APPENDIX A-1

PACIFIC ROCK QUARRY MINE EXPANSION PROJECT NOP

BENCHMARK RESOURCES

POSTED
AUG 23 2017
MARK A. LUNN
Ventura County Clerk and Recorder
By: ______, Deputy

Notice of Preparation of an EIR

County of Ventura · Resource Management Agency · Planning Division
800 S. Victoria Avenue, Ventura, CA 93009-1740 · (805) 654-2478 · ventura.org/rma/planning

Pacific Rock Quarry Mine Expansion Project

Case No. LU10-0003

The County of Ventura, Resource Management Agency, Planning Division currently is processing an application for a modification of an existing surface mining facility. A Mitigated Negative Declaration (MND) was adopted by the Ventura County Planning Commission on June 17, 1980 concurrent with the granting of Conditional Use Permit (CUP) No. 3817. The Planning Division has determined that an Environmental Impact Report (EIR) is required to evaluate the potential impacts of the proposed modifications of this facility pursuant to §15162 of the CEQA Guidelines. The purpose of this notice is to call your attention to this project, and to request that you assist the Planning Division to identify any issues that should be addressed in the EIR. Information on the proposed project and instructions on how to provide commentary on the scope of the EIR are set forth below. The public comment period for this Notice of Preparation is from August 30, 2017 to October 2, 2017.

Project Name/Number: Pacific Rock Mine Expansion Project, Case No. LU10-0003.

Project Location: The project site encompasses 204 acres of a 718-acre property located at the western edge of the Santa Monica Mountains approximately 2.0 miles south of U.S. Highway 101 in the Camarillo area. The existing mining facility is addressed as 1000 South Howard Road, Camarillo CA 93012. (Exhibit 1)

The Tax Assessor's Parcel Numbers (APNs) for the parcels that comprise the project site are 234-0-060-220 and 234-0-060-190.

Project Description:

The applicant requests that a modified Conditional Use Permit (CUP) be granted and an amended Reclamation Plan be approved to authorize the expansion and continued operation of an existing surface mining facility for an additional 25-year period. These requested entitlements would authorize the following:

- An increase in the area subject to the CUP from 115.5 acres to 204.5 acres (Exhibit 2);
- An increase in the mining excavation area subject to reclamation from 55 acres to 172.5 acres (Exhibit 2);
- Increase in operational days (including material export) from 6 days per week to 7 days per week;

- Onsite and haul truck operations from 5:30am to 10:00pm on each operational day;
- Continued material haul truck traffic of up to 120 one-ways truck trips (equivalent to 60 truckloads) per operational day;
- Peak period (7:00am-9:00am or 3:00pm to 5:00pm) truck traffic of 120 trips (60 truckloads) per operational weekday (i.e. the entire daily maximum could occur during either the am or pm peak traffic period.);
- Excavation and export of 13.2 million tons (19.8 million cubic yards) of mined material;
- Reclamation of the mining site to end use of agriculture (grazing) on benched (near level) areas that would remain on the site and open space on the other areas of the site. Final quarry slopes would be at a 1:1 gradient or less (Exhibit 3 and Exhibit 4).
- Continuation of current mining practices.

Surface mining activities will continue to be conducted at the facility through the use of explosives to lift and loosen exposed bedrock. This material is then initially sorted into size classes by pushing the material over a steep slope with a front-end loader or a bulldozer. The heavier (larger) pieces of rock are collected from the base of the working slopes for sale as rip-rap or to be crushed for use as road base. Material is further sorted by passing through vibrating scalp screens. Material that does not pass through the screens is crushed and conveyed back to the screens for additional sorting. Materials are placed in stockpiles on the mining site and segregated by material type and grain size.

Environmental Issues to be Addressed in the EIR:

The EIR will address the potential environmental impacts associated with the proposed modifications of the existing facility, and whether the project will have any new or different impacts than were addressed in the 1980 MND. Specific areas of analysis will include: aesthetics, archeological resources, agricultural resources, air quality, biological resources, cultural resources, fire protection, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, noise, public services, recreation, traffic and circulation, utilities and service systems and visual resources.

Staff has conducted a preliminary assessment of the proposed project and identified the following issue areas that will be addressed in detail in the EIR:

- biological resources
- noise
- visual resources

Public Input: The purpose of this notice is to call your attention to this project and to request that you assist the Planning Division identify any issues that should be addressed in the EIR. Comments on the scope of analysis of the EIR must be submitted in writing.

The public comment period for this Notice of Preparation is from August 30, 2017 to October 2, 2017. Please send your comments to:

Ventura County Resource Management Agency, Planning Division
Attn.: Brian R. Baca, Manager, Commercial and Industrial Permit Section
800 South Victoria Avenue, L#1740
Ventura, CA 93009

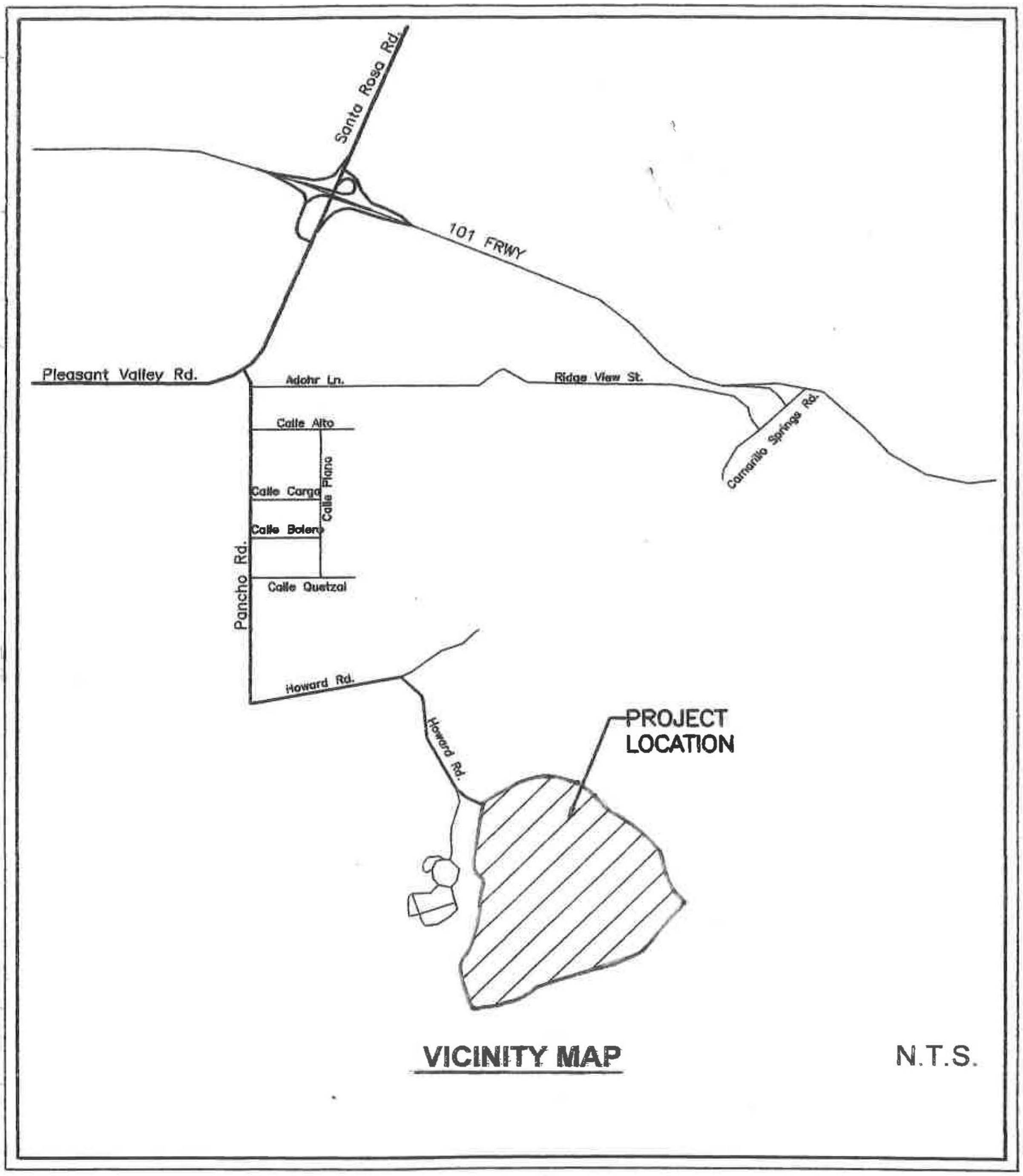
Alternatively, you may email your comments to Mr. Baca at brian.baca@ventura.org or fax them to (805) 654-2509.

