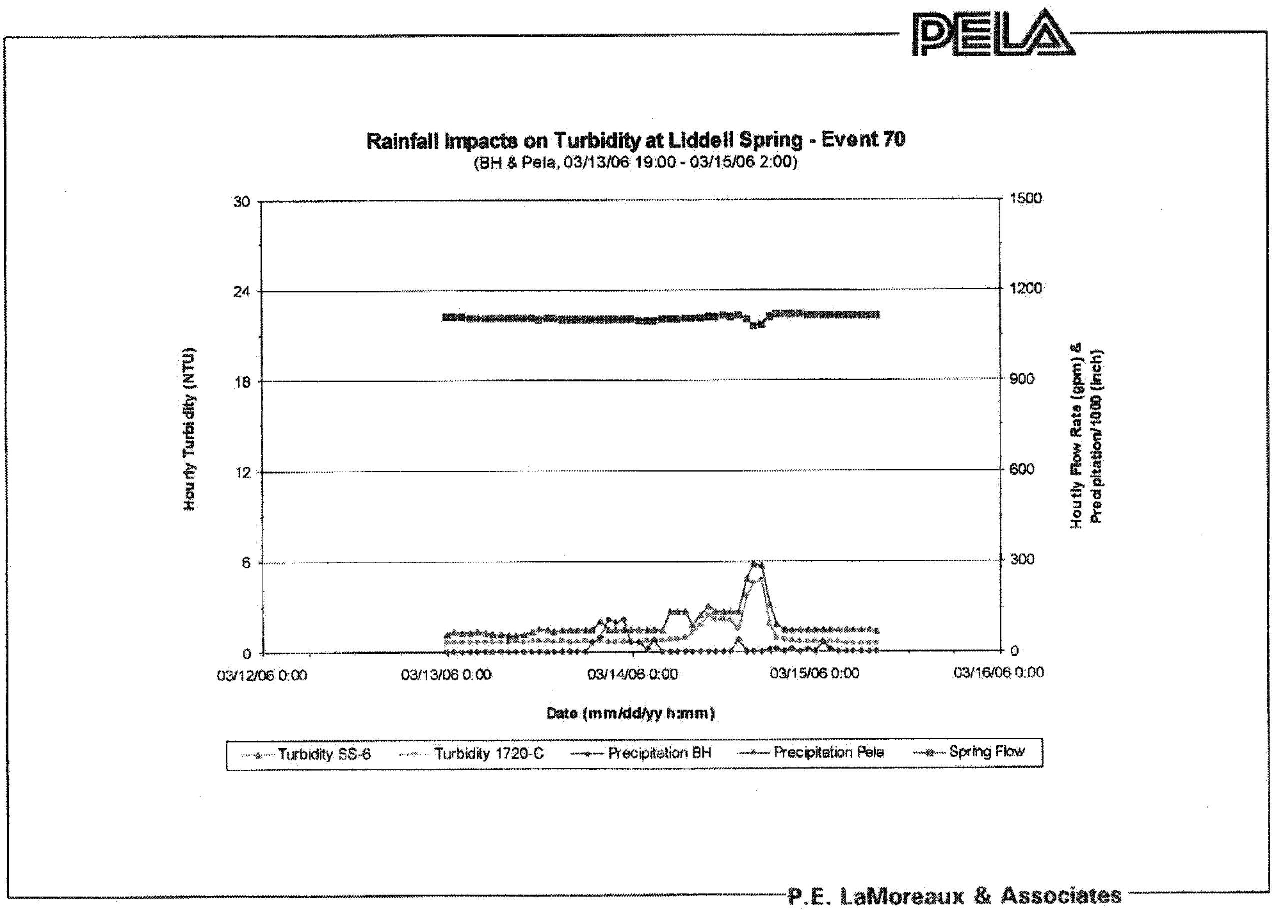
P.E. LaMoreaux & Associates

PELA



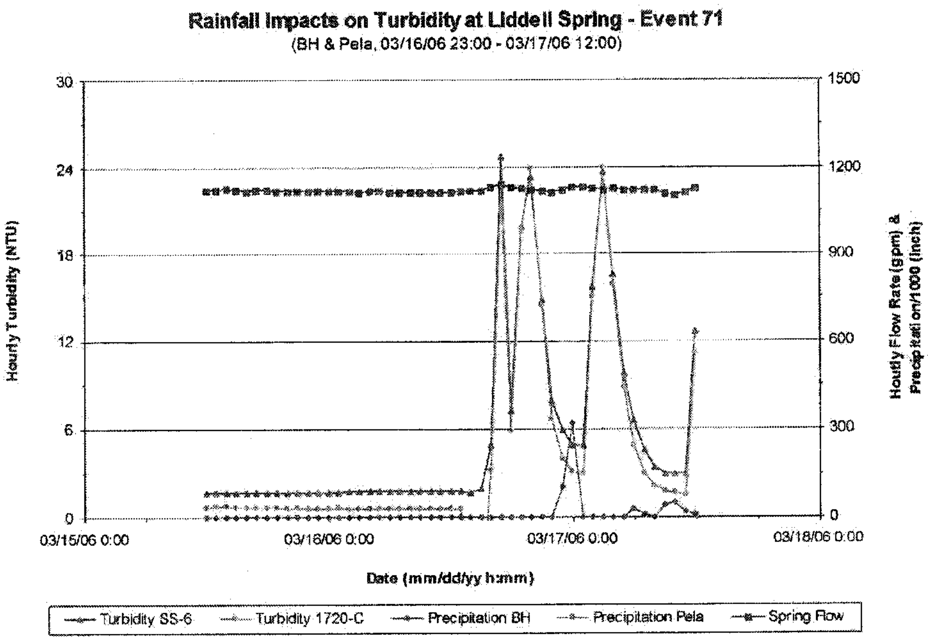
P.E. LaMoreaux & Associates


PELA
Rainfall Impacts on Turbidity at Liddell Spring - Event 69
(BH & Pela, 03/05/06 14:00 - 03/07/06 11:00)
Hourly Turbidity (NTU)
300
240
180
120
60
0
3000
2400
1800
1200
600
0
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
03/04/06 12:00
03/05/06 12:00
03/06/06 12:00
03/07/06 12:00
Date (mm/dd/yy h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow
P.E. LaMoreaux & Associates



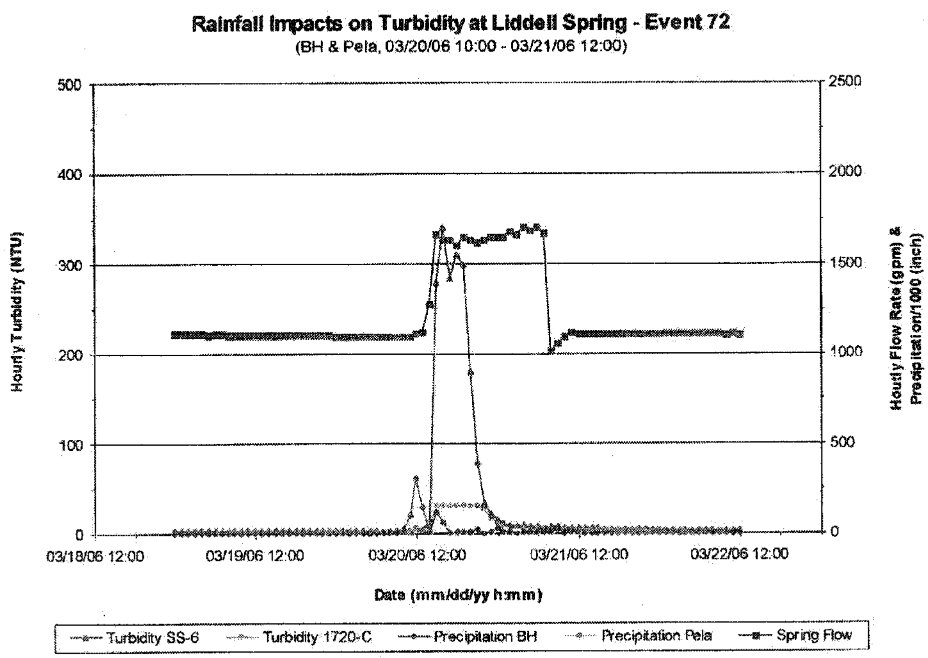
PELA
Rainfall Impacts on Turbidity at Liddell Spring - Event 70
(BH & Pela, 03/13/06 19:00 - 03/15/06 2:00)
Hourly Turbidity (NTU)
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
30
24
18
12
6
0
1500
1200
900
600
300
0
03/12/06 0:00
03/13/06 0:00
03/14/06 0:00
03/15/06 0:00
03/16/06 0:00
Date (mm/dd/yy h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow
P.E. LaMoreaux & Associates

PELA



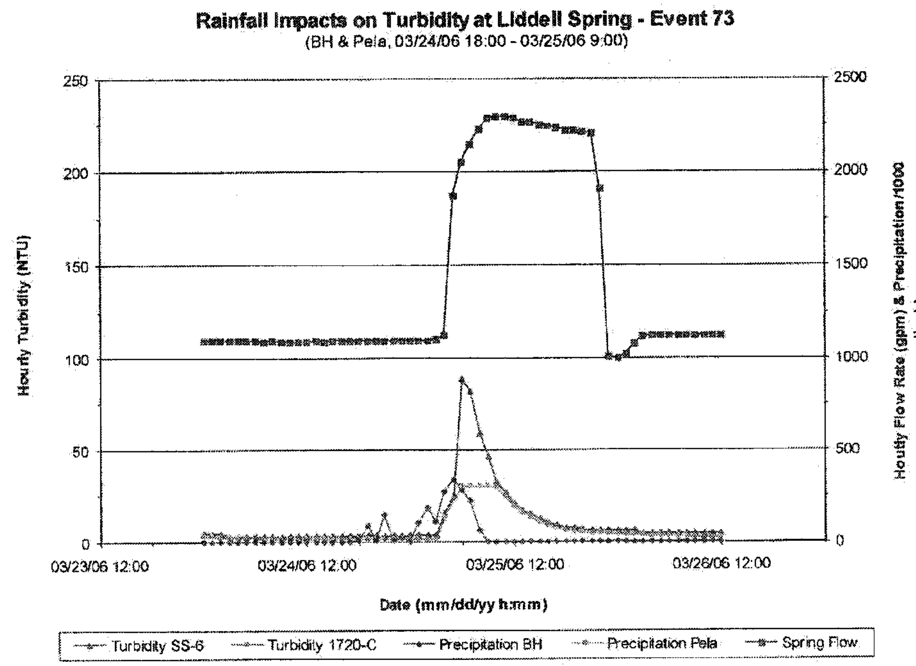
P.E. LaMoreaux & Associates

PELA

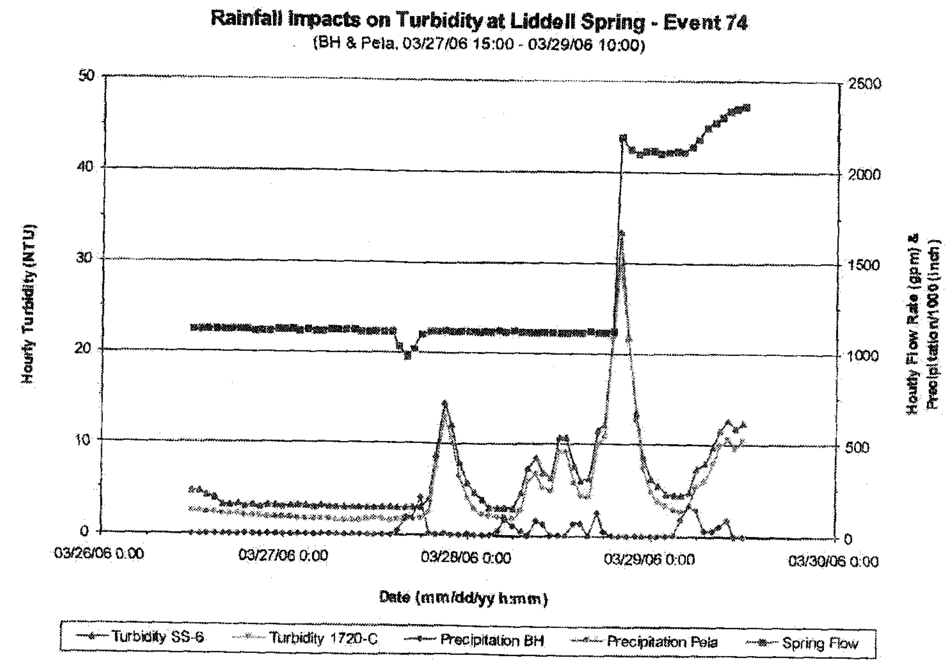


P.E. LaMoreaux & Associates

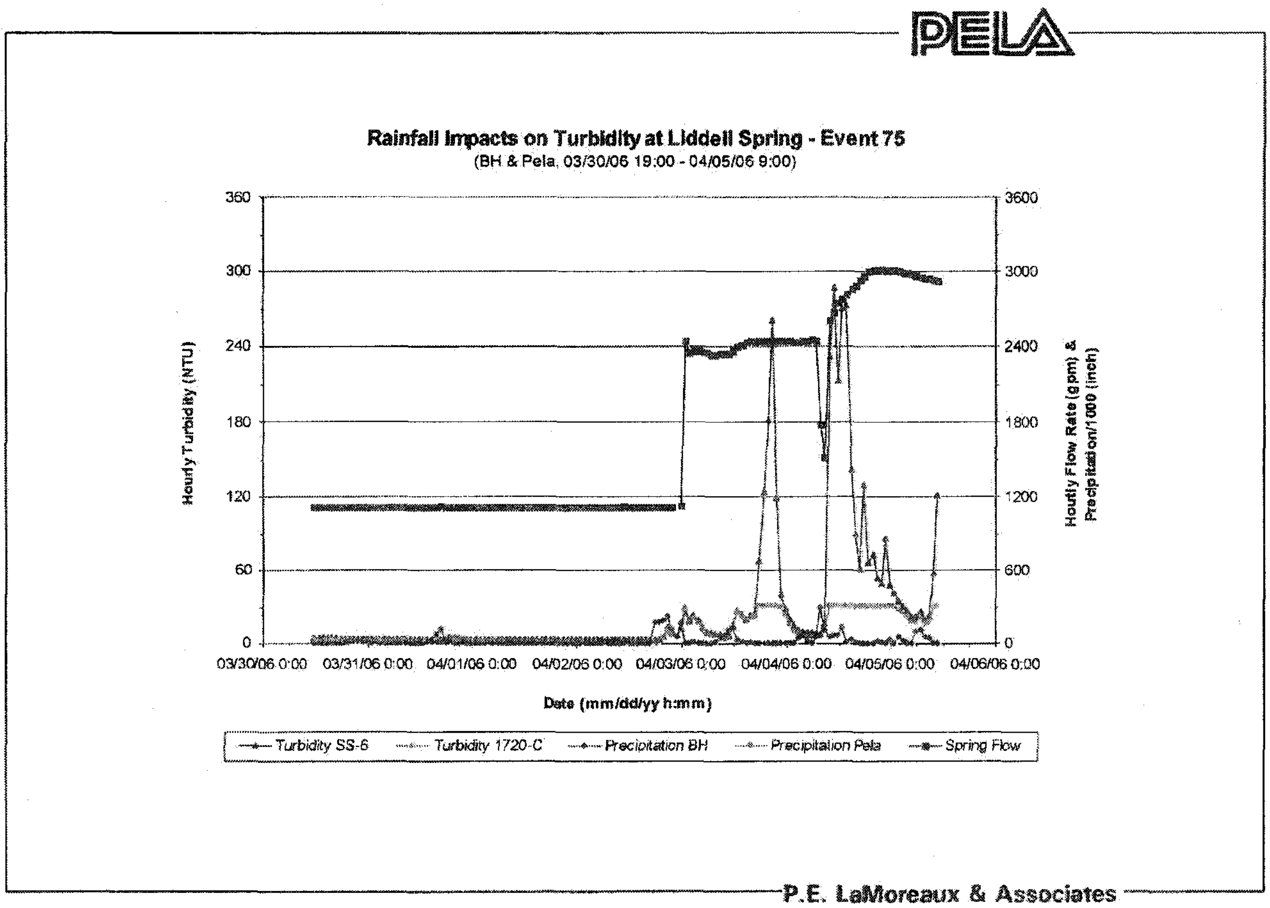
PELA



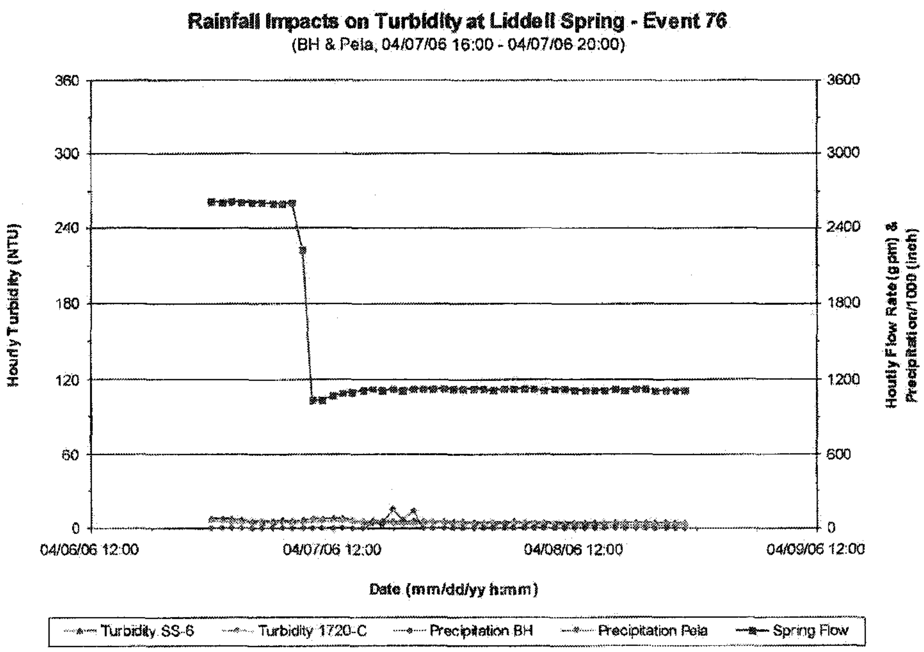
P.E. LaMoreaux & Associates



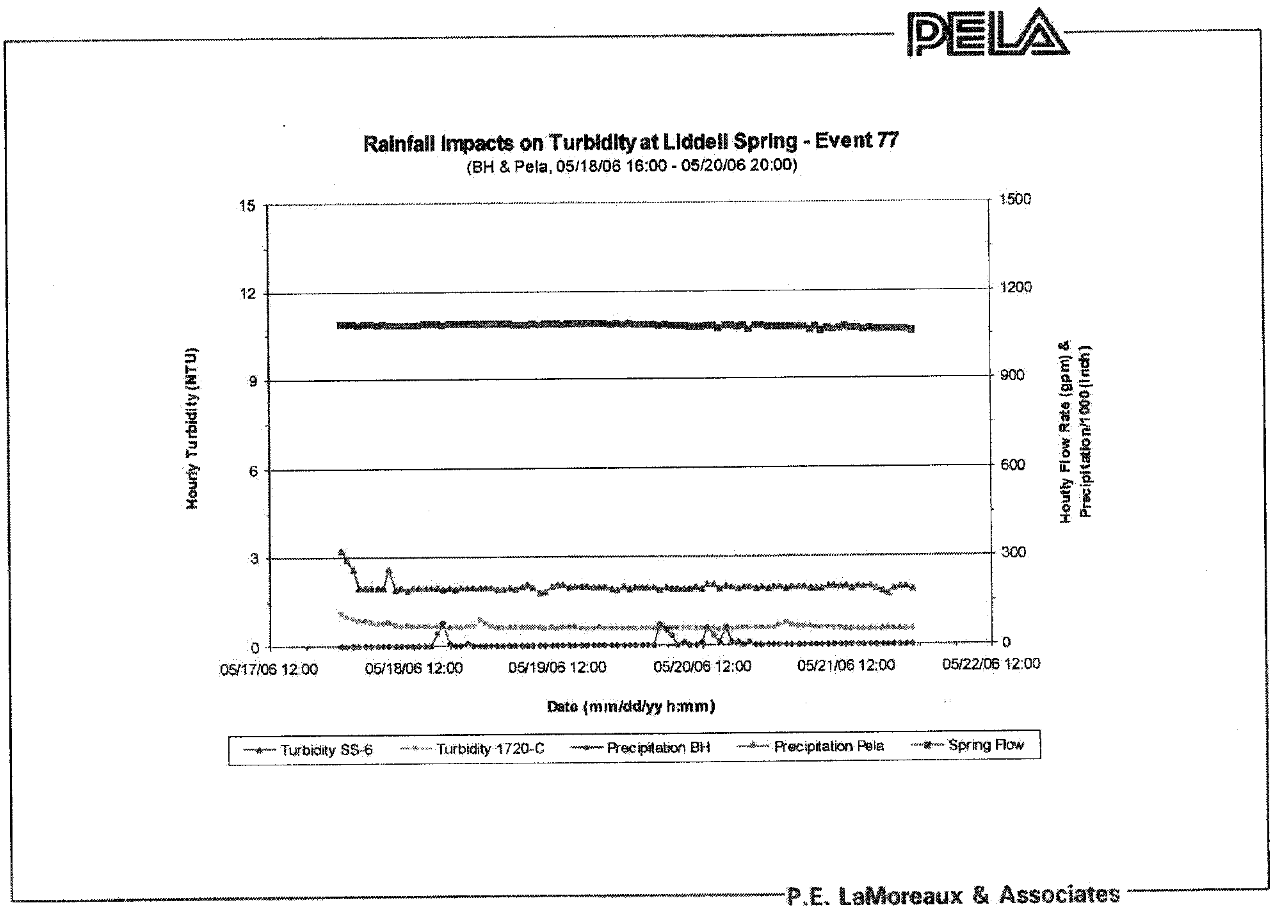
P.E. LaMoreaux & Associates



PELA
Rainfall Impacts on Turbidity at Liddell Spring - Event 75
(BH & Pela, 03/30/06 19:00 - 04/05/06 9:00)
Hourly Turbidity (NTU)
360
300
240
180
120
60
0
3600
3000
2400
1800
1200
600
0
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
03/30/06 0:00
03/31/06 0:00
04/01/06 0:00
04/02/06 0:00
04/03/06 0:00
04/04/06 0:00
04/05/06 0:00
04/06/06 0:00
Date (mm/dd/yy h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow
P.E. LaMoreaux & Associates

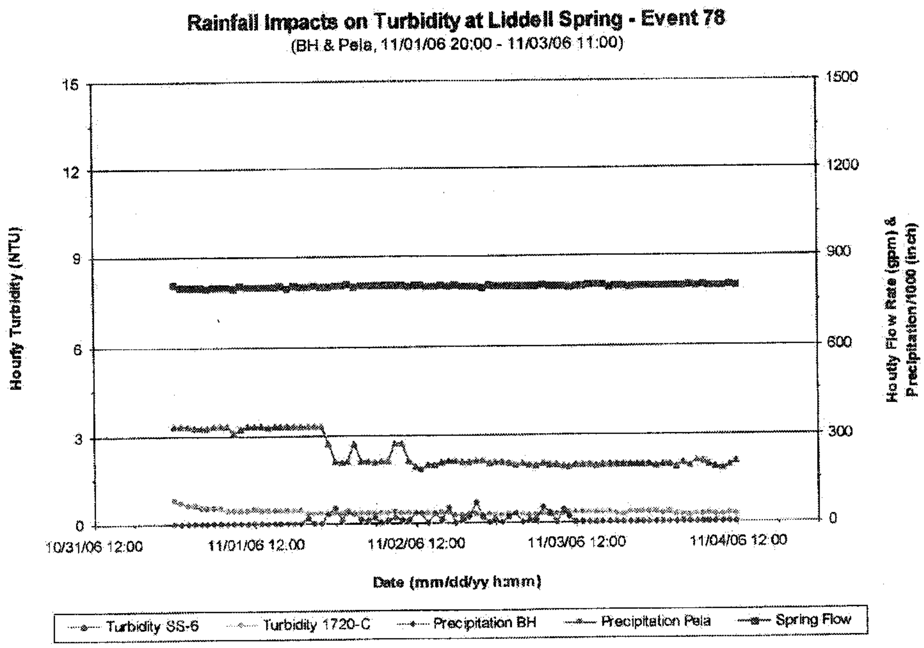


P.E. LaMoreaux & Associates

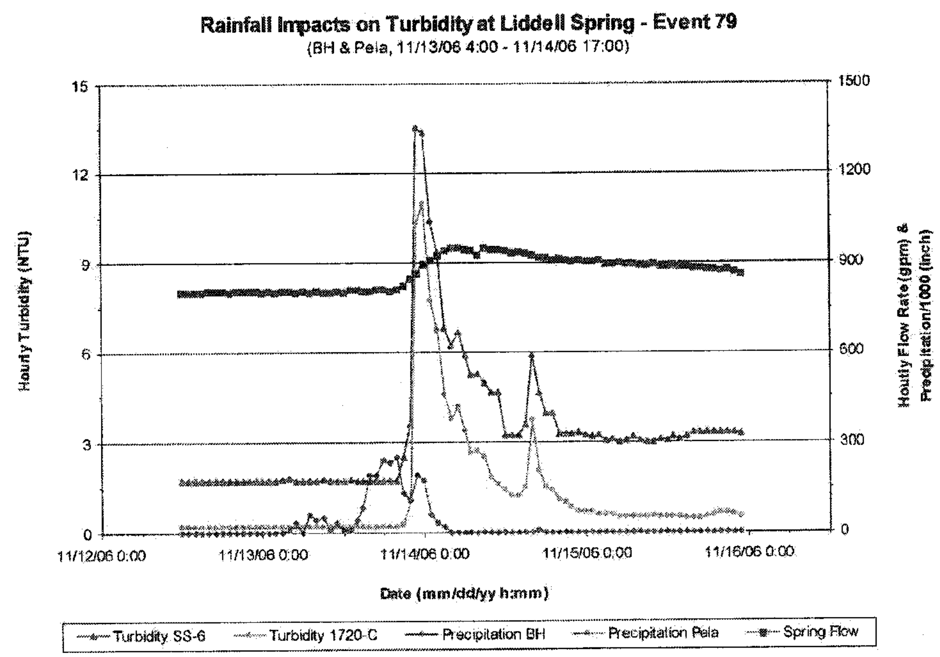


PELA
Rainfall Impacts on Turbidity at Liddell Spring - Event 77
(BH & Pela, 05/18/06 16:00 - 05/20/06 20:00)
Hourly Turbidity (NTU)
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
15
12
9
6
3
0
1500
1200
900
600
300
0
05/17/06 12:00
05/18/06 12:00
05/19/06 12:00
05/20/06 12:00
05/21/06 12:00
05/22/06 12:00
Date (mm/dd/yy h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow
P.E. LaMoreaux & Associates

PELA

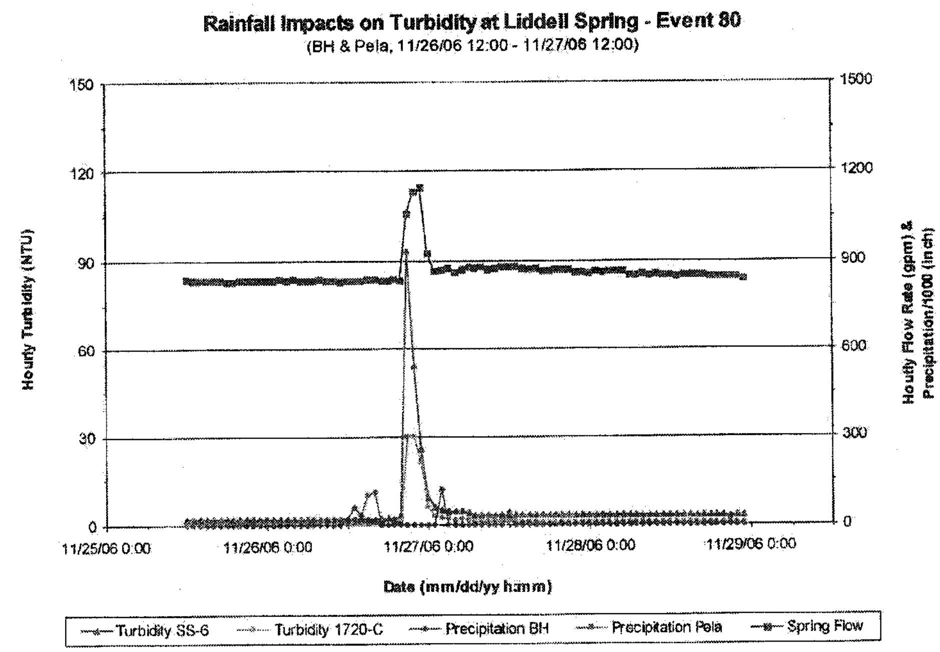


P.E. LaMoreaux & Associates



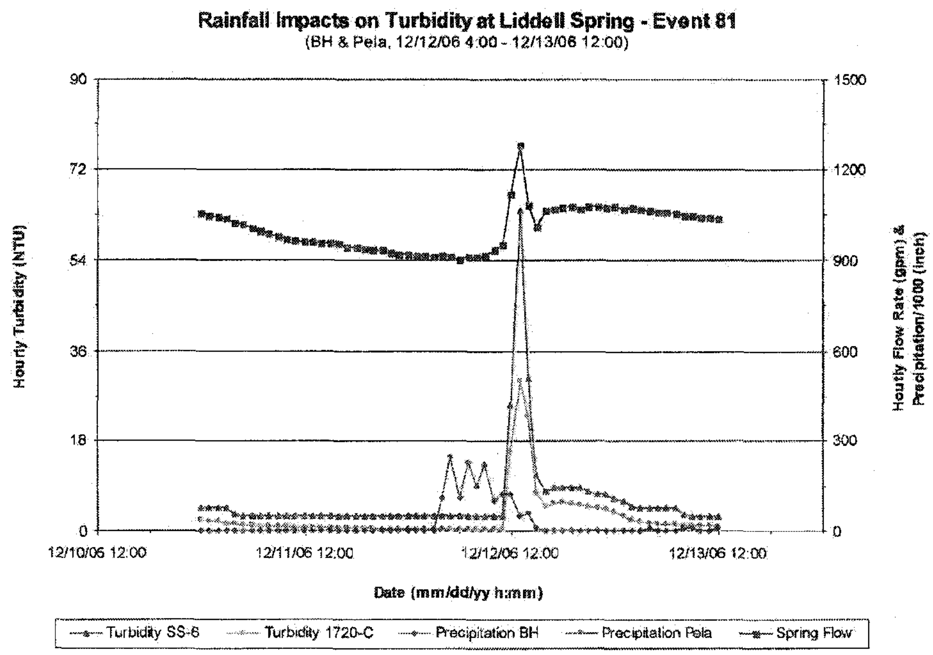
P.E. LaMoreaux & Associates

PELA

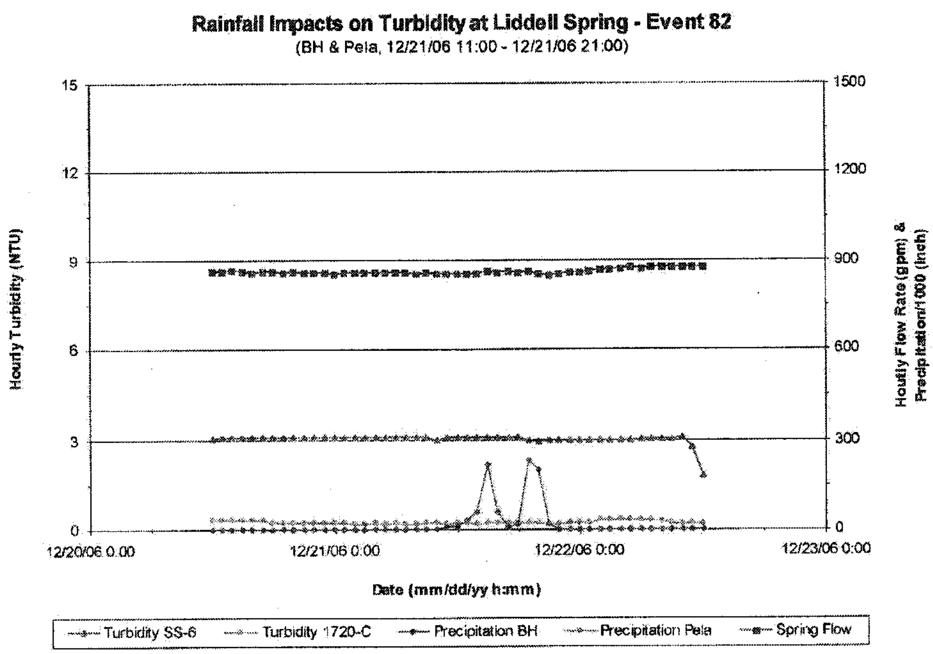


Rainfall Impacts on Turbidity at Liddell Spring - Event 80
(BH & Pela, 11/26/06 12:00 - 11/27/06 12:00)
Hourly Turbidity (NTU)
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
150
120
90
60
30
0
1500
1200
900
600
300
0
11/25/06 0:00
11/26/06 0:00
11/27/06 0:00
11/28/06 0:00
11/29/06 0:00
Date (mm/dd/yy h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow

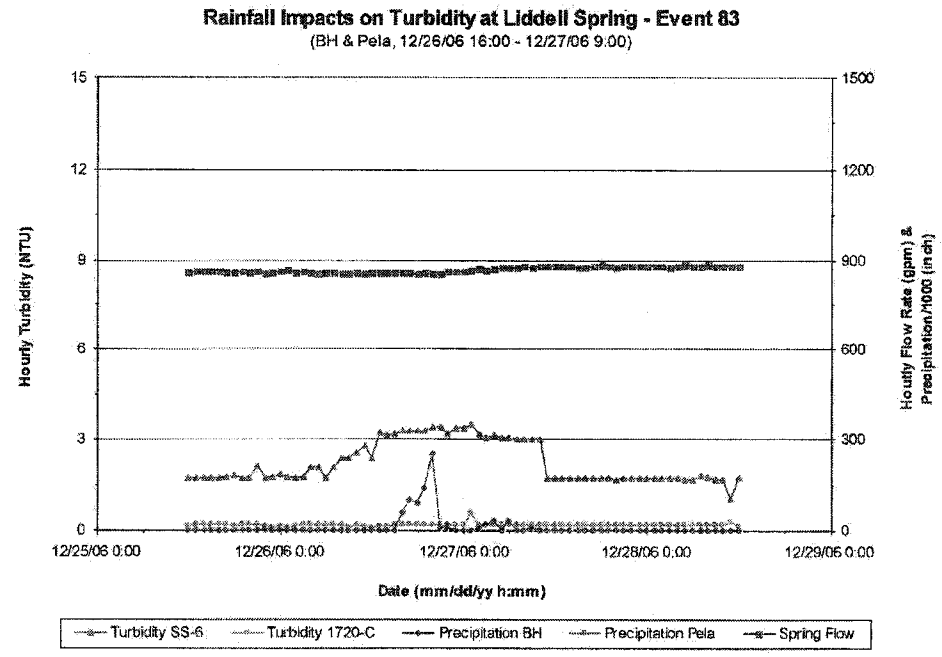
PELA



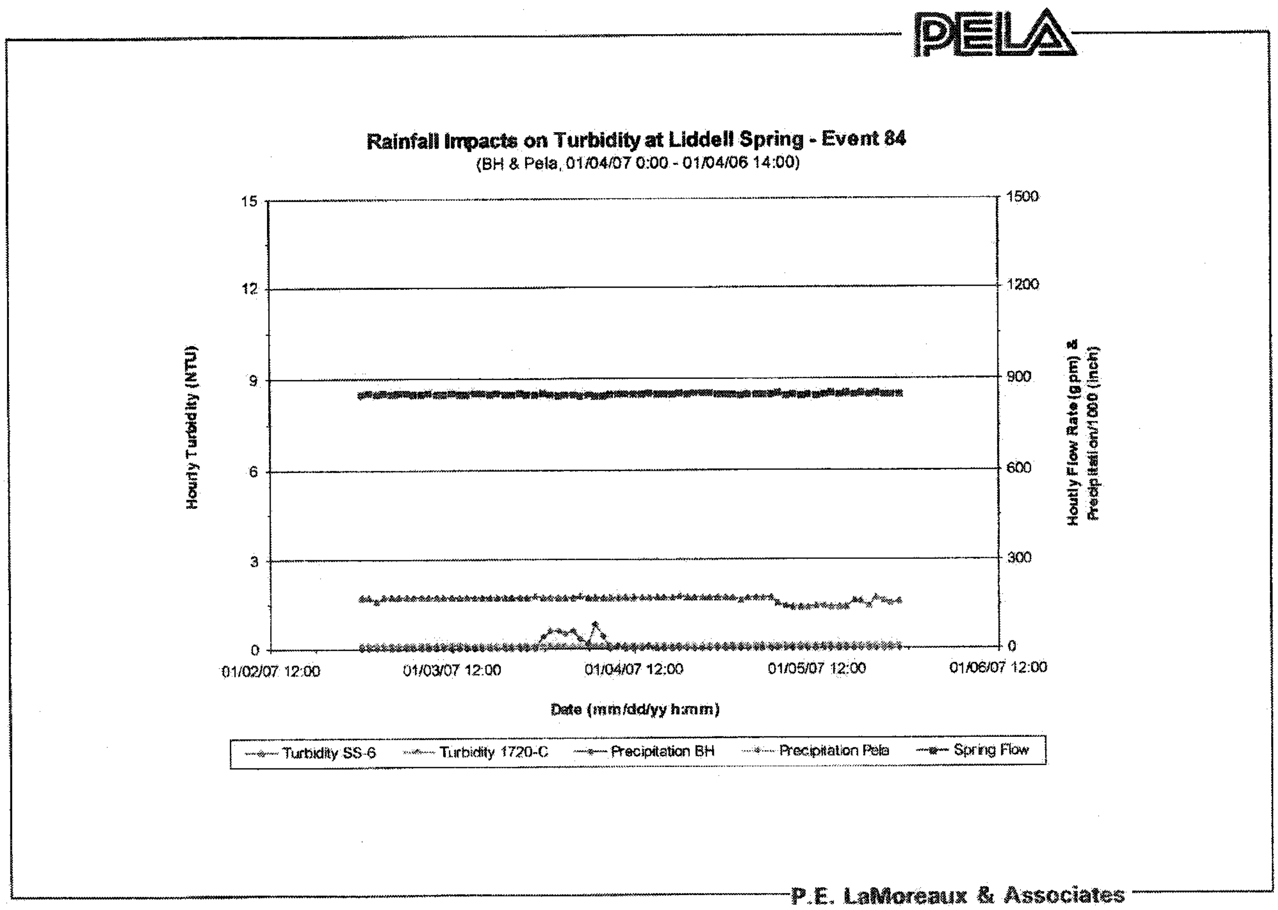
P.E. LaMoreaux & Associates



P.E. LaMoreaux & Associates

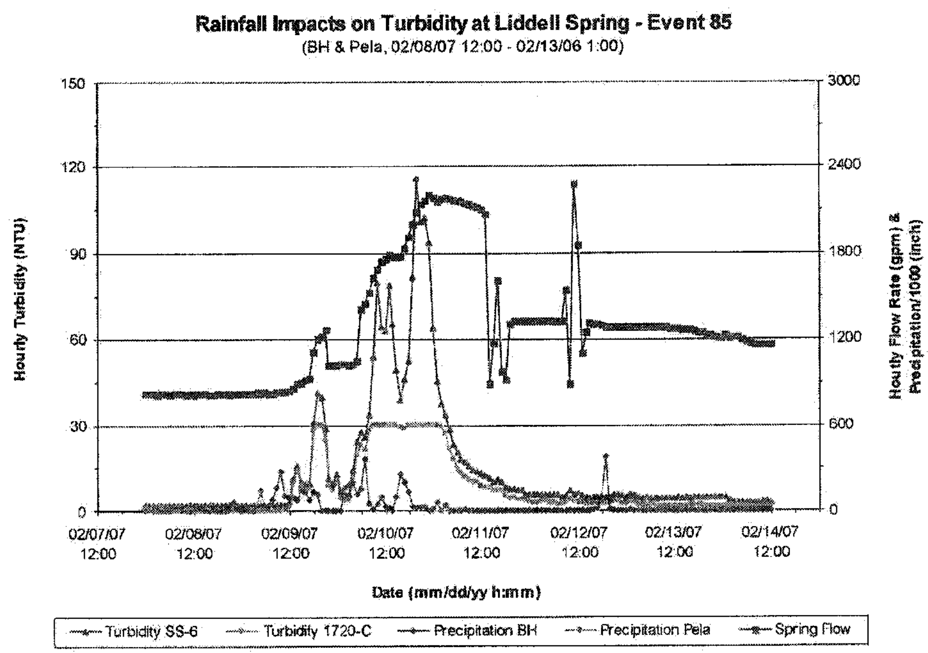


Rainfall Impacts on Turbidity at Liddell Spring - Event 83
(BH & Pela, 12/26/06 16:00 - 12/27/06 9:00)
Hourly Turbidity (NTU)
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
15
12
9
6
3
0
1500
1200
900
600
300
0
12/25/06 0:00
12/26/06 0:00
12/27/06 0:00
12/28/06 0:00
12/29/06 0:00
Date (mm/dd/yy h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow

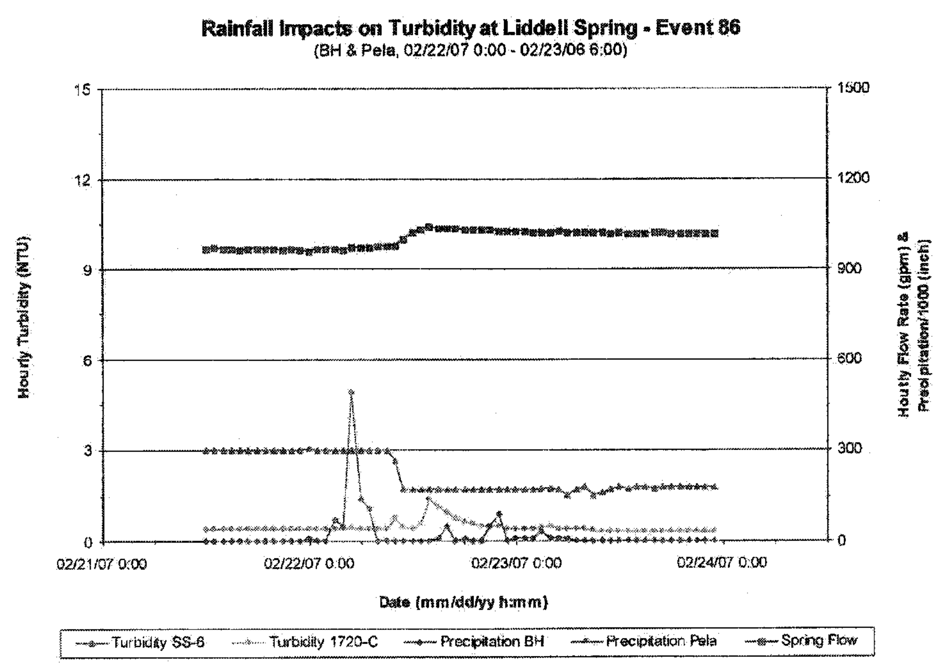


PELA
Rainfall Impacts on Turbidity at Liddell Spring - Event 84
(BH & Pela, 01/04/07 0:00 - 01/04/06 14:00)
Hourly Turbidity (NTU)
Hourly Flow Rate (gpm) & Precipitation/1000 (inch)
Date (mm/dd/yy h:mm)
01/02/07 12:00
01/03/07 12:00
01/04/07 12:00
01/05/07 12:00
01/06/07 12:00
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow
P.E. LaMoreaux & Associates

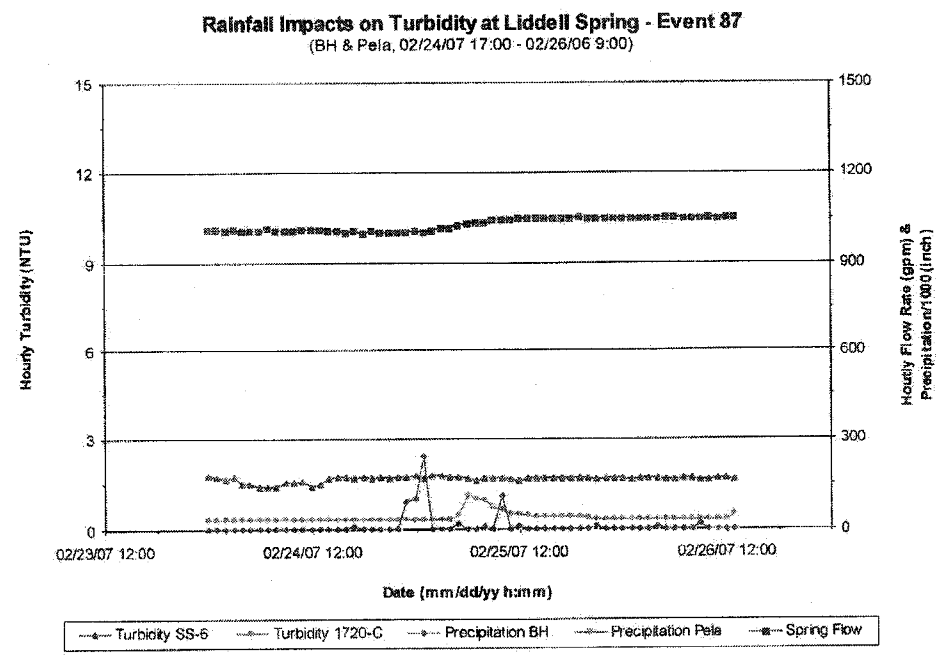
PELA



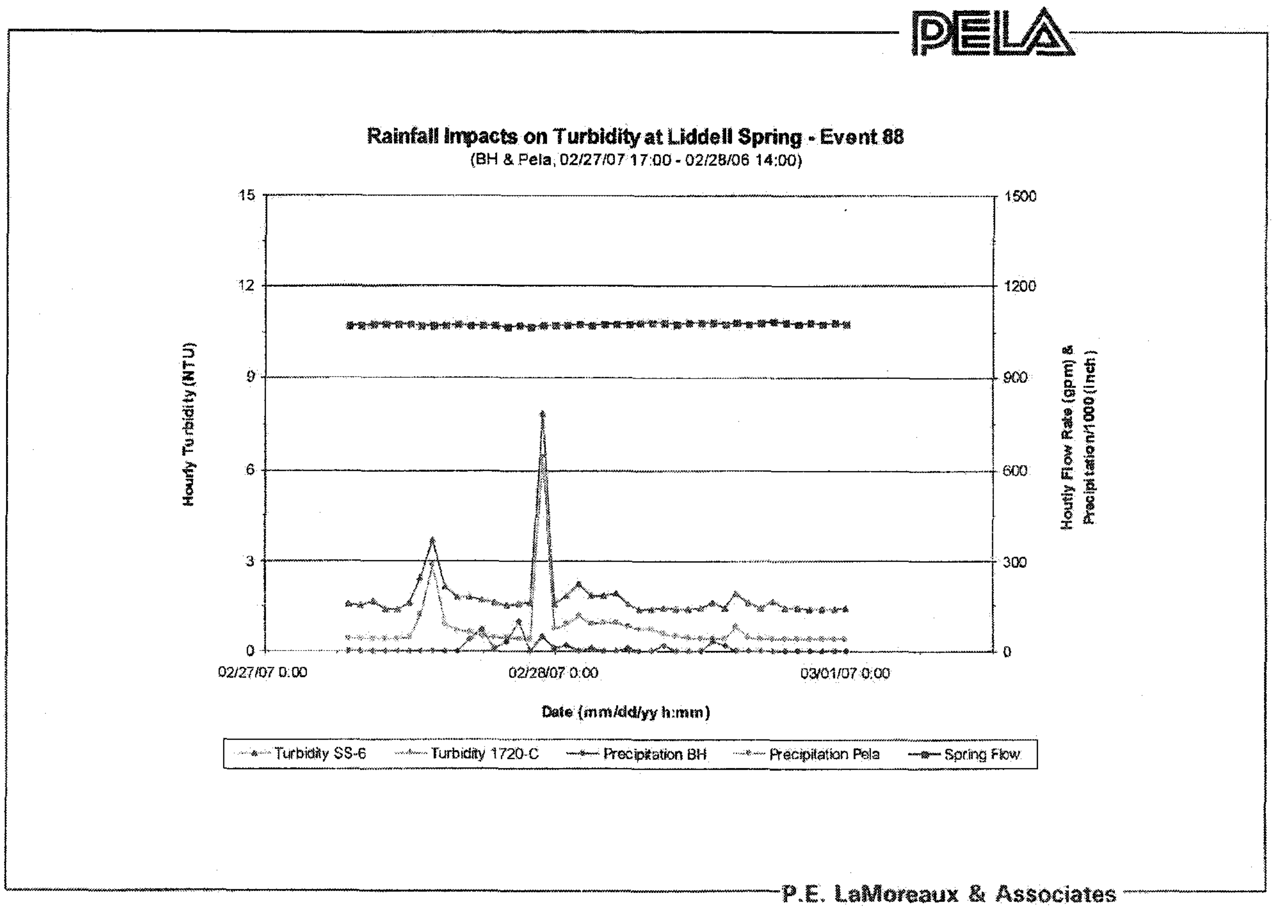
P.E. LaMoreaux & Associates



P.E. LaMoreaux & Associates



P.E. LaMoreaux & Associates


PELA
Rainfall Impacts on Turbidity at Liddell Spring - Event 88
(BH & Pela, 02/27/07 17:00 - 02/28/06 14:00)
Hourly Turbidity (NTU)
Hourly Flow Rate (gpm) & Precipitation/1000 (Inch)
15
12
9
6
3
0
1500
1200
900
600
300
0
02/27/07 0:00
02/28/07 0:00
03/01/07 0:00
Date (mm/dd/yy h:mm)
Turbidity SS-6
Turbidity 1720-C
Precipitation BH
Precipitation Pela
Spring Flow
P.E. LaMoreaux & Associates

ATTACHMENT 3
Hydrology and Water Quality

HYD-3
Proposed Performance Standards

CEMEX
700 Highway-1, P.O. Box 300, Davenport, CA, 95017 ; Tel 831 458 5700

September 24, 2007

Mr. Bill Kocher, Water Director
City of Santa Cruz Water Department
809 Center Street, Room 102
Santa Cruz, CA 95060

Re: CEMEX Proposed Solutions for Liddell Spring

Dear Mr. Kocher:

CEMEX has worked diligently with the City of Santa Cruz Water Department (SCWD) for more
than eight years to determine the root cause of the sediment and turbidity impacts at Liddell
Spring and to determine the best solution for addressing any impacts caused by the existing
quarry operations. The extensive studies on Liddell Spring include years of investigations by
various expert hydrologists for both CEMEX and the SCWD. We appreciate the effort you and 107
your staff have contributed in these investigations, including the ongoing collection of water
quality data at Liddell Spring. A new independent hydrology analysis on Liddell Spring is also
now available as provided by the County of Santa Cruz Planning Department in the Bonny Doon
Quarry Proposed Boundary Expansion Project Draft Environmental Impact Report, dated July
30, 2007 (DEIR).

Based on the extensive information gained on Liddell Spring, including the County's analysis in
the DEIR and numerous discussions with the SCWD, CEMEX believes that the proposed
solutions set forth below will address the concerns raised by the SCWD relating to sediment and
turbidity impacts believed to be contributed by the existing Bonny Doon Quarry. The proposed 108
solutions are in conformance with the 1964 Agreement and satisfy the requirements to remove,
mitigate or treat the cause of the turbidity when such impacts are identified as being caused by
the quarry operations.

Additionally, the proposed solutions also address future sediment and turbidity impacts that
could be caused by the proposed Bonny Doon Boundary Expansion Project, which is subject to 109
the DEIR. Accordingly, CEMEX proposes to enter into a Memorandum of Agreement (MOA)
with the SCWD that sets forth the proposed solutions in this letter.

Sedimentation Trap at Liddell Spring

In order to address the operational problems associated with sediment accumulation in the
Liddell Spring Box, CEMEX proposes to design, install, operate, and maintain a sediment trap at 110
Liddell Spring. The sediment trap will be designed to accommodate flows up to 3,000 gpm,

which should be adequate to treat the SCWD's take, in addition to flows that are bypassed into
Liddell Creek. The trap will effectively remove particles that otherwise would settle out in the
SCWD's transmission pipelines. Design criteria would be similar to the concept previously 110
proposed by CEMEX to the SCWD. As we move forward we would propose to work with the
SCWD, offering your Department the opportunity to review and comment on all deliverables.

CEMEX will retain the services of John Goeddertz, Ph.D. a consultant with URS Corporation, as
project manager. John has provided a preliminary cost estimate in the amount of $629,000,
including $100,000 contingency, to complete the design and installation for the sediment trap. 111
He also estimates the annual operation and maintenance costs at approximately $6,500 per year.
The sediment trap installation at Liddell Spring will be a benefit to the SCWD in that it will treat
all sediment exiting the spring that is contributed by all sources.

<u>Engineered Drainage System Within the Quarry Pit and</u>
<u>Erosion and Sediment Control in Boundary Expansion Area</u>

The SCWD has made it clear to CEMEX that it is concerned with sediment and turbidity impacts
to Liddell Spring believed to be caused by storm water runoff from the CEMEX mining
operations. To address this concern, CEMEX intends to install and maintain an engineered
drainage system within the floor of the quarry pit to prevent sediment from reaching the
underlying Karst aquifer through fractures and other pathways as described as Mitigation
Measure HYD-1 in the DEIR. URS evaluated this mitigation measure and has concurred that the
measure will prevent sediment from reaching the Karst aquifer from the quarry floor. The 112
estimated capital cost of this mitigation measure is $300,000. CEMEX will retain the services of
John Goeddertz, Ph.D. a consultant with URS Corporation, to design the engineered drainage
system and to provide oversight of the installation. Details of the design will be developed as the
permitting process moves forward. As with the sediment trap, we propose to work with your
Department to provide the SCWD with the opportunity to review and comment on all
deliverables.

Additionally, CEMEX intends to implement all the recommendations set forth in Mitigation
Measure HYD-1 and HYD-2 in the DEIR, including establishing appropriate drainage and
erosion controls for use in the Boundary Expansion Area during overburden removal and
subsequent mining phases. CEMEX is committed to implementing continuous water level 113
monitoring as required by mitigation HYD-2. By implementing these measures, the SCWD will
be assured that CEMEX is eliminating sediment and turbidity impacts contributed from storm
water runoff from both the existing quarry operation and the proposed Boundary Expansion
Area.

<u>Turbidity Treatment</u>

With the above measures being implemented, the only turbidity impacts contributed from the
mining operation will be those related to quarry blasting. Based upon the recent discussions
between the SCWD and CEMEX, CEMEX proposes to compensate SCWD an amount annually
that can be used by SCWD for water treatment costs or infrastructure improvements. The cost of 114
providing filtration treatment at Liddell Spring has been estimated to exceed several million
dollars in capital and permitting costs, depending upon the location and complexity of the
treatment system. Regardless of whether the filtration plant would operate intermittently (only

as needed) or full time (more likely) the capital cost would not be reduced. Included in the
estimated capital cost is a generous allowance for regulatory permitting and approval that will be
associated with constructing a water filtration plant in this remote location. Finally, as you 114
imagine, approval to install a filtration treatment system at the spring will take many years to
obtain due to the complex permitting issues involved.

We believe that any expenditure of funds on a source treatment system at Liddell Spring would
be better invested in the overall betterment of the SCWD's North Coast transmission system
and/or the SCWD's Graham Hill Water Treatment Plant (GHWTP). The water from Liddell
Spring mixes with other North Coast sources before being transported to the GHWTP for
conventional filtration treatment (coagulation, sedimentation, filtration). Therefore, any treated 115
water from Liddell Spring would be intermixed with the other untreated North Coast sources and
then treated a second time at GHWTP with those additional sources. If a source treatment plant
were to be constructed at Liddell Spring, it is our opinion that it would not provide any
measurable positive impact to the GHWTB in terms of reduced chemical costs, reduced energy
consumption or reduced sludge production, and may only minimally increase the availability of
North Coast sources.

Accordingly, CEMEX proposes an annual contribution that can be used by the SCWD for any
legitimate purpose during the term of the fund – whether to treat blasting-induced turbidity or
improve the North Coast System, or any portion of each. Our proposed solution is supported by 116
the fact that the SCWD has consistently demonstrated that the water from Liddell Spring and the
other North Coast sources can be effectively treated at the GHWTP to meet all relevant EPA
standards. We applaud the SCWD's ability to provide treatment of these varied sources, and
maintain compliance with the ever-increasing myriad of Safe Drinking Water Act regulations, all 117
at the same time while trying to maintain an aging water system with limited resources.

CEMEX proposes to compensate the SCWD a reasonable amount per year as long as the quarry
remains in operation to offset the additional costs the SCWD incurs to treat blasting-induced
turbid water from the spring. We are ready to negotiate this amount with SCWD if you are 118
amenable to this approach. This amount would be sufficient to adequately compensate the
SCWD for any additional treatment costs, and positively contribute to the overall betterment of
the SCWD.

Memorandum of Agreement between SCWD and CEMEX

CEMEX proposes that the SCWD and CEMEX enter into a Memorandum of Agreement (MOA)
that sets forth the proposed solutions addressed herein. The MOA would be written as an
amendment to the 1964 Agreement, while remaining consistent with the intent of that agreement.
While these proposals do not necessarily track exactly what the 1964 Agreement requires with
regard to treatment options, the 1964 Agreement did not contemplate the precise situation we are
in today, and we are trying to be flexible to meet SCWD's needs. For these reasons, we believe 119
that as long as we stay in compliance with the intent of the 1964 Agreement, which we believe to
be to either remove, mitigate or treat the cause of the turbidity, that CEMEX will continue to be
in legal compliance with that agreement. In the spirit of cooperation to coexist with the SCWD's
Liddell Spring source, CEMEX would very much appreciate the SCWD to take into
consideration the practical constraints and proposed solutions to resolve this matter.

Conclusion

In conclusion, the proposed solutions address the concerns raised by the SCWD relating to
sediment and turbidity impacts from the Bonny Doon Quarry operations in the best practical 120
means plus provide added mitigation for impacts that are not caused by CEMEX.

It is imperative that we gain approval for the proposed Boundary Expansion Project for CEMEX
to continue operations in Santa Cruz County. CEMEX cannot support the level of capital and
operation and maintenance costs that are projected should a water filtration plant be required at 121
Liddell Spring. As we have discussed during our meetings, and in this letter, we do not believe
that construction of a separate water filtration plant at Liddell Spring would provide any tangible
benefit or improvement over what we are proposing in this letter.

Finally, we propose that CEMEX and the SCWD meet on a quarterly basis to discuss operations,
recent data trends, and to generally maintain communication on each other's operations. We
would like to establish a mutually beneficial relationship with the SCWD, to work cooperatively 122
towards improving the quality of water at Liddell Spring and to benefit the SCWD's system all
the while enabling CEMEX to continue to operate the Bonny Doon Quarry.

After you have had a chance to review these proposals, please let us know of your availability
during the next two weeks, so that we may meet with you and discuss any concerns you or your
staff may have with the proposed solutions. Additionally, we would like to begin the framework 123
to prepare a Memorandum of Agreement (MOA) consistent with the terms set forth in this letter.

Sincerely,

S.H. Sheth

Satish Sheth
Vice President, Manufacturing

CC Terry Tompkins – SCWD
Janet Krolczyk
Rob Walker

ATTACHMENT 4
Biological Resources

CEMEX Comments
Prepared By
Dana Bland & Associates
(Wildlife)
And
Biotic Resources Group
(Vegetation)

Dana Bland & Associates, Consulting Biologists
P.O. Box 636, Aptos, CA 95001 • Phone (831) 688-2104 • FAX (831) 688-8093

September 27, 2007

Robert Walker, Quarry Manager
Cemex, Davenport Cement Plant
700 Highway 1
Davenport, CA 95017

Subject: Peer Review of Draft EIR Wildlife Resources Section for Bonny Doon Limestone Quarry Boundary Expansion Project

Dear Robert,

I have reviewed the Chapter 6 Biological Resources section of the DEIR dated July 2007 (prepared by TRA Environmental Sciences), with regard to wildlife resources, impacts and mitigation. My comments are discussed below.

Page 6-19, 2[nd] paragraph, last sentence, reference to golden eagle and white-tailed kite should be removed, as the dense coniferous forest is not considered habitat for either species. 124

Page 6-6, first sentence, 2[nd] paragraph of CRLF discussion. Please correct to state that "….CRLF has been documented to travel 2 miles or more through upland….." Citation should be Bulger 1999. 125

San Francisco Dusky-foot Woodrat (SFDW): Despite its status as a California Species of Special Concern, the SFDW is a very common inhabitant of coastal forests and woodlands. I suggest that the common occurrence of this species throughout the Central Coast region be described in a few sentences, in order to fully evaluate the impact of this project on the region wide population. 126 Page 6-9, first paragraph, 3[rd] sentence states that "The majority of nests were located within the redwood forest and northern coastal scrub." Please state how many nests were in each habitat, as this relates to mitigation measures proposed later in the document. 127 On page 6-18, section 6.3.2.2 Wildlife, the 4[th] sentence states that the "loss of 17.1 acres of …. Is less than significant impact… of regionally-occurring wildlife species." I believe that this analysis applies to the SFDW, as it is a common inhabitant of many woodland types in the region, and can adapt to various woodland habitat types. 128

Page 6-28, impact measure for SFDW again lists "17.1 acres" of habitat. See comment above. Measure BIO-1, step 1, suggests a conservation easement for SFDW, but this is not consistent with the common occurrence of this species in the region, compared to other species with similar designation as "California species of special concern." For example, other wildlife species that may occur in the area, such as sharp-shinned hawk, 129 have a much more limited range in the Santa Cruz Mountains than woodrats. Conservation easements are usually only recommended for state or federally listed species, or species of concern that are endemic to only one localized type of habitat. This is not true of the SFDW. The previously described buffer zone between mining and adjacent lands should be sufficient to provide alternate habitat for SFDW during the mining phase and reclamation resulting in no net loss of SFDW habitat and compensating for temporary displacement of this relatively adaptable and common species. 129

Measure BIO-1, step 2, is unnecessary as mitigation for the SFDW. If the "majority" of SFDW houses were found in redwood habitat, as stated on Page 6-9, then it can be presumed that adjacent redwood habitat would also be suitable for the species. This measure, as proposed is not consistent with the level of project impacts. Under CEQA, mitigation should be commensurate with the level of impacts. Because the SFDW is a common inhabitant of forests in the region, individuals are able to relocate to adjacent undisturbed areas, and there will be no permanent loss of habitat, the measures proposed in BIO-1, step 2, are excessive to mitigate for this species. 130

Measure BIO-2 on page 6-29, should be simplified to state that SFDW houses would be passively dismantled, including a description of what "passive" means, i.e. taken apart by hand to allow woodrats to escape into nearby undisturbed areas. 131

If you have any questions regarding this peer review, please feel free to call me.

Sincerely,

Dana Bland

Dana Bland
Wildlife Biologist

Biotic Resources Group
Biotic Assessments ♦ Resource Management ♦ Permitting

2551 South Rodeo Gulch Road, Suite 12 ♦ Soquel, CA 95073
(831) 476-4803 ♦ Fax (831) 476-8038

Memorandum

To: Rob Walker, CEMEX.

CC:

From: Kathleen Lyons

Date: August 24, 2007

Re: Comments on Vegetation and Revegetation Components of DEIR (Chapter 6)

This memo provides my comments on the vegetation and revegetation components of the DEIR (Chapter 6), as requested.

Page 6-3, Section 6.1.3.1 Vegetation Communities, Coast Live Oak Forest, para. 1, last sentence: I question the accuracy of the statement that the "County Sensitive Habitat Protection Ordinance includes oak woodlands …" and whether this discussion belongs within the vegetation discussion. County Code Section 16.32.040 provides the definition of sensitive habitats. This definition (b) states Sensitive Habitat are "areas which provide habitat for locally unique biotic species/communities, including, but not limited to oak woodlands….". The DEIR describes the oak woodland as supporting common woodland/forest plant species and states in Section 6.3.2.3 (page 6-19) that the proposed boundary expansion area does NOT contain any special status plant species. Therefore, the oak forest within the expansion area should not be considered a sensitive habitat based on vegetation resources. 132

Page 6-4, Section 6.1.3.1 Vegetation Communities, Northern Coastal Scrub, para. 1, 3rd sentence: Cascara (*Rhamnus pushiana)* has not been recorded as occurring in Santa Cruz County as per the *Annotated Checklist of Vascular Plants of Santa Cruz County (*CNPS, 2005). This species is common to northern California (north of San Francisco Bay Region) as well as north/central portions of the Sierra Nevada. 133

Page 6-4, Section 6.1.3.1 Vegetation Communities, Northern Coastal Scrub, para. 1, last sentence: As presented in my earlier comment for oak woodlands, the northern coastal scrub should not be considered to meet the definition of a sensitive habitat based on vegetation resources. As the DEIR describes the coastal scrub as supporting common plant species (coyote brush and poison oak) and states in Section 6.3.2.3 (page 6-19) that the proposed boundary expansion area does NOT contain any special status 134 plant species, the northern coastal scrub within the expansion area should not be considered a sensitive habitat based on vegetation resources. 134

Page 6-5, Section 6.1.3.1 Vegetation Communities, Upland Redwood Forest, para. 1, last sentence: The large-flower fairy bells, *Disporum smithii,* has not been recorded as occurring in Santa Cruz County as per the *Annotated Checklist of Vascular Plants of Santa Cruz County (*CNPS, 2005). Fairy bells, species *hookeri,* are common in this region. Please advise if *Disporum smithii* is a newly recorded species in County. 135

Page 6-11, Section 6.1.3.3 Sensitive Habitats, Northern Maritime Chaparral, para. 1, last sentence: It should be clarified for the reader that maritime chaparral is included in this discussion only because the habitat was impacted under the existing mining plan and the habitat is proposed to be recreated (at a 1:1 replacement ratio) under the Mitigated 1996 Reclamation Plan Amendment (as listed in Table 6-4). 136

Page 6-11, Section 6.1.3.3 Sensitive Habitats, Native Grassland, para. 1, last sentence: It should be clarified for the reader that native grassland is included in this discussion only because the habitat was impacted under the existing mining plan and the habitat is proposed to be recreated (at a 1:1 replacement ratio as diverse native grassland and needlegrass grassland) under the Mitigated 1996 Reclamation Plan Amendment (as listed in Table 6-4). 137

Page 6-17, Section 6.3.1 Thresholds of Significance, last paragraph: As presented in my earlier comments for oak woodland and northern coastal scrub, these two plant communities should not be considered to meet the definition of a sensitive habitat based on vegetation resources. As such the project would not conflict with the County's Sensitive Habitat Ordinance. As the DEIR states the two plant communities support common species and Section 6.3.2.3 (page 6-19) states the proposed boundary expansion area does NOT contain any special status plant species, the habitats should not be considered sensitive based on vegetation resources. 138

Page 6-18, Section 6.3.2.1 Vegetation Communities, 2nd para., 3rd sentence: See earlier comment on whether oak woodland and northern coastal scrub meet the definition of a sensitive habitat, based on vegetation resources. 139

Page 6-19, Section 6.3.2.3 Special Status Plant and Vegetation Communities, 2nd para., 2nd sentence: See earlier comment on whether oak woodland and northern coastal scrub meet the definition of a sensitive habitat, based on vegetation resources. 140

Page 6-25, Table 6-4: Misspelling of blue wild rye under Mitigated 1996 Reclamation Plan Amendment - Early Successional Scrub/Mixed Evergreen Forest. 141

Responses to Comment Letter IV-A
CEMEX

1. Comment noted. The County Planning Department coordinated with the mentioned parties during preparation of the Draft EIR.
2. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
3. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
4. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
5. Comment Noted. See responses to Comments IV-A-74 through106.
6. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
7. Comment noted. See revised HYD-3.
8. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
9. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
10. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
11. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
12. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
13. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
14. Comment noted. Mitigation Measure BIO-7 on page S-3 of the Draft EIR has been corrected to read "BIO-6" in the Final EIR. No Mitigation Measure BIO-7 has been proposed.
15. Overburden removal and site preparation is essentially equivalent to grading associated with construction activity; therefore, the MBAPCD standard is reasonable. The MBAPCD has reviewed the Draft EIR and suggests with respect to mitigation Measure AIR-1 that all disturbed areas be watered as much as possible to limit the generation of fugitive dust.
16. The Draft EIR on Page 3-19 adequately addresses the 1000-foot setback. Information on CEMEX-owned parcels is appropriately included in the Air Quality and Noise Sections of the Draft EIR.
17. The 1991 Golder report recommended that the slope of the upstream face of the levee forming Sediment Basin 4 be reduced by placing keyed and benched fill. We have

reviewed no evidence to suggest that this work was done. The 2001 plans concern replacement of the culvert draining the basin and remedial work on a portion of the basin perimeter that was the site of landsliding.

18. In part, new techniques and methodologies have evolved since the original stability evaluations were conducted that could modify the conclusions of the original analysis. These changes are not so much regulatory in nature, but concern the ever-evolving standards of engineering practice as our knowledge base expands. At the same time, it could be argued that some of the methodology used in the original analysis was not sufficiently rigorous, so that the conclusions could be questioned. We expect the new analysis to remedy any potential criticisms of the original analysis.

19. The location of the landslide is immaterial. The landslide occurred in a quarry slope that the previous stability analysis concluded was stable. The statement that the "majority of the Boundary Expansion Area is not affected by this condition" is without foundation. We have seen no studies conducted by the quarry operator or its consultants that would determine whether the majority of the Boundary Expansion Area (or the existing quarry) is affected or not, otherwise the conditions leading to the present failure would have been identified in advance. Nolan Associates performed a detailed geologic traverse around the quarry. The traverse identified numerous shear surfaces of diverse orientation. The results of the traverse suggest that such failures are possible in the existing quarry face, and those observations are part of the basis for our critique of the stability analysis. There is no reason to expect that the structure in the Boundary Expansion Area is any different.

20. The text of the Draft EIR states that the debris flows were due to failure of quarry spoils. This information was taken directly from the landslide investigation report by Pacific Geotechnical Engineering (2002), to which the quarry operator was a party.

21. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

22. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

23. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

24. Because SH-3 is a depression with no apparent external surface drainage, it is inferred to act similar to a sinkhole in terms of runoff capture and percolation to the underlying karst.

25. The large number of boring logs used (>200) for the analysis presented in Draft EIR Appendix F Figure 21 provides a statistically robust data base upon which to base the stated estimates of karst porosity.

26. Deep groundwater levels do indeed indicate rapid and deep drainage in an area known to be receiving significant surficial recharge.

27. The Draft EIR recognizes both relatively near and distant sources for Liddell Spring (see Draft EIR Appendix F Section 4).

28. Comment noted. This statement expressed in this comment is not in disagreement with Draft EIR Appendix F (see Draft EIR Appendix F Section 4).

29. See responses to comments III-A-74 through III-A-106. No revisions to the conceptual model are deemed necessary other than to acknowledge that pressure pulses associated with karst recharge may mobilize sediment within the saturated zone and contribute to the initial turbidity response.

30. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

31. Draft EIR Appendix F provides a comprehensive interpretation of the area hydrogeology that includes the influence of geologic structure and lithology.

32. Draft EIR Appendix F Section 4.2.5 discloses the following regarding its conceptualization of the shallow groundwater surface immediately upgradient of the quarry (illustrated in Draft EIR Appendix F, Figures 25 & 30): (a) the estimated contours are highly generalized given that the inferred groundwater surface is actually representative of multiple although roughly equivalent zones; (b) in reality, these surfaces may be discontinuous with intermediate surfaces between them; (c) among wells, average water levels may be inconsistent given different periods of record; and (d) some of the spring locations and elevations used to help construct the contours are uncertain. The shallow water level contours represent the complex transition zone between (1) a shallow sandstone aquifer that occurs across much of the Bonny Doon area upgradient to the north and (2) the predominantly karst groundwater aquifer that encompasses the quarry and discharges to Liddell Spring. Although uncertain and approximate, the estimated contours are useful in representing this known transition zone. See also the response to comment IV-A-80.

33. Draft EIR Appendix F agrees that water percolation has been facilitated by quarry excavation and blasting. In disagreement with the comment, however, Draft EIR Appendix F strongly supports the interpretation that highly permeable pathways exist from the existing and proposed quarry area, down through the marble, to the saturated zones contributing to Liddell Spring. This interpretation is supported by multiple lines of evidence presented in Draft EIR Appendix F Section 4, including water-level, isotope, or tracer-test data.

    The comment notes that the connection between the unsaturated and saturated zones in the present quarry floor has been enhanced by blasting and removal of several hundred feet of marble. The comment also concedes that the quarrying exposes open fractures, since it states that many of these fractures are "in the process of being filled". Given these observations, the removal of hundreds of feet of marble and blasting proposed in the Boundary Expansion Area will help further a connection between the unsaturated and saturated zones, exposing open fractures to the rapid percolation of turbid runoff from the quarry.

    Regarding the comment, "fractures on the quarry walls are in the process of being filled or have already been filled, and are not open pathways for recharge," the following are unclear: whether this process is occurring naturally or as part of reclamation; where the drainage will go if recharge is prevented; and, whether the existing quarry drainage system is capable of handling additional runoff resulting from reduced percolation in the quarry area.

Please see responses to comments IV-A-74 through IV-A-106 for additional discussion of this issue.

34. See response to comments IV-A-74 through IV-A-106.

35. The comprehensive data analysis presented in Draft EIR Appendix F fundamentally disagrees with the comment's claim that the initial, primary turbidity spikes associated with storm events occur solely as the result of re-suspension of sediments already deposited within the karst conduits. See response to comments IV-A-93 through IV-A-100 for further discussion of this issue.

36. If, as commented, the sediment supply resides mainly within the karst after being replenished by distant sources, there is no explanation for why turbidly levels consistently peak and decline rapidly while the springflow continues to increase, since the resuspension of sediment responsible for the turbidity is occurring throughout many miles of conduit, each with different travel times and durations. Please see Draft EIR Appendix F Section 4.4 for further discussion of this issue.

37. This series of comments provides no technical justification to support its statements. See previous two responses, responses to comments IV-A-74 through IV-A-106, and the analysis presented in Draft EIR Appendix F Section 4.4.

38. This comment provides no definition or explanation when referring to a "phase difference." An interpretation of turbidity hysteresis might be appropriate if coinciding with the rising and falling limbs of the hydrograph, which it does not. See the responses to comments IV-A-93 through IV-A-100 and the analysis presented in Draft EIR Appendix F Section 4.4. Nothing in the turbidity, discharge, or conductance curves precludes the mixing in of turbid water from the quarry floor.

39. See response to comments IV-A-74 through IV-A-106.

40. See response to comment IV-A-91.

41. On average, the quarry is estimated to percolate roughly 300 to 400 acre-feet per year of rainfall and runoff within a nearly half square mile catchment area (Draft EIR Appendix F Section 4.5). And yet, ponding is minimal and there is no external drainage. It is thus reasonable to infer the existence of high-capacity pathways typical of karst conditions. Captured stormflow cascading through a near-vertical solution channel could travel 50 to 100 feet to the water table within tens of minutes under reasonably favorable subsurface conditions, adding little to the recorded tracer travel time from well NZA to Liddell Spring. The turbidity response to blasting demonstrates travel times from the quarry to the spring that are shorter than the tracer-test results at NZA.

42. The similarity and consistent patterns among streamflow, ponding, and Liddell Spring turbidity responses to storm events provided one of several lines of evidence upon which were based the conclusions of the hydrogeologic interpretation presented in Draft EIR Appendix F. These responses differed significantly from those of parameters more representative of the groundwater system, i.e., the rate of springflow

and springflow specific conductance. The value of the Majors Creek flow record is that it helps confirm that the Liddell Spring storm turbidity response has the characteristics of a surface-water response. The quarry-pit pond record serves a similar purpose as well as demonstrating processes at one end of the pathway from the quarry to Liddell Spring. Please see responses to comments IV-A-93 through 100.

43. Please see response to comments IV-A-101 through 103.
44. The relatively minor turbidity peaks associated with some blast events demonstrate that blasting contributes to the generation and/or mobility of sediment in the subsurface. Blasting may effectively increase the supply of sediment available to percolating water and groundwater flow during and following storm events. Furthermore, the turbidity response to blasting demonstrates travel times from the quarry to the spring that are consistent with some tracer-test results as well as the lag times between peak storm rainfall and peak Liddell Spring turbidity.
45. Comment noted. Please see responses to comments IV-A-74 to IV-A-106.
46. Comment noted. See revised HYD-3.
47. Comment noted. See revised HYD-3.
48. Comment noted. See revised HYD-3.
49. Comment noted. See revised HYD-3.
50. Comment noted. See revised HYD-3.
51. Comment noted. See revised HYD-3.
52. Comment noted. See revised HYD-3.
53. Comment noted. See revised HYD-3.
54. Comment noted. See revised HYD-3.
55. Comment noted. See revised HYD-3.
56. Comment noted. See revised HYD-3.
57. Comment noted. See revised HYD-3.
58. We support the construction of an additional sediment trap at Liddell Spring, although we are of the opinion that the springbox presently serves as an effective sediment trap.
59. Comment noted. See revised HYD-3.
60. Comment noted. See revised HYD-3.
61. Comment noted. See revised HYD-3.
62. Comment noted. See revised HYD-3.
63. Comment noted. See revised HYD-3.
64. Comment noted. See response to comment numbers IV-A-124 to 131.
65. Comment noted. See response to comment numbers IV-A-132 to 141.

66. The 1999 Desert Research Institute study evaluated operational impacts. The proposed project includes the additional component of overburden removal, which is essentially equivalent to grading associated with construction activity. Therefore application of the MBUAPCD standards for construction activity is appropriate.

67. See response to comment 66. The MBUAPCD identifies the level of construction activity that could result in significant temporary impacts if not mitigated. The standard is broken down into two parts: construction sites with minimal earthmoving (8.1 acres) and construction sites with earthmoving (grading excavation; 2.2 acres). Application of this standard to the proposed expansion project can reasonably entail limiting vegetation clearance to 8.1 acres and overburden removal to 2.2 acres at any point in time.

68. See responses to comments 66 and 67.

69. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

70. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

71. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

72. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

73. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

74. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

75. The authors of Draft EIR Appendix F are confident that they have a sufficiently accurate understanding of the hydrology and hydrogeology of the quarry area and Liddell Spring upon which to base their conclusions.

76. This comment is consistent with the hydrogeologic model presented in the Draft EIR Appendix F. No response needed.

77. This comment is consistent with the hydrogeologic model presented in the Draft EIR Appendix F. Lithologic influences on karst development are not limited to present-day "borderlands" surrounding the overall marble body. Lithologic heterogeneities occur throughout the fractured complex of marble and likely occurred in overlying rocks prior to their erosion.

78. This comment is consistent with the hydrogeologic model presented in the Draft EIR Appendix F. We agree that permeable sandstone deposits overlying the marble capture high rates of rainfall recharge that contribute to the formation of dissolution pathways through the marble. Because the marble body that constitutes the quarry area was once completely covered by this sandstone, it is reasonable to infer that "drainage shafts," as the comment refers to them, are likely to occur at geologically favorable locations (e.g., fracture intersections) throughout the quarry area.

79. General agreement. One of the large drainage shafts is approximately bisected in the northeast wall of the quarry.

80. See response to comment IV-A-32 The great increase in permeability at the contact between the crystalline rocks underlying the sandstone north of the quarry and the marble results in a rapid drop in groundwater level from levels noted in the sandstone aquifer. However, the increase in permeability is due to conduit flow, so it is spatially heterogeneous. Consequently, the groundwater levels stair-step downward through a zone of irregular perched zones that overlay a permanent water table at some depth. The purpose of the smoothed water tables was to illustrate this transition. These perched conduits are hydraulically connected to the shallow aquifer north of the quarry, but ultimately drain vertically to the deeper water table (as indicated by well M5A). Although generalized and approximate, the estimated contours are useful in representing this known transition zone.

    The claim that the perched zones are a result of the included schist lenses is speculative. The schist layers are highly fractured; they are discontinuous due to ubiquitous faulting; and they are moderately to steeply inclined. They would be subject to the same process of solution as any other lithologic boundary, as discussed in preceding comments by PELA, which would argue strongly against their functioning as aquitards. As well, none of our visual observations in the quarry support this hypothesis.

81. As stated in Draft EIR Appendix F Section 4.2.2, monitoring well M5A is shallower with higher water levels than other wells with which it is grouped. However, this grouping results from its location along the most upgradient fracture leading to the quarry marble body. Groundwater levels in this area are still transitional between the upgradient sandstone aquifer and the well-drained marble aquifer. Conversely, PELA (May 2005) included this well with their “perched, isolated, and unsaturated zone” wells, despite its positive tracer detection and evidence of high yield.

    Given the area’s hydrogeologic complexity, numerous details exist regarding any one monitoring well that may be used to argue one interpretation or another. Draft EIR Appendix F presents a reasonably accurate and consistent hydrogeologic interpretation of the monitoring well data based on multiple lines of evidence (see Draft EIR Appendix F Table 27).

82. Whether or not rapid pathways exist downward through the marble “under natural conditions,” the conditions within the existing and proposed areas of quarrying are unnatural, beginning with the removal of overburden. As the PELA comment observes, there is a direct hydraulic connection between the quarry floor and the saturated zone. Once the overburden is removed and quarrying begins, pathways such as those described in comment IV-A-78 may be exposed.

83. Draft EIR Appendix F Section 4.4.2 presents an alternative, defendable analysis of the isotope data that is consistent with other lines of evidence and supports the Draft EIR conclusions.

84. As discussed in Draft EIR Appendix F Section 4.4.2, a detailed review of the tracer test results reveals some uncertainty regarding the results of tracers with “moderate” rather than “low” adsorption tendencies. In the case of SH-11, two different tracers,

both with moderate adsorption tendencies, were inserted into SH-11 near the Boundary Expansion Area, and neither tracer was detected at any of the sampling points using PELA's detection criteria. These tracers had to travel under relatively dry conditions due to the plugging of SH-11 with fill in 1998. The combination of dry conditions, moderate adsorption tendencies, and partially filled karst conduits may have contributed to the lack of tracer detections. A strong and rapid connection between the surface and the deep water table is well in evidence at SH-6, although we note that SH-6 is situated closer to the boundary of the marble body. In any event, the case for a weak connection between the unsaturated and saturated zones is based principally on this one test location. We would hesitate to reach such a firm conclusion based on this one locale, particularly given the visible evidence for vertical conduits exposed in the quarry walls.

85. Draft EIR Appendix F Section 4 presents a thorough and defensible analysis of aquifer interconnectivity derived from multiple lines of evidence, including water levels, and which supports the presented hydrogeologic interpretation and Draft EIR conclusions.

86. The occurrence of perched groundwater conditions in some locations does not negate the existence of vertical conduits through the marble at other locations.

87. The description of the structure of a karst aquifer provided in this paragraph is reasonable for a karst aquifer in a tectonically stable region, such as Tennessee or Kentucky, but is less well supported in the present, tectonically active study area, with its complex tectonic history and record of large, cyclic changes in base level. Nor is the depicted karst structure consistent with structure exposed in the walls of the quarry. In any case, arguments presented in this series of comments against vertical connectivity within the marble aquifer become moot once the proposed quarry area is cleared and mining excavates downward into the marble.

88. The comment does not substantially disagree with Draft EIR Appendix F's interpretation that karst conduits have developed throughout the marble body as a result of its geologic history. Some fractures and conduits area filled, others are not.