Scoping Meeting: The Planning Division will be conducting a scoping meeting for the EIR on September 14, 2017 at 10:00am. The scoping meeting will be held at the County Government Center, Hall of Administration, Santa Cruz Conference Room (Room 311), 800 S. Victoria Ave. Ventura, CA 93009.

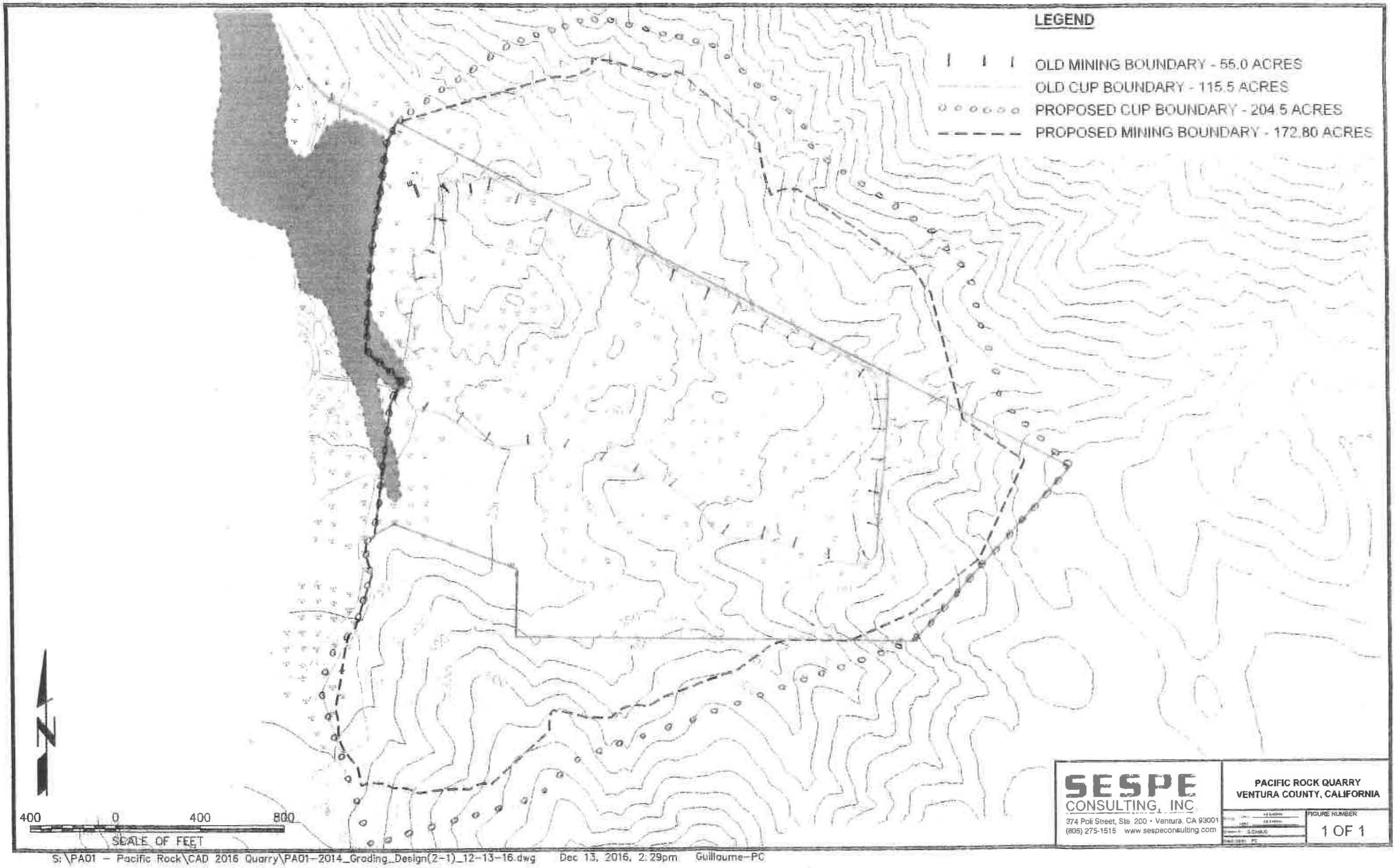
Attachments:

Exhibit 1 – Vicinity Map
Exhibit 2 – Site Plan
Exhibit 3 – Reclamation Plan map
Exhibit 4 – Reclamation Plan cross sections

The above exhibits can be viewed on the Ventura County Planning Division website at:
http://vcrma.org/planning/ceqa/nop.html