    Although the quality of the logging and the descriptions of voids vary from log to log (as noted in our review of the boring logs), there is sufficient data to form a valid statistical picture of void occurrence from the drilling logs. The flight of marine terraces on Ben Lomond Mountain is not an indication that tectonic uplift is episodic. Rather, it is an indication that high sea level stands, at which time the terraces are cut, are episodic. Uplift has been relatively uniform. The PELA authors are referred to Bradley and Griggs (1976) as an introduction to the study of marine terraces in the area.

89. The depth of groundwater under the quarry varies from about 30 feet to 100 feet. Captured stormflow cascading through near-vertical fractures and solution channels could travel this distance within relatively short periods of time under reasonably favorable subsurface conditions, adding little to the recorded tracer travel time from well NZA to Liddell Spring. We would also point out that the site for the NZA well was chosen specifically because it coincided with a well-defined zone of open, near vertical fractures in the wall and floor of the quarry. The other two wells drilled in the

quarry floor were located by PELA based on geophysical anomalies and neither showed any significant connectivity to the conduit system.

90. Similar and consistent patterns among streamflow, ponding, and turbidity responses to storm events provides one of several lines of evidence upon which are based the conclusions of the hydrogeologic interpretation presented in Draft EIR Appendix F. These responses are significantly different than those for springflow and springflow specific conductance. The Majors Creek streamflow record has value because it helps confirm that the Liddell Spring turbidity response to storms has characteristics indicative of surface-water influences. The record of the quarry-pit pond serves a similar purpose. The pressure-pulse explanation for springflow turbidity described in comments IV-A-93 through IV-A-100 does not sufficiently account for Liddell Spring's storm responses.

91. The ponding of water at isolated spots in the quarry floor can hardly be compared to the effect of a significant winter rainstorm and ensuing runoff over the entire area of the quarry watershed. The pond infiltration studies are not directly analogous to the conditions considered to be responsible for the introduction of turbidity into the karst conduits beneath the quarry. The pond studies evaluated the infiltration of water through a quarry bottom contaminated by soil, either placed there or developed in the course of working the quarry. The rapid introduction of turbid water into the subsurface during rainstorms takes place principally where open fractures intercept runoff, which takes place not only on the quarry floor, but throughout the walls of the quarry. This process is not a theoretical proposition, but can be observed during periods of heavy rainfall. The annual rainfall over the area of the quarry drainage basin amounts to about 300 acre-feet of water in a typical year, about 20% of the metered annual flow for Liddell Spring. A large percentage of the runoff from this flow in the quarry is visibly turbid water that percolates into the walls and floor of the quarry, where it flows to groundwater. In addition, the percolating runoff can erode naturally occurring sediment within fractures that were not exposed to runoff until quarrying opened them up. The sediment entrained in this percolating water ultimately enters the karst conduits. Whether, and how much of this sediment flows directly to Liddell Spring or is deposited in the conduit system, to be resuspended and transported to the spring by a later storm pulse is immaterial to the impact assessment in the Draft EIR.

    It is worthwhile noting that the fine-grained sediment accumulating on the quarry floor can function as a filter. It is for this reason that we have recommended purposely developing a sediment filter for the floor of the quarry as part of HYD-1.

92. The comment argues that both near and distant sources relative to the quarry could contribute to the turbidity in Liddell Spring. However, these arguments do not rule out the likely role of the nearby quarry with regard to Liddell Spring turbidity.

93. The following responses to comments IV-A-93 through IV-A-100 reflect thoughtful consideration of (a) the turbidity conceptual model proposed by the PELA comments and (b) the literature cited in support of this model. Also see response to comment IV-A-94.

94. In Draft EIR Appendix F, Liddell Spring discharge data were plotted and analyzed as originally collected by data loggers and were not averaged as the comment speculates. The technical appendix also acknowledges the various limitations of the raw logger data. Draft EIR Figure 29 (Appendix F, Figure 53) is a schematic representation of the characteristic stormflow responses categorized in Appendix F, Table 40 based on inspection of the raw-data plots. There is no significant error or bias introduced by averaging.

95. The analysis of more than 200 boring logs (Draft EIR Appendix F, Figure 21) does not support the comment's contention that "most of the conduit system is below the water table." Rather, there is much "unfilled pipe" above, and interconnected with, the permanently saturated zone as a result of geologic uplift during karst development. This interpretation of a relatively open system is consistent with multiple water and sediment sources, not just the distant sink and swallow holes acknowledged by the comment. Certainly, no one has presented evidence that would demonstrate whether the connections to major sinking sources are "pipe full" or whether they are stair-step type linked conduits. We acknowledge that subsurface sediment is as a probable source for the initial increases in Liddell Spring turbidity that occur near the beginning of a storm event (Draft EIR Appendix F, Section 4.4.4).

    We also acknowledge that deep saturated zones within the karst system are pressurized by storm recharge. However, the comment fails to acknowledge that this storm recharge enters the system in the quarry area as well as the more distant sinkholes and swallow holes described by the comment.

    Spring turbidity increases at a faster rate than spring discharge, not "almost as quickly" as stated in the comment. Storm recharge entering in the karst system in the quarry area arrives at the spring much quicker than "days or weeks," as evidenced by the arrival of a groundwater tracer from the quarry in about 7 hours during relatively dry conditions (Draft EIR Appendix F, Section 4.4.2).

    As discussed at the end of this series of comments, no revision of the Draft EIR conclusions is warranted.

96. We agree with the heading preceding this comment: "transport of turbidity and dissolved solids are generally different in karst."

    The comment contends that (a) water that first arrives at the spring in response to a storm is flushed from the karst conduits and adjacent fractures and (b) the rising limb of the springflow hydrograph is not composed of storm water. We agree that the very first water to emerge from the spring in response to a storm is largely water that already existed in the karst system. However, a nearly immediate dip in springflow electrical conductivity often occurs after the beginning of storm rainfall, suggesting the influence of one or more nearby surface water contributions (Draft EIR Appendix F, Section 4.4.3; SECOR, December 1998). In the case of the March 22, 2005 storm (Draft EIR Appendix F, Figure 51), a particularly pronounced decline in electrical conductivity occurred at the beginning of the spring's storm response and coincided with Majors Creek peak streamflow and Liddell Spring peak turbidity.

    The late-storm increase in springflow electrical conductivity results from mineralized groundwater being pushed out of the karst system by hydraulic heads surcharged by storm recharge. This response lags significantly behind all other storm responses, further indicating that early-storm springflow is diluted with intercepted stormflow.

We acknowledge that the karst groundwater system contributing to Liddell Spring is highly complex with multiple sources and avenues of recharge and sediment transport. Although some similarities with other karst springs are expected, differences from other studied springs are also expected given Liddell Spring's hydrogeologic uniqueness and complexity.

97. This comment argues for an alternative interpretation of Liddell Spring's response to storms. It is based on the following inaccuracies:

- Consistent with earlier comments, this interpretation fails to acknowledge the widespread occurrence of karst dissolution features throughout the marble body overlying the permanently saturated zone (as demonstrated by field observations and the analysis summarized in Draft EIR Appendix F, Figure 21). The available void space above the permanently saturated zone provides surplus groundwater storage and transport capacity during periods of storm recharge. It also results in a relatively open system that facilitates direct recharge under conditions such as those in the quarry area.
- The comment's statement that "highly mineralized water…is rapidly discharged [from Liddell Spring] after a heavy rain" is inconsistent with the available data. Compared to increases in springflow turbidity and discharge, the increase in springflow electrical conductivity is generally the slowest storm response observed (Draft EIR Appendix F, Section 4.4.3). This lag, combined with the initial dip in electrical conductivity that often occurs, supports the interpretation that intercepted surface water significantly contributes to the early springflow response, by diluting more mineralized groundwater and contributing to initial turbidity peaks.
- The comment contends that a decrease in springflow electrical conductivity occurs as a late-storm response. In fact, this is simply a return to baseflow conditions following the storm response.

Because of these inaccuracies, the comment presents a flawed interpretation of Liddell Spring conditions that does not accurately account for the available data. Alternatively, the conceptual model presented in Draft EIR Appendix F is consistent with available information and observations.

98. The comment states that, "If the [Liddell Spring storm] turbidly peak were caused by water infiltrating from the quarry floor, the addition of the new water would dilute the spring and cause a decrease of specific conductance because the rain water has a very low specific conductance." In fact, and as described above, the increase in springflow electrical conductivity that results from storm recharge lags behind other storm responses and is often preceded by an initial dip in electrical conductivity. Stormflow turbidity is up to several orders of magnitude greater than that of ambient karst groundwater, whereas stormflow electrical conductivity is lower than ambient groundwater by a much smaller factor. Thus, the stormflow contribution to springflow is expected to have a much greater effect on increasing turbidity than diluting electrical

conductivity, consistent with the observed initial turbidity peaks and lagged increases in electrical conductivity.

Contrary to the comment's last sentence, Liddell Spring does not exhibit the late "arrival of…storm-diluted groundwater," but rather returns to the low electrical conductivity characteristic of baseflow conditions. This and other related comments are poorly supported by the data and fail to consider the effect of multiple, overlapping influences on Liddell Spring. We acknowledge that the resuspension of sediments already in the karst groundwater system is one factor contributing to springflow turbidity.

99. The comment describes the initial flushing stage of the Liddell Spring's response to storms, stating that recharge rapidly displaces more mineralized groundwater. However, the increase in springflow electrical conductivity that results from storm recharge lags behind other storm responses and is often preceded by an initial dip in electrical conductivity. This is consistent with the contribution of percolated storm water to Liddell Spring during the early stages of storm response.

The comment describes a middle dilution phase of Liddell Spring's storm response that results in minimum springflow electrical conductivity, followed by a final recovery stage when electrical conductivity recovers to pre-storm conditions. In fact, Liddell Spring does not demonstrate any electrical conductivity minimum or recovery as part of its storm response, but simply returns to baseflow conditions of low electrical conductivity after each storm.

The comment acknowledges that Liddell Spring mid- and late-storm turbidity spikes can result from captured turbid storm water migrating several thousand feet through the karst system from swallow holes along Reggiardo and Laguna creeks. Given this and the following observations, it seems inconsistent that the conceptual model presented by this series of comments does not recognize the quarry as a potentially significant source of captured turbid storm water with the potential to cause early-storm turbidity peaks at Liddell Spring:

- The quarry is much nearer to the spring than the swallow holes along Reggiardo and Laguna creeks.
- Percolation into the quarry area is estimated to account for roughly one-fifth of Liddell Spring's yield (Draft EIR Appendix F, Sections 3.2 and 4.5).
- Inferred karst conduits along mapped fractures connect Liddell Spring to the quarry and upgradient sandstone recharge areas as well as to the stream swallow holes along Reggiardo and Laguna creeks (Draft EIR Appendix F, Figure 20).
- A tracer test demonstrated a groundwater travel time of about 7 hours between the quarry and the spring during relatively dry conditions (PELA, 2005), roughly similar to the timing of the initial storm turbidity responses observed at Liddell Spring.
- The existing quarry floor is within as little as 50 feet of the permanently saturated zone.

- The suspended sediment responsible for Liddell Spring turbidity could be accounted for by a few cubic feet of material per day, on average (Draft EIR Appendix F, Section 4.3.6).

Failure to recognize the potentially significant influence of the quarry area on Liddell Spring is a serious flaw in the conceptual model presented by these comments.

The late turbidity peak depicted in the set of schematic Liddell Spring storm -response plots presented in Draft EIR Appendix F, Figure 53 is conceptually representative of all late turbidity peaks and is not intended to suggest a "two-peak turbidity model [as] a general rule."

As noted in response to the preceding paragraph, Liddell Spring does not exhibit storm dilution and recovery stages as described in the comment. This mischaracterization of Liddell Spring's storm response is an additional flaw of the conceptual model presented by these comments.

100. Regarding "springs with a small watershed," it should be noted that the quarry-area portion of Liddell Spring's catchment area is a small watershed.

The comment's reference to a "phase difference" between Liddell Spring's storm-discharge hydrograph and turbigraph is not in and of itself an explanation for the poor correlation between springflow and turbidity.

The comment's second explanation for difference between Liddell Spring storm discharge and turbidity is "turbidity hysteresis." The concept of hysteresis typically applies to an output variable that behaves differently depending on whether an input variable is trending upward or downward. For example, sediment transport in streams as a function of discharge varies depending on whether streamflow is rising or falling. In the case of Liddell Spring, the initial and typically largest turbidity spike occurs entirely during the rising limb of the spring discharge hydrograph. While this may be referred to as hysteresis, it more importantly indicates that these two variables operate partially independently and that one or more other variables are largely responsible for the incidence of turbidity spikes.

We acknowledge that one mechanism for sediment resuspension within the karst system is a pressure pulse associated with a recharge event (seismic shaking from blasting and earthquakes is another). Once suspended, the fine particles responsible for turbidity remain in suspension as long as the rate of discharge remains about equal or greater. However, Liddell Spring's initial and typically largest storm turbidity spikes have short durations that occur entirely during the rising limb of the springflow storm hydrograph. Conversely, the relative size and shape of Liddell Spring turbidity spikes are closely correlated with the streamflow hydrograph of nearby Majors Creek.

It could be argued that the sediment responsible for peak turbidity is both mobilized and held in transport only during the storm recharge pressure pulse, which corresponds to the period of peak streamflow. However, this interpretation is discredited by late-time turbidity peaks arriving from distant swallow holes long after the initial resuspension of fine-grained particles occurred.

The comment recognizes "that the complex relationship between discharge and turbidity can be further complicated" by other factors. However, despite the evidence listed in response to comment IV-A-99 above, this series of comments fails to acknowledge the significant presence of the quarry as one of these complicating factors.

Liddell Spring discharges from a highly complex hydrogeologic system with multiple water and sediment sources and avenues of recharge and transport. It appears likely that mobilized subsurface sediment and captured nearby storm water both contribute to initial turbidity peaks. Given the uniqueness and complexity of the system, it is unreasonable to assume that other studied karst systems are highly analogous, particularly karst systems in highly dissimilar geologic environments.

That significant differences in sediment transport occur depending on whether streamflow is rising or falling is acknowledged. However, the occurrence of initial turbidity spikes prior to and independent of peak springflow is not explained by this comment.

This comment contends that the relatively short duration of Liddell Spring turbidity spikes results from the temporary depletion of the subsurface sediment supply. For this to explain Liddell Spring's characteristic initial turbidity spikes, a relatively finite and discrete slug of sediment would need to be deposited in the karst system a relatively short distance upgradient of Liddell Spring during the falling limb of each preceding storm hydrograph. This slug would then mobilize with the rising limb of the next storm hydrograph but become depleted prior to peak springflow. Furthermore, this period of sediment mobilization and depletion would need to coincide for no apparent reason with the storm hydrographs for local streamflow and quarry ponding. Although such a process likely accounts for a portion of the spring's storm turbidity response, dismissing the concurrence of sediment depletion and declining streamflow as pure coincidence seems unreasonable. Alternatively, attributing a significant portion of the sediment supply to nearby surface water sources (for example, the collection and percolation of rainfall, runoff, and sediment in the quarry area) is consistent with a sediment supply that becomes depleted in conjunction with the falling limb of the surface-water storm response. Both explanations are essentially valid if the subsurface slug of sediment responsible for the spring's initial turbidity peaks derives in part from sediment generated by the quarry and flushed into the karst by quarry storm water percolation. Additionally, the timing of Liddell Spring's initial turbidity peaks following the beginning of storm rainfall is generally consistent with known groundwater travel times between the quarry and spring.

In summary, the hydrogeologic interpretation presented in comments IV-A-93 through 100 does not fully or accurately account for all known conditions and observed storm responses. Nor does it adequately consider that the quarry is one of multiple water and sediment sources. As noted, the turbidity-discharge plots provided as part of the comment reflect multivariate responses. Although we acknowledge the potential contribution of subsurface sediment mobilized by recharge pressure pulses, the quarry area cannot be dismissed as an insignificant potential source of spring turbidity. No revisions of the Draft EIR conclusions are warranted.

101. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

102. The elevated turbidity that is associated with some blast events demonstrates that blasting contributes to the generation and/or mobility of sediment in the subsurface. Blasting may effectively increase the supply of sediment available to percolating water and groundwater flow during and following storm events. See response to comment III.A.16.

103. See response to Comment IV-A-102.

104 The comment does not explain what is actually “misleading” about the referenced description from Draft EIR Appendix F. Depth to groundwater in different geologic units is further clarified in subsequent paragraphs in the Draft EIR and in Appendix F.

105. Water quality standards are relevant to assessing impacts to raw water supplies and the potential need for treatment. For clarity see text change on page 5-14, second paragraph, adding the term “treated water” in parenthesis.

106. See response to earlier comments (e.g., IV-A-102 and 103).

107. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

108. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

109. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

110. There is insufficient evidence of a significant contribution by the quarry operation to sedimentation at Liddell Spring box to warrant a requirement for installation of an additional sediment trap. See analysis contained in Appendix I of the Final EIR.

111. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

112. Comment noted. See revised mitigation measure HYD-1.

113. Comment noted. See revised mitigation measures HYD-1 and HYD-2

114. Comment noted. See revised mitigation measure HYD-3

115. Comment noted. See revised mitigation measure HYD-3

116. Comment noted. See revised mitigation measure HYD-3

117. Comment noted. See revised mitigation measure HYD-3

118. Comment noted. See revised mitigation measure HYD-3

119. Comment noted. See revised measure HYD-3.

120. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

121. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

122. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

123. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

124. The reference to golden eagle and white-tailed kite has been removed from page 6-19 of the Draft EIR as noted. See text amendments.

125. Bulger 1999 has been cited in the text on Page 6-6 to clarify that the California red-legged frog is known to traverse over 1.8 miles through uplands during rainy periods when seeking out new breeding locations.

126. This statement is already contained in the Draft EIR on Page 6-7. The last sentence of the first paragraph under "San Francisco Dusky-footed Woodrat" states, "Although the dusky-footed woodrat is generally considered common throughout its range, their complex social structure makes them sensitive to disturbance (Santa Cruz Mountains Bioregional Council, 2004)."

127. The following table provides a breakout of woodrat nest impact per acre by vegetation community.

Woodrat Impacts of Proposed Bonny Doon Quarry Boundary Expansion Project

Vegetation Community	Acres	Nests	Nest/Acre	Percent Impacted
Redwood Series	11.4	24	0.475	66.6
Douglas Fir/Tanoak Series	2.3	5	0.46	13.5
Coyote Brush	2.5	15	0.167	14.6
Coast Live Oak	0.9	9	0.10	5.3
Total	**17.1**	**53**	**0.32**	**100.0**

Source: TRA 2006.

128. Comment noted. See response to comment #IV-A-126.

129. The County of Santa Cruz Code Section 16.32.040 (d) states, "Areas which provide habitat for species of special concern as listed by the California Department of Fish and Game in the Special Animals list, Natural Diversity Database." Therefore, the County's Sensitive Habitat Protection Ordinance applies to this project for the protection of habitat for the SFDW. CEQA Section 15064.7(a & b) states, "Each public agency is encouraged to publish thresholds of significance that the agency uses in the determination of the significance of environmental effects." … "Thresholds of significance to be adopted for general use as part of the lead agency's environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence." The mitigation proposed under Measure BIO-2 on Page 6-29 of the Draft EIR was developed through coordination with the CDFG to reduce significant impacts to below a level of significance.

130. A total of 24 houses were observed within the Redwood Forest community located within the expansion area (see response IV-A-127). However, Redwood Forest habitat is not typically the preferred habitat of the SFDW. Following the May 2, 2007

meeting with CDFG, it was concluded that Redwood Forest habitat was not to be preserved as mitigation for impacts to the SFDW. Mitigation was to include a more open canopy woodland or scrub community. Mitigation Measure BIO-1 does provide for the preservation of Redwood Forest habitat in the adjacent buffer zone east of the Boundary Expansion Area if the data collected under No. 2 of BIO-1 indicates that Redwood Forest is indeed suitable for nesting and foraging (see Page 6-29 of the Draft EIR).

131. Page 6-30 of the Draft EIR states, "Methods of passive relocation, including whether animals are to be trapped and released locally prior to house dismantling, and what time of day passive relocation should occur." This component will be included in a detailed SFDW Mitigation Plan that will be prepared. Active relocation may be required to ensure that the animals are physically relocated onto parcels containing their relocated houses.

132. Section 16.32.040 (3)(b) of the County Code defines an area as sensitive habitat if it meets one or more of the following criteria. Areas which provide habitat for locally unique biotic species/communities including but not limited to : oak woodlands, …" In addition, CEQA Section 21083.4(b) states, "As part of the determination made pursuant Section 21080.1, a county shall determine whether a project within its jurisdiction may result in a conversion of oak woodlands that will have a significant effect on the environment. If a county determines that there may be a significant effect to oak woodlands, the county shall require one or more of the following oak woodlands mitigation alternatives to mitigate the significant effect of the conversion of oak woodlands: (1) Conserve oak woodland through the use of conservation easements, (2): (A) Plant an appropriate number of trees, including maintaining plantings and replacing dead or diseased trees, (B) The requirement to maintain trees pursuant to this paragraph terminates seven years after trees are planted, (C) Mitigation pursuant to this paragraph shall not fulfill more than one-half of the mitigation requirement for the project, (D) The requirements imposed pursuant to this paragraph also may be used to restore former oak woodlands." Therefore, the County is obligated to protect Oak Woodlands regardless of the presence of special-status plant species.

133. According to Appendix C, Table 1 of the Draft EIR, *Vascular Plant Species Observed within the Bonny Doon Quarry Boundary Expansion Area, Santa Cruz County, California*, cascara (*Rhamnus purshiana*) was observed during surveys within the project area. According to the CalFlora Plant Observation Library, the plant was observed within Santa Cruz County and there is a specimen from Santa Cruz County within a herbarium (http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=7079).

134. Please see response to comment #IV-A-132. Coastal scrub is also identified as a sensitive habitat under the County of Santa Cruz Sensitive Habitat Protection Ordinance. Therefore, the County is obligated to protect coastal scrub regardless of the presence of special-status plant species.

135. According to Appendix C, Table 1 of the Draft EIR, *Vascular Plant Species Observed within the Bonny Doon Quarry Boundary Expansion Area, Santa Cruz County,*

California, fairy bells (*Disporum smithii*) was observed during surveys within the project area. According to the CalFlora Plant Observation Library, the plant was observed within Santa Cruz County and there is a specimen from Santa Cruz County within a herbarium (http://www.calflora.org/cgi-bin/species_query.cgi?where-taxon=Disporum+smithii).

136. Clarifying text concerning Maritime Chaparral has been added as noted. See Text Amendments on Page 6-11.

137. Clarifying text concerning Native Grassland has been added as noted. See Text Amendments on Page 6-11.

138. Please see response to comment numbers IV-A-132 and 134. The County of Santa Cruz Sensitive Habitat Protection Ordinance is applicable to both Oak Woodlands and Coastal Scrub habitats.

139. Please see response to comment numbers IV-A-132 and 134. The County of Santa Cruz Sensitive Habitat Protection Ordinance is applicable to both Oak Woodlands and Coastal Scrub habitats.

140. Please see response to comment numbers IV-A-132 and 134. The County of Santa Cruz Sensitive Habitat Protection Ordinance is applicable to both Oak Woodlands and Coastal Scrub habitats.

141. Typographical error on spelling of blue wild rye in Table 6-4 (p. 6-25) is corrected. See text amendments.

Comment Letter IV-B
Santa Cruz County Business Council

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THE SANTA CRUZ COUNTY BUSINESS COUNCIL INC.

October 1, 2007

Todd Sexauer
County of Santa Cruz Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060

Dear Mr. Sexauer:

I am writing to you to submit my comments regarding the recently filed draft Environmental Impact Report (EIR) on the CEMEX Limestone Quarry Expansion Project prepared for the County of Santa Cruz.

CEMEX is an important employer, taxpayer and environmental steward that has served the regional economy in Santa Cruz County for more than 100 years. The Davenport plant is both an economic and community hub in northern Santa Cruz County. CEMEX Davenport and prior companies that have operated at this site have been integral supporters of schools, rural fire departments and local social services. 1

The CEMEX Davenport plant provides approximately 125 jobs, totaling more than five million in taxes and revenues as Santa Cruz County's leading property taxpayer. Many of the jobs at the plant are filled by union workers, earning a living wage and comprehensive benefits. It is important to note that many of these jobs at the plant involve a trained workforce and provide important opportunities for those that may not necessarily have had the opportunity to go to college. As such, the CEMEX Davenport plant and quarry offer an important example as a stable employer and community taxpayer. 2

CEMEX employs over 1000 employees in Northern California to provide construction materials to the building industry to meet infrastructure, housing industry and commercial requirements. Cement production in Davenport is a key construction material required to continue providing construction industry's needs and help grow the regional economy. 3

740 Front St., Suite 375 * Santa Cruz County * 95060 * Phone (831) 423-6320 *FAX (831) 423-1814E-Mail scbuscoun@aol.com

Environmental Commitment

Though not directly related to the EIR, CEMEX has demonstrated a consistent commitment to a sustainable future for the communities of Davenport, Bonny Doon, and the County of Santa Cruz. For example, the company's "sustained yield" forest management of a 9,000 acre forest reserve is an extraordinary example of the company's commitment to mitigate its environmental impacts. In effect, the forest reserve and on-going planting of over 20,000 redwood seedlings on CEMEX property each winter helps to offset carbon emissions from the plant. 4

Environmental Mitigation

I am aware that CEMEX has worked closely with the City of Santa Cruz over many years to mitigate potential impacts of quarrying on the City's water supply from Liddell Creek. In considering CEMEX'S effort to work with the City of Santa Cruz and Santa Cruz County, it is worth recognizing the company's commitment to fully mitigate potential impacts on Liddell Creek. 5

While only a fraction of turbidity and sedimentation is related to quarry activity, the company has expressed its commitment to fully address all sedimentation and turbidity conditions-most of which occurs as a result of natural rain events. In this way, the City's interests are actually better served by CEMEX's on-going use and mining of the limestone quarry than it would be were CEMEX to cease its operations. That is, the net effected of the proposed CEMEX water treatment effort is to offer the city greater certainty to address both turbidity and sedimentation concerns that if the quarry were to cease operations. 6

As noted on page S-2 of the environmental impact report, the quarry expansion may result in increased sedimentation of the Liddell Spring municipal water source. CEMEX is already working with a highly qualified team of engineers to develop and implement measures to effectively mitigate the sedimentation issue, as outlined on pages 5-35 through 5-39. 7

I am happy to speak with you further about my comments and concerns about the environmental impact report. Thank you for your careful attention to this matter. I appreciate your time and consideration.

Sincerely,

Jim Conklin
Executive Director
Santa Cruz County Business Council

Responses to Comment Letter IV-B
Santa Cruz County Business Council

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
2. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
3. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
4. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
5. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
6. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
7. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

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Comment Letter IV-C
Sierra Club, Santa Cruz County Group

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SANTA CRUZ COUNTY GROUP
----------------------Of The Ventana Chapter----------------------
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Comments on
July 2007 Draft Environmental Impact Report
Bonny Doon Limestone Quarry
Boundary Expansion Project and Reclamation Plan Amendment
Draft Environmental Impact Report
SCH# 2001112115

October 1, 2007

Submitted by the
Sierra Club --Santa Cruz County Group
To the Santa Cruz County Planning Department (c/o Todd Sexauer)
Santa Cruz, California 95060

1. Introduction

These comments are submitted on behalf of the Santa Cruz County Group of the Ventana Chapter of the Sierra Club (the "Sierra Club"), whose members include residents living near the Bonny Doon Limestone Quarry (the "Quarry") and in the town of nearby Davenport, users of recreational land impacted by any expansion of the Quarry, as well as members living in the city of Santa Cruz (the "City"), whose water source will be impacted by expansion of the Quarry.

The Sierra Club believes, based on credible and substantial evidence, that the proposed Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment ("Project" or "Proposed Project") described in the draft environmental impact report ("DEIR") will have significant negative impacts on the environment and the quality of life for residents living near the Quarry and on users of potential recreational areas, potentially land slated for recreational use by the Trust for Public Land ("TPL"), which has agreed to hand over land it owns adjacent to the Proposed Project (between the south end of the Proposed Project and Highway 1, the "TPL Land") to the Bureau of Land Management ("BLM") by the end of 2007. 1

In addition, the Proposed Project will have significant negative impacts on the environment and quality of life for residents living in the town of Davenport, which is adjacent to the Cemex-owned Davenport cement plant (the "Cement Plant") and the direct beneficiary of the limestone to be mined from the Proposed Project. Santa Cruz County (the "County") has allowed Cemex, the owner of both the Cement Plant and the Quarry, separate operating permits, in spite of their mutual dependency and even physical connection via the three-mile long conveyor belt that transports the ore extracted from the Quarry to the Cement Plant for the manufacture of Portland cement. 2

The Proposed Project will severely impact the Bonny Doon neighbors' use and enjoyment of their property, the Davenport residents' environment and quality of life, and 3

visitors' use and enjoyment of the TPL Land and other open space areas. Yet, these 3
impacts are not adequately identified, analyzed, or mitigated in the DEIR. In fact, some
potential significant environmental impacts are simply ignored.

Perhaps the most glaring omissions from the DEIR are the failure to include the
Proposed Project's impact on the recreational users enjoying the TPL Land, and the failure 4
to include the environmental impacts on the town of Davenport and its environs in respect
to noise, traffic, water quality and air quality.

**Instead, CEQA requires a full analysis of Project impacts, and unbiased
identification of a range of reasonable alternatives and mitigation. If alternatives** 5
**and/or mitigation meet most reasonable project alternatives, while minimizing or
eliminating significant negative environmental impacts, the Proposed Project <u>must</u> be
changed accordingly.**

The DEIR's alternatives analysis is extremely biased in favor of Cemex's Proposed
Project. While alternative are identified, they are dismissed, because they do not meet 6
Cemex's objective of making as much money as possible as quickly as possible. That is
not a permissible basis for rejecting an alternative under CEQA. *See* 14 Cal. Code Regs.
§ 15126.6(b).

For these and other reasons, the Sierra Club believes that the DEIR is deeply flawed.
Based on a through analysis by the Sierra Club's scientists and Sierra Club members
themselves, it is clear that the DEIR is inadequate and uncertifiable – because, in a number
of areas, the DEIR is deficient:

- The DEIR fails to adequately define Proposed Project Objectives.
- The DEIR fails to identify and analyze a reasonable range of alternatives.
- The DEIR dismisses alternatives for improper reasons.
- The DEIR uses inappropriate thresholds of significance.
- The DEIR fails to correctly apply some of its own thresholds of significance. 7
- The DEIR fails to conduct the level of analysis required under CEQA.
- The DEIR is based on flawed studies and data.
- The DEIR relies on personal opinions in place of analysis.
- The DEIR fails to identify adequate mitigation measures.
- The DEIR fails to require the key mitigation of adequate financial assurances.
- The DEIR fails to require appropriate mitigation monitoring.
- Public review notice for the DEIR to affected parties was inadequate.

As a result of these and other deficiencies in the DEIR, if the County and other Project
proponents proceed with the Project as proposed, additional analysis and studies (described
below) must be conducted, additional mitigation measures must be proposed, an adequate 8
range of alternatives must be presented and analyzed, and the DEIR must be substantially
rewritten. This will require re-noticing and re-circulating a revised DEIR. See 14 Cal.
Code Regs. § 15088.5.

The Sierra Club requests that the County modify the Proposed Project and revise the
DEIR consistent with these comments and the comments of other concerned citizens.
Where any comment by the Sierra Club does not result in such changes, the County must 9

provide a specific written response to these comments, as required under CEQA. See 14 Cal. Code Regs. § 15088. 9

The Sierra Club looks forward to working cooperatively with County staff and Cemex to address the issues identified in these and other public comments, and other issues concerning the DEIR and the Project. By fully addressing the issues in the DEIR, the County, Cemex, the Sierra Club and others may be able to cooperatively develop a project that is both consistent with applicable law and acceptable to all affected parties. 10

2. Project Goals and Objectives

2.1 <u>The Project Goals and Objectives Must Be Clear and Unbiased</u>. A project description must state a project's objectives, including the underlying purpose of the project. See 14 Cal. Code Regs. Sec 15124(b). An EIR should explain why a project's objectives are held by the lead agency.

Here, the Project Goals and Objectives Section of the DEIR (p. 2-2) fails to meet this standard. In fact, the Project Goals and Objectives Section does not state any County objectives. Instead, the only clear objectives are the objectives of the Cemex, the applicant. By setting up the Project Goals and Objectives Section in a way to make the expansion of the Quarry the key Project objective, the DEIR appears designed to allow the County to adopt a statement of overriding conditions – essentially to be able to approve the Proposed Project as described in the DEIR, regardless of the unmitigable environmental impacts. 11

2.2 <u>The Project Objectives Must Be Consistent with the General Plan</u>. Under the General Plan expansion of a quarry is allowed "where impacts of environmental and scenic resources and surrounding residential uses can be mitigated." Thus, the DEIR must include as a Project objective the mitigation of negative impacts on the environment, scenic resources and surrounding residential uses.

2.2.1 Figures 6-1 and 6-2 are not included as an adjunct to Section 6.9.4 (Policies – Noise), set forth in Table 3-1. These figures should be included in the DEIR. 12

2.2.2 Section 13.10.445 (Industrial Performance Standards) and County General Plan Section 3.6.1 are not included in Table 3-2. These Sections should be included in the DEIR.

2.2.3 No County Plans or Policies were cited in respect to a "new" quarry. If such a County Plan or Policy exists, the DEIR should provide it.

3 DEIR Document Deficiencies in General

The DEIR fails to meet the requirements of CEQA in important respects, as identified throughout these comments. Following are selected examples:

3.1 <u>The DEIR Must Address All Substantial Evidence of Project Impacts</u>. The DEIR does not include or analyze previous Quarry violations identified by the County. If any such violations continue, the negative impacts from them are likely to be increased or 13 exacerbated by the current Proposed Project. The Sierra Club requests that the DEIR be revised to account for all foreseeable impacts of the Proposed Project, including the foreseeable impacts resulting from likely continued permit violations by the Quarry, based on evidence in the County's files.

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3.2 The DEIR's Summary is Inadequate. CEQA Guidelines require that an EIR contain a brief summary of the proposed action and its consequences, and that the EIR specifically identify "[a]reas of controversy known to the Lead Agency including issues raised by agencies and the public." 14 Cal. Code Regs. § 15123. This serves to highlight for the public decision-maker responsible for certifying the EIR, especially important when a project presents complex or detailed issues.

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Here, while the Summary section of the DEIR (pp. S-1 – S-8) provides a chart to summarize the impacts, a reader must hunt through various sections in the DEIR in order to determine where and what the mitigations are. If a decision-maker is in a hurry, he/she will be unduly influenced by the comment in S.2 on page S-1: "These impacts can be reduced to a less than significant level by implementing the identified mitigation measures." This disorganization results in an unsatisfactory Summary section, which should be rectified in the DEIR.

4 Land Use/Planning

Section 5.5.8 of the County General Plan (Allowed Uses in Water Supply and Least Disturbed Watersheds) requires uses in such watershed areas to be compatible with watershed protection policies. Although mining is an acceptable use as an open space use, because of the severe and foreseeable impact of mining on Liddell Spring, a critical water supply source for the City, the Sierra Club believes that mining is an incompatible land use in the Liddell watershed. Further, Section 5.7.1 of the County General Plan (Impacts from New Development on Water Quality) does not allow new development next to streams and bodies of water if adverse impacts cannot be fully mitigated. The proposed mitigations are vague and untested. Cemex is out of compliance with its use permit in respect to water quality even now (as discussed below) – how can the Sierra Club and its affected members believe that the proposed mitigations for the Proposed Project will be effective?

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5 Biological Resources

5.1 In the approximately 17 acres of intact land surface to be harvested for the Proposed Project are listed four types of plant communities. These include coast live oak forest (0.9 acres), mixed evergreen forest (2.3 acres), northern coastal scrub (2.5 acres), and upland redwood forest (11.4 acres). These are all diverse plant communities that support different types of wildlife. The redwood forest section (the largest area) is described as "a relatively mature second growth stand, with a few very large trees mixed in." The second growth trees are estimated at 90 to 120 years old. The largest trees and those with structural attributes like deep bark crevices, broken crowns, large upper branches and burn scars are not described in the document, but it can be assumed that these "very large trees" predate the 1900 clear cuts. This part of the redwood forest can be assumed to possess the attributes of, at least, a late seral stage coast redwood forest. Apparently this area has not been used for timber production by Cemex or the former operators of the current limestone quarry. This portion of redwood forest is thus much older than the production forests on this land holding. The Cemex redwood forests have

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been extensively logged. In many areas there have been 3 logging entries since the 1870 to 1914 (estimate) clear-cuts. Old redwood forests are quite rare and support a number of listed animals and plants including Marbled Murrelets, Coopers hawks, Sharp-shinned hawks, (with cliffs) peregrine falcons, certain rare owls, white-tailed kites (coastal areas), rare bats (including Townsend's big-eared bat) and other wildlife that cannot reproduce in production forestland. The abundant presence of San Francisco Dusky-footed Woodrat (Sec. 6.1.3.2.) is an indicator of general habitat quality. These seventeen acres of land are not to be dismissed as insignificant because they are surrounded by heavily logged 16
production forests. This acreage is, in fact, a rare island of intact old forest that can support rare biological resources that cannot exist on the majority of the Cemex land holdings. All four listed plant communities will likely support a number of listed and endemic plants. The DEIR only states that "none of these species were observed at the site during several surveys." Raptors and bats must be surveyed using very specific scientific protocols. Also, there is a difference between a sighting and the presence of suitable habitat. The absence of an un-described (method) sighting means nothing in regard to actual site occupancy or the suitability of habitat.

5.2 The assertion in the DEIR that "[t]hese communities would be replaced on the site under the Mitigated 1996 Reclamation Plan Amendment" is unsupportable. These plant communities are far too complex to be replaced on different, disturbed soils minus the fungi and soil bacteria necessary for their survival. The removal of these 17 acres of 17
four plant communities will be permanent, irreversible and unmitigable. The assertion that impacts to raptors can be mitigated by the timing of logging is an unsupportable assumption and misses the point -- this area contains high quality forest habitat that is not available nearby on other Cemex lands.

5.3 <u>Mitigations for Lost Habitat</u>. The proposal to substitute locations for rare species such as the San Francisco Dusky-footed Woodrat is speculative and based on 18
assumptions of land conditions and locations that are not determined. The Reclamation strategy and other mitigations for lost habitat are speculative and unproven.

5.4 <u>Sensitive Habitats</u>. Coho Salmon and the North Coast Short Run Coho Stream Habitat. Steelhead (central coast ESU) and North Central Coast California Roach-Stickleback-Steelhead Stream. There is considerable discussion about the movement of waterborne fine sediments from quarry blasting and other operations. It is reasonable to assume that water quality in Liddell Creek will decline in response to the Project's operations. This will be the result of increased sediment. The uncertainty about the movement of water through the karst limestone subsurface channels of the area does not indicate that sediments will not reach fish habitats. Certainly in high rainfall years the flow of water will be swift, on or near the surface, and reach Liddell Creek's fish habitats 19
quickly while carrying a sediment load that will increase as a result of the Proposed Project. The survival of juvenile fish is impaired by sediment interfering with sight feeding. The imbedding of fine sediments in redds (fish egg nests) will cause the death of steelhead, coho and other fish eggs through oxygen depletion. The relative size of the quarry expansion to the area of Liddell Creek's watershed says very little about impacts to water quality through sediment production. Quarry operations produce very large volumes of fine sediment through blasting and bulldozer operations, etc., and can easily overwhelm a small stream with sediment. Simply stated, the Proposed Project conflicts with the County's Sensitive Habitat Protection Ordinance.

The Sierra Club requests that the DEIR include a new section specifically analyzing the Proposed Project's on sensitive habitat and sediment impacts on downstream 20
fish habitats.

5.5 Timber Resources. Section 9.1.1 of the DEIR refers to a decrease in timber production from 2001 to 2005, which has little bearing on the effects of the Proposed Project. However, the reasons given for a decrease are easily demonstrated by the history of logging on Cemex lands. Over 6,000 acres of timber have been harvested on Cemex's land holdings in the past twenty years. The depletion of large valuable trees on major logging land holdings is a principle reason for a decline in local timber production 21
volume. The only regulatory change that affected logging production in terms of removable wood volume were rules adopted in 1999 that were intended to avert the extinction of salmonids. To a modest extent, these "Threatened and Impaired rules" reduced the number of trees that could be removed from wet riparian corridors. These rules apply to the entire coast of California from the Santa Cruz Mountains to the Oregon border.

A Timber Land Conversion Permit and a THP are necessary for the removal of the forest on top of the quarry expansion. This permit will allow the land to be stripped and prepared for quarry blasting. According to the DEIR description of the existing forest on the Project acreage, the forest has a thriving understory, large wood, and other 22
characteristics of a "late successional" forest. The timber resources include remnant old growth trees and it is reasonable to assume (considering the intensity of logging on the rest of CEMEX holdings) that this is one of the highest quality redwood forest habitats on Cemex's entire property. Removal of this forest area is not a mitigable impact.

5.6 Effects of Explosive Blasting on Wildlife Must Be Evaluated. The Quarry is located in an environmentally sensitive habitat area, home to a wide diversity of plant and animal species, including several species of special concern and threatened and endangered species. Several of the special-status species observed or expected to occur in the Project area include:

- California Red-legged Frog (breeds in the Quarry's settlement basins)
- San Francisco Dusky-footed Woodrat
- Central Coast Steelhead (occurs in Liddell Creek, downstream of the Project)
- Raptors, such as Cooper's Hawk, Sharp-shinned Hawk, Golden Eagle and Long-eared Owl 23

Despite the presence of these and many other species in the Project area, the DEIR concludes that the Project – with mitigation – will have no significant impacts on biological resources. However, the DEIR failed to adequately analyze a key potentially significant impact: both direct and indirect impacts of the proposed explosive blasting on Quarry area wildlife, including threatened and endangered species. Under the federal Endangered Species Act, it is prohibited to harass or harm wildlife ("harm" may include significant habitat modification or degradation that significantly impairs essential behavioral patterns of fish or wildlife). *See* 50 Code Fed. Regs. 222.102.

Indirect impacts of blasting would include foreseeable results of the blasting and quarrying in expansion areas, such as desiccation of area habitat and disturbing local aquifers.

The Sierra Club requests that the County ask its biological consultants to study the potential effects of explosive blasting on wildlife in the Project area, and the DEIR be revised accordingly, with additional analysis and mitigation as needed. 23

5.7 The DEIR's Biological Study May Be Too Outdated. The DEIR's Biological Resources section is at least partially based on "Table 3: Special-Status Species and Habitats Considered." Table 3 sources include a California Native Plant Society study from 2001, a United States Fish and Wildlife Service study from 2003, and a County of Santa Cruz study from 1994. As a result, the data and regulatory conditions upon which it is based may be too dated to be reliable. Due to the fact that biological conditions (such as the presence of threatened or endangered species) change over time, the Sierra Club believes that it would be prudent for the County to, at the very least, obtain a written professional opinion from TRA Environmental Sciences stating that their biotic assessment is still reliable (if it is). 24

In addition, it should be noted that the legal status of species of concern changes periodically, and new "critical habitat" for endangered species continues to be designated. The Sierra Club believes it would not be prudent to certify the DEIR without at least confirming that the species of concern identified as present or likely at the Project site have not been downgraded to a more precarious status (e.g., from "candidate" to "threatened" or "endangered"). 25

The Sierra Club requests that the County update the DEIR with current information on the status of plant and wildlife species of concern. 26

6 Hydrology, Geology, and Water Quality

The Sierra Club incorporates herein by this reference the reclamation, hydrology and geology report by Dr. Robert Curry, Watershed Systems, September 17, 2007 (the "Curry Report," Attachment A). In sum, this report indicates that mitigation measures HYD-1, HYD-2 and HYD-3 for the Proposed Project are inadequate – there are no analyses or data to explain how these mitigation measures will reduce hydrology, water quantity and water quality impacts to a less than significant level. The hydrology report demonstrates that these impacts have not been adequately analyzed in the DEIR, and that appropriate mitigation measures have not been identified, discussed, or analyzed. 27

The DEIR needs to specifically discuss water quality and quantity as it relates to the City water supply, including issues of nitrate levels and turbidity in the City's water supply as they may or may not relate to the Proposed Project. Further, the DEIR is inadequate in that it seems to avoid the very strong possibility that ammonium nitrate used for blasting is the most likely source of increased nitrate in the groundwater. Dr. Curry notes that past analyses clearly implicate blasting as a cause of some of the high turbidity excursions that render the City unable to utilize all of the Liddell spring flow. 28

Further, because the Project site is part of a larger karst complex, the DEIR needs to address water quality and quantity issues in terms of adjacent water courses of the full Liddell watershed, as well as nearby Yellow Bank and San Vicente Creeks -- adjacent water courses are probably all fed by some recharge from the general quarry area for at least part of the year. Base flow in summer and fall is important to downstream (off-site) 29

species such as Red Legged Frogs, steelhead and Coho, as well as to farms and nearshore 29
marine habitats.

The Sierra Club requests that the DEIR be revised to address the impacts identified in Dr. Curry's report, and that appropriate mitigation measures be identified, discussed, and analyzed, and that appropriate, enforceable mitigation be required in the DEIR, and in 30
any Quarry use permit. Further, because potential loss of water to the City could require expensive mitigation into the indefinite future, mitigation for such impacts must be included in the Quarry's financial assurances.

In addition, the Sierra Club has identified other DEIR deficiencies regarding water use and water quality, including the following:

6.1 Erosion, Landsliding and Sedimentation. Soil erosion, landsliding and sedimentation issues are a serious problem for the Proposed Project. Although the DEIR recognizes serious erosion, landsliding and sedimentation issues, such issues have not been adequately addressed in the DEIR. For example, removal of the overburden and the quarrying itself will increase the amount of runoff from the Quarry by creating steep slopes 31
and more exposed rock. Here, the proposed slopes for the Quarry are too steep to be considered safe, especially considering the landslide failure observed during the winter of 2005-2006 in the limestone quarry. Additionally, proposed mitigations will not ward off impacts resulting from seismic activity. A landslide also has occurred near Liddell Springs, a crucial City water source, introducing further sedimentation into that water source. A soil stability report should be conducted by a certified geologist, and this should be part of the DEIR.

7 Seismicity

7.1 In Section 4.3.2.4 of the DEIR, the DEIR drafters state that the seismic shaking hazard associated with the Project is not significant because the existing level of hazard due to seismic shaking is not expected to increase due to the quarry expansion. This represents an incomplete and inaccurate analysis. Once the current limestone quarry is depleted (Cemex is currently "scraping the bowl"), the settlement basins (constructed to 32
catch sediment-laden runoff) could be dismantled and the danger of levee instability or complete failure in the event of a strong earthquake would be moot. It is, in fact, the *continued* need for settlement basins to service the Proposed Project that raises the seismic hazard to a significant level.

7.2 Seismologist Dr. Karen McNally, in her letter to the Santa Cruz County Planning Department regarding the DEIR, states that the County "should conservatively assume that [an earthquake of MW 7.2] could occur 'tomorrow' in order to protect [the public's] health and safety." She states that an earthquake of MW 7.2 could occur at a distance of only 4.7 miles with a peak horizontal ground acceleration of 0.46-0.67g at the site during the lifetime of the Project, and warns that the "compounding effects of very strong earthquake shaking could easily include (1) slope failure on the steep gradients 33
being proposed for the quarry walls, and (2) failure of settlement basins due to liquefaction." The Sierra Club requests that the DEIR address the failure of settlement basins and the resulting impact of free water being released below, especially since the TPL Land will be opened to recreational users.

7.3 A liquefaction assessment of the Quarry settlement basin levees should be conducted by a certified geologist and engineers, and this should be part of the DEIR. 33

8 Reclamation

The applicants propose to replace those portions of the mined lands classed as sensitive habitats (3.4 acres), but do not explain how this will be accomplished. They hopefully note that discovery of stockpiled topsoil from past mining "...has led to plantings ... that are showing signs of success," but the success sounds speculative at best, and, as the Curry Report notes, we are provided nothing of the required efforts, monitoring, and reclamation bonds that would better ensure success. As for the proposed 34
1996 Reclamation Plan Amendment, we ask, "If Cemex was unsuccessful reclaiming the subject area in its 1996 Reclamation Plan, how can we believe that its reclamation plan for the Proposed Project will be successful?" The Sierra Club requests that the DEIR be revised to analyze the reclamation questions raised in the Curry Report, that if appropriate, enforceable mitigation be required in the DEIR and in any Quarry use permit, and that a discussion and analysis in respect to the posting of adequate financial security insuring the reclamation of the Quarry be included in the DEIR.

9 Noise

The proposed expansion of quarry operations would bring noise sources and vibrations (called "attenuation" in the DEIR), already a constant nuisance to the limestone 35
quarry neighbors, even closer. The noise and vibration (attenuation) impact analysis is inadequate, including for the following reasons:

9.1 <u>Noise and Attenuation Issues – Ambient Quarry Noise and Attenuation</u>

9.1.1 The DEIR gives noise levels and attenuation levels for heavy equipment, but only at a distance of 50 feet. Noise levels should be provided for the actual 36
affected residences, not just for an abstract 50 feet, which affects wildlife, but no human-occupied residences.

9.1.2 The baseline levels provided for noise levels are inadequate. The baseline levels include noise levels from the existing quarry operations instead of from the 37
Proposed Project. The Proposed Project will be located much closer to many of the affected neighbors than the existing quarry, and the baseline noise levels should be adjusted to account for this difference in the DEIR.

9.1.3 The DEIR fails to account for Project impacts to humans. In the event that the County Code or other regulatory agency sets a specific acceptable level for 38
public sensitivity to groundborne vibration, the DEIR should provide such level in the DEIR.

9.1.4 The thresholds of significance (p. 8-6) provided in Section 8.3.1 are inadequately defined. For example, in terms of groundborne vibration, what is 39
"excessive"? For ambient noise levels, what does "permanent," "temporary," or "periodic" mean? The DEIR should clarify these questions.

9.2 <u>Noise and Attenuation Issues – Blasting</u>

9.2.1 Blasting Will Cause Significant Impacts – Even by County Criteria. According to County Mining Regulations 16.54.050 (Table 3-2), a "higher noise level may be authorized by the Planning Commission if the increase in noise level is from construction related activity, the noise is generated only on a specified temporary basis and all neighbors within 1000 feet of the property have been notified in writing of the increase in noise level by the operator." However, the increase in noise level is designed for construction-related activity, and the activity here is not related to construction, but to blasting or destruction in order to begin excavation, and so should not be allowed. Further, even if the destruction of the Proposed Project surface were determined to be construction, the noise will not be generated on a temporary basis (even if the sound sources associated with blasting last only 15 minutes within each hour), but will take place over several months. Due to the severe nuisance to neighbors caused by blasting and the harm it causes to wildlife, any noise level over 60 dBA should be prohibited in the DEIR. 40

9.2.2 <u>Blasting Impacts Must Be Mitigated</u>
The DEIR should explore other blasting alternatives. For example, Dexpan is a non-explosive demolition agent that causes no noise or vibration. 41

10 Air Quality

10.1 <u>Potential Toxics in Dust</u>. Naturally-occurring asbestos can be an issue. Serpentine rock contains asbestos, a toxic air contaminant, and the possibility of the Quarry encountering this rock during the proposed expansion needs to be addressed. If Cemex encounters serpentine in the expanded area of the Quarry, toxic asbestos emissions will likely occur. The California Air Resources Board has established measures in rulemaking that require quarry operators to control this dust. At a minimum, the DEIR must identify the potential for this toxic impact to occur, and, if necessary, mitigate this impact. Moreover, mercury can be found in limestone. The DEIR must also identify the potential for this toxic impact to occur, and, if necessary, mitigate this impact. 42

10.2 <u>Mitigation for Air Quality Impacts is Required</u>. Project-induced dust nuisance appears likely to be a significant impact. Mitigation or avoidance measures could include more intense road watering and Quarry watering. Other mitigation measures could include minimizing truck idling, which would also reduce noise and toxic diesel emissions. 43

10.3 <u>Limitation of Site Preparation Activities at a Given Time</u>. While Cemex agrees to limit active work areas for site preparation to less than 8.2 acres for vegetation clearing or 2.2 acres for overburden stripping at any point in time, no information is given as to the amount of time such site preparation will take per acre. As a result, the DEIR reader is not able to evaluate whether this nuisance limitation is reasonable or not. This issue should be rectified in the DEIR. 44

10.4 <u>Monitoring of Dust Emissions</u>. The DEIR sets out no monitoring program of dust emissions for the Proposed Project. The Sierra Club requests that the DEIR be revised to include a detailed monitoring program for dust emissions. 45

11 Aesthetics

The existing limestone quarry is already an eyesore, and will be for decades to come. Under the Proposed Project, for the benefit of only three years worth of limestone, this eyesore will grow bigger. Any proposed reclamation plan is questionable, given the applicant's poor track record in respect to the 1996 Reclamation Plan. In addition, the County has failed to require successful reclamation or adequate financial assurances. Thus, the DEIR's assumption that visual impacts will be addressed lacks foundation. The Sierra Club requests that the DEIR be modified accordingly. 46

12 Alternatives Analysis

An alternatives analysis is at the heart of the purpose of an EIR. *See* Pub. Res. Code § 21101. An EIR must analyze a range of reasonable alternatives to a project that would feasibly attain most basic objectives while avoiding or substantially lessening a project's significant impacts. *See* 14 Cal. Code Regs. § 15126.6(a). An EIR "must consider a reasonable range of potentially feasible alternatives that will foster informed decisionmaking and public participation….. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives." 14 Cal. Code Regs. § 15126.6(a). 47

Here, the alternatives analysis does not meet several basic CEQA requirements, including the requirement that an EIR describe a reasonable range of feasible alternatives to the project, *see* 14 Cal. Code Regs. § 15126.6(c), and the requirement that the discussion of alternatives must focus on alternatives that are capable of avoiding or substantially lessening the significant environmental effects of a project, "even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly." 14 Cal. Code Regs. § 15126.6(b).

12.1 <u>The Project Objectives Section Biases the Alternatives Analysis</u>. An alternatives analysis is predicated on a proper definition of project purpose. *See* 14 Cal. Code Regs. § 15124(b). Here, the Project Objectives Section of the DEIR (p. 2-2) is excessively imprecise. It did not indicate that the Project would meet any County goals, even something as generic as providing a source of construction grade rock. Instead, the only clearly stated objectives in the DEIR's Project Objective Section are a repetition of Cemex's objectives. Of course, Cemex's objectives are written in a way that makes expansion of the Quarry the key Project objective. This is a common strategy, designed to predetermine approval of the Project proponent's preferred project alternative (the one analyzed in the EIR). In other words, by setting up the Project Objectives Section in a way to make expansion of the Quarry the key Project objective, the DEIR appears designed to allow the County to adopt a statement of overriding conditions – essentially, to be able to approve the Project as described in the DEIR, regardless of the unmitigable environmental impacts. 48

Further, under the General Plan the expansion of a quarry is allowed "where impacts of environmental and scenic resources and surrounding residential uses can be mitigated." Thus, the DEIR must include as a Project objective the mitigation of negative impacts on the environment, scenic resources and surrounding residential uses. Santa Cruz Co. Gen. Plan, Policy 2.19.2.

12.2 <u>The Alternatives in the DEIR Are Not Adequately Analyzed</u>. The DEIR presents the following six alternatives to the Proposed Project: 49

- Alternative Project Location
- Full Boundary Expansion
- Modified Legal Mining Limit 49
- Reduced Boundary Expansion Area
- Modified Overburden and Spoils Disposal
- No Project Alternative

An "EIR shall include sufficient information about each alternative to allow
meaningful evaluation, analysis, and comparison with the proposed project." 14 Cal.
Code Regs. Sec 15126(d). Here, the DEIR devotes approximately a paragraph to each
alternative, except for the "No Project" alternative – for the "No Project" alternative,
the DEIR provides over 2-1/2 pages. That is clearly inadequate for the Planning
Commission and the public to be able to make informed decisions. The DEIR must
include sufficient information about each alternative to allow meaningful evaluation,
analysis, and comparison with the Proposed Project. The devotion of far more analysis 50
to the "No Project" alternative appears to be a sham set-up, in order to guide the
decisionmaker and the public to the County's preferred option, the Modified
Overburden and Spoils Disposal. The DEIR reader is told that even though the "No
Project" alternative is the environmentally superior alternative, it does not meet the
Project objectives. Cleverly, the Project objectives have already been set up to make
the expansion of the Quarry the key Project objective, allowing the County to adopt a
statement of overriding conditions, as it has done here – the DEIR selects the Modified
Overburden and Spoils Disposal option, regardless of the unmitigable environmental
impacts.

Further, the alternatives that are analyzed in the DEIR are not analyzed with
respect to all relevant impacts. Instead, only selected impacts are analyzed for the
"Considered and Rejected Alternatives," focusing on the Project objectives and 51
virtually ignoring myriad significant environmental impacts, including, for example,
noise and vibration, air quality, reclamation, land use, visual resources, etc.

The flawed alternatives analysis is especially relevant to the Project, because the
alternatives will be the major focus of upcoming public discussions and decisions. Yet
the DEIR completely fails to provide information and analysis necessary for informed 52
discussion of key significant environmental impacts and their potential solutions.

12.3 <u>The DEIR Dismisses Alternatives For Improper Reasons</u>. Under CEQA,
if financial constraints are used as the basis to reject an alternative which would
substantially lessen impacts of a project, a full financial analysis should be presented,
and the financial data and objectives should be included as part of the "Project
Objective" itself. *See Association of Irritated Residents v. County of Madera*, 10 Cal.
App.4th 1381, 1401 (2003). Equally important, increased cost of an alternative is not a
sufficient reason to dismiss the alternative, if that alternative mitigates for significant
environmental impacts. *See* 14 Cal. Code Regs. § 15126(b). 53

Here, the DEIR fails to present the required financial analysis. Although the
DEIR cleverly does not mention financial concerns outright, it is clear that Cemex's
objective is to make as much money as possible as fast as possible. That is not a
permissible basis for dismissing an alternative under CEQA. *See* Cal. Code Regs. §
15126.6(b). For example, the Reduced Boundary Expansion Area Alternative is

rejected because the slope gradient is too steep, and any reduction in slope gradient would reduce the 3-year extension of the Quarry life. (Translation: Cemex wants to make money for at least 3 years.) 53

Other alternatives are sham alternatives in that there are too many obvious hurdles (e.g., the Full Boundary Expansion Alternative without hydrology mitigation, due to the project border being too close to the City's water source), or too many obvious permit issues (e.g., Alternative Project Locations (reactivation of the old San Vicente Quarry), rejected due to too many regulatory hurdles; and the Modified Legal Mining Limit Alternative (expansion of Quarry to the north), rejected due to too many regulatory hurdles). The latter two can also be tied to financial concerns in that it would be prohibitively expensive for Cemex to jump through so many regulatory hoops to reach its financial goals. Interestingly, the alternative selected by the DEIR, the Modified Overburden and Spoils Disposal Alternative, does not even make it clear whether the Project area is the full vested area of 26.5 acres or the partial 17.1 acres. 54

12.4 Additional Alternatives Should Be Developed and Analyzed. Other feasible, and appropriate, alternatives are not presented or discussed at all in the DEIR. These include:

- An off-site alternative for limestone within Santa Cruz County
- An alternative source of limestone outside Santa Cruz County (e.g., Cupertino, Milpitas, Stevens Creek, Gilroy) 55

Again, the DEIR's failure to include alternatives such as these defies the "reasonable range" analysis requirement of CEQA. These additional alternatives comprise logical, reasonable, and feasible alternatives to the Project, and reduce significant impacts of the Project. Therefore, they should be considered and fully analyzed in the DEIR.

The Sierra Club requests that the DEIR be revised to expand the analysis to a full range of alternatives, so the County can make an informed decision, with informed public input, as required by CEQA. 56

13 Additional Significant Impacts Unaddressed in DEIR

13.1 Recreation

The DEIR lacks a section devoted to Proposed Project impacts on recreational resources. This is in contrast to most EIRs, which generally analyze a proposed project's potential impacts in this area.

Here, the Proposed Project is west of Wilder Ranch State Park, southwest of the Bonny Doon Ecological Reserve (managed by the California Department of Fish and Game), and immediately north of the TPL Land. While a certain portion of the TPL Land (just south of the Proposed Project) is currently leased by Cemex for quarrying operations, when the lease has expired, the leased land will revert back to TPL or its successor in interest, BLM. After reclamation, this portion of the TPL Land has the potential to be used as recreational land, together with the rest of the TPL Land. 57

Access to the TPL Land is accessed from Highway 1 and Bonny Doon Road. In addition, there are several graded dirt roads providing moderate access within the watersheds, which have potential to become more developed trails or paths. (*Coast Dairies Long-Term Resource Protection and Use Plan: Existing Conditions Report for the Coast Dairies Property*, prepared for the Trust for Public Land by Environmental Science Associates, June 2001 (the "TPL Use Plan, 2001"), Sections 5.4-10, 5.4-23.

In the TPL Use Plan, 2001, Section 2.0 Section 5.0 Human Uses of the Coast Dairies Property, Table 5.4-5 and Figure 2-1, TPL analyzes the TPL Land in terms of
zones: Liddell Watershed Woodland areas (LW-2, LW-3 and LW-4) and Liddell 58
Stream Protection Zones (LSPZ-1 and LSPZ-2). For LW-2, which borders the Proposed Project to the west, TPL cites 2 vista points, 1 access route (trail/path) and 3 recreation uses. For LW-3, which borders the Proposed Project to the south, TPL cites 3 vista points, 3 access routes (trails/paths), and 2 recreation uses. For LW-4, also to the south of the Proposed Project, TPL cites 3 vista points. For Liddell Creek LSPZ-2, TPL cites 2 vista points, 1 access route (trail/path), and 3 recreation uses. It is clear from TPL's analysis that there are recreational and visual resources to be found within the TPL Land.

Other potential impacts on recreational resources include: increased noise 59
from additional quarrying activities, air quality impacts of additional dust on hikers.

The Sierra Club requests that the DEIR include a new section specifically
analyzing the Proposed Project's impacts on recreational resources. 60

13.2 <u>Cement Plant Environmental Impact on Davenport and Environs; 9.4-Acre Quarry Expansion</u>

The Cement Plant operations have not been included in the DEIR assessment of cumulative impacts. As noted above, the County has allowed Cemex, the owner of both the Cement Plant and the Quarry, separate operating permits, in spite of their mutual dependency and even physical connection via the three-mile long conveyor belt that connects the two parts of their operation. Such separation of operating permits is inappropriate in that it gives Cemex better cover for its piecemealing of its Cement Plant expansion project. Under CEQA, an applicant may not "piecemeal" a project, i.e., divide one project into several parts and conduct environmental review of some or
all of the parts, rather than the whole. In 2003, the Cement Plant applied for and 61
received a 105,000 ton annual increase in cement production from the County, knowing that it needed a quarry expansion in order to continue production at the rate allowed by the increase. Additionally, the Cement Plant submitted (and then subsequently withdrew) an application to the County for the so-called "Dome Project," which would have allowed an eight-story high dome to cover an analyzer in plain view of scenic Highway 1 and across the street from the Monterey Bay National Marine Sanctuary. Again, we believe that the aborted "Dome Project" is related to the Proposed Project.

The Sierra Club requests that the DEIR be revised to address the question of
piecemealing raised in the Curry Report, and that appropriate, enforceable mitigation 62
be required in the DEIR, and in any Quarry use permit. In addition to the question of

piecemealing, any impacts on the town of Davenport and environs in terms of increased air and soil pollutants, additional cement truck traffic on Highway 1 and train trips, etc., should be addressed in the DEIR. 62

Moreover, Cemex makes it clear that it still intends to mine the 9.4-acre remaining area next to the existing limestone quarry and south of the Proposed Project. The DEIR states that its impact is "Less than Significant," with "No mitigation required," but provides inadequate analysis of such a quarrying expansion's cumulative impact on the environment, especially in respect to hydrologic and geologic impacts. The Sierra Club requests that the DEIR include an adequate discussion of this intended mining area, as well as all cumulative impacts, in the DEIR. 63

13.3 Hazards

The DEIR provides little analysis of the Proposed Project's potential health and safety impacts for workers and the public. The DEIR mentions that the Proposed Project involves blasting agents and other hazardous materials, in addition to landslides. However, the DEIR's explanation and analysis of those harzards is inadequate, and no monitoring plan of the Quarry's blasting materials was presented. With the advent of recreational use on the TPL Land, any Hazards Plan must include a recreational interface component. 64

13.4 Permit Compliance

The DEIR does not discuss Cemex's compliance with existing permits, including the fact that the existing limestone quarry permit states that in the event that water quality is impacted by mining activities, mining shall cease until such impacts are remedied. The Sierra Club requests that the DEIR analyze permit compliance and the County's enforcement record in respect to any lack of compliance by the applicant. 65

13.5 AB 32: Global Warming Solutions Act

AB 32 requires that California's global warming emissions be reduced to 1990 levels by 2020. The reduction will be accomplished through an enforceable statewide cap on global warming emissions that will be phased in starting in 2012, during which time the Quarry will have just begun its operations. (*See* p. 8-8; the Proposed Project will be in operation for approximately three years, from 2012-2015.)

The Sierra Club requests that the DEIR include a new section specifically analyzing the Proposed Project's impacts on global warming, and how it will comply with the requirements of the AB 32, the Global Warming Solutions Act. 66

13.6 Additional Notice for Public Review of the DEIR May Be Required

The Sierra Club believes that the impacts noted in this Section 13 will result in a "significant unavoidable cumulative impact," and so public notice of the availability of the DEIR should have been provided to all those who are reasonably and foreseeably affected by the Proposed Project under Pub. Res. Code § 21092(b)(3). The Sierra Club requests that public notice of the availability of the DEIR should be 67 provided to potential recreational users of the TPL Land and the residents of Davenport. 67

14 Mitigation Monitoring

CEQA requires that all state and local agencies establish a monitoring or reporting program whenever approval of a project relies upon an EIR. *See* Pub. Res. Code Public Health and Safety § 21081.6.

Here, where the DEIR recognizes potential environmental impacts as "significant," the DEIR requires mitigation measures However, the DEIR provides very little information regarding reporting, monitoring, and enforcement of the Quarry's implementation of the mitigation measures.

All of the mitigation measures that are incorporated into the Proposed Project or imposed as conditions of approval must be monitored and reported on. *See* Pub. Res. Code § 21081. Further, the mitigation measures must be fully enforceable through permit conditions, agreements, or other measures. *See* 14 Cal. Code Regs. § 15091(d). Because of this CEQA requirement, the DEIR should include specific information regarding reporting, monitoring, and enforcement of the Quarry's implementation of the mitigation measures cited in the DEIR. Especially here, where there is substantial evidence of Quarry noncompliance with its Use Permit, the limestone quarry's own unrealistic 1996 Reclamation Plan, and other requirements, decision-makers cannot make an informed decision regarding the Proposed Project without assurance that necessary mitigation measures will in fact be implemented. *See* 14 Cal. Code Regs. § 15002(a). 68

In addition, there are serious questions regarding the County's ability to make mitigation measures enforceable, as CEQA requires. For example, as discussed above in the section on "Permit Compliance," the County has not enforced the existing limestone quarry permit in relation to water quality, i.e., if water quality is impacted by mining activities, mining must cease until such impacts are remedied. The City of Santa Cruz claims that its water quality has suffered, the impact has not been remedied, yet the mining permit has not been revoked. 69

15 Attachment

A. Analysis of mining expansion with cement plant operations, reclamation of the quarry expansion, and hydrologic impacts of a quarry expansion, Robert Curry, Ph.D., P.G., Waterbed Systems, September 17, 2007 70

16 References

Coast Dairies Long-Term Resource Protection and Use Plan: Existing Conditions Report for the Coast Dairies Property, prepared for the Trust for Public Land by Environmental Science Associates, June 2001.

Coast Dairies Long-Term Resource Protection and Access Plan: Draft Final prepared for the Trust for Public Land by Environmental Science Associates, June 26, 2003.

Letter from Seismologist Dr. Karen C. McNally to Mr. Todd Sexauer, Santa Cruz County Planning Department regarding seismic issues in the DEIR, dated September 30, 2007

Thank you very much for the opportunity to comment on this DEIR.

Very truly yours,

Aldo Giacchino, Chair
Sierra Club - Santa Cruz County Group

SIERRA CLUB
FOUNDED 1892

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Comments on
July 2007 Draft Environmental Impact Report
Bonny Doon Limestone Quarry
Boundary Expansion Project and Reclamation Plan Amendment
Draft Environmental Impact Report
SCH# 2001112115

October 3, 2007

Submitted by the
Santa Cruz County Group, Ventana Chapter of the Sierra Club
To the Santa Cruz County Planning Department (c/o Todd Sexauer)
Santa Cruz, California 95060

ERRATA

Please accept the following redlined changes to the comments submitted to the Santa Cruz County Planning Department on behalf of the Santa Cruz County Group of the Ventana Chapter of the Sierra Club (the "Sierra Club"):

2 Reclamation

The applicants propose to replace those portions of the mined lands classed as sensitive habitats (3.4 acres), but do not explain how this will be accomplished. They hopefully note that discovery of stockpiled topsoil from past mining "...has led to plantings ... that are showing signs of success," but the success sounds speculative at best, and, as the Curry Report notes, we are provided nothing of the required efforts, monitoring, and reclamation bonds that would better ensure success. As for the proposed 1996 Reclamation Plan Amendment, we ask, "If Cemex was unsuccessful reclaiming the subject area in its 1996 Reclamation Plan, how can we believe that its reclamation plan for the Proposed Project will be successful?" The Sierra Club requests that the DEIR be revised to analyze the reclamation questions raised in the Curry Report, that if appropriate, enforceable mitigation be required in the DEIR and in any Quarry use permit, and that a discussion and analysis in respect to the posting of adequate financial security insuring the reclamation of both the cement plant and the Quarry be included in the DEIR. 34

3 Alternatives Analysis

An alternatives analysis is at the heart of the purpose of an EIR. *See* Pub. Res. Code § 21101. An EIR must analyze a range of reasonable alternatives to a project that would feasibly attain most basic objectives while avoiding or substantially lessening a project's significant impacts. *See* 14 Cal. Code Regs. § 15126.6(a). An EIR "must consider a reasonable range of potentially feasible alternatives that will foster informed decisionmaking and public participation..... The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives." 14 Cal. Code Regs. § 15126.6(a).

Here, the alternatives analysis does not meet several basic CEQA requirements, including the requirement that an EIR describe a reasonable range of feasible alternatives to the project, *see* 14 Cal. Code Regs. § 15126.6(c), and the requirement that the discussion of alternatives must focus on alternatives that are capable of avoiding or substantially lessening the significant environmental effects of a project, "even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly." 14 Cal. Code Regs. § 15126.6(b).

3.1 The Project Objectives Section Biases the Alternatives Analysis. An alternatives analysis is predicated on a proper definition of project purpose. *See* 14 Cal. Code Regs. § 15124(b). Here, the Project Objectives Section of the DEIR (p. 2-2) is excessively imprecise. It did not indicate that the Project would meet any County goals, even something as generic as providing a source of construction grade rock. Instead, the only clearly stated objectives in the DEIR's Project Objective Section are a repetition of Cemex's objectives. Of course, Cemex's objectives are written in a way that makes expansion of the Quarry the key Project objective. This is a common strategy, designed to predetermine approval of the Project proponent's preferred project alternative (the one analyzed in the EIR). In other words, by setting up the Project Objectives Section in a way to make expansion of the Quarry the key Project objective, the DEIR appears designed to allow the County to adopt a statement of overriding conditions – essentially, to be able to approve the Project as described in the DEIR, regardless of the unmitigable environmental impacts.

Further, under the General Plan the expansion of a quarry is allowed "where impacts of environmental and scenic resources and surrounding residential uses can be mitigated." Thus, the DEIR must include as a Project objective the mitigation of negative impacts on the environment, scenic resources and surrounding residential uses. Santa Cruz Co. Gen. Plan, Policy 2.19.2.

3.2 The Alternatives in the DEIR Are Not Adequately Analyzed. The DEIR presents the following six alternatives to the Proposed Project:

- Alternative Project Location
- Full Boundary Expansion
- Modified Legal Mining Limit
- Reduced Boundary Expansion Area
- Modified Overburden and Spoils Disposal
- No Project Alternative

An "EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed project." 14 Cal. Code Regs. Sec. 15126(d). Here, the DEIR devotes approximately a paragraph to each alternative, except for the "No Project" alternative – for the "No Project" alternative, the DEIR devotes over 2-1/2 pages. That is clearly inadequate for the Planning Commission and the public to be able to make informed decisions. The DEIR must 50

include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the Proposed Project. The devotion of far more analysis to the "No Project" alternative appears to be a sham set-up, in order to guide the decisionmaker and the public to the County's preferred option, the Modified Overburden and Spoils Disposal. The DEIR reader is told that even though the "No 50
Project" alternative is the environmentally superior alternative, it does not meet the Project objectives. Cleverly, the Project objectives have already been set up to make the expansion of the Quarry the key Project objective, allowing the County to adopt a statement of overriding conditions, as it has done here – the DEIR selects the Modified Overburden and Spoils Disposal option, regardless of the unmitigable environmental impacts.

Further, the alternatives that are analyzed in the DEIR are not analyzed with respect to all relevant impacts. Instead, only selected impacts are analyzed for the "Considered and Rejected Alternatives," focusing on the Project objectives and virtually ignoring myriad significant environmental impacts, including, for example, noise and vibration, air quality, reclamation, land use, visual resources, etc.

The flawed alternatives analysis is especially relevant to the Project, because the alternatives will be the major focus of upcoming public discussions and decisions. Yet the DEIR completely fails to provide information and analysis necessary for informed discussion of key significant environmental impacts and their potential solutions.

3.3 The DEIR Dismisses Alternatives For Improper Reasons. Under CEQA, if financial constraints are used as the basis to reject an alternative which would substantially lessen impacts of a project, a full financial analysis should be presented, and the financial data and objectives should be included as part of the "Project Objective" itself. *See Association of Irritated Residents v. County of Madera*, 10 Cal. App.4th 1381, 1401 (2003). Equally important, increased cost of an alternative is not a sufficient reason to dismiss the alternative, if that alternative mitigates for significant environmental impacts. *See* 14 Cal. Code Regs. § 15126(b).

Here, the DEIR fails to present the required financial analysis. Although the DEIR cleverly does not mention financial concerns outright, it is clear that Cemex's objective is to make as much money as possible as fast as possible. That is not a permissible basis for dismissing an alternative under CEQA. *See* Cal. Code Regs. § 15126.6(b). For example, the Reduced Boundary Expansion Area Alternative is rejected because the slope gradient is too steep, and any reduction in slope gradient would reduce the 3-year extension of the Quarry life. (Translation: Cemex wants to make money for at least 3 years.)

Other alternatives are sham alternatives in that there are too many obvious hurdles (e.g., the Full Boundary Expansion Alternative without hydrology mitigation, due to the project border being too close to the City's water source), or too many obvious permit issues (e.g., Alternative Project Locations (reactivation of the old San Vicente Quarry), rejected due to too many regulatory hurdles; and the Modified Legal Mining Limit Alternative (expansion of Quarry to the north), rejected due to too many 54
regulatory hurdles). The latter two can also be tied to financial concerns in that it would be prohibitively expensive for Cemex to jump through so many regulatory hoops to reach its financial goals. Interestingly, the alternative selected by the DEIR,

the Modified Overburden and Spoils Disposal Alternative, does not even make it clear whether the Project area is the full vested area of 26.5 acres or the partial 17.1 acres. Upon further careful reading, we realize we are meant to infer that this alternative includes the mining of the entire 26.5 acres, without requiring full analysis of the impacts of mining the 9.4 acres bordering the Proposed Project to the south and which are located even closer to the City's water source, Liddell Springs. 54

3.4 Additional Alternatives Should Be Developed and Analyzed. Other feasible, and appropriate, alternatives are not presented or discussed at all in the DEIR. These include:

- An off-site alternative for limestone within Santa Cruz County
- An alternative source of limestone outside Santa Cruz County (e.g., quarries that do not border on or unduly affect established neighborhoods)

Deleted: Cupertino, Milpitas, Stevens Creek, Gilroy

Again, the DEIR's failure to include alternatives such as these defies the "reasonable range" analysis requirement of CEQA. These additional alternatives comprise logical, reasonable, and feasible alternatives to the Project, and reduce significant impacts of the Project. Therefore, they should be considered and fully analyzed in the DEIR. 55

The Sierra Club requests that the DEIR be revised to expand the analysis to a full range of alternatives, so the County can make an informed decision, with informed public input, as required by CEQA.

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3.1 Cement Plant Environmental Impact on Davenport and Environs; 9.4-Acre Quarry Expansion

The Cement Plant operations have not been included in the DEIR assessment of cumulative impacts. As noted above, the County has allowed Cemex, the owner of both the Cement Plant and the Quarry, separate operating permits, in spite of their mutual dependency and even physical connection via the three-mile long conveyor belt that connects the two sites. Such separation of operating permits is inappropriate in that it gives Cemex better cover for its piecemealing of its Cement Plant expansion project. Under CEQA, an applicant may not "piecemeal" a project, i.e., divide one project into several and conduct environmental review of some or all of the parts, rather than the whole. In 2003, the Cement Plant applied for and received a 105,000 ton annual increase in cement production from the County, knowing that it needed a quarry expansion in order to continue production at the rate allowed by the increase. Additionally, the Cement Plant submitted (and then subsequently withdrew) an application to the County for the so-called "Dome Project," which would have allowed an eight-story high dome to cover an analyzer in plain view of scenic Highway 1 and across the street from the Monterey Bay National Marine Sanctuary. Again, we believe that the aborted "Dome Project" is related to the Proposed Project.

The Sierra Club requests that the DEIR be revised to address the questions of cumulative impacts and piecemealing as raised in the Curry Report, and that appropriate, enforceable mitigation be required in the DEIR, and in any Quarry use permit, including, but not limited to, inclusion of the Cement Plant itself in any 62 reclamation plans and financial bonds. In addition to the question of cumulative impacts and piecemealing, any cumulative impacts on the town of Davenport and environs in terms of increased air and soil pollutants, additional cement truck traffic on Highway 1 and train trips, etc., should be addressed in the DEIR. 62

Moreover, Cemex makes it clear that it still intends to mine the 9.4-acre remaining area next to the existing limestone quarry and south of the Proposed Project. The DEIR states that its impact is "Less than Significant," with "No mitigation required," but provides inadequate analysis of such a quarrying expansion's cumulative impact on the environment, especially in respect to hydrologic and geologic impacts. The Sierra Club requests that the DEIR include an adequate discussion of this intended mining area in the DEIR.

Thank you very much.

Very truly yours,

Aldo Giacchino

Aldo Giacchino
Chair, Santa Cruz County Group
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September 17, 2007

County of Santa Cruz
Planning Department
701 Ocean Street
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This review of the **Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment Draft Environmental Impact Report** of July, 2007 has been prepared at the request of the *Sierra Club*. It will address three primary issues, only two of which are covered in the dEIR prepared for the County of Santa Cruz. The third issue is not addressed but is an integral part of the other two. The issues to be addressed, in the order of their presentation, are:

1. Integration of the planned mining expansion with Cement Plant operations. 71
2. Reclamation of the quarry site during and following mining operation.
3. Potential hydrologic impacts of quarry expansion.

IMPORTANCE OF PLANT OPERATIONS TO MINING PLAN:

The dEIR fails to address the important and fundamental linkages between
cement plant production and mining. These are not independent operations and as 72
such an environmental impact statement must include discussion of any proposed
changes or limitations in plant operations as they may affect the proposed mining
expansion.

The CEMEX Davenport Cement Plant operates the Bonny Doon Quarry as a
source of raw material for its cement manufacture. CEMEX is a world-leader in 73
manufacturing cement products. Any expansion of its quarrying operations must involve
all of the basic mining procedures and economic considerations that include overburden

and spoils ratios and handling, site reclamation, and 'grade' – or quality control on the raw materials to be mined.

These basic attributes of a mining plan are dependent on the flexibility and design of the processing plant that utilizes the materials mined in the quarry. Standards for Portland-type cement used in making concrete are high and rigorous. While the weekend consumer buying a bag of ready-mix concrete may not be able to evaluate and test her bag before purchase, the contractor for a federal highway or public building must demonstrate that the products in use meet stringent standards.

Cement, the basic ingredient of concrete that is to be made from the material to be mined in the proposed quarry expansion, is not simply ground-up and heated marble or limestone. It is a carefully controlled mixture of materials that contain appropriate amounts of calcium compounds, silica, alumina and iron oxide that can be crushed and screened and placed in a rotating cement kiln. Ingredients used in this process are typically materials such as limestone, marble, shale, iron ore, clay, and fly ash.

The marble found at the Bonny Doon Quarry site is not pure calcium carbonate, but is an assemblage of rock types that have formed by metamorphism of old marine sediments that were primarily mud on the sea floor. The mud was rich in microscopic and some larger marine shells, most of which were made of calcium and magnesium carbonate. When this mud was buried and heated and squeezed as Ben Lomond Mountain granitic rocks were intruded and uplifted, the calcium carbonate in the mud was geochemically remobilized and redeposited as marble. This metamorphic processes favored progressive segregation of the water-soluble limey carbonate and the less soluble silica-rich diatoms and silt. The former became marble and the latter became mica schist. 73

The marble deposits of the southwest flank of Ben Lomond Mountain are thus a mélange of schist and other silicate rocks and relatively pure marble. The marble is veined with clumps of schist and redeposited silica minerals. Santa Cruz County's other major marble quarries on and around the Cowell Ranch just a few miles east of the Bonny Doon Quarry were unable to maintain necessary quality control for the production of cement and had to close after only a few years of production due to impurities. The same impurities that restricted Henry Cowell's cement production almost 100 years ago are present in the Davenport marble deposits.

CEMEX and their predecessors have been able to continue to produce cement because their more modern cement plant can segregate and be selective about what they use as feed stocks. The "impurities" in the marble, in the primary form of mica schist, can be beneficially incorporated into the cement in small carefully controlled quantities, but large bodies or inclusions of schist and other silicate rocks have to be segregated at the quarry and become mining spoils. Other impurities have to be segregated at the crushers and added to the enormous waste piles adjacent to the plant site or hauled back into the quarry.

How plant upgrading affects mining:

Modern competitive cement plant operations can have the best economic advantage if they can utilize as much of their raw material as possible. Mining mica schist and "shale" beyond the amounts needed for the cement formulations is a waste of effort. Standards for cement and concrete made from it dictate the mix of raw materials used at the time of its manufacture. If CEMEX is to make the best use of its limited raw 74 material resources it must process what it mines so as to allow as much of it to go into its finished products as possible while still meeting minimum standards for the finished product. The upgrading of the plant originally proposed by CEMEX's predecessor, RMC Lonestar, was designed to accomplish this. The original proposed project, referred to informally as the "dome project", has apparently been withdrawn by CEMEX, but the basic need for stockpiling and augmentation of raw materials for cement manufacture remains. How the present plant plans to utilize the expanded Bonny Doon Quarry resources, and the proportions of those materials that have to be classified as spoils must be an integral part of the mining plan.