County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 1 – Vicinity Map



County of Ventura
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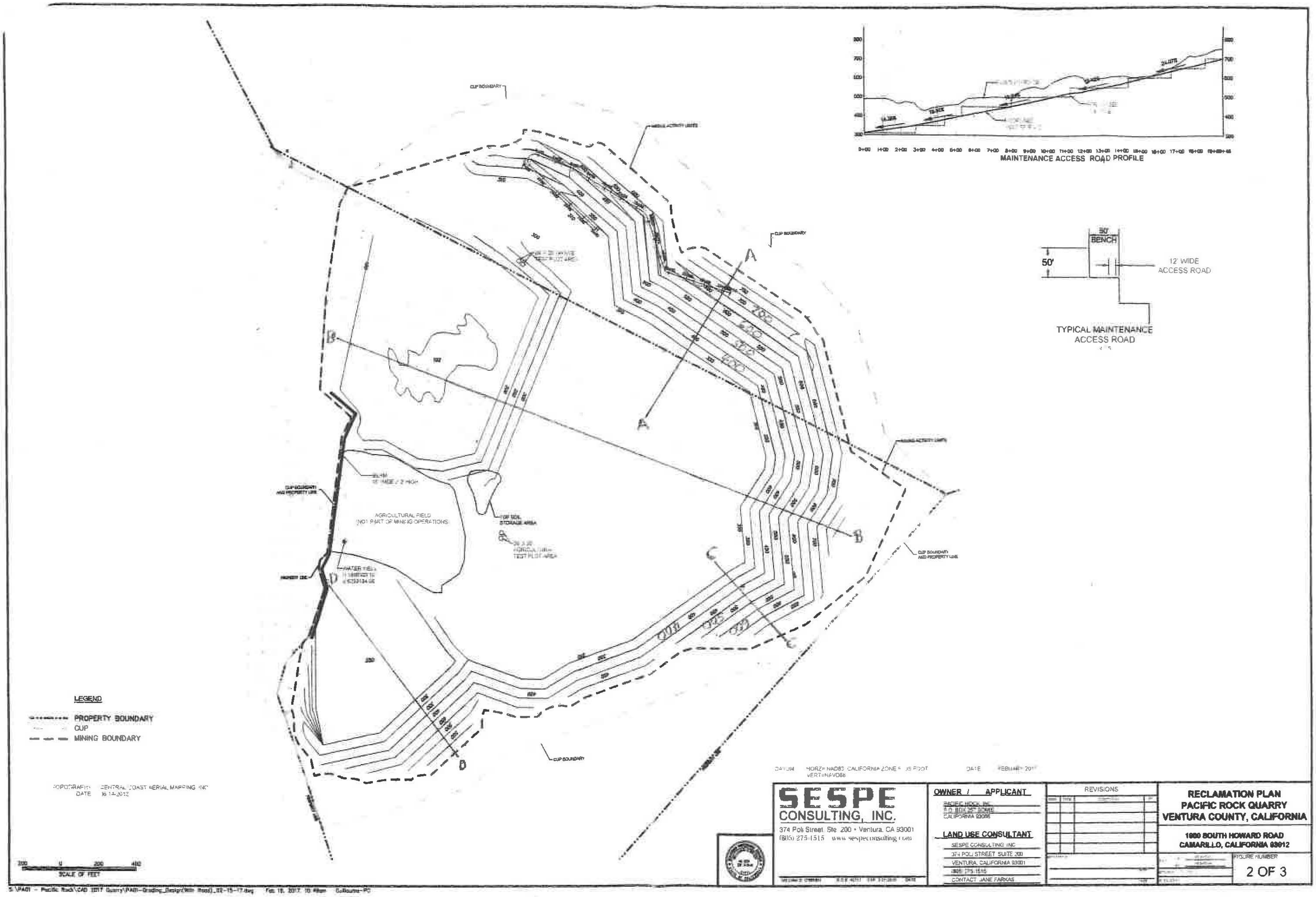
LU10-0003



County of Ventura
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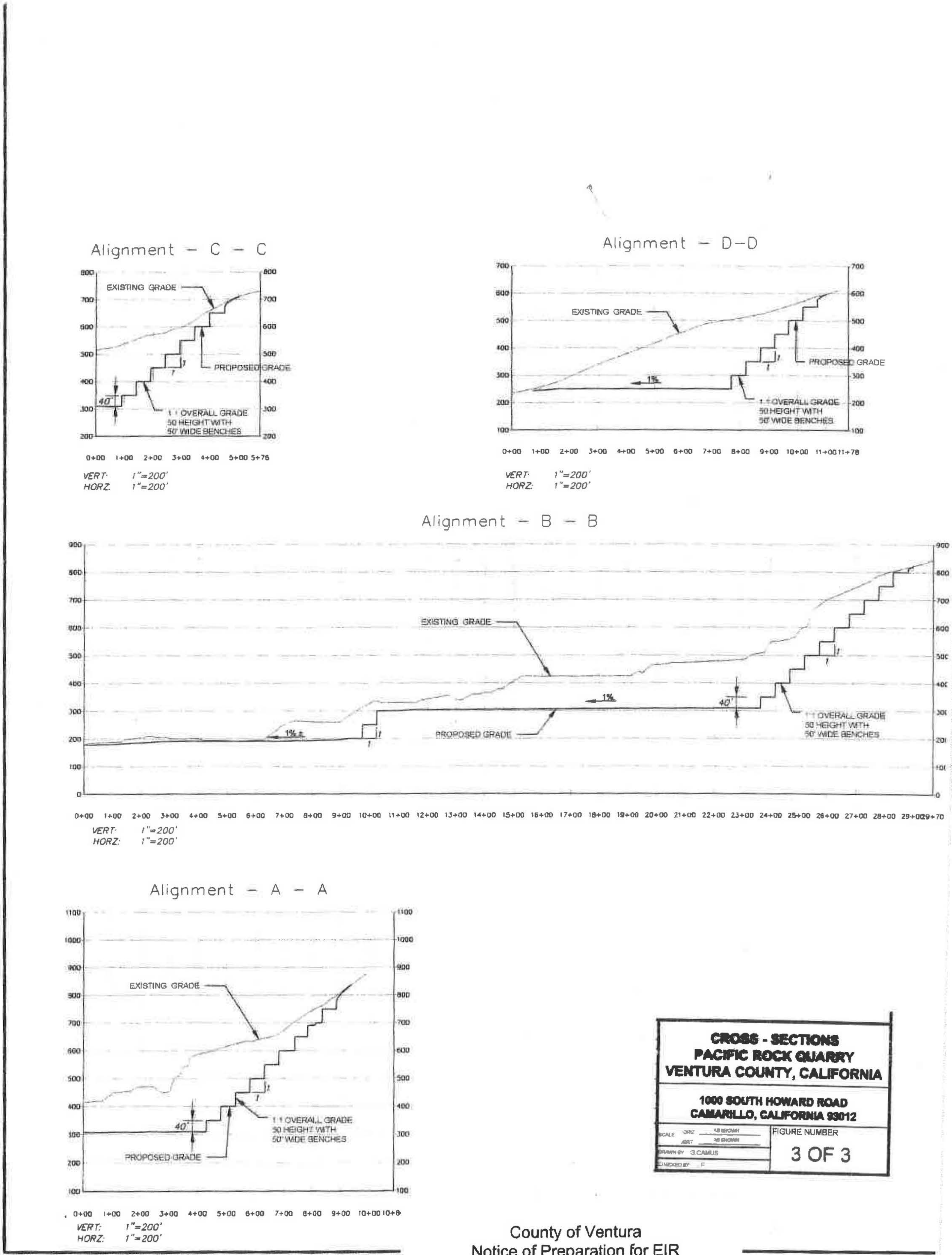
LU10-0003



County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 4 – Reclamation Plan
Cross Sections

Print Form

Appendix C

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P.O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH #

Project Title: Pacific Rock Quarry Mine Expansion Project, LU10-0003

Lead Agency: County of Ventura — Contact Person: Brian R. Baca
Mailing Address: 800 S. Victoria Avenue, — Phone: 805-654-5192
City: Ventura CA — Zip: 93009 — County: Ventura

Project Location: County: Ventura — City/Nearest Community: Camarillo
Cross Streets: Howard Road and Poncho Road — Zip Code: 93012
Longitude/Latitude (degrees, minutes and seconds): ____° ____′ ____″ N / ____° ____′ ____″ W — Total Acres: 204 acres
Assessor's Parcel No.: 234-0-060-190, -220 — Section: 8 — Twp.: 1N — Range: 20W — Base: SBBM
Within 2 Miles: State Hwy #: U.S. 101 — Waterways: Calleguas Creek
Airports: Camarillo Airport — Railways: ____ — Schools: Camarillo High School

Document Type:

CEQA: [X] NOP; [ ] Early Cons; [ ] Neg Dec; [ ] Mit Neg Dec; [ ] Draft EIR; [ ] Supplement/Subsequent EIR (Prior SCH No.) ____; Other: ____
NEPA: [ ] NOI; [ ] EA; [ ] Draft EIS; [ ] FONSI
Other: [ ] Joint Document; [ ] Final Document; [ ] Other: ____

Local Action Type:

- [ ] General Plan Update
- [ ] General Plan Amendment
- [ ] General Plan Element
- [ ] Community Plan
- [ ] Specific Plan
- [ ] Master Plan
- [ ] Planned Unit Development
- [ ] Site Plan
- [ ] Rezone
- [ ] Prezone
- [X] Use Permit
- [ ] Land Division (Subdivision, etc.)
- [ ] Annexation
- [ ] Redevelopment
- [ ] Coastal Permit
- [X] Other: Rec. Plan

Development Type:

- [ ] Residential: Units ____ Acres ____
- [ ] Office: Sq.ft. ____ Acres ____ Employees ____
- [ ] Commercial: Sq.ft. ____ Acres ____ Employees ____
- [ ] Industrial: Sq.ft. ____ Acres ____ Employees ____
- [ ] Educational: ____
- [ ] Recreational: ____
- [ ] Water Facilities: Type ____ MGD ____
- [ ] Transportation: Type ____
- [X] Mining: Mineral RipRap and crushed rock
- [ ] Power: Type ____ MW ____
- [ ] Waste Treatment: Type ____ MGD ____
- [ ] Hazardous Waste: Type ____
- [ ] Other: ____

Project Issues Discussed in Document:

- [X] Aesthetic/Visual
- [X] Agricultural Land
- [X] Air Quality
- [ ] Archeological/Historical
- [X] Biological Resources
- [ ] Coastal Zone
- [X] Drainage/Absorption
- [ ] Economic/Jobs
- [ ] Fiscal
- [X] Flood Plain/Flooding
- [ ] Forest Land/Fire Hazard
- [X] Geologic/Seismic
- [X] Minerals
- [X] Noise
- [ ] Population/Housing Balance
- [ ] Public Services/Facilities
- [ ] Recreation/Parks
- [ ] Schools/Universities
- [ ] Septic Systems
- [ ] Sewer Capacity
- [X] Soil Erosion/Compaction/Grading
- [ ] Solid Waste
- [ ] Toxic/Hazardous
- [X] Traffic/Circulation
- [X] Vegetation
- [X] Water Quality
- [X] Water Supply/Groundwater
- [X] Wetland/Riparian
- [ ] Growth Inducement
- [ ] Land Use
- [ ] Cumulative Effects
- [ ] Other: ____

Present Land Use/Zoning/General Plan Designation:

Existing mining facility / Agricultural Exclusive and Open Space zoning / Agriculture and Open Space General Plan designations

Project Description: *(please use a separate page if necessary)*

The applicant requests that a modified Conditional Use Permit (CUP) be granted and an amended Reclamation Plan be approved to authorize the expansion and continued operation of an existing surface mining facility for an additional 25-year period.

Note: The State Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Pacific Rock Quarry, LU10-0003

Reviewing Agencies Checklist

Lead Agencies may recommend State Clearinghouse distribution by marking agencies below with and "**X**".
If you have already sent your document to the agency please denote that with an "**S**".

X Air Resources Board
___ Boating & Waterways, Department of
___ California Emergency Management Agency
X California Highway Patrol
X Caltrans District # 7
___ Caltrans Division of Aeronautics
___ Caltrans Planning
___ Central Valley Flood Protection Board
___ Coachella Valley Mtns. Conservancy
___ Coastal Commission
___ Colorado River Board
X Conservation, Department of
___ Corrections, Department of
___ Delta Protection Commission
___ Education, Department of
___ Energy Commission
___ Fish & Game Region # ___
___ Food & Agriculture, Department of
___ Forestry and Fire Protection, Department of
___ General Services, Department of
___ Health Services, Department of
___ Housing & Community Development
X Native American Heritage Commission
___ Office of Historic Preservation
___ Office of Public School Construction
___ Parks & Recreation, Department of
___ Pesticide Regulation, Department of
___ Public Utilities Commission
X Regional WQCB # ___
___ Resources Agency
___ Resources Recycling and Recovery, Department of
___ S.F. Bay Conservation & Development Comm.
___ San Gabriel & Lower L.A. Rivers & Mtns. Conservancy
___ San Joaquin River Conservancy
X Santa Monica Mtns. Conservancy
___ State Lands Commission
___ SWRCB: Clean Water Grants
___ SWRCB: Water Quality
___ SWRCB: Water Rights
___ Tahoe Regional Planning Agency
___ Toxic Substances Control, Department of
___ Water Resources, Department of

___ Other: ___
___ Other: ___

Local Public Review Period (to be filled in by lead agency)