Thus, the proportion of the area to be mined that can be made to be an economic resource depends on the plant design and operation. Similarly, the amount of spoils or the "spoils ratio" of economic resource to spoil is dependent on the plant design and operation. And, ultimately the handling of the spoils and the overburden at the quarry site are in part dependent on the plant. This becomes a very important element in design of a successful reclamation plan. In this sense, the mining plan for expansion presented and evaluated in this draft EIR does not stand alone independent of plant operation between the time of initiation of quarry expansion and the ultimate life of the cement production plant. The ability of the plant to utilize the mix of materials to be encountered during mining and the amount of material that will be left in the quarry or vicinity after mining are integral parts of any mining plan and cannot be assessed without knowing something about the future plant operations. The EIR cannot be segregated. 74

RECLAMATION:

The dEIR (section 2.5 et seq) explains how the California Mining and Geology Board's 1996 reclamation plan approval was modified in 2001 and how they hope to again amend for future reclamation. The basic findings and proposed changes make good sense in that the applicants had an almost impossible goal of restoration to native species found on site before mining and could not achieve that goal. The goal was not possible within the time frame for an economic enterprise unless an intact topsoil ecosystem could be sacrificed elsewhere and transported to the site.

Because the previous attempts at restoration of preexisting plant communities of special concern such a *Stipa pulchra* (purple needle-grass) were not successful despite efforts of experts such as Paul Kephart, it is not clear from the dEIR that future efforts will be effective. Once the deeply weathered soils on the marble and adjacent bedrock units are removed, no amount of work will allow them to be replaced and replanted to mature forest species within a practical timeframe. 75

The oldest native soils of the quarry site had developed over half a million or more years based on their elevation and the fact that they were higher than the highest marine terrace of perhaps 600,000 years age immediately below (south of) the quarry site. Soils on the marble and schist develop as the soluble carbonate components of the rock are dissolved away leaving an alkaline residue of clay minerals and feldspars and quartz derived from the mica schist that was disseminated in the marble. The older soil units of in excess of 200,000 years age (ie, those on the Davenport marine Terrace and those higher on the flank of Ben Lomond Mountain) have very well developed clay-rich zonal soils. In the humid coastal climate the schist minerals weather rather completely to an iron-rich residue of clay mineral silicate lattices and amorphous silica (mixed layer clays) that create a soil very rich in clay-sized particles. Those subsoil clays tend to 76 perch soil water derived from winter rainfall on low-gradient surfaces. This creates an ideal substrate for redwood forest species. On steeper slopes of 15 to 20% or more, the clays may not accumulate or wash away after disturbances such as fire and a mixed shrub and forest community develops in response to the lesser soil moisture holding capacity of those soils.

Without continuous handling of soils to maintain their viability and native microorganisms, one cannot successfully stockpile most of the coastal redwood habitat soils in a fashion that preserves their capabilities for forest production. *Continuous handling* means that when a topsoil and associated substrate is removed, it is immediately carried to a site of ongoing reclamation and carefully placed in approximate stratigraphic order on a site that will no longer be mined or disturbed. Because the past mining procedures have stockpiled soil resources rather than immediately placing them in growth context, the soil organisms and seed bank have been killed and the nutrients stored in the organic matter and clay mineral has been largely lost into runoff or groundwater. 76

The quarry operators have realized that their planting for reclamation based on the 1996 Reclamation Plan and earlier efforts has not been successful. They now propose to merely reset the successional clock. That is, they propose to use pioneering native plant species that will survive on bare rock and highly disturbed sites without stratified soil media. This makes good sense from both a practical standpoint and an economic standpoint. It means that the quarry site will not, in any practical sense, ever be restored to anything like it premining state, but it does propose to develop some ground cover that will aid in reducing future erosion and beginning the slow formation of whatever soil type may form in today's climate. This means that future soils will differ from existing soils that owe their origins to a legacy of past climatic variations and marine influences. The dEIR uses language such as "With sufficient time and natural weathering processes, the shrub community in the Limestone Quarry would trend toward Mid-successional Mixed evergreen forest". (dEIR p. 2-13) The key words are *sufficient time* and *trend toward.* 77

By choosing a more practical goal for reclamation, the quarry operators impose a long-term responsibility for control of non-native plants such as pampas grass that tend to take over abandoned quarries after only a few years. It further means that the mining operation commits us to an irretrievable loss of site productivity, watershed functions and future choices for its use. The local coastal program of the County General Plan allows mining expansion only "...where impacts of environmental and scenic resources...can be mitigated" (SC County Policy 2.19.2). The basic problem is that the biological, pedological, and hence recharge hydrology impacts of the proposed quarry expansion are **not demonstrated to be mitigable** on site. 78

The applicants propose to replace those portions of the mined lands classed as sensitive habitats (3.4 acres) but do not explain how this will be accomplished. They speculate that discovery of stockpiled topsoil from past mining "...has led to plantings ... that are showing signs of success." (dEIR p 3-15). That language does not suggest that success is at all assured, and we know nothing of the required efforts, monitoring, and reclamation bonds that would better insure success. The language is changed significantly on p. 6-24 to say that "Because it has been demonstrated that these communities can be reestablished..." One of these statements may be accurate but nothing is demonstrated or cited to establish veracity of the proposed biological mitigation. 79

An important aspect of reclamation is restoration and maintenance of
groundwater and vadose zone water (above the groundwater) recharge potential. The
overlying vegetation and soils and structure of permeability within the marble itself all
contribute to maintaining local and regional water tables, spring flow, and dry-season
stream flow. The great effort of this dEIR and its supporting documents that addresses
evaluation and potential mitigation of hydrologic impacts (cf App. F) attest to the
difficulties and concerns associated with mining an aquifer system. But it is the surface
reclamation that is a cornerstone for site hydrology. Unless we can maintain or restore 80
the storage capacity of vegetation, litter, and soils above the aquifer units, we cannot
help but alter site and regional hydrology. None of the proposed hydrologic mitigations
(HYD 1 – 3) can alter the fact that the proposed quarry expansion will reduce capture of
rainfall by soil and vegetation and reduce storage capacity within the soil and litter,
whether for sensitive habitats or evergreen forest. Mature vegetation and its associated
soil detains rainfall and runoff, allowing more time and more effective infiltration.

The proposed reclamation plan amendments that are listed as mitigations in the
dEIR are all sound but the topsoil handling is naïve. While it is good to separate topsoil
from overburden and other spoils, the proposed performance standards for topsoil
salvage, maintenance and redistribution (Section 3.3.4, p. 3-21) still perpetuate the
errors of past mining plans in that the proposed open time frames for stockpiling and 81
lack of care in handling will kill the soil organisms and leach its nutrients. The proposed
soil handling is analogous to a farmer bulldozing his barn out of the way for a few years
to grow a crop in its place, and then bulldozing the remains of the barn back to its
original site. The functions such as storage, shelter for animals, protection against flood
and storm, and maintenance of a healthy exchange of air are all lost irretrievably.

Part 5 of measure BIO-5 (dEIR p. 6-33) illustrates a very naïve approach to
revegetation and soil management. It suggests use of fertilizer or other soil
amendments "...if the soil has been chemically altered..." If it is stockpiled over a few
days, it follows directly that it will be chemically altered and soil nutrients will no longer
be sequestered in organic and mineral storage sites resistant to leaching. Weed growth
is a natural response to activities that break biogeochemical cycling pathways and 82
release stored nutrients. Weeds actually help retain water-soluble nutrients on site.
Mitigations BIO-5 and BIO-6 that deal with site reclamation use the right language to
describe the wrong strategies. Careful handling of topsoil and subsoil resources after
mapping those resources is espoused but no methods are discussed to accomplish
these responsibilities and little confidence is generated through the proposed mining
plan and reclamation plan discussions.

HYDROLOGY:

Appendix F provides significant contributions to the understanding of local
geology and hydrology and is a major contribution that can serve as the basis for much 83
future impact assessment in Santa Cruz County.[1] That document was apparently not

[1] Geologic, Hydrologic, and Hydrogeologic Technical Appendix F of the Bonny Doon Limestone Quarry Draft Environmental Impact Report, Nolan Associates and Nicholas M. Johnson, February 13, 2007.

circulated with the dEIR to the public because of its size and the complexity of its 83 figures, but it was made available on-line.

We are told (dEIR Sect 5.4 beginning on p. 5-34) that mitigation measures HYD-1, HYD-2 and HYD-3 ..."would reduce the hydrology, water quantity and water quality impacts of the mining expansion project to a less than significant level." But there are no analyses or data to explain how this is to occur. Instead we are told that a drainage plan 84 shall be developed, and that there will be improved monitoring of groundwater levels, and that a written agreement with the City of Santa Cruz will reduce Liddell Spring water turbidity. But there is not enough detail to assess how, by how much, and the feasibility of the proposed mitigation to "less than significant levels."

For example, HYD-2 proposes improved groundwater monitoring to mitigate the possibility of mining to the depth of the water table. Because the level of water in observation wells in karst marble terrain does not actually correspond to a water table in standard porous rocks and because the seasonal level of saturation during rainstorms 85 may reasonably be expected to coincide with the ground surface, it is unclear and misleading to propose that improved monitoring, even if continuous, would prevent mining to the seasonal high groundwater levels. What is to happen when monitoring indicates that the water table just rose above the 20-foot cutoff after mining is underway?

Because Santa Cruz County regulations and most of those in the western United States attempt to regulate sand and gravel mining to the depth of a "blue-line" that purports to be above the level of saturated porous material, it does not follow that this concept is valid to protect downstream springs, wells, and creeks below a marble quarry 86 in karst terrain. In trying to shoe-horn an inappropriate regulation established to deal with different kinds of mining in places such as the sand quarries in Scotts Valley, we risk forcing CEMEX to use an ineffective tool (water level monitoring) to protect a critical resource.

A significant question remains about the duration and frequency of groundwater conditions that are purported to be mitigated by improved monitoring. What is the 87 frequency of the mapped "generalized upper groundwater surface" that is mapped in the Nolan Fig 25 and shown on cross-sections in Plate 3 of App. F? What does 88 "generalized" mean? If the monitoring is designed to prevent intersection of groundwater by quarrying, how long must the monitoring be performed before mining is 89 initiated to insure that the limit on mining is accurate? If the generalized mapped groundwater surface represents a seasonal high level achieved in years with average rainfall, what happens in years with much above normal precipitation? (For example, 90 see Figure 2 for the 1941 water year, or 1983 and 1998 of Figure 3). Is it the intention of HYD-2 to mitigate against degradation of Liddell Spring water quality even in very wet 91 years, or just during average years?

Based on the long history of attempts to develop a university on the karst topography of parts of the old Cowell Ranch site, UCSC has had to try to understand some basic facts of local karst hydrology. At Bonny Doon Quarry, just as at UCSC, most of the karst system of open water-carrying conduits has developed near or above the highest marine terrace. Because the uplift of Ben Lomond Mountain has been relatively continuous during the last 600,000 -800,000 years while sea levels have risen and 92 dropped repeatedly over a range of about 300 feet, the surface drainage and the subsurface karst drainage systems have had to repeatedly change their base-level, or elevation where they meet sea level. Surface streams simply incise to new depths during low sea-level stands and fill with sediments during times of rising sea levels relative to the slowly-rising land. But the subsurface drainages developed by solution of fractured marble and limestone tend to dissolve vertical solution cavities (which may then fill with soil to create the features termed "dolines" on Plate 1 of the dEIR). The vertical solution cavities and passages cannot dissolve much below the lowest seasonal level of groundwater saturation, which is determined ultimately by sea level. Because the level of the ocean relative to the land is changing along Ben Lomond Mountain more than it is fixed, the karst drainage channels tend to form vertical passageways that are interconnected with more horizontal solution cavities that represent the times when Ben Lomond is rising at about the same rate as sea level. 92

What this means, as mapped near UCSC, is that the karst system exists at several discrete levels interconnected by vertical drops. The upper levels formed first and the lowest levels are forming today at the elevations of the trunk surface streams to which they are geochemically graded. One cave system in Cave Gulch is called IXL in reference to this geometry and similar structure is found wherever mica schist or granitic rocks do not interfere with the karst drainage channels. 93

At the Bonny Doon Quarry site, as well as at much of UCSC, the vertical passageways are often filled with soil washed in during wet climate periods. These are the *doline fill* sites mapped in the EIR. Depending on the amount of clay in that fill material, downward percolating groundwater may or may not be perched seasonally or for several years in some karst cavities. Other parts of a karst system may accommodate as much surface runoff and rainfall as is ever provided and carry it to the lowest levels in the present system of karst voids, where it then provides base flow for coastal streams bearing anadromous salmonids. In the Bonny Doon Quarry area as well as at UCSC, current research suggest that differential solution along preexisting fractures or faults creates primary pathways for lateral transport of water in what water law terms "known and definite channels." The work of Nolan and Associates illustrated in Fig 55 of Appendix F illustrates a simplified schematic diagram of the multi-level system that is probably typical of karst systems that developed over long geologic time with rising and falling relative sea levels. Because the system fills with water to different levels in different years and because the adjacent sound bedrock need not be saturated at all times of high water levels in the open swallow holes and voids, it follows that a monitoring program relying on drilled wells cannot prevent mining into a water-bearing karst system. Slow moving groundwater may exist well above and well below a primary fracture-controlled passage system such as is postulated between Reggiardo and Laguna creeks and Liddell Spring. 94

Further complicating the HYD-2 proposed mitigation are the observations of ponded water on the quarry floor and static water levels in bore holes above the proposed 20-foot vertical mining buffer and groundwater. For example, Cross Section A-A' on App. F, Plate 3, shows that near borings DDH-39 and 58+200, the proposed mining limit intersects both the upper and lower limits of the generalized groundwater surfaces with no proposed mining buffer.

Clearly, the applicants are trying to meet Santa Cruz County criteria that are unrealistic and not in accord with hydrogeology of karst aquifers. But equally clearly, the applicant has proposed what they term mitigations that are simply not functional or realistic. If monitoring is to be proposed as a mitigation to protect groundwater resources, then the monitoring must be initiated well before mining is initiated and must be carried out long enough to assess a realistic range of precipitation regimes. In practice, this would mean that the mining must be restricted to an elevation well above any possible seasonal high groundwater (perhaps 100 feet higher) and then allowed to go deeper if and when it can be proven that continuously monitored wells and 95

piezometers will be above water tables that would be associated with two to three times 95
the average seasonal rainfall.

In evaluating the dEIR and proposed hydrologic mitigations, the issue of the long-term accuracy of observed water levels in test holes and wells becomes quite important. Appendix F and the dEIR itself present a good compilation of historic climate records. We have conducted an analysis of a monthly precipitation record for Santa Cruz for a 99-year period for which these data can be verified by comparison with simultaneous data from other nearby regional stations[2]. Although Santa Cruz has data extending back into the 1850's, the ranges of available records from other nearby stations limits data verification to the 1906-07 water year and more recent records. 96
The verified Santa Cruz water-year data for 1907 to 2006 were regressed against 16 consecutive water-years of similar data for Davenport (r^2 = 0.96) to permit estimation of a long-term record for the coastal area of Davenport. The records are very similar with a regression equation in which annual water year total precipitation in inches at Santa Cruz = 1.0467 x the value at Davenport + 0.7476. In other words, Davenport is consistently slightly drier than Santa Cruz. That regression plot is shown in Figure 1. The Davenport station was at a fixed location at 28 feet MSL elevation for 1961 through 1976 while the Santa Cruz station was moved slightly in 1931, 1950, and 1987 but always remained at 13 feet elevation.

Figures 2 and 3 are plots of the Santa Cruz water year data (Oct. 1 of prior year to Sept. 30 of the named year) with an added tabulation and plotting of a weighted cumulative 3-year precipitation value that assesses the potentials for carry-over water storage for diminishing amounts of prior years' rainfalls. The weighted values are calculated by multiplying the amount of rainfall of the year in question by 4, adding that 97
to 2 times the rainfall of the prior year and adding that total to the amount for the year before that; and then dividing the total by 7. This provides an index of potential contribution of prior years to the water stored in a large karst system. All data are from the California Data Exchange Center and Western Regional NOAA Climate Center.

Appendix F provides several analyses of the travel times and potential pathways for groundwater travel through the Bonny Doon Quarry area karst and surface water system. All of these analyses suggest that most rainfall travels rapidly, in one month or less, from its point of origin through the quarry site and into local springs and streams. 98
The volumes of potential year-to-year carry-over storage are believed to be finite and not large at elevations above that of Liddell Springs.

Liddell Springs Concerns:

As is acknowledged by the focus of Appendix F of the dEIR, the import of Liddell Spring to the City of Santa Cruz municipal water supply is critical. The EIR needs to specifically discuss this issue as it relates to the municipal water supply. Issues of nitrate levels and turbidity in the City of Santa Cruz water supply as they may or may not relate to mining and quarry expansion should be openly addressed. The dEIR is 99
inadequate in that it seems to pass over the very strong possibility that ammonium nitrate used for blasting is the most likely the source of increased nitrate in the groundwater. No evidence is presented to implicate grazing animals in Bonny Doon.

[2] Final values for August and September of the 2007 water year were not available when this letter-report was drafted and long-term average values for those months were used in place of actual recorded values.

Past analyses clearly implicate blasting as a cause of some the high turbidity excursions that render the City unable to utilize all of the Liddell spring flow. The added complications of a landslide adjacent to the spring that could be a source of some 100
turbidity and the observation of turbidity excursions at times when blasting may not have occurred complicates development of a possible mitigation.

Turbidity increases are noted in surface streams that drain karst topography on and below the UC Santa Cruz campus during seasonal rainfall events and are apparently associated with campus construction in karst areas. This turbidity is created by very fine grained clay mineral particles that are probably derived not only from surface soil disturbance but also from changes in volumes or points of infiltration and recharge for the karst system. Based on simple observations of spring flow on the Pogonip and in Cave Gulch and Empire Cave, it appears that changes in surface runoff patterns that contribute to karst recharge mobilize clay mineral particles that have 101
accumulated in karst voids and carry them to outlet springs and seeps. The UCSC experience has shown that no matter how carefully surface soil disturbance is controlled, captured in sumps, hay-bales, and silt fences, or prevented, the turbidity of spring-flow increases when runoff increases into swallow holes or seeks new recharge pathways. It is reasonable that some quarry blasting will dislodge clays from karst drainage pathways while other blasting will not because other pathways are either not carrying water at the time of the blasting or have no accumulated clay residues.

Because it is acknowledged that site clearing and preparation for quarrying causes release fine sediments from the clay-rich subsoil and that this is associated with increases in Liddell turbidity, mitigation strategy HYD-1 is proposed to disperse runoff throughout the present pit and to allow it to be filtered through 15 feet of existing spoils that are to be regraded over the pit floor. The efficacy of this proposal is not demonstrated in the dEIR. Because spoils and overburden were mixed in earlier quarrying operations, it follows that clay-rich subsoils exist within the material to be spread as a filter over the quarry floor. Further, the topography of the quarry does not 102
readily lend itself to recontouring that will capture and retain runoff from the proposed new quarry area in addition to the rainfall and runoff into old initial pit area. Such a scheme may be possible, but no engineering feasibility is proposed, no analyses of the spoils are provided and no drawings of the final pit contour with drainage capture facilities are provided. Finally, the swallow holes that presently function to recharge groundwater in the pit area either have to be protected or plugged and local runoff must then be otherwise accommodated. In essence, the proposed mitigation seems not to have been practically developed in a fashion that demonstrates feasibility.

Regional Water Quality Concerns:

The dEIR needs to take a watershed approach to impact assessment. Because the site is part of a larger karst complex, the adjacent watercourses of the full Liddell watershed, and nearby Yellow Bank and San Vincente creeks, are probably all fed by some recharge from the general quarry area in at least part of the year. Base flow in summer and fall is important to Red Legged Frogs, steelhead and Coho as well as to 103
farms and nearshore marine habitats. The karst system is somewhat independent of surface water streams. The karst system both supplies base flow to the surface streams and is supplied by seasonal flow from them. Alterations to flows to Liddell Spring and Plant Spring are not the only potential hydrologic impacts of quarry operation and expansion. It is our understanding that biologic resources of the adjacent coastal 104

watersheds are of widespread concern and the focus of both study and restoration efforts and should be addressed in the EIR. 104

The watershed concept is useful for environmental impact assessment in that it usually defines a hydrographic boundary and thus the potential limits of hydrologic impacts. But in karst terrain the actual zones of influence are much more difficult to define. The "watershed" for groundwater does not coincide with the topographic surface water catchment area. The dEIR authors have postulated a limited source area for groundwater that may enter the quarry and a larger area for the recharge for the Liddell Spring. It is not clear why those two areas of influence should not be coincident since the waters that reach Liddell Spring mix from various sources.

For example, if the spoils are regraded into the pit as proposed to buffer and filter 105
sediment from the runoff that will be directed into the pit from the quarry expansion area, then it follows that water filtering through the spoils to recharge the karst will itself be loaded with soluble components from the spoils and mixed overburden. That water will be more mineralized than would runoff reaching the Spring from karst passageways alone. And groundwater that bypasses Liddell Spring by flowing southwest toward Liddell tributaries and San Vincente Creek will have changed chemical characteristics. In other words, the entire area of Liddell Watershed and adjacent surface watersheds needs to be evaluated for impacts, not just the parts of Liddell above Liddell Spring. Higher nutrient loading in Liddell Creek at Highway One may affect ongoing habitat restoration there.

Because of the proposed changes to the infiltration capacity of the quarry area and proposed use of local barriers to prevent or reroute quarry runoff with unknown efficacy, some assessment should be given to the longitudinal profile of Liddell Creek between the ocean and the quarry. If, as proposed, sediment trapping can be effective and reasonably permanent even during intense long-duration rainstorms such as those
of 1982, the bed of Liddell Creek below the quarry may incise due to more rapid higher 106
stage storm flows. The proposed expansion area, the roads serving the quarry facilities, and the past mine and spoils piles all contribute to storm runoff. Infiltration capacities and runoff detention can be calculated and modeled for various expected storm conditions and these should be a basic part of hydrologic impact assessment.

CONCLUSIONS:

The Draft Bonny Doon Limestone Quarry Expansion and Reclamation Plan
Amendment Impact Report is deficient in several technical respects related to site 107
reclamation and hydrology. These technical deficiencies need to be corrected before the draft is recirculated. The question of the adequacy of the scope of the dEIR is also seen as a fundamental failing of any EIR effort that purports to address Quarry
expansion and reclamation because the operation of the CEMEX plant site that is to be 108
the beneficiary of the proposed actions is directly linked to the proposed quarry activities.

Respectfully Submitted

Robert R. Curry
Registered Geologist and Hydrologist

Figures:

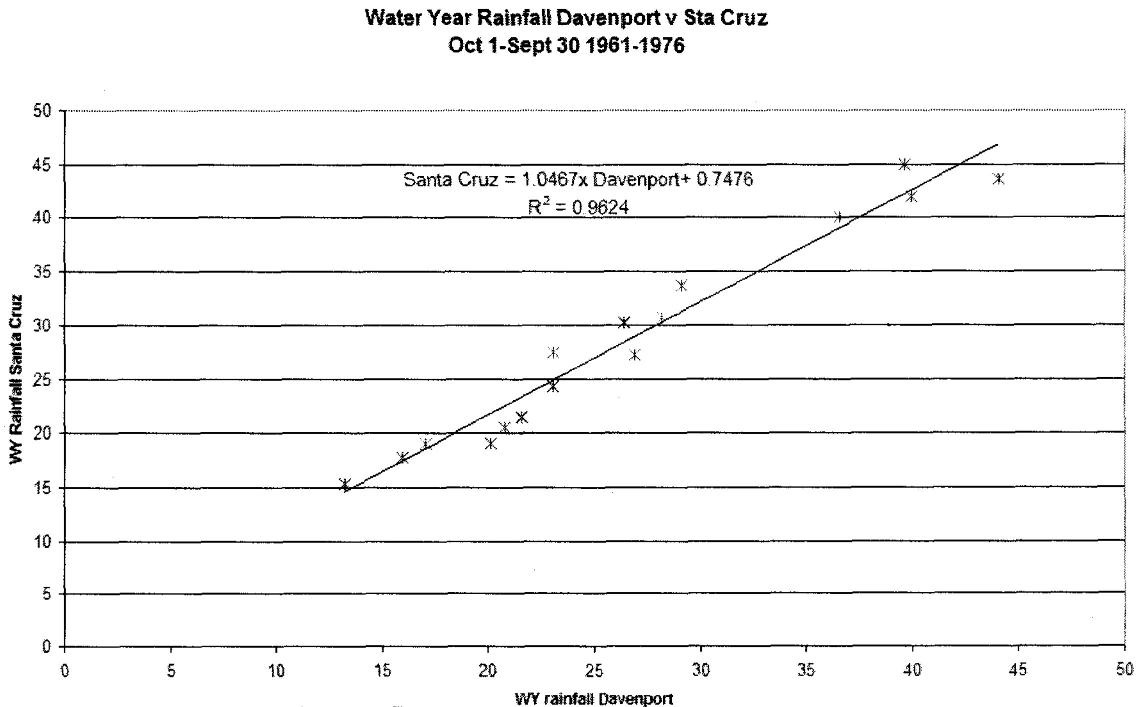


Figure 1 Sierra Club Letter Report

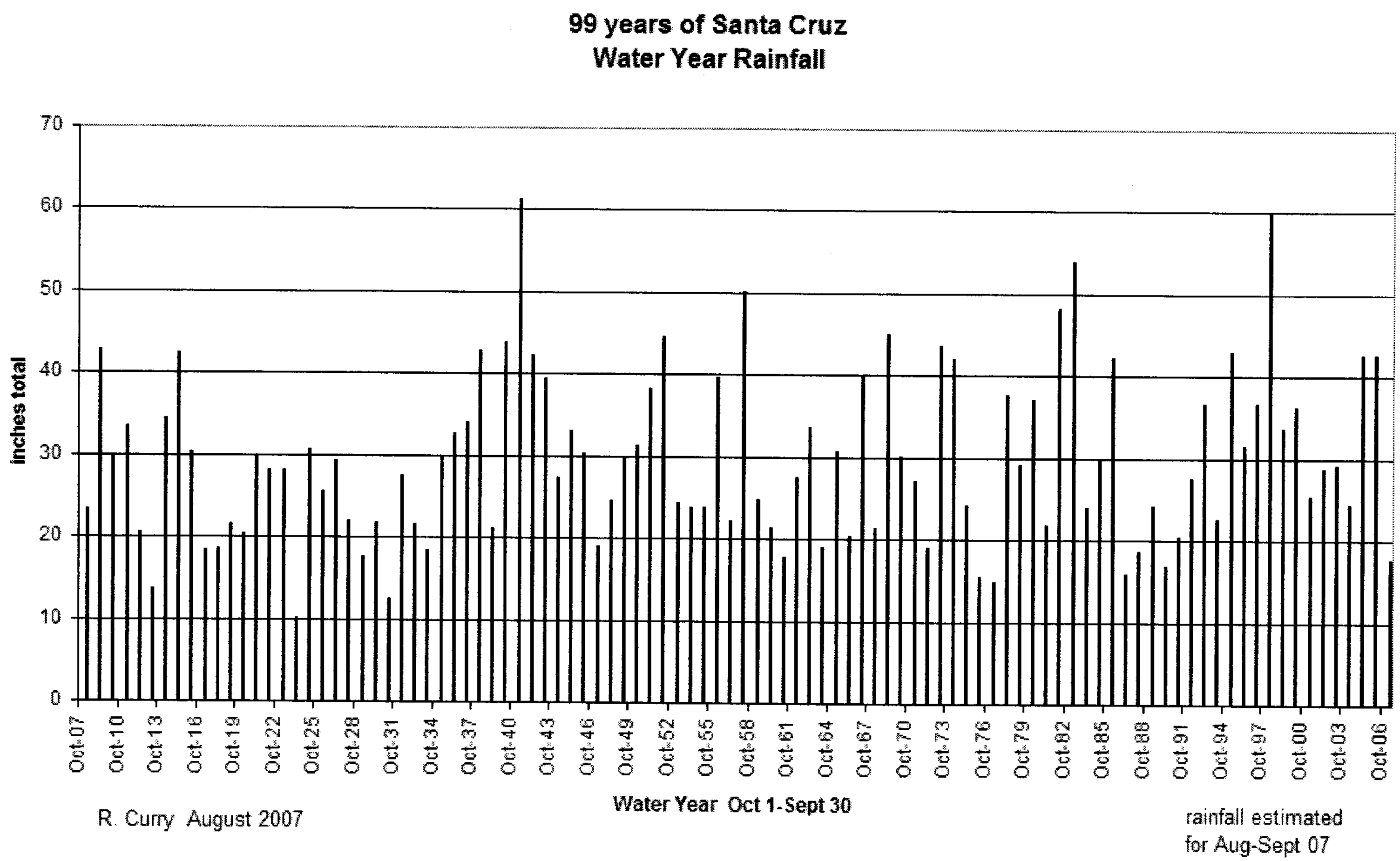


Figure 2 - Sierra Club Letter Report

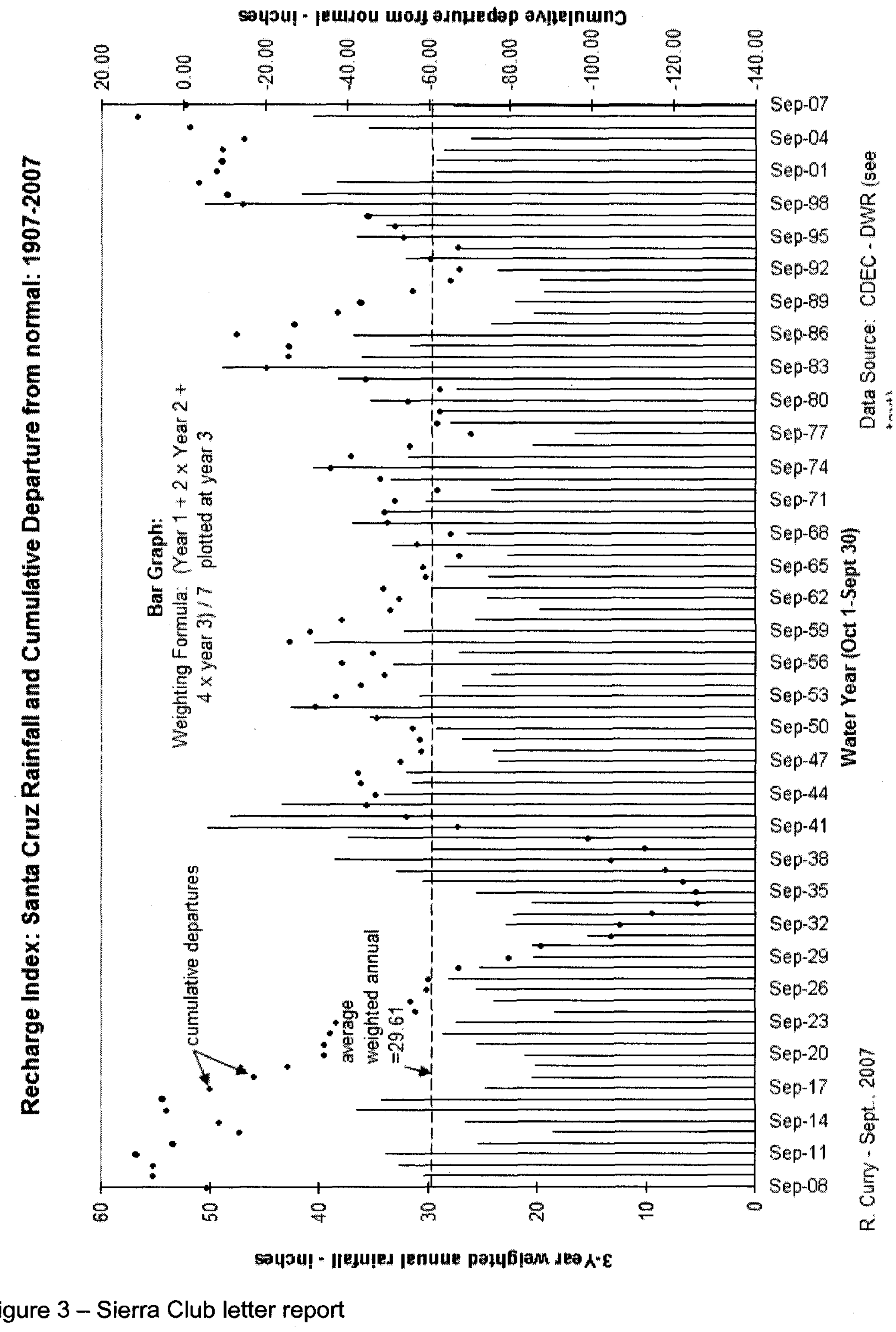


Figure 3 – Sierra Club letter report

Response to Comment Letter IV-C
Sierra Club, Santa Cruz County Group

1. Comment noted. The Draft EIR addresses the major issues areas required under CEQA (i.e., Geology and Soils, Hydrology and Water Quality, Biological Resources, Air Quality, Noise, and Energy and Natural Resources) that may have a significant adverse effect on adjacent property owners. Traffic impacts are not anticipated from project implementation (see Initial Study in Appendix A of the Draft EIR). Quarry expansion to the east of the existing quarry pit within the vested mining area would not impede proposed recreational opportunities on adjacent parcels to the south proposed for transfer to the Bureau of Land Management (see Initial Study in Appendix A of the Draft EIR).

2. Comment noted. The Davenport Cement Plant began operations in 1907, approximately 63 years prior to the opening of the Bonny Doon Limestone Quarry. There is no "sunset clause" contained in the Use Permit for the Davenport Cement Plant. Therefore, the plant has the option to continue operations after the closure of the Bonny Doon Limestone Quarry once its resources have been depleted. If the Davenport Cement Plant has access to other sources of raw materials, the continued operation of the plant would be their option. Prior to the Bonny Doon Limestone and Shale Quarries providing raw materials (i.e., shale and limestone) to the Davenport Cement Plant in 1970, the San Vicente Limestone and Shale Quarries supplied those raw materials to the plant for cement production (see Section 10.1.1 of the Draft EIR). In addition, the plant currently imports a small amount of high-grade limestone by rail. Other essential raw materials used by the plant for cement production include gypsum, laterite, iron ore and coal. All of these materials are shipped to the plant from locations outside of Santa Cruz County and in some instances, California. Although these two operations operate cooperatively, they have distinctly separate purposes with independent utility justifying separate use permits.

   The scope of this EIR does not include the Davenport Cement Plant; and therefore, would not address potential impacts associated with the existing Cement Plant on residents of the town of Davenport.

   The Davenport Cement Plant is exempt from requirements of the Surface Mining and Reclamation Act (SMARA) (PRC Section 2714(c)) and the County's Mining Regulations (16.54.014(b)(7)) because no mining takes place at the site. However, the Bonny Doon Quarry is not exempt and must comply with state and local mining regulations. The Bonny Doon Quarry and Davenport Cement Plant have entirely different purposes with unique regulatory requirements. As a result, they have been permitted separately.

3. Comment noted. Please see response to Comment #s IV-C-1 & 2.

4. Comment noted. Please see response to Comment #s IV-C-1 & 2.

5. Comment noted. Chapter 10.0 of the Draft EIR discusses project alternatives. CEQA Guidelines Section 15126.6 states, "An EIR shall describe a range of reasonable alternatives to a project or location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any

significant effects of the project, and evaluate the comparative merits of the alternatives." Five alternatives were evaluated in addition to the "No Project" alternative. All five were considered and rejected due to infeasibility (not meeting the basic project objectives), increased environmental impacts, or incorporated as mitigation in the proposed project. The commenter has suggested no additional alternatives. In *Save Our Residential Environment v. City of West Hollywood* (2d Dist. 1992), the court stated, "Although we recognize the burden is not on Save Our Residential Environment (SORE) to identify alternatives if this factual conclusion were unfounded, surely SORE would have identified the alternative sites meriting analysis. Its failure to do so points up the futility of requiring alternative site analysis in this case." Agencies are not expected to anticipate the thoughts of project opponents who are requesting analysis of vague alternatives without specifying what they have in mind.

6. See Response to Comment IV-C-5 above. Section 2.2 of the Draft EIR clearly outlines the project objectives. The objective referred to by the commenter, "CEMEX's objective of making as much money as possible as quickly as possible" is not a stated objective in the Draft EIR. Project alternatives are not dismissed solely based on finances.

7. Deficiencies cited in the comment are addressed individually in specific comments. For comments regarding:

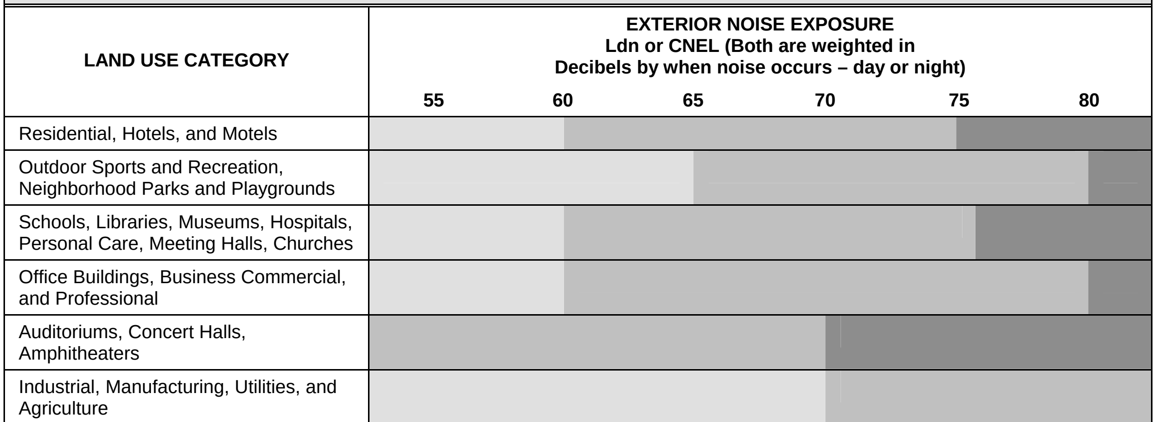
   - Project Objectives. As required by CEQA Section 15124(b), the Draft EIR (Section 2.2) clearly describes the project objectives. The primary objective is stated very clearly as, …to expand the mining boundary by approximately 17.1 acres onto the northern two-thirds of the unmined land within the Legal Mining Limit."
   - Range of Alternatives. See Response to Comment IV-C-5.
   - Dismissed Alternatives. See Response to Comment IV-C-5.
   - Inappropriate Thresholds of Significance. The commenter does not identify which specific thresholds of significance are inappropriate. The thresholds of significance are clearly outlined under each issue area in sections titled "Thresholds of Significance." These thresholds are based on the County of Santa Cruz Code, state and federal law, Appendix G of CEQA, and best available scientific information.
   - Applied Thresholds of Significance. Commented noted. The commenter does not identify which specific thresholds of significance are incorrectly applied.
   - Level of analysis required under CEQA. Comment noted. Comment is vague. No specific example is provided by the commenter where the CEQA analysis is insufficient.
   - Flawed Studies and data. Comment noted. Comment is vague. No specific example is provided by the commenter.
   - Personal opinions. Comment noted. Comment is vague. No specific example is provided by the commenter.

- Adequate mitigation measures. Comment noted. Comment is vague. No specific example is provided by the commenter.
- Adequate financial assurances. Comment noted. Comment is vague. No specific example is provided by the commenter.
- Mitigation monitoring. CEQA does not require that the Mitigation, Monitoring and Reporting Program (MMRP) be circulated with the Draft EIR (see *Christward Ministry v. Superior Court,* 1986). The MMRP has been prepared in conjunction with the Final EIR (see Appendix K).
- Public review notice. The public noticing procedures followed Section 15087 of the CEQA Guidelines.

8. Comments received on the Draft EIR are responded to in full in the Response to Comments and text amendments. No new analysis is presented that changes the conclusion of the impact analysis presented in the Draft EIR. Mitigation measures have been modified based on public comment to improve feasibility and effectiveness of reducing the environmental impact. The conclusion of less significant impact remains unchanged; and therefore, does not meet the requirement for recirculation as defined by CEQA Guidelines Section 15088.5(b). Recirculation is not required where the new information merely clarifies, amplifies, or makes minor modification to an adequate EIR.
9. It is the discretion of a project applicant to define the Proposed Project. The project proposed by the Project Applicant is the expansion of the limestone quarry mining boundary to include land within its vested mining limit. By the power of vested rights, the quarry operator already possesses the authority to mine within its legal limit. The discretionary approvals before the County are limited to those actions that are necessary to prevent significant environmental impacts and ensure that the quarry operates in a manner that protects public health and safety.
10. Comment noted. Please see response to Comment IV-C-9. The Final EIR fully addresses all public comments. The project is consistent with applicable law as discussed in Draft EIR Chapter 3.0 and in Response to Comments on consistency with Local Coastal Program and General Plan policies.
11. Project's objectives are the applicant's objectives for proposing the project. These are determined by a Project Applicant and not the County of Santa Cruz (Lead Agency). CEMEX is a mining company. Its business is the extraction of ore for the production of cement. The project objective for CEMEX is to fully utilize the land within its vested rights to extract the mineral resources for the production of cement. The project objectives presented in the Draft EIR remain an accurate statement of objectives.
12. The proposed project has been reviewed for consistency with General Plan policies (see Draft EIR Section 3.0). The applicant's objectives need not incorporate a commitment to mitigate negative impacts on the environment, scenic resources and surrounding residential uses. Rather, the EIR must address the potential for significant adverse environmental impacts and present mitigation to avoid or reduce these effects to a less than significant level.

See General Plan Figures 6-1 and 6-2 of the County of Santa Cruz General Plan below:

Figure 6-1
Land Use Compatibility For Community Noise Environments



NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

UNACCEPTABLE
New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

Ldn = Day/Night Average Sound Level
CNEL = Community Noise Equivalent Level

Figure 6-2
Maximum Allowable Noise Exposure
Stationary Noise Sources (1)

	Daytime (5) (7AM to 10PM)	Nighttime (2,5) (10PM to 7AM)
Hourly Leq – average hourly noise level, dB (3)	50	45
Maximum level, dB (3)	70	65
Maximum Level dB – Impulsive Noise (4)	65	60

dB = decibel

(1) As determined at the property line of the receiving land use. When determining the effectiveness of noise mitigation measures, the standards may be applied on the receptor side of noise barriers or other property line noise mitigation measures.

(2) Applies only where the receiving land use operates or is occupied during nighttime hours.