Starting Date August 30, 2017 Ending Date October 2, 2017

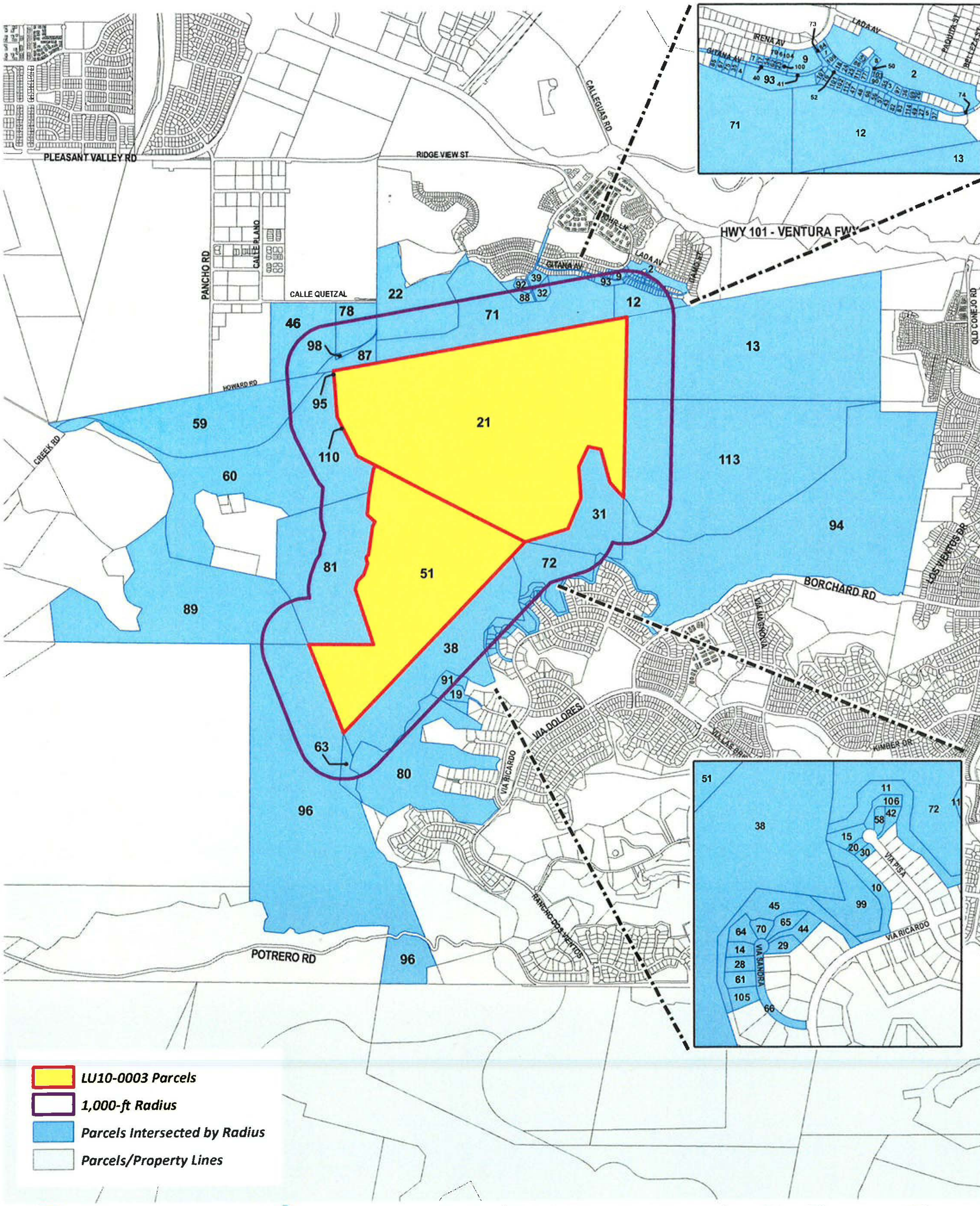
Lead Agency (Complete if applicable):

Consulting Firm: ___
Address: ___
City/State/Zip: ___
Contact: ___
Phone: ___

Applicant: ___
Address: ___
City/State/Zip: ___
Phone: ___

Signature of Lead Agency Representative: Brian R Bea **Date:** 8/22/17

Authority cited: Section 21083, Public Resources Code. Reference: Section 21161, Public Resources Code.



Ventura County
Resource Management Agency
Information Systems GIS Services
Map created on 8/22/2017

RMAgis

County of Ventura
Planning Division
LU10-0003
1,000-ft Radius Map

Disclaimer: this map was created by the Ventura County Resource Management Agency Information Systems GIS, which is designed and operated solely for the convenience of the County and related public agencies. The County does not warrant the accuracy of this map and no decision involving a risk of economic loss or physical injury should be made in reliance therein

1 = 234021042
WONG STEVEN W TR
34303 MIMOSA TERR
FREMONT CA 94555

2 = common

3 = 234023027
INGRAM RALPH L-JOAN K TRUST
6901 S SEPULVEDA BLVD
WESTCHESTER CA 90045-1511

4 = 234020622
HARGREAVES R-HAIMOWITZ M TR ATTN RICHARD HARGREAVES TTEE
6330 GITANA AVE
CAMARILLO CA 93012-8127

5 = 234023035
FRENSDORFF BODO M-NELLY TR
6574 SAN COMO LN
CAMARILLO CA 93012-8150

6 = 234021017
BENIOFF KATHRYN I TR
6342 IRENA AVE
CAMARILLO CA 93012-8134

7 = 234021023
PILCHER THOMAS C JR TR
6309 GITANA AV
CAMARILLO CA 93012-8135

8 = 234021054
FINCH BETTY J TR
6453 SAN COMO CT
CAMARILLO CA 93012-8144

9 = common

10 = common

11 = common

12 = 163018007
PLM HOLDINGS LLC ET AL ATTN STEPHEN PETIT
626 B AVE
CORONADO CA 92188

13 = 234036008
PACIFIC ROCK INC
PO BOX 255
SOMIS CA 93066

14 = 236023015
CRAWFORD JAMES D JR SEP TR
PO BOX 3162
VENTURA CA 93006

15 = 236020008
KHARE SANJAY D ARORA-KHARE TARUNA
291 WHITCLEM WAY
PALO ALTO CA 94306

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18 = 234021044
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CAMARILLO CA 93012-9428

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STEWART JONATHAN L TR STEWART JOSEPH D TR
PO BOX 253
NEWBURY PARK CA 91319-0253

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JOBY ESIA-YVONNE M MASSAIS IBRAHIM-KAMRA
5372 VIA PISA
THOUSAND OAKS CA 91320-7007

21 = 234006019
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PO BOX 255
SOMIS CA 93066

22 = 234004076
CHAMELEON SPRINGS LLC
PO BOX 11480
BEVERLY HILLS CA 90213

23 = 234021027
DOEBLER PAUL D-TERRY M TR
6343 GITANA AVE
CAMARILLO CA 93012-8135

24 = 234021045
LANG JOHN W-EUGENA M TR
6401 SAN COMO LN
CAMARILLO CA 93012-8143

25 = 234021046
LUESEBRINK MARGARETE SURV TR
6411 SAN COMO LN
CAMARILLO CA 93012-8143

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EISLER PAUL-ANN TR
6535 SAN COMO LN
CAMARILLO CA 93012-8148

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GEIGER N LOU TR ATTN DENISE C JENNINGS TTEE
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COTONE MARK-JANET TR
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MCDONNELL TODD K-CLARICE TR
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PALO ALTO CA 94306

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2100 E THOUSAND OAKS BLVD
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POLLEY STEPHEN K-CAROLE L TR
6316 GITANA AVE
CAMARILLO CA 93012

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FIERRO ROBERT T HALSELL JEAN R
6507 SAN COMO LN
CAMARILLO CA 93012-8147

37 = 234023036
BAKER H-J TR ATTN HAROLD-JULIE
BAKER TTEE
6590 SAN COMO LN
CAMARILLO CA 93012

38 = 234036001
MOUNTAINS REC-CNSV AUTHORITY
3750 SOLSTICE CANYON RD
MALIBU CA 90265-2901

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41 = common-p

42 = 236020011
LUITHLY JOSEPH R TR
1612 ASPENWALL RD
WESTLAKE VILLAGE CA 91361

43 = 234023029
TURNEY KATHRYN E TR
6488 SAN COMO LN
CAMARILLO CA 93012-8146

44 = 236023019
BRENT ANDREW B TR ATTN RICHARD S
BRENT CO-TTEE
PO BOX 85552
SAN DIEGO CA 92186

45 = common

46 = 234004084
CAMARILLO SANITARY DISTRICT
PO BOX 248
CAMARILLO CA 93011-0248

47 = 234021063
3 BROS REAL ESTATE LLC
10681 FOOTHILL BL #140
RANCHO CUCAMONGA CA 91730

48 = 234021062
STABEN THOMAS A
PO BOX 255
SOMIS CA 93066

49 = 234023033
MCTHOMAS JOEL VALENZUELA PATRICIA
6542 SAN COMO LN
CAMARILLO CA 93012-8150

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PACIFIC ROCK INC
PO BOX 257
SOMIS CA 93066-0257

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6439 SAN COMO CT
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CAMARILLO CA 93012

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JAMES P SHIRAISHI TTEE
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VALENCIA CA 91355

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1920 TIENDA DR STE 204
LODI CA 95242-3932

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AGRIVEST LLC
1920 TIENDA DR STE 204
LODI CA 95242-3932

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THOUSAND OAKS CA 91320-6887

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CAMARILLO CA 93012

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3750 SOLSTICE CANYON RD
MALIBU CA 90265-2901

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110 VIA SANDRA
NEWBURY PARK CA 91320-6887

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CAMARILLO CA 93012-8146

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OLMSTEAD GARY L
6521 SAN COMO LN
CAMARILLO CA 93012-8148

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BUTLER TODD W TR
103 VIA SANDRA
THOUSAND OAKS CA 91320-6887

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626 B AVE
CORONADO CA 92188

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2100 E THOUSAND OAKS BLVD
THOUSAND OAKS CA 91362-2996

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74 = common-p

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CAMARILLO CA 93012

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ELLIOTT THEODORE III-RITA TR
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CAMARILLO CA 93012-8136

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ROSENFELD DOROTHY M TR ROSENFELD DOROTHY M DEC TR
6425 SAN COMO LN
CAMARILLO CA 93012-8143

78 = 234004082
CAMARILLO SANITARY DISTRICT
PO BOX 248
CAMARILLO CA 93011-0248

79 = 234021016
GARZA-LAIRD MARTHA C TR
6334 IRENA AVE
CAMARILLO CA 93012-8134

80 = 236042007
OPERATING ENG PENSION TR
100 E CORSON ST
PASADENA CA 91103

81 = 234006012
CARRIAGE CEMETERY SERV INC ATTN PROPERTY TAX DEPT
3040 POST OAK BLVD #300
HOUSTON TX 77056-6513

82 = 234023030
SPANN SUSAN C TR
6494 SAN COMO LN
CAMARILLO CA 93012-8146

83 = 234023031
MILLER CALVIN G JR TR
6508 SAN COMO LN
CAMARILLO CA 93012

84 = 234021041
JOHNSON EDWARD-DOROTHY V TR
6369 SAN COMO LN
CAMARILLO CA 93012-8137

85 = 234020618
KINSLING HARRY R TR EST ATTN H RANDALL KINSLING TTEE
5182 KINGSGROVE DR
SOMIS CA 93066-9718

86 = 234021050
FOY W CHARLES
6431 SAN COMO CT
CAMARILLO CA 93012-8144

87 = 234004085
VENTURA COUNTY FL CTRL DIST ATTN R-W AGENT
800 S VICTORIA AVE
VENTURA CA 93009-0001

88 = common

89 = 234006038
GALWAY FARMS LLC ATTN ERIC MAYER
4241 JUTLAND DR STE 207
SAN DIEGO CA 92117

90 = 234021056
KEIM JULIA TR
6467 SAN COMO LN
CAMARILLO CA 93012

91 = 236042001
CONEJO OPEN SPACE CNSV AGY
2100 E THOUSAND OAKS BLVD
THOUSAND OAKS CA 91362-2996

92 = common

93 = common

94 = 234036006
THOUSAND OAKS CITY OF
2100 E THOUSAND OAKS BLVD
THOUSAND OAKS CA 91362-2996

95 = 234006035
VENTURA COUNTY FL CTRL DIST ATTN R-W AGENT
800 S VICTORIA AVE
VENTURA CA 93009-0001

96 = 234007014
GALWAY FARMS LLC ATTN ERIC MAYER
4241 JUTLAND DR STE 207
SAN DIEGO CA 92117

97 = 234023026
APPEL KARL A-ELFRIEDE TRUST
6487 SAN COMO LN
CAMARILLO CA 93012-9429

98 = 234004083
VENTURA COUNTY FL CTRL DIST ATTN R-W AGENT
800 S VICTORIA AVE
VENTURA CA 93009-0001

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CONEJO OPEN SPACE CNSV AGY
2100 E THOUSAND OAKS BLVD
THOUSAND OAKS CA 91362-2996

100 = 234021028
CHARI SRINIVAS-PREMA TR
6351 GITANA AV
CAMARILLO CA 93012

101 = 234021066
ZELINSKI LOWELL F-MARIAM TR
6404 SAN COMO LN
CAMARILLO CA 93012-8145

102 = 234021065
EADS PHILIP M LAWRENCE LINDA D TR
448-3 TUOLUMNE AV #3
THOUSAND OAKS CA 91360

103 = 234021055
RAPMUND ETHEL W TR
6459 SAN COMO CT
CAMARILLO CA 93012

104 = 234021018
WRISLEY GEORGE L TR
6350 IRENA AV
CAMARILLO CA 93012

105 = 236023012
FISH DANIEL-GRETCHEN
163 VIA SANDRA
THOUSAND OAKS CA 91320-6887

106 = 236020009
CALAGNA BILLY R TR
5381 VIA PISA
NEWBURY PARK CA 91320

107 = common

108 = common

109 = 234021043
KELLY ROBERT R JR-HELEN TR
6385 SAN COMO LN
CAMARILLO CA 93012-9428

110 = 234006034
CAMARILLO SANITARY DISTRICT
PO BOX 248
CAMARILLO CA 93011-0248

111 = 234021047
PALAME SALVATORE
6417 SAN COMO PL
CAMARILLO CA 93012

112 = 234021064
3 BROS REAL ESTATE LLC
10681 FOOTHILL BL #140
RANCHO CUCAMONGA CA 91730

113 = 234036007
PACIFIC ROCK INC
PO BOX 255
SOMIS CA 93066

114 = 234023032
DEWEY RICHARD A-CAROLYN J
6524 SAN COMO LN
CAMARILLO CA 93012

Pac. Rock NOP (w/duplicates)