(3) Sound level measurements shall be made with “slow” meter response.

(4) Sound level measurements shall be made with “fast” meter response.

(5) Sound level measurements shall be raised to the ambient noise levels where the ambient levels exceed the allowable levels. Allowable levels shall be reduced 5dB if the ambient hourly Leq is at least 10 dB lower than the allowable level.

General Plan Section 13.10.445 and 3.6.1 called out in Table 3-2 is a typo. This has been corrected to read Section 16.54.050(c)(1) and Section 6.9.4 in the Final EIR.

The Bonny Doon Limestone Expansion Project is part of an existing quarry that has been in operation since 1969. There is no need to cite General Plan policies with respect to a "new quarry." Please see Table 3-1 on page 3-3 of the Draft EIR for a complete list of applicable General Plan policies pertaining to Mineral Resources.

13. Compliance with existing permit conditions is not within the scope of this EIR. The County recently completed a permit review for the Bonny Doon Quarry's Certificate of Compliance (COC) on October 8, 2008. The COC review process reviews compliance with the conditions of the permit and associated mitigation measures.

14. Areas of controversy are identified in the Project Description section. This discussion has been summarized into the Summary chapter as required by CEQA Guidelines Section 15123. See text amendments.

    Mitigation measures are fully presented in the individual environmental discipline chapters. The Summary chapter in the Draft EIR states that Table S-1 contains a summary of the measure and that actual text is presented in the chapters. The statement that "These impacts can be reduced to a less than significant level by implementing the identified mitigation measures" remains an accurate statement. The Draft EIR Summary chapter has been revised to reflect changes in mitigation measures made in response to public comment. In addition, impact statements and mitigation measures have been included in their entirety. See text amendments.

15. Mining at the Bonny Doon Limestone Quarry is an existing use within the watershed. The expansion of the Limestone Quarry is protected by vested rights, however, the County must also consider the protection of Liddell Spring as a water supply source for the City of Santa Cruz. Potential project impacts upon the quality and quantity of Liddell Spring are addressed in the EIR (See text amendments for the revised Hydrology and Water Quality chapter). The County General Plan does contain policies to protect water quality from impacts of new development. Project consistency with General Plan water resource policies is presented in Draft EIR Section 3.3.2. Mitigation measures identified for watershed impacts in the Draft EIR (Measures HYD-1, HYD-2, and HYD-3) have been revised based on agency and public comment. The EIR concludes that project impacts upon Liddell Spring can be mitigated to a less than significant level; and therefore, is consistent with General Plan policy.

16. Comment noted. Please see response to comments II-C-11 and 12. Also see the revisions to Appendix C Table 3 of the Draft EIR for a complete list of special-status species and habitats considered.

17. Table 6-2 of the Draft EIR identifies the impacts to vegetation communities that would occur from mining the Boundary Expansion Area. Coast live oak forest and northern coastal scrub acreage would be incorporated into the Mitigated 1996 Reclamation Plan Amendment as required by Measure BIO-3. Replacement of the mixed evergreen forest is already proposed in the Revegetation Plan. Therefore, the loss of the oak forest, coastal scrub, and mixed evergreen forest is not permanent. These communities can be successfully re-established over the short term (coastal scrub) and medium term (coast live oak, mixed evergreen) as soil conditions develop on site.

The loss of the Upland Redwood Forest (11.4 acres) would be permanent. Redwoods are not proposed for replacement given the highly disturbed nature of the quarried soils that cannot provide the complex requirements of redwoods. The loss of Redwood Forest would not be considered a significant impact based on established thresholds of significance (Draft EIR Section 6.3.1 and response to comments II-C-11 and 12). Upland Redwood Forest is not a protected vegetation community, does not support special status plants, and Redwood Forest remains in the project vicinity and throughout the Santa Cruz Mountains (Draft EIR Section 6.3.2.1).

18. The mitigations for SFDW have been coordinated with and approved by CDFG. The proposed conservation areas have been determined to provide suitable habitat for the SFDW by CDFG.

    The revegetation strategy would be required to meet the standards contained in Section 16.54.055, Reclamation Standards, of the County of Santa Cruz code as well as the adopted reclamation plan.

19. Comment noted. Please see response to comment II-C-2 and II-C-19. Implementation of mitigation Measures BIO-1 through BIO-5 would ensure compliance with the County's Sensitive Habitat Protection Ordinance (see Section 6.4 of the Draft EIR).

20. Impacts to the Central Coast steelhead and North Central Coast California steelhead stream habitat are addressed in Draft EIR Section 6.3.2.3. Please see response to comment II-C-2 and II-C-19.

21. Comment noted. The discussion contained within Section 9.1.1 of the Draft EIR is intended only to set the baseline for timber resources in Santa Cruz County.

22. Comment noted. Please see response to comment II-C-11 for a discussion regarding old growth forest. Also refer to response to comment IV-A-17 for a discussion of site revegetation.

23. Please see the revisions to Appendix C Table 3 of the Draft EIR for a complete list of special-status species and habitats considered. Quarry blasting currently occurs between once and twice per week. Impacts to the SFDW have been identified and would be mitigated (see BIO-1 and 2 of the Draft EIR). No impacts to other special-status species from quarry-related activities are anticipated.

    No significant impacts to the Liddell Spring water quality and quantity would occur following the implementation of HYD-1, 2, and 3 as outlined in the Final EIR. As stated in response to comment III-A-2, despite more than 30 years of concurrent quarry and City-diversion operations, there is no evidence of quantified procedural or financial impacts to the City's operations. The efficacy of mitigation measures cannot be estimated for impacts that cannot be quantified.

24. The Biological Resources section of the Draft EIR is based on acceptable data. "County of Santa Cruz 1994" is in reference to the 1994 General Plan, "CNPS 2001" is in reference to the Inventory of Rare and Endangered Plants of California – sixth edition," and the "USFWS 2003" is in reference to the list of endangered and threatened species that may occur in or be affected by projects in the Davenport quadrangle. The USFWS list was generated within the last five years and has not changed (County Code Section 16.32.080). The CDFG 2007 citation was in reference

to an updated 2007 database search of the California Plants and Animals: Species of Special Concern.

25. No change in the status of species of special concern has been identified for species potentially occurring within the Davenport, California Quadrangle. One correction was noted regarding the American peregrine falcon. This species was listed as federal endangered in Appendix C, Table 3 of the Draft EIR. It has been corrected in the Final EIR to read that is now "delisted." The species was delisted due to recovery of the species.

26. Comment noted. Please see response to comment IV-C-25.

27. Comment noted. See revised mitigation measures HYD-1, HYD-2, and HYD-3. See also responses to "Curry Report" comments in the response to comments IV-C-71-108.

28. The water-resource value of Liddell Spring to the City water supply is described in Draft EIR Appendix F Section 3.5. As stated in Section 5.6.3 of Draft EIR Appendix F, the proposed quarrying may have an ongoing influence on the concentration of nitrate in groundwater. However, available data does not support the claim of a rising trend in Liddell Spring nitrate concentration levels. Liddell Spring nitrate concentrations rarely peak higher than 10 percent of the drinking-water standard, and never more than 25 percent of the standard; and, identified sources other than the quarry may be as or more responsible. Thus, there is insufficient evidence to conclude that quarrying of the proposed Boundary Expansion Area would significantly worsen conditions regarding Liddell Spring nitrate concentrations. See response to comment III-A-66 for additional discussion.

29. As discussed in Appendix F and Chapter 5 of the Draft EIR, the proposed quarry mining amendment would not impact water quantities, either in terms of infiltration of rainfall or water production at Liddell Spring. The drainage scheme proposed for the quarry (HYD-1) is more likely to enhance recharge to groundwater, since all runoff would be percolated to groundwater. Therefore, impacts on base flow in Liddell Creek would not be affected. The hydrogeologic interpretation presented in Draft EIR Appendix F encompasses the entire hydrologic system of Bonny Doon Quarry and Liddell Spring. No hydraulic connection to San Vicente or Yellow Bank creek watersheds is found. See responses to comments III-A-102 through III-A-104 for additional discussion.

30. Comment noted. See revised mitigation measures HYD-1 through HYD-3.

31. The Draft EIR and Draft EIR Appendix F have adequately analyzed impacts related to erosion, landsliding, and sedimentation. Mitigation measures GEO-1 and GEO-2 would mitigate recognized impacts. The comment contains a number of incorrect assertions: 1) the removal of overburden and quarrying would increase the amount of runoff from the quarry; 2) the proposed slopes for the quarry are too steep; and 3) the landslide that occurred near Liddell Spring requires detailed investigation. First, the drainage system for the quarry would be designed to impound runoff within the quarry and to percolate captured runoff to groundwater; therefore, there would be no increase in runoff from the quarry. Second, it has not been demonstrated that the proposed slopes for the quarry are too steep. Rather, mitigation measure GEO-2 specifically requires that the proposed slopes be analyzed to determine if they are too steep or not.

If they prove to be insufficiently stable, a new, stable slope design must be provided by the applicant, to include any seismically induced instability. Lastly, the landslide that occurred near Liddell Spring was the subject of a detailed investigation and stability analysis performed by certified engineering geologists and hydrogeologists. This study was performed jointly by Pacific Geotechnical Engineering and Balance Hydrologics (2002) under the auspices of the technical advisory committee, consisting of representatives of the County of Santa Cruz, the City of Santa Cruz Water Department, and the quarry operator.

32. Mitigation measures GEO-1 and GEO-2 specifically address the seismic stability of both the settlement basin levees and the quarry slopes.

33. Section 4.3 of the Draft EIR explicitly recognizes the seismic potential of the region and provides analysis and mitigating design (Measures GEO-1 and GEO-2), as required by the results of the analysis, for the quarry slopes and basin levees.

34. Pursuant to proposed mitigation Measure BIO-3 the applicant has submitted an updated revegetation plan component of the overall reclamation plan. In compliance with SMARA and County Mining Regulations the updated plan proposes a native species vegetative cover similar to naturally occurring habitats in the surrounding area, including replacement of lost sensitive habitats. The updated plan includes a test plot program and a plan for topsoil salvage, maintenance and redistribution. Success of revegetation will be based on quantified measures of vegetative cover and species richness based on data from nearby reference sites. Standard sampling techniques will be used to measure success and the need for remedial action. Monitoring will continue until performance standards are met.

    In accordance with SMARA and the County's Mining Regulations, a financial assurance made payable to the County, as lead agency, and the California Department of Conservation (DOC) has been submitted by the quarry operator to ensure that adequate reclamation is performed in accordance with the approved Reclamation Plan. The financial assurance is reviewed each year by the County and adjusted, as needed, to account for current conditions. The Planning Department and the DOC, Office of Mine Reclamation approved the 2008 update. The amount of the existing Surety Bond ($3,573,753.00) is executed for an amount in excess of the required amount of the bond based on the updated cost estimate. When the County and DOC are satisfied that the quarry has completed reclamation pursuant to the approved Reclamation Plan, the financial assurance will be released.

    Prior to approving a financial assurance update for a major amended mining operation (expansion project) the Planning Department will present a review of the amount and type of financial assurance to the Planning Commission in a public hearing. Typically, this would occur within 90 days of approval of the expansion project.

    Because no mining takes place at the Cement Plant it is exempt from SMARA (PRC Section 2714(c)) and the County's Mining Regulations (16.54.014(b)(7)). Accordingly, the cement plant operates under a separate use permit from the quarries. (Refer to comment IV-C-34 contained in the errata letter dated October 3, 2007.)

35. Comment noted. See response to comments IV-C-36 through 39. It should be noted that attenuation, as described in the Draft EIR refers to the dissipation in space and

absorption by the environment of sound wave energy as it travels away from the source. Attenuation does not mean vibration.

36. The measurement taken for individual pieces of heavy equipment is intended only for use as a reference. As stated in Section 8.1.1.3 of the Draft EIR, "For community noise analysis, the inherent loudness of a source is indicated by giving its sound level measured at a reference distance such as 50 or 100 feet from the source; this allows the level at other distances to be calculated."

37. The purpose of presenting the baseline noise levels are to provide a comparison of the existing quarry generated noise with that of the proposed project. Without presenting this baseline, it would be impossible to determine what the increase in noise would be from the proposed Boundary Expansion Project. Section 8.1.3 of the Draft EIR (page 8-3) states, "…ambient noise levels at the quarry rim when the quarry is inoperative is typically 37 or 38 dBA, increasing to the range of 50 to 54 dBA when quarry operations commence. Section 8.3.3 of the Draft EIR analyzes the impacts associated with the expanded operations.

38 The Draft EIR does account for project impacts to humans. The analysis uses the decibel scale. The decibel scale is measured on the logarithmic decibel scale (dB), usually with a frequency sensitivity that matches the human ear, called "A-weighting" (see Section 8.1.1.1 of the Draft EIR). See Section 16.54.050 (c) of the County Mining Regulation in Section 8.2 of the Draft EIR for a complete discussion of noise standards for mining operations.

39. The noise thresholds of significance are explicitly identified in the Draft EIR. Section 8.3.1 states, "Section 16.54.050(c) of the County Mining Regulations (60 dBA for a cumulative period of 15 minutes during any hour of operation i.e., L25) and General Plan Policy 6.9.1 Land Use Compatibility Guidelines (60dB Ldn) serve as the principal standards of significance. See text amendments to Sections 8.1.3.3, 8.3.1 and 8.3.3 regarding blasting and ground vibration.

40. The EIR does not conclude that blasting exceeds local noise standards or Federal regulations for ground vibration. The higher noise levels discussed in Section 8.3.2 are associated with site preparation activities involving vegetation clearance and overburden removal in the temporary absence of the shielding effects of the quarry rim. As overburden is removed the heavy equipment activity would drop below the newly forming rim of the quarry and noise levels at the property line would again comply with the 60dBA standard at the property line. The temporary higher noise levels would occur on receptor parcels C3 and C5, owned by CEMEX, which also represent the 1,000 foot notification zone. It should also be noted, as further described in Section 8.3.2, that at no time would noise levels exceed the 60 dBA standard at any residence (sensitive receptor).

41. Blasting at the limestone quarry does not result in significant impacts from noise and vibration (see Section 8.3.3 of the Draft EIR). Therefore, no mitigation is required**.** Regarding Dexpan, the product appears to be an alternative to blasting in sensitive situations such as building demolition or in quarries for the production of decorative slabs and blocks. It does not seem practicable to use such a product in a large quarry that produces crushed rock for cement production.

42. No naturally occurring asbestos is known to occur in the project vicinity. While it is present all over the State of California — in 42 of 58 counties — naturally occurring asbestos can be found most abundantly in and around Humboldt County, in areas of San Benito and Monterey counties, and in western El Dorado County. The Environmental Protection Agency's (EPA's) Pacific Southwest Region has a long history of involvement in assessing and minimizing the risk from asbestos in California, including Alameda, Calaveras, Fresno, Los Angeles, Santa Clara, Santa Cruz, San Benito, and San Mateo counties (http://www.epa.gov/region09/toxic/noa/basic.html). See A General Location Guide for Ultramafic Rocks in California - Areas More Likely to Contain Naturally Occurring Asbestos, Compiled By Ronald K. Churchill and Robert L. Hill, August 2000. The site has been extensively studied and monitored, and no mercury is known to occur in the project area.

43. As stated in Section 7.4 of the Draft EIR, "Site preparation including vegetation clearing and overburden removal would occur in several stages over a two-year period. These activities would result in increased emissions of fugitive dust in addition to existing mining operations." Mitigation Measure AQ-1 would mitigate this impact to a less than significant level. No other project-induced dust emissions are anticipated.

44. The thresholds for vegetation clearance and earthmoving activities are not based on the amount of time the activity takes per acre. The standards simply state that no more than a certain amount (area) of vegetation clearance or earthmoving activity can take place on any given day. If the given thresholds are not exceeded then significant impacts would not occur.

45. As stated in Section 7.3.2 the extensive air monitoring completed in 1999 found that during mining, PM10 levels at the nearest residential receptors averaged one-quarter of the state 24-hour standard. Table 7-5 shows that estimated site preparation equipment emissions fall below MBUAPCD suggested CEQA thresholds. Mitigation Measure AQ-1 ensures that newly disturbed area will not exceed MBUAPCD suggested CEQA thresholds. Even with the combination of these factors the good daytime emissions dispersion at the site, and the distance to the nearest residential receptor (approximately 1,000 feet), ambient air quality at residential receptors would remain below applicable standards. Ongoing site inspection would ensure operations remain consistent with this analysis in terms of disturbed area and dust control measures. As stated in Section 7.3.3 of the Draft EIR, "CEMEX employs several measures in an effort to reduce fugitive dust in accordance with Certificate of Compliance (COC) Conditions of Approval to assure compliance with County Mining Regulations air quality provisions (Section 16.54.050 (c)(2)) and MBUAPCD Permit to Operate requirements. Dust emissions have been minimized by watering of roadways, working surfaces, and crusher material, routine maintenance of dust control devices on stationary equipment, treating unvegetated disturbed areas to prevent wind blown dust, and restricting vegetation removal to an approved phasing plan. These conditions would be applied to the proposed mining operations in the Boundary Expansion Area through project amendment of the COC."

46. Comment noted. As stated in Section 11.5 of the Draft EIR, "The County of Santa Cruz prepared an Environmental Review Initial Study for the Bonny Doon Limestone

Quarry Boundary Expansion Project." The Initial Study concluded that the project would have no significant impact on aesthetics.

47. Comment noted. The alternatives analysis provided in the Draft EIR does meet the objectives of CEQA Guidelines Section 15126.6. Also, please see response to comment IV-C-5.

48. Comment noted. CEQA Section 15124(b) states, "A statement of objectives sought by the proposed project. A clearly written statement of objectives will help the lead agency develop a reasonable range of alternatives to evaluate in the EIR and will aid the decision makers in preparing findings or a statement of overriding considerations, if necessary. The statement of objectives should include the underlying purpose of the project." The purpose or goal of the project is to expand the working mining boundary by 17.1 acres within the limits of the Legal Mining Limit. Section 2.2 of the Draft EIR states, "The first objective of the project is to expand the mining boundary by approximately 17.1 acres onto the northern two-thirds of the unmined land within the Legal Mining Limit. This would provide additional mining acreage and extend mining operations in the present quarry pit by approximately three years based on current production rates." The second objective states, "The second objective of the proposed project is to revise the revegetation plan that is a component of the approved 1996 Reclamation Plan for both the Bonny Doon Shale and Limestone Quarries, which specifies a planting scheme more suitable to post-mining soil conditions to improve the success of reclamation efforts." These objectives clearly meet the spirit and intent of CEQA Section 15124(b).

    See response to comment IV-C-46 for a response to the comment regarding scenic resources.

49. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

50. Comment noted. (Refer to comment IV-C-50 contained in the errata letter dated October 3, 2007.) See responses to comments IV-C-48 and IV-C-5. It should be noted that the comment is incorrect in that a " statement of overriding conditions (considerations)" is not proposed and the Draft EIR identifies no unmitigated environmental impacts.

51. Comment noted. CEQA Section 15126.6(f)(2)(B) states, "If the lead agency concludes that no feasible alternative locations exist, it must disclose the reasons for this conclusion, and should include the reasons in the EIR. For example, in some cases there may be no feasible alternative locations for a geothermal plant or mining project which must be in close proximity to natural resources at a given location." Section 10.1.1 of the Draft EIR states, "Alternative unmined project locations are infeasible because the nature of the project is mineral extraction, which ties the project location to where the limestone marble occurs. Also, CEMEX does not have vested mining rights in other locations. An alternative existing quarry location is the San Vicente Limestone Quarry." Based on a review of available information and the length of time that has passed since operation, CEMEX no longer has vested mining rights at this location. A new mining approval would be required to reactivate the mine to recover

what minimal marble resources may still occur. Also, see response to comment IV-C-5.

52. In depth analysis was not provided for each of the rejected alternatives because none of the alternative projects were considered feasible; and therefore, were rejected from further consideration. See response to comment IV-C-5 and CEQA Section 15126.6(f)(2)(B).

53. Comment noted. All five project alternatives were considered and rejected due to infeasibility (not meeting the basic project objectives), increased environmental impacts, or incorporated as mitigation in the proposed project (see response to comment IV-C-5). As stated under "Rule of Reason" (CEQA Section 15126.6(f)(1)), "Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries, and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives." CEQA Section 15131provides that economic data is not required to be included in an EIR. In addition, Public Resources Code Section 21081.5 states that a finding of infeasibility shall be based on "substantial evidence in the record." Subdivision (e) of Section 21167.6 provides that the record of proceedings consists of many different types of materials, not just the EIR.

    The only alternative considered and rejected that considered the economic viability of the alternative was the "Reduced Boundary Expansion Area (see Section 10.1.4 of the Draft EIR). The Draft EIR clearly states, "Reducing the size of the Boundary Expansion Area to less than the proposed 17.1 acres would offer less than the 3-year extension of quarry life provided by the project. This reduction is not practical for quarry operation." During the initial permit application process, the quarry operator originally requested a 26.5-acre expansion area. Subsequently, it was reduced to 17.1 acres in size in an attempt to minimize impacts (see Section 10.1.2 of the Draft EIR). An additional reduction in acreage would not be feasible.

54. Comment noted. (Refer to comment IV-C-54 contained in the errata letter dated October 3, 2007). See response to comment IV-C-53. CEMEX has vested mining rights within the entire 26.5-acre mining area.

    As stated in Section 10.1.2 of the Draft EIR, "The larger full boundary expansion alternative does not reduce any environmental impact of the project; and therefore, does not meet the CEQA purpose of a project alternative."

55. Comment noted. (Refer to comment IV-C-55 contained in the errata letter dated October 3, 2007). See response to comment IV-C-51. Also see Section 10.1.1, Alternative Project Locations, of the Draft EIR. As stated in Section 1.1 of the Draft EIR, "The County determined that the mining plan expansion, while covered under vested rights, is subject to environmental review under CEQA. The County's authority under vested rights, is described in a letter from County Counsel to the Board dated March 11, 2002. *"…as previously acknowledged by the County, and out of respect for the vested rights which RMC does possess, and consistent with the County Code, the*

County will impose additional conditions or restrictions only in the case that the stricter standards are necessary to mitigate a potentially significant environmental impact, and/or to protect public health or safety, and/or to respond to a public nuisance. Should additional limitations be found to be necessary to prevent significant environmental impacts or threats to public health and safety, the risks associated with these impacts must be weighed against the effects of such restrictions on quarry operations to ensure that they do not unreasonably constrain the permit holder from exercising their vested rights." Please see response to comment III-A-35. Significant impacts associated with the proposed project have been adequately mitigated. Therefore, it is the County's position that justification for an alternative project location that would deny the vested rights of the permit holder is not warranted.

56. Comment noted. See responses to comments IV-C-49 through 56.

57. Comment noted. The County of Santa Cruz prepared an Initial Study for the proposed Bonny Doon Limestone Quarry Boundary Expansion Project (see Appendix A). It concluded that no impacts to recreational resources would occur as a result of the proposed project. Please see response to comment IV-C-1.

58. Comment noted. Please see response to comments IV-C-57 and IV-C-1.

59. Comment noted. Please see Sections 7.3.3 and 8.3.3 of the Draft EIR for a complete discussion of air quality and noise impacts. No significant impacts to air quality are anticipated with implementation of mitigation contained in Section 7.4 of the Draft EIR. No adverse noise impacts are anticipated, and therefore, no mitigation for potential noise impact is required.

60. Comment noted. Please see response to comment IV-C-57.

61. Comment noted. The scope of this EIR does not include the Davenport Cement Plant; and therefore, would not address potential impacts associated with the existing Cement Plant on residents of the town of Davenport. See response to Comment IV-C-2.

62. Comment noted. (Refer to comment IV-C-62 contained in the errata letter dated October 3, 2007). See response to comment IV-C-2.

63. Comment noted. The cumulative analysis in the Draft EIR is consistent with CEQA Section 15130. "Where a lead agency is examining a project with an incremental effect that is not *cumulatively considerable*, a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable."

64. Comment noted. The County of Santa Cruz prepared an Initial Study for the proposed Bonny Doon Limestone Quarry Boundary Expansion Project (see Appendix A). It concluded that impacts from hazards would be less than significant as a result of the proposed project. Section 11.5.7 of the Draft EIR provides a summary of the conclusions provided in Appendix A for this issue.

65. On October 8,2008 the Planning Commission conducted a public hearing to review the permit for the existing mining operation for compliance with conditions of approval. It should be noted that the existing permit does not state that in the event that water quality is impacted by mining activities, mining shall cease until such impacts are remedied.

66. Comment Noted. Please see Section 11.4 of the Final EIR for an added discussion on Greenhouse Gas Emissions and Global Climate Change.

67. Comment noted. Please see Section 15088.5(a and b) of CEQA. "A lead agency is required to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the Draft EIR for public review under Section 15087 but before certification. As used in this section, the term "information" can include changes in the project or environmental setting as well as additional data or other information. New information added to an EIR is not "significant" unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement. …Recirculation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR." No significant new information has been included that would require recirculation. Please see response to comment IV-C-57.

68. Comment noted. The Mitigation Monitoring and Reporting Program (MMRP) has been prepared in conjunction with the Final EIR (see Appendix K). CEQA Section 21081.6 does not require the inclusion of the MMRP in the Draft EIR (see *Christward Ministry v. Superior Court, 1986*).

69. Comment noted. See response to comment IV-C-65.

70. Attachment noted. Please see response to comments IV-C-71 through 108.

71. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

72. See response to comment IV-C-2. The Davenport Cement Plant began operations in 1907, approximately 63 years prior to the opening of the Bonny Doon Limestone Quarry. There is no "sunset clause" contained in the Use Permit for the Davenport Cement Plant. Therefore, the plant has the option to continue operations after the closure of the Bonny Doon Limestone Quarry once its resources have been depleted. If the Davenport Cement Plant has access to other sources of raw materials, the continued operation of the plant would be their option. Prior to the Bonny Doon Limestone and Shale Quarries providing raw materials (i.e., shale and limestone) to the Davenport Cement Plant in 1970, the San Vicente Limestone and Shale Quarries supplied those raw materials to the plant for cement production (see Section 10.1.1 of the Draft EIR). In addition, the plant currently imports a small amount of high-grade limestone by rail. Other essential raw materials used by the plant for cement production include gypsum, laterite, iron ore and coal. All of these materials are shipped to the plant from locations outside of Santa Cruz County and in some instances, California. Although these two operations operate cooperatively, they have distinctly separate purposes with independent utility justifying separate use permits.

73. Comment noted. As stated in response to comment IV-C-72, raw materials for cement production are imported from areas outside of Santa Cruz County, and in some cases California. As a result, the Davenport Cement Plant currently faces these quality control challenges.

74. There is more than adequate capacity at the mine site in Disposal Area C and in the pit to dispose of anticipated spoils from existing operations and expansion area operations regardless of the relative efficiencies in the use of raw materials at the cement plant. As stated in Section 2.4.2 of the Draft EIR there is adequate disposal capacity based on original estimates before additional operational efficiencies in the use of raw materials were implemented.

    It should be noted again that because no mining takes place at the Cement Plant it is exempt from SMARA (PRC Section 2714(c)) and the County's Mining Regulations (16.54.014(b)(7)).

75. Comment noted. Although an application was received from the quarry operator, the 1996 Reclamation Plan was not amended in 2001. The proposal only includes an amendment to the 1996 Reclamation Plan. Please see section 3.3.4 of the Draft EIR, "Performance Standards for Revegetation" and "Conformance with Mining Regulations 16.54.055, Reclamation Standards." The revised reclamation plan conforms to the requirements of the County Mining Regulations and the State Mining and Geology Board.

76. Comment noted. As stated in response to comment IV-C-75, topsoil would meet the requirements of Section 16.54.055(h) of the Mining Ordinance, "Performance Standards for Topsoil Salvage."

77. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

78. Comment noted. Sections 4.4 and 5.4 of the Final EIR, and Section 6.4 of the Draft EIR outline feasible mitigation measures that would reduce significant impacts to geology and soils, hydrology and water quality, and biological resources to below a level of significance. Please see response to comment II-D-10.

79. Comment noted. Please refer to mitigation Measures BIO-3 and BIO-5 in the Draft EIR.

80. Comment noted. See response to comment IV-C-29.

81. Comment noted. Please see mitigation Measure BIO-6. It is acknowledged that it is very difficult, except under ideal circumstances, to preserve all of the beneficial aspects of topsoil during the process of removal, transport, long-term storage and redistribution. Due to the nature of the mining operation and limited storage area topsoil must be stored for long periods of time and in deep stockpiles. According to the 2003 publication of the California Geological Survey, *Rehabilitation of Disturbed Lands in California: A Manual for Decision-Making*: "If the soil is stockpiled deeper than the rooting depth of the plant cover, the energy supply for the soil is cut off. The microbial activity in the soil will steadily decline with time. Although the soil becomes biologically inactive, it still maintains many of the textural characteristics and nutrient levels from when it was an active soil. In this respect, it is still a valuable revegetation resource; its biological activity can be regenerated more easily than a whole soil can be created from non-soil material."

82. BIO-5 is a recitation of Section 16.54.055 of the County Code, which are general performance standards for revegetation. Part 5 of BIO-5 covers the issue of quality of

soils to successfully implement the revegetation program. The updated revegetation plan (August 2008) addresses this issue in several ways including soils analysis, test plot program (including comparison of different plant medium additives), success criteria and monitoring to ensure the objectives of the revegetation program are met.

83. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

84. See revised mitigation measures HYD-1, HYD-2, and HYD-3.

85. The seasonal water level does not coincide with the ground surface. This observation is made clear by mining of the existing quarry, otherwise, the quarry would be submerged during wet periods, which is not the case. There has been much discussion of the difficulty of defining a water table in karst terrain and the fact that the required 20-foot separation from groundwater is better suited to a granular aquifer. Nevertheless, the quarry has been successful in maintaining the required 20-foot separation from groundwater in the active quarry. The existing quarry bottom, at about elevation 750', is dry (above the permanent water table) and measurement of water levels in drill holes in the quarry bottom during WY2004 showed relatively constant water levels ranging from about 38' to 96' below the quarry bottom. Nevertheless, it is important that precautions be taken to help insure that mining does not encounter the permanent groundwater table. Mining of the Boundary Expansion Area will take place from the top down, so there will be time to collect and analyze additional groundwater data from the Boundary Expansion Area (to supplement existing water level data) prior to reaching depths where there is a possibility of encountering groundwater. The revised mitigation measure HYD-2 provides additional assurance that water level monitoring will be sufficient to maintain separation from groundwater.

86. See response to comment IV-C-85.

87. The illustrations presented in Appendix F represent hydrogeologic conceptualizations based on multiple lines of evidence that are needed to support the Draft EIR analysis. The generalized groundwater-surface maps presented in Draft EIR Appendix F are intended to convey an understanding of the overall groundwater system. However, they are not sufficiently accurate for evaluating allowable mining depths. Going forward, the presentation of monitoring data may call for similar or different procedures of illustration. See also responses to comments IV-A-32 and IV-A-80.

88. "Generalized" means recognition and depiction of general spatial trends.

89. Refer to the revised mitigation measure HYD-2.

90. The range of water level fluctuation in average or above average years will be used to evaluate the potential range of fluctuation in above average years. Should a potential for large fluctuations be identified, mining may be restricted to shallower depths.

91. It is the intention of Measure HYD-2 to mitigate against degradation of Liddell Spring water quality even during very wet years.

92. We are in general agreement with the comment regarding karst formation and the hydrologic role of dolines in the study area. However, we disagree with the concept

that karst pathways represent "known and definite channels," either in a practical sense or in a California water-law sense (IV-C-94). The subsurface karst drainage in the quarry area is highly distributed and complex . See response to comment IV-C-85 for more discussion. See also revised mitigation measure HYD-2.

93. See response to comment IV-C-92.

94. See response to comment IV-C-92.

95. Our observations indicate that ponded water on the quarry floor is due to runoff collected within the quarry during rainstorms, aided by the accumulation of fine-grained sediment, which reduces the permeability of the quarry floor. Nevertheless, the potential for intersecting groundwater in the area shown on cross section A-A', Appendix F, was recognized in the Appendix and is one of the reasons for developing HYD-2.

96. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

97. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

98. Tracer-estimated groundwater travel times ranged up to 3 months, not "one month or less." Annual springflow correlates with three prior years' rainfall (Draft EIR Appendix F Table 21 and Figure 14), indicating that there is indeed significant "carry-over" groundwater storage.

99. The water-resource value of Liddell Spring to the City water supply is described in Draft EIR Appendix F Section 3.5. As stated in Section 5.6.3 of Draft EIR Appendix F, the proposed quarrying may have an ongoing influence on the concentration of nitrate in groundwater. However, rising trends in Liddell Spring nitrate concentration are poorly defined by the available data; Liddell Spring nitrate concentrations rarely peak higher than 10 percent of the drinking-water standard, and never more than 25 percent of the standard; and, identified sources other than the quarry may be as or more responsible. Thus, there is insufficient evidence to conclude that quarrying of the proposed Boundary Expansion Area will significantly worsen conditions regarding Liddell Spring nitrate concentrations. See response to comment III-A-66 for additional discussion.

100. Refer to the revised mitigation measure HYD-3.

101. Comparison between karst conditions in the quarry area and at UCSC has limitations given lack of equivalent UCSC data record and significant differences in site conditions. In addition, turbidity increases in response to rainfall events are a natural occurrence in karst and are not, by themselves, evidence for construction related impacts. However, the technical analysis, as presented in the Draft EIR Appendix F, does conclude that there is a potential for significant impacts from quarrying.

102. See revised mitigation measure HYD-1.

103. No evidence is found for a hydraulic connection between the quarry karstic hydrologic system and San Vicente or Yellow Bank creek watersheds. There are no karstic connections between the quarry and San Vicente Creek or Yellow Bank Creek. These

streams are sourced from granitic or sedimentary rock. The Draft EIR found that quarrying has not had a detectable impact on flow quantities at Liddell Spring and mitigation measures proposed in the EIR will help maintain recharge to the aquifer. See also responses to comments III-A-103 and III-A-104.

104. See response to IV-C-103.

105. It is not clear what the first paragraph of this comment is referring to. The potential mineralization of water percolating through fill placed in the quarry is interpreted as a less than significant impact. Most of the water percolated into the quarry will recharge relatively rapidly through the filter system proposed as part of HYD-1. There are no karstic connections between the quarry and San Vicente Creek , Mill Creek, or the West Branch of Liddell Creek. These areas drain terrain underlain principally by granite or sedimentary rock.

106. Mining in the Boundary Expansion Area will not alter existing hydrology of downstream areas. Runoff from the quarry is presently detained within the quarry, as is proposed.

107. Comment noted. Please see revisions to Section 4.0 Geology and Soils, and Section 5.0 Hydrology and Water Quality in the Final EIR.

108. Comment noted. Please see response to comment IV-C-2.

Comment Letter IV-D
Santa Cruz Chamber of Commerce

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SANTA CRUZ chamber of COMMERCE

October 1, 2007

Todd Sexauer
County of Santa Cruz Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060

Dear Mr. Sexauer:

Please consider the following comments in relation to the draft Environmental Impact Report (EIR) on the CEMEX Limestone Quarry Project.

The operators of the Davenport Cement Plant and limestone quarry have operated at that site for more than a century. They are frequently cited in local and national press for attention to environmental impacts and adapting to environmental concerns. In 2007, the plant received special recognition from the Portland Cement Association for its environmental track record. The plant has also recognized for use of effective emissions reduction technology. They have a reputation within the industry as one of the most pollution-efficient cement manufacturing facilities in the United States. 1

A leading private sector employer in Santa Cruz County, CEMEX Davenport is the County's single largest taxpayer, paying the county approximately $5 million in property taxes annually. 2

CEMEX has responded to the complex and evolving requirements for the use and management of natural resources. Faced with a rapid expansion of regulation and political expectations they have succeeded both in meeting the expectations of the community and as a business in a very competitive environment, suggesting generations of capable management. There are very few companies in Santa Cruz County - or anywhere in the country - that have shown an ability to operate in one place for more than a century. 3

This includes management of its 9,000-plus acre timber reserve to minimize overall fire risk and work with local companies including Big Creek Timber to harvest timber on a conservative, sustainable basis. CEMEX Davenport has also been a leader among private landowners in developing an on-site habitat conservation plan to protect the California red-legged frog. Additionally, the 4

611 Ocean Street, Santa Cruz, CA 95060
(831) 457-3713 http://www.santacruzchamber.org

company is working on a program to protect the dusky-footed woodrat, a California special species of concern. 4

As noted in the draft EIR, CEMEX is actively pursuing measures to effectively mitigate the sedimentation issue related to the City's intake of water from Liddell Spring. Based on the company past performance as a steward of the environment it manages, the Chamber believes that the company is committed to mitigate environmental impacts associated with the proposed extension of the limestone quarry. 5

It seems worth noting that the quarrying activity propose is actually located further away from Liddell Spring than current quarrying operations. CEMEX has also monitored cause-and-effect conditions related to sedimentation and proposed mitigation measures to address turbidity and sedimentation concerns. 6

From the perspective of the community, CEMEX Davenport has invested in supporting community-based organizations in the county. They have been active and generous in their support of regional education and environmental programs such as Save Our Shores, Pacific School, Bonny Doon School, the Bonny Doon Fire Station and other important community organizations. 7

Please consider the broad contribution of the CEMEX Davenport facility and its importance as a member of the regional economic base as well as its history and commitments in addressing and mitigation environmental impacts of its operations. We support the company's permit application and its effort to address issues identified in the EIR. 8

Sincerely,

William R. Tysseling
Executive Director
Santa Cruz Chamber of Commerce

Response to Comment Letter IV-D
Santa Cruz Chamber of Commerce

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
2. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
3. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
4. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
5. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
6. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
7. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
8. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

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Comment Letter IV-E
Big Creek Lumber Company

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BIG CREEK

"Growing Redwoods for the Future"

IV-E

2007 OCT 1 PM 12 32

September 26, 2007

Todd Sexauer, Environmental Planner
County Building, 4th Floor
701 Ocean Street
Santa Cruz, CA 95060

RE: Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment Draft Environmental Impact Report

Dear Mr. Sexauer,

Big Creek Lumber Company supports the Bonny Doon Limestone Quarry Boundary Expansion Project and the associated Draft Environmental Impact Report 1
(DEIR). Our company has more than sixty years of first hand experience interacting with the owners of the Davenport Cement Plant, including Cemex, the current owner.

Santa Cruz County is fortunate to have the Davenport Cement Plant as one of its long-standing businesses. Not only does the Cemex Davenport facility provide a critical 2
product that is used by everyone, the new owners are carrying on a long tradition of responsible land stewardship.

We have reviewed the DEIR and find it detailed and thorough. Big Creek would 3
like to offer a broader environmental and economic perspective, one which we believe is of considerable relevance to the county.

Portland Cement, (the finished product produced at the Davenport Cement Plant), is one of the fundamental building blocks of modern civilization. The list of applications 4
is practically endless, but one needs look no further than hospitals, roads and schools to understand the importance of this material. The fact that that it can be produced locally is something we all should support.

During a previous conversation with a cement plant representative, I learned that South Korean manufacturers of Portland cement are able to manufacture the product, ship it across the Pacific Ocean and sell it for less than it can be produced locally. There are many reasons for this, but one of the primary factors is the dramatic variation in environmental regulation and the costs associated with such regulations. 5

There is something terribly wrong with this dynamic. The environmental consequences of shipping material 5,600 miles in a freighter are enormous. The consequences include burning huge amounts of fossil fuel, the manufacture of the freighter in the first place, not to mention the fact that the cement is manufactured under less protective environmental regulations.

The natural resource that is the subject of this DEIR is only 3 miles from the manufacturing facility. Santa Cruz County has an opportunity to think globally while acting locally by doing everything within reason to support the continued operation of the Davenport Cement Plant. Conversely, if the plant ceases operation, not one less cubic yard of Portland cement will be produced worldwide. The production will be shipped 6
elsewhere, with the extreme likelihood that it will be manufactured under less stringent environmental standards. As consumers of cement, Santa Cruz residents have a moral responsibility to ensure that the product we use is manufactured using the highest standards. There is no better way to do this than supporting the Davenport plant, thereby guaranteeing that we retain local control.

There is another significant consideration regarding the future of the Davenport facility: Economics. It is my understanding that for decades the Davenport Cement Plant has been one of the largest taxpayers in Santa Cruz County. Given the ongoing financial problems experienced by the county, we can ill-afford to loose this significant tax 7
revenue. The tax loss would be exacerbated by the concurrent loss of many high paying jobs should the cement plant be forced to close because they are not granted access to the needed raw material.

Another significant consideration is the direct and indirect economic support that the Davenport plant provides for the county and particularly the residents of the town of Davenport. The Cement Plant currently supplies water to the town of Davenport. They do not charge for the water. Additionally, they pay half of the operating costs for treatment of this water and half of the maintenance costs.

The Davenport Cement Plant is a longtime financial contributor to both Bonny 8
Doon Elementary School and the Pacific School in Davenport. I am also aware that the company contributes many thousands of dollars to various charitable, environmental and other non-governmental organizations.

It is unclear whether county government would be responsible for covering any of these contributions, should the Davenport Cement Plant close. However, it is fair to say that the loss of such contributions would eventually impact county revenue and resources.

Over the years, I have heard ongoing criticism of the Davenport Cement Plant and its various owners. This criticism primarily comes from a small handful of residents who seek to have the plant shut down completely. Over the course of time I have never heard these individuals offer any solutions to the serious economic and environmental consequences that would result in the abandonment of the manufacturing facility or the 9
lands under current Cement Plant Ownership. Turning the land into open space would be fraught with environmental consequences, which are too numerous to elaborate in this correspondence. Losing the business, employees, income and sales tax, as well as taking the lands off the property tax roles would be an economic catastrophe for Santa Cruz County.

I urge the county to consider the Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment Draft Environmental Impact Report rationally, and to consider all the potential long-term implications of the 10
continuing operation of this facility.

I believe you will come to the conclusion that not only does it make economic sense to support the Cement Plant's continued operation, from a global environmental perspective, it is the responsible thing to do.