A

APN	NAME_1	NAME_2	MAIL_ADDR	CTY_STA	ZIP	APN10	SITUS	INDEX
234021042	WONG STEVEN W TR		34303 MIMOSA TERR	FREMONT CA	94555	2340210425	6377 SAN COMO LN	1
common								2
234023027	INGRAM RALPH L-JOAN K TRUST		6901 S SEPULVEDA BLVD	WESTCHESTER CA	90045-1511	2340230275	6481 SAN COMO LN	3
234020622	HARGREAVES R-HAIMOWITZ M TR	ATTN RICHARD HARGREAVES TTEE	6330 GITANA AVE	CAMARILLO CA	93012-8127	2340206225	6330 GITANA AV	4
234023035	FRENSDORFF BODO M-NELLY TR		6574 SAN COMO LN	CAMARILLO CA	93012-8150	2340230355	6574 SAN COMO LN	5
234021017	BENIOFF KATHRYN I TR		6342 IRENA AVE	CAMARILLO CA	93012-8134	2340210175	6342 IRENA AV	6
234021023	PILCHER THOMAS C JR TR		6309 GITANA AV	CAMARILLO CA	93012-8135	2340210235	6309 GITANA AV	7
234021054	FINCH BETTY J TR		6453 SAN COMO CT	CAMARILLO CA	93012-8144	2340210545	6453 SAN COMO CT	8
common								9
common								10
common								11
163018007	PLM HOLDINGS LLC ET AL	ATTN STEPHEN PETIT	626 B AVE	CORONADO CA	92188	1630180070		12
234036008	PACIFIC ROCK INC		PO BOX 255	SOMIS CA	93066	2340360080		13
236023015	CRAWFORD JAMES D JR SEP TR		PO BOX 3162	VENTURA CA	93006	2360230155	127 VIA SANDRA	14
236020008	KHARE SANJAY D	ARORA-KHARE TARUNA	291 WHITCLEM WAY	PALO ALTO CA	94306	2360200085	5380 VIA PISA	15
common-p								16
234021025	KESTER JAMES-CYNTHIA		6329 GITANA AV	CAMARILLO CA	93012	2340210255	6329 GITANA AV	17
234021044	PITZER DIANN REV LIV TRUST		6397 SAN COMO LN	CAMARILLO CA	93012-9428	2340210445	6397 SAN COMO LN	18
236042002	STEWART JONATHAN L TR	STEWART JOSEPH D TR	PO BOX 253	NEWBURY PARK CA	91319-0253	2360420025	5519 VIA OLAS	19
236020007	JOBY ESIA-YVONNE M	MASSAIS IBRAHIM-KAMRA	5372 VIA PISA	THOUSAND OAKS CA	91320-7007	2360200075	5372 VIA PISA	20
234006019	PACIFIC ROCK INC		PO BOX 255	SOMIS CA	93066	2340060190		21
234004076	CHAMELEON SPRINGS LLC		PO BOX 11480	BEVERLY HILLS CA	90213	2340040760		22
234021027	DOEBLER PAUL D-TERRY M TR		6343 GITANA AVE	CAMARILLO CA	93012-8135	2340210275	6343 GITANA AV	23
234021045	LANG JOHN W-EUGENA M TR		6401 SAN COMO LN	CAMARILLO CA	93012-8143	2340210455	6401 SAN COMO LN	24
234021046	LUESEBRINK MARGARETE SURV TR		6411 SAN COMO LN	CAMARILLO CA	93012-8143	2340210465	6411 SAN COMO LN	25
234023023	EISLER PAUL-ANN TR		6535 SAN COMO LN	CAMARILLO CA	93012-8148	2340230235	6535 SAN COMO LN	26
234023034	GEIGER N LOU TR	ATTN DENISE C JENNINGS TTEE	6558 SAN COMO LN	CAMARILLO CA	93012-8150	2340230345	6558 SAN COMO LN	27
236023014	COTONE MARK-JANET TR		139 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230145	139 VIA SANDRA	28
236023028	MCDONNELL TODD K-CLARICE TR		134 VIA SANDRA	NEWBURY PARK CA	91320-6887	2360230285	134 VIA SANDRA	29
236020006	D SOUZA LANCY J-ASHA L TR		PO BOX 60072	PALO ALTO CA	94306	2360200065	5364 VIA PISA	30
234036003	THOUSAND OAKS CITY OF		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2340360035		31
common								32
common-p								33
common-p								34
234020621	POLLEY STEPHEN K-CAROLE L TR		6316 GITANA AVE	CAMARILLO CA	93012	2340206215	6316 GITANA AV	35
234023025	FIERRO ROBERT T	HALSELL JEAN R	6507 SAN COMO LN	CAMARILLO CA	93012-8147	2340230255	6507 SAN COMO LN	36
234023036	BAKER H-J TR	ATTN HAROLD-JULIE BAKER TTEE	6590 SAN COMO LN	CAMARILLO CA	93012	2340230365	6590 SAN COMO LN	37
234036001	MOUNTAINS REC-CNSV AUTHORITY		3750 SOLSTICE CANYON RD	MALIBU CA	90265-2901	2340360010		38
common								39
common-p								40
common-p								41
236020011	LUITHLY JOSEPH R TR		1612 ASPENWALL RD	WESTLAKE VILLAGE CA	91361	2360200115	5365 VIA PISA	42
234023029	TURNEY KATHRYN E TR		6488 SAN COMO LN	CAMARILLO CA	93012-8146	2340230295	6488 SAN COMO LN	43
236023019	BRENT ANDREW B TR	ATTN RICHARD S BRENT CO-TTEE	PO BOX 85552	SAN DIEGO CA	92186	2360230195	122 VIA SANDRA	44
common								45
234004084	CAMARILLO SANITARY DISTRICT		PO BOX 248	CAMARILLO CA	93011-0248	2340040840		46
234021063	3 BROS REAL ESTATE LLC		10681 FOOTHILL BL #140	RANCHO CUCAMONGA CA	91730	2340210635	6434 SAN COMO LN	47
234021062	STABEN THOMAS A		PO BOX 255	SOMIS CA	93066	2340210625	6446 SAN COMO LN	48
234023033	MCTHOMAS JOEL	VALENZUELA PATRICIA	6542 SAN COMO LN	CAMARILLO CA	93012-8150	2340230335	6542 SAN COMO LN	49
common-p								50
234006022	PACIFIC ROCK INC		PO BOX 257	SOMIS CA	93066-0257	2340060220		51
common-p								52
234021051	PALMER AL TR	SCHRAGE TR	6439 SAN COMO CT	CAMARILLO CA	93012-8144	2340210515	6439 SAN COMO CT	53
234021024	STABEN TOM		756 CALLE PLANO	CAMARILLO CA	93012	2340210245	6317 GITANA AV	54
234021057	HYMAN HAROLD-JUDITH M TR		6473 SAN COMO LN	CAMARILLO CA	93012	2340210575	6473 SAN COMO LN	55
234021060	SHIRAISHI GRACE E SURV TR	ATTN JAMES P SHIRAISHI TTEE	25685 PASEO LAURO CT	VALENCIA CA	91355	2340210605	6464 SAN COMO LN	56
234021059	SMITH TIMOTHY-MARY		6476 SAN COMO LN	CAMARILLO CA	93012	2340210595	6476 SAN COMO LN	57
236020010	JONES JOSHUA A-TARA T		5373 VIA PISA	THOUSAND OAKS CA	91320-7007	2360200105	5373 VIA PISA	58
234006025	MIDNIGHT SUN INC V	ATTN UBS AGRIVEST LLC	1920 TIENDA DR STE 204	LODI CA	95242-3932	2340060250		59
234006032	MIDNIGHT SUN INC V	ATTN UBS AGRIVEST LLC	1920 TIENDA DR STE 204	LODI CA	95242-3932	2340060325		60
236023013	DENNING RANDALL-KATHERINE TR		151 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230135	151 VIA SANDRA	61
234021026	BESSERT MICHAEL A	FAY LAURA	6335 GITANA AV	CAMARILLO CA	93012	2340210265	6335 GITANA AV	62
234007015	MOUNTAINS REC-CNSV AUTHORITY		3750 SOLSTICE CANYON RD	MALIBU CA	90265-2901	2340070150		63
236023016	COLLIER MATTHEW S-MARY H		115 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230165	115 VIA SANDRA	64
236023018	IRELAND MIKE L-NICOLE TRUST		110 VIA SANDRA	NEWBURY PARK CA	91320-6887	2360230185	110 VIA SANDRA	65
common-p								66