I appreciate your consideration of these comments and look forward to continuing participation in the process.

Sincerely,

Homer T, (Bud) McCrary
Vice President

Responses to Comment Letter IV-E
Big Creek Lumber Company

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
2. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
3. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
4. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
5. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
6. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
7. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
8. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
9. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
10. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

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Comment Letter IV-F
Boilermakers-Iron Shipbuilders, Blacksmiths-Forgers & Helpers

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International Brotherhood Of
Boilermakers-Iron Shipbuilders Blacksmiths-Forgers & Helpers

Carey B. Allen
Director, CLGAW Division Services
P.O. Box 813
Cloverdale, IN 46120

Office (765) 795-6418
Fax (765) 795-5252
e-mail callen@boilermakers.org

September 30, 2007

Mr. Todd Sexauer
County of Santa Cruz, Planning Department
701 Ocean Street, 4th floor
Santa Cruz, CA 95060

Dear Mr. Sexauer:

I am writing to offer comments on the draft Environmental Impact Report (EIR) related to the CEMEX Limestone Quarry Expansion Project. In Short, Santa Cruz County lacks the kind of economic opportunities that the CEMEX quarry and plant represent. The County has a critical lack of employment opportunities for skilled trade's jobs which our members must have to remain engaged in the County's economy. Technology, government and retail businesses don't make the economy in Santa Cruz whole and don't offer jobs to our members. 1

It makes perfect sense that a cement operation that's been in operation for 100 years – and its quarry, operated for 40 years – should continue to be upgraded and operated. Why? Someone will develop the limestone and make the cement the region demands. The environmental impact of doing this at the existing facility and quarry makes a lot more sense than developing a new source. Allowing the material to be imported will cost our members their jobs. If we lose the plant and the quarry, the County, and the Boilermakers Union will lose 100 union jobs and the regional Santa Cruz economy will be further hollowed-out. The jobs at the top and the jobs at the bottom of the County's economy will remain but the critical jobs in the middle will continue to disappear. 2

This is simple, if the plant doesn't have adequate limestone supply for its future, our members will lose their jobs. Based on everything you know about CEMEX's environmental performance at the quarry, there is no reason this permit and EIR shouldn't be approved. 3

The jobs at the plant offer roughly 75 of our member's important jobs. In all, union workers and professional staff represent about 125 Santa Cruz County jobs. CEMEX provides more than 1000 jobs in northern California. The cement industry is an essential part of the economy. It provides materials for highways, infrastructure, housing and commercial projects. 4

CEMEX has made a good effort to forward a workable proposal which addresses the city's concerns about its Liddell Spring water supply. There are no new issues in the EIR that raises concerns. Therefore, I respectfully request that the EIR and permit be approved. 5

Sincerely

Carey B. Allen, Director
CLGAW Division Services
International Brotherhood of Boilermakers, AFL-CIO

Responses to Comment Letter IV-F
Boilermakers-Iron Shipbuilders, Blacksmiths-Forgers & Helpers

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
2. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
3. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
4. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
5. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

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Comment Letter IV-G
Rural Bonny Doon Association

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Rural Bonny Doon Association
102 Sunlit Lane
Bonny Doon, CA 95060

Sept. 28, 2007

Todd Sexauer
County of Santa Cruz
Planning Department
701 Ocean Street, 4th floor
Santa Cruz, CA 95060

Dear Mr. Sexauer,

Regarding the draft Environmental Impact Report (DEIR) for the expansion of the Cemex Limestone Quarry in Bonny Doon.

We believe that the DEIR is deficient in some areas, most significantly regarding the potential impacts on Liddell Spring, which is *a major source of water for the City of Santa Cruz*. In fact, it is, according to the City Water Dept., the purest and most dependable source, and operates with little maintenance. Any negative impacts on this source will severely affect City Water customers, who have few, if any, dependable water source alternatives. 1

We are concerned that if the quarry expansion does indeed reduce the quality and/or quantity of water from Liddell Spring, the city may be forced to try to obtain more water from Majors and Laguna creeks in Bonny Doon, which could have lasting negative impacts on both private property owners who draw their water from these streams, and on fish and other wildlife dependent on them. In addition, North Coast farmers who draw "raw" water from North Coast streams could potentially be impacted if Liddell Spring production is reduced or halted in the dry months. All these possible impacts have not been studied in the DEIR. 2

Therefore it is of utmost importance that there be very strong assurances that the quarry expansion will not negatively affect Liddell Spring. Unfortunately, that is not the case. In fact, the DEIR states specifically that the quantity and quality of the water that flows into Liddell Creek and Liddell Spring is potentially affected by clearing and mining the Boundary Expansion Area. Studies have shown beyond a doubt that turbidity in Liddell Spring is affected by existing quarry activity. The implementation of key mitigations HYD-1 and 2 are far from guarantees that Liddell Spring won't be negatively and significantly impacted. Quoting from the DEIR: *"In any event, potentially significant impacts to water production from Liddell Spring may occur even with implementation of measures HYD-1 and HYD-2..."* Once the Boundary Expansion Area is mined, if it turns out that Liddell Spring is harmed, like Humpty-Dumpty, it cannot be put together again. 3

That brings us to HYD-3, which is the only mitigation that could reduce impacts to a lower than significant level. We believe that this mitigation is also less than reassuring in its effectiveness of guaranteeing no harm to Liddell Spring. It doesn't deal with all the potential impacts, including production and recharge area loss and several others. Furthermore, it is based on a mutual agreed upon pact being worked out between the City of Santa Cruz and Cemex, which in fact may never be achieved. If that is the case, HYD-3 is moot. We saw in the recent case of the City and County of Santa Cruz and CLUE/RBDA vs. University of California-Santa Cruz regarding the EIR for its 2005-2020 Long Range Development Plan that the judge voided the section dealing with water use because it was based on the successful completion of a desalination plant, an event with perhaps an equally speculative outcome which could take years to work out and implement. 4

HYD-3 also speculates that all the water resources impacted by quarry operations
can be economically and environmentally feasibly corrected, while in fact that may not
be the case. It is critical to bear in mind that while quarry operations may be extended by
three years by the expansion, as forecast in the DEIR, the water impacts could be 5
impacted forever. Liddell Spring will continue to be an important water source for the City
of Santa Cruz in perpetuity. What will be the cumulative costs of mitigating these impacts
over the next 20, 50 or even 100 years? Who will pay them once the Cemex operation
ceases?

We also question whether HYD-3 considers the legal interests of other regulatory
entities that have jurisdiction over the Clean Water Act (CWA), California Fish and Game
Code, the Porter-Cologne Water Quality Control Act, the California Water Code and the 6
state and federal Endangered Species Act. These should be dealt with before the final
EIR is approved.

If indeed there are increased sediment levels in Liddell Creek from quarrying
activities, there are potentially significant harmful effects on stream habitat for steelhead 7
that may not be able to be mitigated.

We also are very concerned about the possible interception of the water table by the
quarry expansion. We recognize that Cemex is very anxious not to do this, but
recognizes that the possibility exists because of the constantly changing height of the
table and the dynamic nature of the karst formations through which the water flows. As
the DEIR states (page 5-27): *"Without long term monitoring, the maximum ground water
levels are not known with certainty...Other researchers have described ground water
levels fluctuating as much as 63 feet in 20 days."* While Cemex plans to monitor the 8
table height with wells, it is far from a guarantee that the slender 20 foot margin of safety
won't be breached. If that happens, it will have an unknown, and possibly deleterious
and permanent affect on Liddell Spring. Because of that, we recommend that quarrying
be limited to a 50 foot margin above the water table.

Another failing of the DEIR is that it does not analyze climate change related impacts
of the quarry expansion. In light of this increasingly dire situation, this is an oversight that 9
must be addressed.

A third area of the DEIR that we feel should be more definitively studied is the
potential increase in noise levels at neighboring properties. More extensive ground test
simulations would help assure the Expansion Area's neighbors that noise levels would
be under the legal limits, both from blasting and other quarry activity. 10

The DEIR states (Section 8.3.2) that during site preparation activities the noise levels
on parcels adjoining the Expansion Area will routinely exceed 75 dBA., which is above
the 60dBA L25 standard set forth in Mining Regulation 16.54.050(d), Since the site
preparation will take many months, this is a significant impact, yet no mitigation is
offered.

Respectfully yours,
Ted Benhari
Chairman, Rural Bonny Doon Association

Responses to Comment Letter IV.G
Rural Bonny Doon Association

1. Liddell Spring continues to be the City's purest and most dependable water source and operates with little maintenance. The severity of potential impacts to City water customers is uncertain given that the City has not quantified the treatment and production costs associated with springflow turbidity to date. The City has adequate treatment capacity and the overall supply of water has a low probability of being adversely affected. Based on the available data and a review of all studies completed to date regarding turbidity at Liddell Spring, the quarry's contribution to Liddell Spring turbidity appears to be of little importance in terms of quality, reliability and treatment cost. Based on the available data there is no evidence that turnouts have become more frequent or lengthy due to elevated turbidity. The available data shows no loss of production. On the contrary, Liddell Spring improvements resulting from the permit process have allowed more efficient management of this water source to maximize production.

2. The Draft EIR does address the potential for the quarry expansion to adversely affect the quantity and quality of water from Liddell Spring. Technical Appendix F concludes that the proposed quarry expansion could have a significant impact on turbidity at Liddell Spring. Appendix F further concludes that there has been no apparent decline in the quantity of Liddell Spring discharge as a result of quarrying. Because the City has adequate turbidity treatment capacity, the overall supply of water has a low probability of being adversely affected. Other than short duration, minor turbidity spikes associated with some quarry blasting, the potential for elevated turbidity occurs primarily during the wet season. Thus, it is highly unlikely that production will be reduced or halted during the dry season. See also response to comment IV-G-5.

3. See revised mitigation measures HYD-1 and HYD-3.

4. See revised mitigation measures HYD-1 and HYD-3.

5. See revised mitigation measures HYD-1 and HYD-3. The component of the total turbidity at the spring contributed by the existing quarry operation cannot be quantified. However, there is no evidence that turbidity caused by the existing quarry operation has resulted in any actual loss of water to the City Water Department. The available data indicate that any impact on the City water supply source at Liddell Spring as a result of quarry operations is limited to potential increased treatment cost associated with an unknown, but likely very small, increment of poorer quality water. Even this conclusion appears to be of little importance, however, because there has been no loss of production and all of the water produced from Liddell Spring can be treated at the City's Graham Hill Water Treatment Plant. Any incremental increase in treatment costs attributable to poorer quality water from Liddell Spring has not been quantified. Nonetheless, the 1964 Agreement between the City of Santa Cruz and the quarry operator provides mutually agreed-upon standards for judging turbidity increases. For water exceeding these turbidity levels, the agreement requires some form of mitigation or compensation to the City. With implementation of Mitigation

Measures HYD-1 and HYD-3 the proposed quarry expansion would have a similar less than significant impact on the quality and quantity of Liddell Spring water.

It would be impossible to verify if the quarry's contribution to spring turbidity has been rectified because available data on pre-quarry water quality is not adequate for before-and-after comparison. Therefore, it is not possible to predict the endpoint of the period of presumed or actual water quality deterioration. The presumption in the 1964 Agreement is that turbidity impacts persist as long as water quality does not meet the standards in the agreement. However, a reasonable endpoint could be as long as quarry operations continue or until the site is reclaimed. Reclamation of the quarry will include a combined process of land treatment that will minimize the generation of sediment that could become a component of turbidity at the spring. The process will include, grading, resoiling, revegetation, soil compaction, stabilization, and other measures. A conservative assumption would be to define the period of deterioration as continuing until the quarry is reclaimed.

6. See revised mitigation measure HYD-3.

7. The proposed mitigation measures will reduce the potential for sedimentation impacts downstream to a less than significant level. The component of the total turbidity at the spring contributed by the quarry operation cannot be quantified. However, the available data indicate that any impact on the Liddell Spring as a result of quarry operations is likely limited to a very small increment of poorer quality water. Liddell Spring flow bypasses the City diversion (flows down the natural channel) during high flows and turnouts. Reasons for turnouts are elevated turbidity associated with rainfall or maintenance. Variable portions of high flows and rainfall-related turnouts would contain elevated turbidity, but would also be associated with elevated turbidity in receiving waters (During rainfall events, creek discharge and turbidity levels naturally increase because the Liddell Creek receives turbid runoff water from other sources as well). Spring flow turned out for maintenance is not associated with elevated turbidity. With the proposed mitigations, the Draft EIR considers downstream impacts of elevated turbidity related to quarry operations in Liddell Spring flow bypassing the City diversion or in Plant Spring flow to be less than significant. See revised mitigation measures HYD-1 and HYD-3.

8. See revised mitigation measure HYD-2. See also response to comment IV-C-85.

9. A discussion on global climate change has been added to the Final EIR (see section 11.4.3, Assessment of Cumulative Impacts). The proposed quarry expansion does not entail changes in water use significantly susceptible to the effects of climatic change within the proposed operational period. Trends exhibited by Santa Cruz County historical records indicate warming of 0.1° to 0.2° F per decade (mostly from rising nighttime temperatures) and rainfall increasing 1 to 2 percent per decade (N.M. Johnson, personal files). The quarry's continued diversion of 21 gpm from Plant Spring during the less than 20-year life of the expanded quarry is unlikely to be impacted significantly, or significantly contribute to other cumulative impacts, as a result of climate change. The effects of climatic change on discharge and sediment released from the quarry's surface drainage system are not within the Draft EIR scope (see response to comment I-A-1).

10. As required pursuant to the existing permit the quarry operator is required to annually monitor noise levels to verify that equipment noise remains consistent with noise levels that were the basis of the 1996 EIR, and that noise levels at the property lines does not exceed the standards in the Mining Regulations. Amending the permit to include the expansion project would not change this permit condition; therefore, noise monitoring will continue during mining of the expansion area.

    The EIR acknowledges that property line noise level standards would be exceeded during removal of overburden along the northern property line. Mining Regulations Section 16.54.050(c) would allow the Planning Commission to approve a higher noise level if the increase in noise level is from construction related activity, the noise is generated only on a specified temporary basis and all neighbors, within 1,000 feet of the property, have been notified in writing of the increase in noise level by the operator. Staff would recommend the Planning Commission approve a higher property line noise level along the north property line for the following reasons: 1) Overburden removal operations would be temporary and progress in a downward direction below the shielding effects of the quarry rim, 2) The buffer to the nearest sensitive receptor contains substantial vegetation, which provides sound attenuation and, 3) The property to the north is owned by the quarry operator, which provides an effective buffer of over 1,000 feet to the nearest property not owned by CEMEX. Therefore, no neighbor notification would be required.

    As required pursuant to the existing mining permit, the quarry monitors each blast with a seismograph at the quarry and, occasionally, at neighboring residences. A qualified professional consultant to the quarry reviews the data and provides a summary report each year. Conclusions each year have been consistent: provided that no major changes are made to the blast design or procedures, there is no risk of any blast-related damage to structures located beyond the boundaries of the quarry. This conclusion is based on maximum vibration and air blast levels established by Federal regulations for residential structures. However, neighbors of the Limestone Quarry do hear and feel blasts. In 2004 several blast–related complaints were received by the Planning Department, for example. Based on the annual report for 2004 the maximum-recorded ground vibration, while in the distinctly perceptible range based on studies of human response to blast vibration, was still a factor of 15 below the Federal level for residential structures. The existing blasting regime and monitoring program would continue in the expansion area.

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Comment Letter IV-H
Robert Walker, CEMEX

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From: Robert Walker [robert.walker@cemex.com]
Sent: Tuesday, July 31, 2007 10:35 AM
To: Claudia Slater; Todd Sexauer
Subject: HYD-3

Claudia and Todd:

In our very quick cursory review of the DEIR, we find that there is a statement that is not
accurate which has potential to result in significant impacts to CEMEX. Specifically,
the mis-quote suggests that I indicate CEMEX will install a stand-alone treatment system 1
at LIddell Spring to reduce turbidity to 1 NTU maximum as a mitigation measure. Please
be advised that this must a typo or there is some confusion as I never would have made
this statement since it would require a significant complex water treatment system to
reduce turbidity to 1 NTU at the spring. Additionally, the date of the statement also has
a typo as it shows that this statement is in the future -- October 10, 2007. 2

We are working with the City Water Department and thus far are considering installing a
system that will reduce the turbidity to 25 NTU or less as suggested by the City. Since
we are still working the details out with the City, the mitigation measure should only state 3
that we will be entering into an agreement with the City that outlines the details for
installing a sediment/turbidity treatment system at Liddell Spring.

CEMEX will provide these comments to the County in our formal written comments on
the DEIR. In the meanwhile, please be aware that the statement in the DEIR relating to 4
this issue is wrong and may cause some confusion.

Thank you

Rob

Robert C. Walker
Quarry Manager - Davenport Plant - United States of America
Office : +1(831)458-5711 , Fax: +1(831)458-5779 , Mobile: +1(831)359-3885
Address: 700 Highway 1 Davenport, CA 95017
E-Mail: robert.walker@cemex.com
www.cemexusa.com

Responses to Comment Letter IV-H
Robert Walker, CEMEX

1. Comment noted. See revised mitigation measure HYD-3 in Section 5.4 of the Final EIR. The inaccurate statement has been removed from the text.
2. Comment noted. See revised mitigation measure HYD-3 in Section 5.4 of the Final EIR. The inaccurate date has been removed from the text.
3. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
4. Comment noted. Please see responses to comment letter IV-A.

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Comment Letter IV-I
International Association of Machinists & Aerospace Workers

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INTERNATIONAL ASSOCIATION OF MACHINISTS & AEROSPACE WORKERS
LOCAL LODGE 93
Phone (408) 723-4900
Suite 105
2102 Almaden Road
San Jose, CA 95125 - 2104

Affiliated with
AFL-CIO

October 1, 2007

Post-it® Fax Note 7671	Date 10-1-07	# of pages ▸ 1
To TODD SEXAUER	From SAM M. SAIU	
Co./Dept. S. CRUZ Co.	Co. IAMAW Local 93	
Phone # PLANNING DEPT	Phone # (408) 723-4900	
Fax # (831) 454-2131	Fax # (408) 448-4618	

Todd Sexauer
County of Santa Cruz Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060

Dear Mr. Sexauer:

I am writing to you to offer my comments on the recently filed draft Environmental Impact Report (EIR) for the CEMEX Limestone Quarry Expansion Project, prepared for the County of Santa Cruz.

CEMEX is a critical resource for the regional economy in Santa Cruz County, and has been for more than 100 years. The CEMEX Davenport plant provides approximately 125 jobs to the community. The International Association of Machinists and Aerospace Workers and the International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers, and Helpers; Cement, Lime, Gypsum and Allied Workers Division are two of the unions represented at CEMEX Davenport. These important jobs offer living wages and benefits. Also, many of these jobs at the plant involve a trained workforce and provide important opportunities for those that may not necessarily have had the opportunity to go to college. CEMEX Davenport's economic contributions to the region results in more than five million in taxes and regulatory fees as Santa Cruz County's leading property taxpayer. 1

I am happy to speak with you further about my comments and about the environmental impact report. I can be reached at 408-723-4900. Thank you for your attention to this matter. I appreciate your time and consideration.

Sincerely,

Sam M. Saiu

Sam M. Saiu
Business Representative
Local Lodge 93, IAMAW

Response to Comment Letter IV-I
International Association of Machinists & Aerospace Workers

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

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Comment Letter V-A
Barbara McCrary, Resident

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27 September 2007

Todd Sexauer
Santa Cruz Planning Dept.
701 Ocean St.
Santa Cruz, CA 95060

Dear Todd,

Consider this public input re: DEIR on the Cemex Bonny Doon quarry.

I was invited to take a tour of the quarry on Tuesday, September 25. I found the facility quiet, considering the operation, and dust was being managed by sprinkling the ground with a water truck. I believe there is some opposition to the 17+ acre expansion, but as I see it, there is already a quarry there and there doesn't seem to be any immediate impact on anything else should the expansion to take place. 1

There are no obvious residences nearby, and there isn't enough noise to be considered obnoxious. I suppose the two blasts a week would be noticeable, but I can't imagine people wouldn't be able to tolerate that for brief periods of time. 2

I support the Cemex, Inc. operation for the following reasons:

1. Cement is a necessary building material in today's society.
2. Cemex pays a large amount of taxes, which Santa Cruz County needs.
3. Cemex is a critical support for the community of Davenport.
4. It is probable that Davenport as a town would not have come into existence if the cement plant had not been established there over 100 years ago.
5. Cemex donated the land for Davenport's fire station, it donates thousands of dollars every year to Pacific School, it provides water for the town and it incinerates the town's sewage. 3
6. While some say Cemex could import limestone from elsewhere so as to continue operations, consider the cost and the use of vast amounts of petroleum fuels to transport it to Davenport. There is now much effort put into saving energy and reducing our dependency on foreign oil. Having to import limestone or cement from elsewhere would not help that effort.
7. Importing limestone or cement from overseas would be sending U.S. dollars out of country. Our trade deficit is bad enough as it is.
8. Cemex provides jobs for many people, not only direct employees, but also subcontractors, truckers and suppliers.

Consider the history of the company's contribution to the construction we now consider part of America. A few examples:

1. Boulder (Hoover) Dam
2. Panama Canal 4
3. Golden Gate Bridge
4. San Francisco Bay Bridge
5. University of California, Santa Cruz

6. And last, but not least, the foundations, sidewalks and highways that are an integral part of our homes and society. 4

I have noticed that there are the same few people who constantly object to businesses they feel are "destroying" the environment. These people are very vocal, but they do not represent the majority. I think you would find that the majority, were there to be a canvass of their opinions, would support the company that has supported Davenport and its citizens for the past century. We cannot live in today's society without taking something from the earth. If we "preserved" the earth in its entirety, we would all be living in caves with no light but the sun. We would be out hunting animals with spears. And our life span would be about 35 years. 5

Think about this.

Sincerely,

Barbara McCrary

Barbara McCrary
Swanton resident for 57 years

Responses to Comment Letter V-A
Barbara McCrary, Resident

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
2. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
3. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
4. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
5. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

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Comment Letter V-B
Milton and Nancy Howe, Residents

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Milton W. Howe
4141 Smith Grade
Santa Cruz, CA 95060

28 September 2007

RE: DEIR Bonny Doon Quarry Expansion

Todd Sexauer
County of Santa Cruz Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060

Mr. Sexauer,

We object to the quarry expansion.

Our opposition is based on the fact that the DEIR and studies do not address the affect of increased noise levels on the quality of life of the nearby residents. The noise from expanded quarry operations, especially the clearing of the 'overburden,' will greatly impact the very nature of our environment – turning it from the natural forest sounds to that of an industrial neighborhood. The DEIR states that the impact of noise it "Less than Significant" – this clearly is written by someone who does not live next to a quarry. No – the noise will not burst our eardrums, but it is significant and it will be offensive and will invade our house. 1

We have been residents on Smith Grade, proximal to the quarry, for 34 years. We located here for the natural beauty and tranquility of the region and were aware of the then existent quarry operations. Now retired, we spend a great deal of time outdoors in our garden and the current quarry operations are noticeable but not offensive. With an expansion of the quarry we will face huge increases in noise levels from chain-sawing, trucking, blasting, mechanical loaders, the OSHA required beeping sound of reversing vehicles. etc.; this noise is contrary to one of the main reasons we live here. 2

Of course there are other reasons to oppose the expansion, eg. clear-cutting of forests is ecologically unsound and not an accepted practice. 3

However our strong opposition is based primarily on the increased industrial noise levels which will accompany quarry expansion; noise which is incompatible the environment of Bonny Doon and which will degrade our quality of life. 4

Please consider the people resident nearby and reject the quarry expansion. 5

Sincerely,

Milton W. & Nancy M. Howe

Responses to Comment Letter V-B
Milton and Nancy Howe, Residents

1. The Howe residence is located approximately 1,680 feet from the eastern edge of the Boundary Expansion Area and approximately 2,100 feet from the edge of the existing active mining area. Section 8.1.1.3 of the Draft EIR states, "In actual experience, sound is often more attenuated because of non-reflective ground, intervening dense vegetation, or topographic and structural barriers. With line-of-sight transmission in open country, attenuation proves to be somewhat greater than theoretical loss due to absorption of soft ground and approaches 9 dB per doubling of distance for point sources and 4.5 db for line sources. As stated in Section 8.3.3 of the Draft EIR, "The five easterly residences (R1-R5) are now 1,650 to 2,000 feet from the active mining; the project would reduce that distance by 300 to 400 feet or roughly 20 percent of the present distance. Theoretically, the decrease in sound attenuation due to reducing distance by 20 percent is 2 to 3 dB; this level of increase is not usually considered significant. Because of the distance and shielding effect of the quarry configuration, these four residences would not be significantly affected by noise from expanded quarry operations." Your residence would experience a similar increase in the decibel level of 2 or 3 decibels. However, due to the distance from the proposed Boundary Expansion Area, noise impacts would not be considered significant at the Howe residence.
2. Comment noted. Please see response to comment V-B-1.
3. Comment nosed. Section 9.2 of the Draft EIR states, "The Boundary Expansion Area is part of the larger Quarry parcel (063-132-08). Current zoning is M-3, which allows timber harvest. The County Significant Tree Removal permit program would not apply to the commercial harvest. …Timber harvest in Santa Cruz County is subject to the jurisdiction of the California Department of Forestry (CDF). …the proposed Boundary Expansion Area would require both a Timberland Conversion Permit and a Timber Harvest Plan."
4. Comment noted. Please see response to comment V-B-1.
5. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

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Comment Letter V-C
David S. Kossack, Ph.D., Resident

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V-C

David S. Kossack, Ph. D.
P. O. Box 268
Davenport, CA 95017

October 1, 2007
(831) 427-3733
dkossack@cruzio.com

Mr. Todd Sexauer
Santa Cruz County Planning Department
701 Ocean St. 4th Floor
Santa Cruz, CA 95060
Todd.sexauer@co.santa-cruz.ca.us

RE: Bonny Doon Quarry Expansion DEIR

Dear Mr. Sexauer,

Thank you for the opportunity to comment on the Bonny Doon Limestone Quarry
Boundary Expansion Project and Reclamation Plan Amendment Draft Environmental
Impact Report State Clearinghouse 2001112125. As you are likely aware several other
concerned parties are commenting on the vast array of growth inducing and cumulative
impact associated with this project. Additional concerns include project fragmentation
(a.k.a. piecemeal development) as a result of this document's failure to discuss the
Davenport cement plant, inseparable components in the manufacture of cement, and 1
proposed plans at this location. For the sake of brevity I would like to include the
concerns raised by those parties by reference, including the concerns raised by the City of
Santa Cruz Water Department, though not necessarily their proposed solutions. However,
I would like to raise several concerns that I feel are particularly important.

To say that "Although the proposed project indirectly supplies materials that may be used
in regional growth, the project itself does not induce growth." is more than a little
misleading. This project clearly supplies materials directly to regional growth and many 2
projects in the San Francisco Bay Area and Sacramento Valley that use cement from
Davenport simply would not happen if this source were not available. This project has
growth inducing and cumulative impacts.

If the proposed expansion of the Limestone Quarry is approved, extending mining by
three years it will also extend operations at the Shale Quarry and at the Davenport cement
plant by ~3 years. Therefore there will be continued and ongoing cumulative impacts 3
with respect to transportation, water and air quality in Davenport as well as water and
habitat impacts in the San Vicente Creek watershed .

The DEIR correctly points out that coho salmon spawn in San Vicente Creek and that the
watershed of the Shale Quarry drains into San Vicente Creek. However the DEIR fails to
point out that, as in Liddell Creek, the sediment catch basins within the Shale Quarry 4
have a history of breaching sending a torrent of sediment into critical habitat for coho,
steelhead, red-legged frogs and other species of the Santa Cruz Mountains.

Streambed Alteration Agreements (SAA) have been issued to the cement plant in the past
for the sediment catch basins associated with the Limestone Quarry. It is unclear as to the 5

present status of these permits. (i.e., when do the SAA's expire). There are also numerous other in-stream structures on cement plant properties that should require SAA's as well
that are associated with the Cemex properties. Please provide the SAA status for these 5
structures including the sediment catch basins associated with the Shale Quarry; diversion dams on San Vicente and Mill Creeks; and the landfill on an unnamed stream that acts as a dam forming the reservoir identified by Water Rights in their report of December 2001. All of the structures identified above represent in-stream water storage and barriers to fish passage. Before any permit for an expansion or continued mining
under this DEIR these in-stream structures should be removed and services provided by 6
off-stream storage.

11.5.5 Traffic/Transportation

> "Quarried materials are transported to the cement plant in Davenport by a conveyor belt. Mining the Boundray Expansion Area would not generate new traffic on local roads."

If the conveyor belt through Davenport is the only way to move material out of the Quarries, then by truck and/or rail other destinations, then the Davenport Cement Plant must be considered as part of this DEIR. Cement truck traffic is an ongoing issue on
Highway 1 in Santa Cruz and San Mateo Counties and Highway 17. If the present DEIR 7
is approved then these traffic impacts would also continue for an additional 3 years. Despite the EIRs claim to the contrary expansion of the plant (i.e., the Dome Project) continues to appear in discussion associated with environmental permits (e.g., USFWS letter dated December 15, 2006 to Louis Schipper, Cemex:

> The Dome Project and Implementation of the Closure Plan for the Cement Kiln Dust Disposal Pile, and Comments on the Draft Habitat Conservation Plan for the California Red-legged Frog for the Davenport Cement Plant, Santa Cruz County, California.).

There are growth inducing and cumulative impacts at the Davenport Cement Plant associated with the expansion of the Limestone Quarry. Transportation/traffic impacts were not assessed when the County increased annual production rates; it does need to be
assessed now. If the Davenport Cement Plant is not integral to the Quarry operations then 8
the DEIR needs to identify where and how limestone is to be transported the Davenport end of the conveyor belt, and mitigations for unstated transportation impacts.

Water deals with the City of Santa Cruz Water Department:

Page 159 of the DEIR's Technical Appendix states "***Potentially significant impacts to water productions from Liddell Spring may be unavoidable given the interconnectivity and complexity of the karst groundwater system, the unavoidable generation of***
sediment by quarry operations and the potentially unavoidable capture of significant 9
precipitation and runoff within mined areas." The Technical Appendix goes on to rather open-endedly state, "***A suitable package of relatively indirect mitigations measures (e.g., treatment, water supply replacement) will require negotiation between RMC and the City.***"

This statement implies postponed mitigation, off-site mitigation, and project
fragmentation. Potential mitigations measures capable of addressing the loss of water
quantity and quality are likely to be of a magnitude in scale equal to, or greater than, the
Quarry expansion project itself in terms of energy consumption, impacts to habitat and 9
protected species, and increase load on water resources that are already over taxed and
their growth inducing and cumulative impacts. Two particular concerns are any attempt
to trade either water from San Vicente Creek and/or promotion of desalination by the
applicant for a sign-off from the City of Santa Cruz Water Department (SCzWD).

As presented on page 3-3, Table 3-1, County policies to Maintain Adequate Streamflows
have designated San Vicente (SVC) as well as Liddell Creeks as "currently utilized at full
capacity, as Critical Water Supply Streams". One of the on-going issues with the cement
plant is their failure to follow through with past and present conditions of approval, need
for regulatory compliance, or other statute relevant to cement plant activities. In the case
of San Vicente Creek, STATE WATER RESOURCES CONTROL BOARD, DIVISION
OF WATER RIGHTS identified in 2001 that more than 35% of the water diverted from
SVC by the cement plant "spilled without beneficial use. The diversion of water without
beneficial use constitutes a waste and unreasonable use of water and an unreasonable 10
method of diversion." It is my understanding that water spilled as waste can not be
perfected. No information has been provided to suggest that effective and permanent
mechanisms to eliminate waste have been implemented for the cement plant's SVC
waterworks. A very real concern is that the cement plant will attempt to trade water
diverted from SVC, that is not put to beneficial use, to the SCzWD in exchange for
dropping any claims of injury to Liddell Springs. Such an egregious transfer of water
would be contrary to the County's Policies, water code, state and federal laws to protect
endanger species and necessary habitat as well as project fragmentation and cumulative
and growth inducing impacts under CEQA.

The DEIR also needs to look as impacts to subsurface water movement, as described for 11
Liddell Springs, for water from these systems that could/would flow into the San Vicente
Creek watershed that could be impacted by quarry activities.

There is also the unstated connection to the SCzWD's yearning to implement
desalination. Any contribution of support direct or indirect for such projects, with their
overwhelming energy, cumulative and growth inducing impacts would frustrate both an
assessment of the present proposed project on its own terms as well as a frustration of the
necessary public discussion of whether desalination is a realistic source of water or just 12
an expensive, energy consuming 'diversion' from the real issue of an over-extended
infrastructure and the need for a sustainable economy. SCzWD may find desal tantalizing
but it will not quench what seems to be an ever increasing thirst. Unfortunately it appears
that SCzWD is leading us down that path with little public review in its 'experiment'
with the U.C. marine lab.

Any agreement between the cement plant and SCzWD needs to be presented *a priori* as a
complete environmental document included as part of the present DEIR for public 13

review, not put together as an unenforceable condition of approval. Mitigation for any impact to water quantity and/or quality needs to include the restoration and permanent protection for habitat protection of Cemex properties on Ben Lomond Mountain including but not limited to those within Rancho San Vicente. A Quit Claim to mining at the San Vicente Quarry and any other mineral rights owned by Cemex associated with the Davenport cement plant (i.e., Rancho San Vicente and Bonny Doon) and surrounding properties should also be a condition of approval. 13

The applicant should be required to post bond capable of ensuring that funds are available to implement conditions of approval; ensure that County staff and facilities are available to carried out approval triggered follow up review (e.g., the infamous five year review) and repair and/or replace damage to resources as a result of a failure to implement conditions of approval. 14

Thank you for this opportunity to comment on the Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment Draft Environmental Impact Report State Clearinghouse 2001112125.

Sincerely

David S. Kossack

Responses to Comment Letter V-C
David S. Kossack, Ph.D., Resident

1. Comment noted. Please see responses to comments V-C-2 through 14.

2. Comment noted. CEQA Section 15126.2(d) defines Growth-inducing Impacts of a project as, "…projects which would remove obstacles to population growth (a major expansion of a waste water treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects." Section 11.3 of the Draft EIR states, "The proposed mining expansion project would not directly result in growth inducing impacts. The project does not include expansion of infrastructure or services that would enable new growth to occur in the project vicinity. Limestone from the quarry is used to make cement products used in the construction industry. …Although the proposed project indirectly supplies materials that may be used in regional growth, the project itself does not induce growth." The proposed project does not "remove obstacles to population growth." The quarry only supplies limestone, one of many raw materials used in the production of Portland cement. The project is not growth inducing.

3. Comment noted. Please see response to comment IV-C-72. The cumulative analysis in the Draft EIR is consistent with CEQA Section 15130. "Where a lead agency is examining a project with an incremental effect that is not *cumulatively considerable*, a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable." The proposed project would not generate new traffic trips and therefore, would not contribute to cumulative traffic (see Appendix A of the Draft EIR). Sections 5.3.4 and 7.3.6 of the Draft EIR address cumulative impacts for air and water quality. No significant impacts would occur. See Appendix E for a discussion of cumulative projects.

4. Ponds in the Shale Quarry have adequate capacity and rarely hold significant quantities of water or, even more rarely, discharge water into downstream watercourses. According to the 1996 EIR the basins have no history of overtopping or failure. Based on Planning Department files and site inspections no such events have occurred since the 1996 EIR. The culvert at the road crossing along San Vicente Creek below Pond 5 is problematic due to reasons inherent to the culvert, not Pond 5.

5. Stream Alteration Agreements between the quarry operator and the California Department of Fish and Game (CDFG) have been completed for the expansion of Disposal Area C and for annual clean out of the settlement ponds. The status of the Stream Alteration Permit for the expansion of the Disposal Area C is discussed in the staff report for the October 8, 2008 Planning Commission review of the existing permit for the mine operation for compliance with conditions of approval (also see response to comment II-C 29). The quarry operator conducts annual cleanout of the settlement ponds as described in the most recent Notice of Lake or Streambed Alteration submitted to CDFG August 31, 2006. As described in the notification the project term for annual cleanout of ponds is 2007 through 2011 and the seasonal work period is August 1 through October 15. Because CDFG did not issue a draft Agreement or

inform the quarry operator that an Agreement is not required by September 29, 2007 the quarry operator may complete the annual pond clean out as described in the Notification without an Agreement. Structures or facilities that may come under the jurisdiction of CDFG associated with the cement plant or on CEMEX properties other than the quarry operation are not within the scope of this EIR.

6. All settlement ponds at the Limestone and Shale quarries (Ponds 1, 2X, 3, 4, 5, 6 and 7) are permitted under the existing Certificate of Compliance and Reclamation Plan Approval 89-0492 for Use Permit 3236-U Parts III and IV, which is based on the 1996 EIR. The suggestion to remove in-stream structures and replace these facilities with off-stream storage is outside the scope of this EIR.
7. Analysis of the Davenport Cement Plant is not within the scope of this EIR. Please see response to comments IV-C-72 and IV-C-2.
8. Please see response to comment V-C-7.
9. See revised mitigation measures HYD-1 through HYD-3 in the Final EIR. No tradeoffs with other water supply sources are proposed or considered.
10. Issues related to the Davenport Cement Plant are not within the scope of this EIR.
11. No hydraulic connection is interpreted between the Liddell Spring and quarry hydrologic system and San Vicente Creek. See responses to comments III-A-103 to III-A-104 for additional discussion.
12. Issues related to the City's plans for desalination are not within the scope of the Draft EIR.
13. See revised mitigation measure HYD-3.
14. In accordance with SMARA and the County's Mining Regulations, a financial assurance made payable to the County, as lead agency, and the California Department of Conservation (DOC) has been submitted by the quarry operator to ensure that adequate reclamation is performed in accordance with the approved Reclamation Plan. The financial assurance is reviewed each year by the County and adjusted, as needed, to account for current conditions. The Planning Department and the DOC, Office of Mine Reclamation approved the 2008 update. The amount of the existing Surety Bond ($3,573,753.00) is executed for an amount in excess of the required amount of the bond based on the updated cost estimate. When the County and DOC are satisfied that the Quarry has completed reclamation pursuant to the approved Reclamation Plan, the financial assurance will be released.

    Prior to approving a financial assurance update for a major amended mining operation (expansion project) the Planning Department will present a review of the amount and type of financial assurance to the Planning Commission in a public hearing. Typically, this would occur within 90 days of approval of the expansion project.

    The existing permit for the mining operation requires that all costs for the County's inspection and review of annual reports and other reports submitted by the mining operator shall be paid by the quarry within 30 days after billing. In the event that future County inspections of the subject property disclose noncompliance with any conditions of the Certificate of Compliance or use Permit 3236-U 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 permit revocation. This existing condition of approval will continue to apply to the expansion project.

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Comment Letter V-D
James Austin, Resident

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September 26, 2007

Mr. Todd Sexauer
Santa Cruz County
Planning Department
701 Ocean Street, 4th floor
Santa Cruz, Ca 95060

RE: DEIR for the Proposed Bonny Doon Limestone Quarry Expansion Project

Dear Mr. Todd Sexauer,

The proposed southward expansion of quarry operations would bring noise sources closer to the community and surrounding homes. The noise levels are already in excess of the threshold as stated in the Industrial Performance Standards of Section 13.10.445 and County General Plan Section 3.6.1. The DEIR conveniently glosses over the noise impact on the surrounding area with terms like "Less than significant" and "No mitigation required". This could not be further from the truth. The noise and dust issues are not adequately addressed in the DEIR. 1

The "Noise impacts on sensitive receptors" are not adequately addressed as requested in the "Notice of Preparation". A financial compensation plan for the adjoining community needs to be put in place and continually monitored. As stated in Section 8.3.5, "The impacts of site preparation would dominate the immediate surroundings", which includes neighborhood residents and community. 2

There are many periods through out the year when the noise threshold as stated in the General Plan is exceeded at nearby residences. This is before the expansion, and the excessive site preparation has begun. Sound levels have never been adequately measured at the properties adjacent to the proposed quarry site. The tests that were made were conveniently done when the machinery was in the bottom of the pit and almost undetectable at nearby homes. It will be many years before the proposed operations will be at that depth. 3

The operators of the quarry have a long history of deception concerning their intentions for expansion. Before I purchased my home in 1976 I visited the plant to find out their future plans. They assured me they would run out of limestone within 10 years and have to close down their operations. Now, over 30 years later, they are still going strong and proposing a major expansion. This dramatic escalation of operations would severely impact the use and enjoyment of our homes and community. These impacts are not adequately identified, analyzed, or mitigated in the DEIR 4

The DEIR Alternatives Analysis (Section 10) is extremely biased in favor of Cemex. There is no mention of the fact that they can import the particular type of limestone they need and that they have been doing so for years. 5

The DEIR offers absolutely no mitigation for the increase in noise levels that will occur. Besides moving considerably closer, they are proposing to take out the hill and remove the old growth redwood forest that is now acting as a noise buffer to the neighboring communities. The DEIR offers extensive mitigation measures for the dusky-footed woodrat, why not for the citizens and residents of the adjoining community? 6

Sincerely,

James Austin
Quarry Neighborhood Resident

Cc: Neal Coonerty, Third District Supervisor for Santa Cruz County

Cc: Ted Benhari, RBDA Board Chair

Responses to Comment Letter V-D
James Austin, Resident

1. The Austin residence is located approximately 1,340 feet from the eastern edge of the Boundary Expansion Area and approximately 1,900 feet from the edge of the existing active mining area (see Table 7-1, R4). Section 8.1.1.3 of the Draft EIR states, "In actual experience, sound is often more attenuated because of non-reflective ground, intervening dense vegetation, or topographic and structural barriers. With line-of-sight transmission in open country, attenuation proves to be somewhat greater than theoretical loss due to absorption of soft ground and approaches 9 dB per doubling of distance for point sources and 4.5 db for line sources. As stated in Section 8.3.3 of the Draft EIR, "The five easterly residences (R1-R5) are now 1,650 to 1,900 feet from the active mining; the project would reduce that distance by 300 to 400 feet or roughly 20 percent of the present distance. Theoretically, the decrease in sound attenuation due to reducing distance by 20 percent is 2 to 3 dB; this level of increase is not usually considered significant. Because of the distance and shielding effect of the quarry configuration, these four residences would not be significantly affected by noise from expanded quarry operations." The Austin residence would experience a similar increase in the decibel level of 2 or 3 decibels. However, due to the distance from the proposed Boundary Expansion Area, noise impacts would not be considered significant at the Austin residence.

2. Comment noted. Please see response to comment V-D-1. Section 8.3.5 of the Draft EIR states, "The sound level perceived at a source is determined mainly by the sound of the loudest, and this case, the closest equipment. The impacts of site preparation would dominate the immediate surroundings and the additional noise from ongoing quarry operation would not be appreciable." "Immediate surroundings" is not referring to neighborhood residents and community. Section 8.3.3 of the Draft EIR states, "Quarry operations and site preparation noise sources comprise individual pieces of heavy equipment producing from 81 to 94 dBA at a reference distance of 50 feet. Taken as a whole, the operations act as a diffuse area source generating an effective source strength of 61 dBA average (Leq) at locations around the edge of the quarry property with line-of-sight noise transmission. …Because the quarry forms benches below steep slopes, the operation is blocked from line-of –sight noise transmission with the quarry rim acting as an effective noise barrier. Field measurements show the typical attenuation reduces quarry operations noise to the 40 to 45 dBA Leq range at points 200 feet back from the rim. As stated in response to comment V-D-1, the Austin residence is located approximately 1,340 feet from the eastern edge of the Boundary Expansion Area. No significant noise impacts are anticipated as stated in the Draft EIR.

3. The Draft EIR specifically analyzes noise impacts to this parcel (R4). Section 8.3.2 of the Draft EIR states, "The closest residences not owned by CEMEX (R3 and R4) are located roughly 1,300 feet east to the Boundary Expansion Area (Table 7-1 of the Draft EIR). Noise levels from site preparation would be in the range of 40 to 55 dBA at these parcels. Site preparation noise at all residences is consistent with the 60 dBA Mining Regulations standard and also consistent with GP/LCP Policy 6.9.1, which requires noise sensitive land developments (occupied by sensitive receptors) to

conform to a noise exposure standard of 60 dB Ldn (day/night average noise level) for outdoor noise. No significant noise impact would occur as stated in the Draft EIR.

4. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

5. As stated in Chapter 1.0 of the Draft EIR, "The County determined that the mining plan expansion, while covered under vested rights, is subject to environmental review under CEQA. The County's authority under vested rights, is described in a letter from County Counsel to the Board dated March 11, 2002.

   "…as previously acknowledged by the County, and out of respect for the vested rights which RMC does possess, and consistent with the County Code, the County will impose additional conditions or restrictions only in the case that the stricter standards are necessary to mitigate a potentially significant environmental impact, and/or to protect public health or safety, and/or to respond to a public nuisance. Should additional limitations be found to be necessary to prevent significant environmental impacts or threats to public health and safety, the risks associated with these impacts must be weighed against the effects of such restrictions on quarry operations to ensure that they do not unreasonably constrain the permit holder from exercising their vested rights."

   The first project objective outlined in Section 2.2 of the Draft EIR is to "expand the mining boundary by approximately 17.1 acres onto the northern two-thirds of the unmined land within the Legal Mining Limit." Importing limestone to the Davenport Cement Plant is not a viable alternative for the Quarry Expansion Project. It would unreasonably constrain the permit holder from exercising their vested rights.

6. Comment noted. Please see response to comments V-D-1 through 3.

Comment Letter V-E
Karen McNally, Resident

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V-E

Karen McNally Comments.txt

From: Karen McNally [karen-mcnally@webtv.net]
Sent: Monday, October 01, 2007 12:00 AM
To: Todd Sexauer
Cc: karen-mcnally@webtv.net
Subject: DEIR for Bonny Doon Quarry

Mr. Todd Sexauer,
Planning Dept,
Santa Cruz County

Dear Mr Sexauer,
I would like to contribute my comments to the "Public Comments" for
the DEIR for the Bonny Doon Quarry Boundary Expansion Project. I am
writing as an interested individual and a resident of Davenport, CA. 1
In particular, I would like to address the geologic study and review by
Nolan, Assoc. I would like to underscore what I believe to be important
health, safety, and environmental concerns revealed by the excellent
report by the Nolan group.
First let me state that I consider that the County would be wise to
adopt the planning premise that an earthquake of MW 7.2 could occur at a
distance of only 4.7 miles with a peak horizontal ground acceleration of
0.46-0.67g at the site during the lifetime of the project [which will
exceed 3 years, including the preparation, quarrying activity, and
reclamation period]. The County should not be calmed by the 400 year
recurrence period for an event of this type on the San Gregorio Fault as
an "average recurrence interval" does not preclude much shorter
interevent periods and even the statistical data set upon which the 2
interval is determined is very limited [Studies are difficult, as large
sections of the fault lie underwater and the best on-land surface
exposures are limited; also, complex fault strands and structures can
occur at the depths of earthquakes, complicating our understanding based
solely on fault surface features. This was clearly revealed along the
San Andreas Fault in 1989]. In short, the County should conservatively
assume that such an event could occur "tomorrow" in order to protect
our health and safety.
The compounding effects of very strong earthquake shaking could
easily include (1)slope failure on the steep gradients being proposed
for the quarry walls, and (2) failure of settlement basins due to
liquefaction. During the 1989 earthquake, much free water was released
along the mountain slopes during the strong shaking. Would it be prudent 3
to consider whether excess water along the proposed steep quarry walls
could act to increase pore fluid pressure along local fractures during
strong shaking, reducing the normal stress of confinement, and
increasing the potential for slope failure?
I also would like to underscore the importance of strong ground motion
amplification along topographic ridges, especially those made from 4
non-engineered fill, as the Basin walls were most likely constructed.
In summary, I would like to strongly recommend that you follow ALL of
the serious recommendations of Nolan Assoc.
in the DEIR for the Bonny Doon Quarry 5
Boundary Expansion Project.
I apologise that I am writing with so little time: I have only just
received a copy of the report, as it was released in summer when many of
us were away until after Labor Day. The seriousness of the proposed
project and the importance and implications of the thoughtful work
presented in the DEIR deserve more of my time, but your comment deadline
is tomorrow and I have no further opportunities to write for now.
Thankyou for your consideration.
Dr. Karen C. McNally
Davenport, CA. 95017
30 Sept 2007

Responses to Comment Letter V-E
Karen McNally, Resident

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
2. Comment noted. Proposed mitigation Measure GEO-1 requires updated seismic stability evaluations and suggests using the criteria highlighted by the commenter. The updated stability evaluation would be submitted to the Planning Department for peer review to ensure appropriate criteria are used in the evaluation.
3. Comment noted. Proposed mitigation Measure GEO-2 requires updated slope stability evaluation for proposed quarry slopes and recommends including appropriate water pressure and seismic loading conditions in the evaluation. The updated stability evaluation would be submitted to the Planning Department for peer review to ensure appropriate criteria are used in the evaluation.
4. Comment noted. Mitigation Measure GEO-2 requires that the slope stability evaluation account for topographic amplification.
5. Comment noted. The peer review of the updated seismic stability and slope stability evaluations would ensure all appropriate design considerations are incorporated into the updated evaluations.

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Comment Letter V-F
Joan Hellenthal, Resident

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Mr. Todd Sexaur,
Planning Department
Of Santa Cruz County
701 Ocean Street, 4th floor
Santa Cruz, Ca 95060

Dear Mr. Sexauer,

The Draft Environmental Impact Report for the Proposed Bonny Doon Limestone Quarry Expansion Project does not say anything about what is most important to us that live in the immediate surroundings.

It makes no mention of the intolerable noise and dust that will occur if the expansion project is allowed. There are no plans for monitoring the noise levels at our homes. There are no mitigation measures for the noise levels that would increase many times more than what we presently have to endure. 1

Please address these issues in the Final Environmental Impact Report.

Thank you,

Joan Hellenthal
4177 Smith Grade
Santa Cruz, Ca 95060

Response to Comment Letter V-F
Joan Hellenthal, Resident

1. The Hellenthal residence is located approximately 2,200 feet from the eastern edge of the Boundary Expansion Area and approximately 2,500 feet from the edge of the existing active mining area. Section 8.1.1.3 of the Draft EIR states, "In actual experience, sound is often more attenuated because of non-reflective ground, intervening dense vegetation, or topographic and structural barriers. With line-of-sight transmission in open country, attenuation proves to be somewhat greater than theoretical loss due to absorption of soft ground and approaches 9 dB per doubling of distance for point sources and 4.5 db for line sources." As stated in Section 8.3.3 of the Draft EIR, "The five easterly residences (R1-R5) are now 1,650 to 1,900 feet from the active mining; the project would reduce that distance by 300 to 400 feet or roughly 20 percent of the present distance. Theoretically, the decrease in sound attenuation due to reducing distance by 20 percent is 2 to 3 dB; this level of increase is not usually considered significant. Because of the distance and shielding effect of the quarry configuration, these four residences would not be significantly affected by noise from expanded quarry operations." The Hellenthan residence would experience a similar increase in the decibel level of 2 or 3 decibels. However, due to the distance from the proposed Boundary Expansion Area, noise impacts would not be considered significant at the Hellenthal residence.

   As required pursuant to the existing permit the quarry operator is required to annually monitor noise levels to verify that equipment noise remains consistent with noise levels that were the basis of the 1996 EIR for the Certificate of Compliance, and that noise levels at the property lines does not exceed the standards in the Mining Regulations. Amending the permit to include the expansion project would not change this permit condition; therefore, noise monitoring will continue during mining of the expansion area.

   As required pursuant to the existing mining permit, the quarry monitors each blast with a seismograph at the quarry and, occasionally, at neighboring residences. A qualified professional consultant to the quarry reviews the data and provides a summary report each year. Conclusions each year have been consistent: provided that no major changes are made to the blast design or procedures, there is no risk of any blast-related damage to structures located beyond the boundaries of the quarry. This conclusion is based on maximum vibration and air blast levels established by federal regulations for residential structures. However, neighbors of the Limestone Quarry do hear and feel blasts. In 2004 several blast–related complaints were received by the Planning Department, for example. Based on the annual report for 2004 the maximum-recorded ground vibration, while in the distinctly perceptible range based on studies of human response to blast vibration, was still a factor of 15 below the federal level for residential structures. The existing blasting regime and monitoring program would continue in the expansion area.

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Comment Letter V-G
Margaret Kliegel, Resident

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September 27, 2007

Mr. Todd Sexauer
Santa Cruz County
Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, Ca 95060

Dear Mr. Sexauer

My home borders the 1000' buffer zone of the quarry near Smith Grade. The proposed expansion of the quarry will have a huge negative impact on the reasonable use and enjoyment of my property. The impact will be felt by neighbors on Bonny Doon Road and the length of Smith Grade. 1

Re: 6.1.3.1. and 6.3.2.1 The removal of these 90 to 125 year old Redwood Trees and surrounding vegetation will never be mitigated. It is stated that the area of this stand of vegetation is not significant in view abundant stands in the area. Might I point out that these other trees are protected in parks, open space, the coastal zone, and timber harvest laws. Removing these trees and the supporting soil is unconscionable. From the prospective of close neighbors, this stand of trees affords us moderate protection from the dust and noise of the quarry as well as protection from coastal wind. 2

Re: 2.4 Please clarify the significance of the 3 yr. extension of the life of the quarry. In the late 1960s a person naively believed a verbal assurance that "the mineral would play out in 20 years and quarry activity would cease." (PCA) In the late1970s, another naïve person believed the verbal assurance from Lone Star that it was about 10 years to quarry closure. It would be interesting to see some estimates in writing, as our property values are lowered by the continued activity. 3

Re: 8.1.3.3 The blasting is disconcerting, rattling windows and china.
8.1.3.4 "Equipment is audible and residents on Smith Grade Road may be disturbed" Are these levels acceptable for residential areas? Cemex is zoned mining; we are not. The noise of the machinery and the back up signals is very disturbing, as will be the dust and increased traffic. 4

Thank you for your attention,

Margaret M. Kliegel

Responses to Comment Letter V-G
Margaret Kliegel, Resident

1. Comment noted. Please se response to comments V-G-2 through 4.

2. Please see Section 9.2 of the Draft EIR. Section 9.2 states, "Current zoning is M-3, which allows timber harvest. The County Significant Tree Removal permit program would not apply to the commercial harvest. …Timber harvest in Santa Cruz County is subject to the jurisdiction of the California Department of Forestry (CDF). CDF administers both the Timberland Conversion Permit and Timber Harvest Plan. According to Richard Sampson, CDF, Felton timber cutting as part of site preparation for the proposed Boundary Expansion Area would require both a Timberland Conversion permit and a Timber Harvest Plan. …Upon approval of conversion, actual commercial harvest requires a Timber Harvest Plan. The Timber Harvest Plan process takes into account economic and environmental factors and serves as the functional equivalent of an EIR."

3. Comment noted. This estimate was provided by the applicant and is based on the anticipated resources within the 17.1-acre expansion area and anticipated demand.

4. Please see response to comment IV-G-10 for a discussion of ongoing monitoring of noise and blasting.

   The Kliegel residence is located approximately 1,320 feet from the eastern edge of the Boundary Expansion Area and approximately 1,650 feet from the edge of the existing active mining area (see Table 7-1, R3). Section 8.1.1.3 of the Draft EIR states, "In actual experience, sound is often more attenuated because of non-reflective ground, intervening dense vegetation, or topographic and structural barriers. With line-of-sight transmission in open country, attenuation proves to be somewhat greater than theoretical loss due to absorption of soft ground and approaches 9 dB per doubling of distance for point sources and 4.5 db for line sources." As stated in Section 8.3.3 of the Draft EIR, "The five easterly residences (R1-R5) are now 1,650 to 1,900 feet from the active mining; the project would reduce that distance by 300 to 400 feet or roughly 20 percent of the present distance. Theoretically, the decrease in sound attenuation due to reducing distance by 20 percent is 2 to 3 dB; this level of increase is not usually considered significant. Because of the distance and shielding effect of the quarry configuration, these four residences would not be significantly affected by noise from expanded quarry operations." The Kliegel residence would experience a similar increase in the decibel level of 2 or 3 decibels. However, due to the distance from the proposed Boundary Expansion Area, noise impacts would not be considered significant at the Kliegel residence.

   The implementation of mitigation Measure AQ-1 as outlined in Section 7.4 of the Draft EIR would reduce emissions of fugitive dust to below a level of significance.

   Section 11.5.5 of the Draft EIR states, "Quarried materials are transported to the cement plant in Davenport by a conveyor belt. Mining the Boundary Expansion Area would not generate new traffic on local roads." No increase in traffic is anticipated.

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Comment Letter V-H
Tom Pye, Resident

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Mr. Ted Sexaur
Planning Department of Santa Cruz California
701 Ocean Street, 4th Floor
Santa Cruz, Ca. 95060

Dear Mr. Sexaur,
The Draft Environmental Impact Report for the proposed Bonny Doon limestone quarry is deficient in a fundamental way. It does not assess the impact of the added noise to the residents. My property abuts the quarry and I have been experiencing increased noise levels for the last few years. Lately, I regularly hear dynamiting on weekdays and sometimes Saturdays, before 8:00AM. 1 Property values of all our houses will be reduced if this becomes an issue. In addition, will dust levels increase? Please address these in your final report. 2

Thank you.

Tom Pye

Tom Pye
335 Shake Mill Road
Santa Cruz, Ca. 95050

Responses to Comment Letter V-H
Tom Pye, Resident

1. The Pye residence is located approximately 10,600 feet from the northern edge of the Boundary Expansion Area and approximately 10,200 feet from the edge of the existing active mining area. The expansion area would be farther from the Pye residence than the existing mining area. Section 8.1.1.3 of the Draft EIR states, "In actual experience, sound is often more attenuated because of non-reflective ground, intervening dense vegetation, or topographic and structural barriers. With line-of-sight transmission in open country, attenuation proves to be somewhat greater than theoretical loss due to absorption of soft ground and approaches 9 dB per doubling of distance for point sources and 4.5 db for line sources." As stated in Section 8.3.3 of the Draft EIR, "The five easterly residences (R1-R5) are now 1,650 to 1,900 feet from the active mining; the project would reduce that distance by 300 to 400 feet or roughly 20 percent of the present distance. Theoretically, the decrease in sound attenuation due to reducing distance by 20 percent is 2 to 3 dB; this level of increase is not usually considered significant. Because of the distance and shielding effect of the quarry configuration, these four residences would not be significantly affected by noise from expanded quarry operations." The Pye residence would not experience an increase in the decibel level from the proposed project due to distance (approximately two miles) and proximity of the expansion area. Therefore, noise impacts would not be considered significant at the Pye residence.
2. Blasting at the quarry does not occur on weekends or prior to 8:00 a.m. No change in blasting schedule is proposed with the Boundary Expansion. The implementation of mitigation Measure AQ-1 as outlined in Section 7.4 of the Draft EIR would reduce emissions of fugitive dust to below a level of significance.

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Comment Letter V-I
Wendy Domster and Christine Echavia, Residents

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Wendy E. Domster
4209 Smith Grade Rd.
Bonny Doon, SC, 95060

Reference: DEIR Bonny Doon Quarry Expansion Project

September 28, 2007

Mr. Todd Sexauer
Santa Cruz, County Planning Dept.
701 Ocean Street, 4th floor
Santa Cruz, CA 95060

Dear Mr. Sexauer:

I am a home owner directly involved and impacted by the quarry expansion project proposal. Living in the Bonny Mead neighborhood adjacent to the quarry operations, I have a very generous level of concern for the local residents in this area, as well as for all habitants that are in the surrounding Bonny Doon area. 1

There are many concerns, first and foremost our life force, our water! We depend on our wells and the quality and quantity of our ground water. Santa Cruz County is focused on the disruption of Liddell Spring as we are focused on our own hydrologic connection located just hundreds of feet away from the amendment area. Once our water has been intercepted or altered in any way there are NO reparations. My question is, what happens then? What happens to the value of our land and homes? 2

Bottom line, with the ground water supply NOT clearly identified and poorly understood by qualified experts, the potential for ground water disaster is a very credible concern.

The projected geologic factors, noise levels, biotic, air quality, natural resources are all quite conservative. NO monitoring or mitigation will regenerate old second growth redwoods. Ask anyone living in the town of Davenport if they have particulates from factory emissions on the hoods of their cars every morning. It's almost surreal to know we have such large plant operations located right in the middle of specific coastal sensitive habitats. Yes, the locals are very aware that the noise levels have continually been exceeded and no doubt will amplify if this proposal gets approval. 3

Just when every responsible person should be breathing with a sigh of relief that this quarry has come to the end of its life time, it's ludicrous to think this expansion is even being considered, as we consider ourselves the leaders across the country of our "Greening Movement". 4

Projection is a very interesting word. The visualizing of an idea or objective reality, calculating the future, either cost or revenue. The act of planning or **scheming**... The projected impact(s) of this expansion is in black and white on hundreds of pages of paper. 5

The **actual** impact is unknown.

As a previous employee for RMC Lonestar, I have first hand knowledge and experience of the cement plant and quarry environments. There is no a doubt in my mind that all limits will be pushed 6
for maximum production once they have been established. Accidents occur- is this one that could have been avoided? Is this worth risking our "life force"?

Todd, thank you for taking the time to listen. We plead, that you carefully, thoughtfully and most important consciously consider this project. I, my family and the Bonny Mead residents oppose any 7
further quarry expansion.

Sincerely,
Concerned resident
Wendy E. Domster and Christine K. Echavia

Let Cemex and it' true character speak for itself in reflecting on its environmental history record.
We know our behavior is authentic when we can consistently ***say what we mean, do what we say, and say what's so when it's so.***

Responses to Comment Letter V-I
Wendy Domster and Christine Echavia, Residents

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

2. Relatively shallow wells immediately upgradient of the quarry lie within a complex transition zone between (1) a shallow sandstone aquifer that occurs across much of the Bonny Doon area upgradient to the north and (2) the predominantly karst groundwater aquifer that encompasses the quarry and discharges to Liddell Spring. The configuration of the shallow groundwater system north of the quarry is fairly consistent until nearly approaching the quarry pit. Shallow groundwater encounters the marble aquifer immediately upstream of the quarry. The marble aquifer's highly permeable karst features cause the groundwater level to drop 300 feet in elevation over a relatively short distance. Because the deeper karst groundwater aquifer is separated from the shallow sandstone aquifer by this transition zone, the proposed quarrying of marble would not be expected to effect relatively shallow wells in the sandstone aquifer upgradient of the quarry because quarrying would not take place in the sandstone aquifer.

3. Comment noted. As stated in Section 6.3.2.1 of the Draft EIR, "The Limestone Quarry Boundary Expansion Area would result in the removal of 17.1 acres of native vegetation (see Figure 35 and Table 6-2). …The Upland Redwood Forest and Mixed Evergreen Forest are not designated as sensitive habitats. The area of these vegetation communities to be removed by the project is not significant when viewed in context of the abundant forested land containing these communities that remain in the project vicinity and throughout the Santa Cruz Mountains."

   Section 8.3.3 of the Draft EIR states, "With the expansion project, the Quarry would continue mining both the Shale and Limestone Quarries at their current rates; there would be no change in equipment or intensification of operations. …Although this extends the ongoing impact of the Quarry, monitoring has shown that the current operation meets Mining Regulations noise standards and the noise impact of extending the Quarry operating life is less than significant."

4. Comment noted. Please see discussion in Section 1.1 of the Draft EIR regarding the County's authority under vested rights described in a letter from County Counsel to the Board, dated March 11, 2002.

5. Comment noted. CEQA Section 15021 states, "CEQA recognizes that in determining whether and how a project should be approved, a public agency has an obligation to balance a variety of public objectives, including economic, environmental, and social factors and in particular the goal of providing a decent home and satisfying living environment for every Californian. An agency shall prepare a statement of overriding considerations as described in Section 15093 to reflect the ultimate balancing of competing public objectives when the agency decides to approve a project that will cause one or more significant effects on the environment." Section 11.1 of the Draft EIR states, "There are no significant unavoidable impacts associated with the Bonny Doon Limestone Quarry Boundary Expansion Project and Reclamation Plan Amendment. Potentially significant impacts of the Limestone Quarry Boundary

Expansion and the 1996 Reclamation Plan Amendment are identified in Chapters 3 through 9 of this EIR (Draft EIR) along with mitigation measures that would reduce or avoid these impacts. All project impacts can be reduced to a less than significant level with mitigation."

6. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

7. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

Comment Letter V-J
Betty Brolly, Resident

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Mr. Todd Sexauer
Santa Cruz, County
Planning Department
701 Ocean Street, 4th floor.
Santa Cruz, CA 95060

Ref: DEIR for the Proposed Bonny Doon Limestone Quarry Expansion Project

Dear Mr. Todd Sexauer

The Bonny Doon Limestone Quarry Boundary Expansion & Reclamation Plan Amendment Draft Environmental & Impact Report does not consideration the property owners adjacent to neither the proposed expansion area nor what happens to the plants and animals in the expansion area and the surrounding areas. 1

- The Biological Resources sections DER is through and provides interesting reading. However the conclusion of <u>no impact</u> upon the pants and animals does not make sense 2
  - All animals & birds native to this entire area including the redwood forests will be adverse affected. A proposal for moving the wood rat was mentioned. There was no mention of any help for the other animals and birds. What will happen to these animals and birds when their habitat is destroyed and a large area of surrounding area? 3
    What will prevent the wood rats and other displaced animals invading their close neighbors, the people of Bonnymede? 4
    Spreading the removal of overburden <u>out for years</u> with laud heavy machines and blasting will only extend the intolerable conditions, both for, the families of Bonnymede and the animals and birds. 5
    Perhaps some native plants will be saved and replanted somewhere else. But where? 6
  - Redwood Forest:
    The Redwood Forests of the California are unique to the world. Yet destined to be destroyed are 11.4 acres of upland redwood forest containing mature second growth with a few very large trees 90-100 years old. (p 6/5) These beautiful trees are considered only "<u>overburden</u>" and will be disposed of in the initial clearing. 7

- Water: There is no mention in the report of the impact on the wells of the adjacent property owners. Figure 28 shows there will be major disturbance to the underground water source of these wells by blasting. The water flow, as shown, moves toward the overburden. The structure of the rocks and soil is complex. What will happen to the aquifer, presently the source of existing wells?
  My Husband and I have lived on our property for 17years. Recently we noticed the water level in our well lowering significantly. This we attribute to the blasting of the present Bonny Doon Limestone Quarry (Cemex). 8
  Another well ran dry and several attempts were made before water was found again.

- Noise & Dust during construction and later:
  During the removal of the overburden, heavy equipment and blasting will be used at each level. The process is estimated to take 2 years. No consideration has been given to the home owners suffering the intolerable noise, dust, and traffic produced. The hills now shielding the homes from the noise of the blasting will be removed, allowing the noise of the blasting & dust to continue indefinitely. 9
  The property value of <u>all the homes</u> in Bonnydoon will be negatively impacted.

The quiet environment of beautiful Bonnydoon and Bonnymede with its cool climate, majestic red woods and diverse other trees, birds, plants, and animals is unique. Yet future generations could be deprived of enjoying what exists now. 9

Please consider alternate sources of limestone, 10
Please leave Bonnydoon and Bonnymede alone!!!!

Betty J. Brolly

Betty J Brolly (age) 78
4203 Smith Grade Rd.
Santa Cruz, CA, 95060

Responses to Comment Letter V-J
Betty Brolly, Resident

1. Comment noted. Please see responses to comments V-J-2 through 10.
2. Please see Section 6.2, Regulatory Setting, of the Draft EIR. The Regulatory Setting outlines the local, state, and federal regulations pertaining to protection for plants, animals and their habitat. Protection for biological resources is afforded by local ordinances (e.g., Sensitive Habitat Protection Ordinance), state legislation (e.g., California Endangered Species Act), and federal law (federal Endangered Species Act). Section 6.3.1 of the Draft EIR provides the "Thresholds of Significance" that provide limits of specific impacts under the CEQA (e.g., change the diversity of species, or number of species of plants or animals). The impacts analysis has to take all of these regulations and thresholds into consideration when determining the significance of an impact from a proposed project. Plants, animals, and their habitats that do not meet these criteria would not be considered a significant impact under CEQA, and would not require mitigation. Those biological impacts that would require mitigation are included in Section 6.4 of the Draft EIR, Mitigation Measures.
3. Comment noted. Please see response to comment V-J-2.
4. Mitigation Measure BIO-2 (see Section 6.4 of the Draft EIR) would require up to 40 San Francisco Dusky-footed woodrats (SFDW) be relocated from the Boundary Expansion Area prior to land clearing activities that would impact their houses. Two potential relocation sites have been identified. A SFDW mitigation plan would also be prepared and the relocated animals would be tracked following relocation.
5. Section 2.4.1 of the Draft EIR outlines the vegetation, topsoil and overburden removal process. Land clearing would be conducted during the late summer and fall months in each of the first two years of operation (see Section 2.4.1 of the Final EIR). Overburden stripping would require a total of 9 to 12 months, possibly spread over a period of two years.
6. Although native plants that are removed during vegetation clearing would not be transplanted, many of them would be salvaged for mulching and blending with the salvaged topsoil to add structure and possible nutrients. The topsoil would be stored for use in reclamation/revegetation at the Limestone and Shale Quarries (see Section 2.4.1 of the Draft EIR).
7. Please see response to comment V-I-3 for a discussion on impacts to Redwood Forest.
8. Relatively shallow wells immediately upgradient of the quarry lie within a complex transition zone between (1) a shallow sandstone aquifer that occurs across much of the Bonny Doon area upgradient to the north and (2) the predominantly karst groundwater aquifer that encompasses the quarry and discharges to Liddell Spring. The configuration of the shallow groundwater system north of the quarry is fairly consistent until nearly approaching the quarry pit. Shallow groundwater encounters the marble aquifer immediately upstream of the quarry. The marble aquifer's highly permeable karst features cause the groundwater level to drop 300 feet in elevation over a relatively short distance. Because the deeper karst groundwater aquifer is separated from the shallow sandstone aquifer by this transition zone, the proposed quarrying

would not be expected to effect relatively shallow wells in the sandstone aquifer upgradient of the quarry because quarrying would not take place in the sandstone aquifer.

9. The Brolly residence is located approximately 2,500 feet from the eastern edge of the Boundary Expansion Area and approximately 2,900 feet from the edge of the existing active mining area. Section 8.1.1.3 of the Draft EIR states, "In actual experience, sound is often more attenuated because of non-reflective ground, intervening dense vegetation, or topographic and structural barriers. With line-of-sight transmission in open country, attenuation proves to be somewhat greater than theoretical loss due to absorption of soft ground and approaches 9 dB per doubling of distance for point sources and 4.5 db for line sources. As stated in Section 8.3.3 of the Draft EIR, "The five easterly residences (R1-R5) are now 1,650 to 1,900 feet from the active mining; the project would reduce that distance by 300 to 400 feet or roughly 20 percent of the present distance. Theoretically, the decrease in sound attenuation due to reducing distance by 20 percent is 2 to 3 dB; this level of increase is not usually considered significant. Because of the distance and shielding effect of the quarry configuration, these four residences would not be significantly affected by noise from expanded quarry operations." The Brolly residence would experience a similar increase in the decibel level of 2 or 3 decibels. However, due to the distance from the proposed Boundary Expansion Area, noise impacts would not be considered significant at the Brolly residence.

   The implementation of Mitigation Measure AQ-1 as outlined in Section 7.4 of the Draft EIR would reduce emissions of fugitive dust to below a level of significance.

   Section 11.5.5 of the Draft EIR states, "Quarried materials are transported to the cement plant in Davenport by a conveyor belt. Mining the Boundary Expansion Area would not generate new traffic on local roads." No increase in traffic is anticipated.

   See response to Comment IV-G-10 for a discussion on blasting impacts. Also, see Section 8.1.3.3 of the Draft EIR. Blasting impacts would not be considered significant, and do not exceed the thresholds outlined in federal regulations.

10. Comment noted. Please see response to Comment V-D-5.

Comment Letter V-K
Barry Balanda, Resident

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V-K

Todd Sexauer
Santa Cruz County
Planning Department
701 Ocean Street, 4^{th} Floor
Santa Cruz, CA, 95060

Ref: DEIR for the Proposed Bonny Doon Limestone Quarry Expansion Profect

To: Mr. Todd Saxauer
From: Barry Balanda,

The Forest will re-grow and the animals will figure out a way to survive. 1

Two major problems suggest themselves.

First: Disruption of the water table and local wells. Anyone claiming there will be no effect by the expanded quarry is a fool or a liar. 2

Second: The prevailing wind at all times of the year is a cool NNW sea breeze. That sea breeze is moderated by the landmass upon which the forest, that will be removed grows, and by the forest itself. If the forest and the landmass is removed the potential exists to unalterably change the micro-climates directly down wind which encompass all the residents of Laguna Creek Canyon on both sides of Smith Grade and all the residents in the Majors Creek. Baldwin Creek drainage is west of Smith Grade. The effects may reach Capitola. There is no way to know for sure until you do it. 3

Sincerely,

Barry Balanda
1700 Pine Flat
Santa Cruz, CA, 95060

Barry Balanda

Responses to Comment Letter V-K
Barry Balanda, Resident

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
2. Please see response to comment V-J-8.
3. Mining into the 17.1-acre Boundary Expansion Area is not expected to impact weather patterns in the greater Santa Cruz area. 1700 Pine Flat Road is located approximately two miles north of the Boundary Expansion Area. The elevation at 1700 Pine Flat Road is 1,750 feet above mean sea level (amsl). The Boundary Expansion Area has an existing elevation of approximately 1,250 feet amsl. This is a difference in elevation of approximately 500 feet. The landmass and vegetation removed during mining operations in the expansion area would not influence weather patterns at your property.

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Comment Letter V-L
Christel Markevich, Resident

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V-L

COUNTY OF SANTA CRUZ PLANNING DEPARTMENT
DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR)
FOR
BONNY DOON LIMESTONE QUARRY BOUNDARY EXPANSION PROJECT AND RECLAMATION PLAN AMENDMENT
SANTA CRUZ, COUNTY, CALIFORNIA

Public Comment Card

Please use this comment card to submit your views regarding the proposed project and regarding any potential environmental impacts of the proposed project.

Name: CHRISTEL MARKEVICH
Mailing Address: 4015 SMITH GRADE
Street, State, Zip Code: SANTA CRUZ, CA 95060
Affiliation (if any):
Date: September 11, 2007

Comments:

I UNDERSTAND THE PRESENT INTERESTS OF THE QUARRY. BUT FOR THE LONG THERM FUTURE, IT'S WISE NOT TO EXPAND THE QUARRY. 1

THE BEAUTY OF THE FOREST, THE FUTURE GENERATIONS THE HEALTH OF OUR COMMUNITY... IT'S OUR RESPONSABILITY. I WISH MANY GENERATIONS OF KIDS TO KEEP ON RUNNING AND PLAYING IN THIS BEAUTIFUL FOREST. 2

Continue on reverse side if additional space is needed.

Please submit comments tonight or mail to:

County of Santa Cruz
Planning Department
701 Ocean Street, 4th Floor
Santa Cruz, CA 95060
Attn: Todd Sexauer
(831) 454-3511

IMPORTANT: Comments must be received by 5:00 P.M. October 1, 2007

Responses to Comment Letter V-L
Christel Markevich, Resident

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
2. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

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Comment Letter V-M
Roberta Smith, Resident

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Roberta K. Smith, Ph. D.
P. O. Box 174
Davenport, CA 95017

September 9, 2007

Subject: Draft Environmental Impact Report – Cemex Proposed Quarry Addition

Todd Sexauer
Santa Cruz County Planning Department
701 Ocean Street
Santa Cruz, CA 95060

Dear Mr. Sexauer and Other Concerned Parties:

I am writing about the Cemex proposal to include or add 17 acres of their remaining unmined property immediately adjacent to the Bonny Doon limestone/marble quarry in or to the quarry.

I am a 25-year resident of Davenport and I see approval of the quarry permit as nearly critical to Davenport. As the existing permitted portion of the quarry is essentially mined out, the addition of the 17 acres will allow mining for a few more years. Should the cement plant close down as a result of lack of local raw material, this time potentially is essential to Davenport to resolve major problems which would threaten our existence: sewer and water, which are intimately tied to the cement plant; jobs; and the major taxes provided by the cement plant for County infrastructure, schools, etc., etc. 1

It may be possible for the cement plant to continue to run after mining out the additional reserves in the expanded area, if approved, if they explore new/other options such as bringing in limestone from elsewhere or mining limestone from (an)other site(s) on their extensive lands here (if they could obtain a new quarry permit for another area). There may also be other options, but this presently proposed additional few years of mining in the quarry appears critical to Davenport. 2

The Draft Environmental Impact Report (DEIR) appears very thorough and to be based on extensive studies by experts of areas of concern. I support its acceptance. 3

Sincerely,

Roberta K. Smith

Roberta K. Smith

Responses to Comment Letter V-M
Roberta Smith, Resident

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
2. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
3. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

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Comment Letter V-N
Gene Lytle, Resident

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From: Kate Werner [Werner@traenviro.com]
Sent: Monday, September 03, 2007 12:37 PM
To: Todd Sexauer
Subject: Fwd: Bonny Doon

Hi Todd,
See attached comment I received on the Bonny Doon EIR.

Kate

Kate Werner
Senior Associate
TRA Environmental Sciences, Inc.
545 Middlefield Road, Suite 200
Menlo Park, CA 94025
tel: 650-327-0429 ext. 71
fax: 650-327-4024

>>> <Poppageno@aol.com> 8/29/2007 7:53 PM >>>
Hi,

I want to address my concerns about the proposed expansion of the Bonny Doon Limestone Quarry. 1

As one of your proposals is to do nothing thereby causing the quarry to reach its mining permit boundary, I want to know what happens then? 2

Specifically you have failed to address the endangered Bonny Doon miners and the endangered Davenport Plant workers! There are approximately 20 miners in the quarry and over 100 workers in Davenport. Will they be extinct? 3

I estimate that these employees of Cemex, Management and Union, earn around $2,000,000+ each year. These peoples purchase homes, autos, groceries, insurance, EIR's, pay property taxes and sales taxes among other things. 4

What happens to these workers and their families should doing nothing cause the parent company to close the local facility. 5

Lets take a look at another aspect of the cement plant closing. Who else gets affected? Surely the County of Santa Cruz, they will lose tax income from one of the largest remaining employers in the county! Pacific Gas and Electric will lose a customer with a six figure monthly bill! Southern Pacific railroad will lose a customer as will the coal mines in Utah whose miners risk life and limb to bring us coal for cement! The quarries which provide iron and laterite and sand will all lose a customer. In some of those products we utilize waste (slag) products that would otherwise go to dumps. 6

How about the 7-11 and the food and fuel vendors along Mission Street in Santa Cruz. They all take money that the truckers who haul goods in and out of the plant spend. What happens to those truckers? Will they be endangered and some go extinct? 7

So I feel sorry for a few red-legged frogs, that seem to be all over the West Coast, and the wood rats, that will get poisoned by the folks in Bonny Doon when they show up in their attics, and the native grasses and redwood trees. I do not think the expansion will affect the Liddell Spring. However if the City complains enough Cemex will probably buy em a filter plant for it. 8

Bottom line; I feel your DEIR is incomplete when the aspects aforementioned are not taken into consideration. 9

Furthermore, My apology if this has reached the wrong person, can you see that it gets into the records?

Response to Comment Letter V-N
Gene Lytle, Resident

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
2. Section 15126.6 (e) of CEQA requires that the "No Project" alternative be evaluated along with its impact. See section 10.2 of the Draft and Final EIR for a complete discussion of the No Project Alternative.
3. Section 15131 of CEQA states, "Economic and social effects of a project shall not be treated as significant effects on the environment." Therefore, these issues have not been discussed.
4. Please see response to comment V-N-3.
5. Please see response to comment V-N-3.
6. Please see response to comment V-N-3.
7. Please see response to comment V-N-3.
8. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.
9. Please see response to comment V-N-3.

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Comment Letter V-O
Jeannine Bassett, Resident

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V-O

Sept. 30, 2007

To Mr. TODD Sexauer,

As a Bonny Doon resident for 12 years I feel it important to lend a voice of concern in regards to the Quarry Expansion Project. Not only concern, but a voice of disent - NO TO THE EXPANSION! 1

I am very much aware of the quarry as I live on a large expanse of North Coast Meadow between Smith Grade and Highway One. One of the most beautiful places in Santa Cruz County with a 180° view of the Monterey Bay. To the North are the Bonny Doon Mountains and our beloved Redwood forests. In this picturesque 2

view there sits the eye sore of the quarry excavation. Not only am I able to see the impact but hear and feel it as well with the blasting.
And Not only will this project inflict more impact on the local residents (most especially the one's living a mere 1000 ft. from the expansion) but to the Earth itself. With the small amount of residual lime stone left it is not worth the extra 17 acres of carving, blasting for 5 more years nor possible harm to the local ecosystem + Water/Springs.

2

3

I do not feel enough care
nor concern has been given to
the future of the Bonny Doon
community culture nor proposing
environmental measures to "clean 4
up" after the extraction. Will
the community be left to deal
with the gapping hole in the
earth?

As was stated at the RBDA
meeting Sept. 11, 2007, the
representative mearly said
the the company has just been 5
trying to get the permit and
then they can look to the
future and conservation.

Again I say NO to the expansion! 6

thank you,

Jeannine B. Bassett

Jeannine B. Bassett

2807 Smith Grade
Santa Cruz, CA
95060

Response to Comment Letter V-O
Jeannine Bassett, Resident

1. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

2. As stated in the Environmental Review Initial Study contained in Appendix A, "Although the project is located adjacent to a designated scenic corridor, it is not visible from Highway 1, Bonny Doon Road, or Smith Grade. The northwest corner of the project area is mapped as a scenic corridor adjacent to Smith Grade. The project as proposed will maintain a significant vegetative buffer between Smith Grade and the quarry. Additionally, site topography rises from Smith Grade up to the quarry boundary, which will further screen the quarry from the public viewshed off Smith Grade Road. In summary, the quarry will not be visible from scenic corridors or areas." Although the project would be visible from a few private viewsheds, it would not be visible from designated scenic corridors, and therefore, would not be considered a significant impact under CEQA.

   The Bassett residence is located approximately 9,400 feet from the eastern edge of the Boundary Expansion Area and approximately 9,300 feet from the edge of the existing active mining area. Section 8.1.1.3 of the Draft EIR states, "In actual experience, sound is often more attenuated because of non-reflective ground, intervening dense vegetation, or topographic and structural barriers. With line-of-sight transmission in open country, attenuation proves to be somewhat greater than theoretical loss due to absorption of soft ground and approaches 9 dB per doubling of distance for point sources and 4.5 db for line sources." As stated in Section 8.3.3 of the Draft EIR, "The five easterly residences (R1-R5) are now 1,650 to 1,900 feet from the active mining; the project would reduce that distance by 300 to 400 feet or roughly 20 percent of the present distance. Theoretically, the decrease in sound attenuation due to reducing distance by 20 percent is 2 to 3 dB; this level of increase is not usually considered significant. Because of the distance and shielding effect of the quarry configuration, these four residences would not be significantly affected by noise from expanded quarry operations." The Bassett residence would experience a minimal increase in the decibel level (less than 1 decibel). Due to the distance from the proposed Boundary Expansion Area, noise impacts would not be considered significant at the Bassett residence.

3. Comment noted. Please see response to comment III-A-35 for a discussion of potential impacts to Liddell Spring.

4. Comment noted. A reclamation plan is required to reclaim the mining site following mining activities. See Section 2.5 of the Draft EIR.

5. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

6. Comment noted. No specific comments were made on the analysis or mitigation measures presented in the Draft EIR. No response is required.

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