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234020619	SHIVELY JOAN B TR		6262 GITANA AV	CAMARILLO CA	93012-8127	2340206195	6262 GITANA AV	67
234021061	RUOFF MARTHA J LIVING TR	ATTN RUSSELL AND TIM RUOFF	6458 SAN COMO LN	CAMARILLO CA	93012-8146	2340210615	6458 SAN COMO LN	68
234023024	OLMSTEAD GARY L		6521 SAN COMO LN	CAMARILLO CA	93012-8148	2340230245	6521 SAN COMO LN	69
236023017	BUTLER TODD W TR		103 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230175	103 VIA SANDRA	70
234004028	PLM HOLDINGS LLC ET AL	ATTN STEPHEN PETIT	626 B AVE	CORONADO CA	92188	2340040280		71
234036002	THOUSAND OAKS CITY OF		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2340360025		72
common-p								73
common-p								74
234020620	KILPATRICK DAVID-MARGARET TR		6276 GITANA AV	CAMARILLO CA	93012	2340206205	6276 GITANA AV	75
234021067	ELLIOTT THEODORE III-RITA TR		6390 SAN COMO LN	CAMARILLO CA	93012-8136	2340210675	6390 SAN COMO LN	76
234021048	ROSENFELD DOROTHY M TR	ROSENFELD DOROTHY M DEC TR	6425 SAN COMO LN	CAMARILLO CA	93012-8143	2340210485	6425 SAN COMO LN	77
234004082	CAMARILLO SANITARY DISTRICT		PO BOX 248	CAMARILLO CA	93011-0248	2340040820		78
234021016	GARZA-LAIRD MARTHA C TR		6334 IRENA AVE	CAMARILLO CA	93012-8134	2340210165	6334 IRENA AV	79
236042007	OPERATING ENG PENSION TR		100 E CORSON ST	PASADENA CA	91103	2360420075		80
234006012	CARRIAGE CEMETERY SERV INC	ATTN PROPERTY TAX DEPT	3040 POST OAK BLVD #300	HOUSTON TX	77056-6513	2340060120	2052 HOWARD RD	81
234023030	SPANN SUSAN C TR		6494 SAN COMO LN	CAMARILLO CA	93012-8146	2340230305	6494 SAN COMO LN	82
234023031	MILLER CALVIN G JR TR		6508 SAN COMO LN	CAMARILLO CA	93012	2340230315	6508 SAN COMO LN	83
234021041	JOHNSON EDWARD-DOROTHY V TR		6369 SAN COMO LN	CAMARILLO CA	93012-8137	2340210415	6369 SAN COMO LN	84
234020618	KINSLING HARRY R TR EST	ATTN H RANDALL KINSLING TTEE	5182 KINGSGROVE DR	SOMIS CA	93066-9718	2340206185	6248 GITANA AV	85
234021050	FOY W CHARLES		6431 SAN COMO CT	CAMARILLO CA	93012-8144	2340210505	6431 SAN COMO CT	86
234004085	VENTURA COUNTY FL CTRL DIST	ATTN R-W AGENT	800 S VICTORIA AVE	VENTURA CA	93009-0001	2340040850		87
common								88
234006038	GALWAY FARMS LLC	ATTN ERIC MAYER	4241 JUTLAND DR STE 207	SAN DIEGO CA	92117	2340060380		89
234021056	KEIM JULIA TR		6467 SAN COMO LN	CAMARILLO CA	93012	2340210565	6467 SAN COMO LN	90
236042001	CONEJO OPEN SPACE CNSV AGY		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2360420015		91
common								92
common								93
234036006	THOUSAND OAKS CITY OF		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2340360065		94
234006035	VENTURA COUNTY FL CTRL DIST	ATTN R-W AGENT	800 S VICTORIA AVE	VENTURA CA	93009-0001	2340060350		95
234007014	GALWAY FARMS LLC	ATTN ERIC MAYER	4241 JUTLAND DR STE 207	SAN DIEGO CA	92117	2340070140		96
234023026	APPEL KARL A-ELFRIEDE TRUST		6487 SAN COMO LN	CAMARILLO CA	93012-9429	2340230265	6487 SAN COMO LN	97
234004083	VENTURA COUNTY FL CTRL DIST	ATTN R-W AGENT	800 S VICTORIA AVE	VENTURA CA	93009-0001	2340040830		98
236020001	CONEJO OPEN SPACE CNSV AGY		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2360200015		99
234021028	CHARI SRINIVAS-PREMA TR		6351 GITANA AV	CAMARILLO CA	93012	2340210285	6351 GITANA AV	100
234021066	ZELINSKI LOWELL F-MARIAM TR		6404 SAN COMO LN	CAMARILLO CA	93012-8145	2340210665	6404 SAN COMO LN	101
234021065	EADS PHILIP M	LAWRENCE LINDA D TR	448-3 TUOLUMNE AV #3	THOUSAND OAKS CA	91360	2340210655	6416 SAN COMO LN	102
234021055	RAPMUND ETHEL W TR		6459 SAN COMO CT	CAMARILLO CA	93012	2340210555	6459 SAN COMO CT	103
234021018	WRISLEY GEORGE L TR		6350 IRENA AV	CAMARILLO CA	93012	2340210185	6350 IRENA AV	104
236023012	FISH DANIEL-GRETCHEN		163 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230125	163 VIA SANDRA	105
236020009	CALAGNA BILLY R TR		5381 VIA PISA	NEWBURY PARK CA	91320	2360200095	5381 VIA PISA	106
common								107
common								108
234021043	KELLY ROBERT R JR-HELEN TR		6385 SAN COMO LN	CAMARILLO CA	93012-9428	2340210435	6385 SAN COMO LN	109
234006034	CAMARILLO SANITARY DISTRICT		PO BOX 248	CAMARILLO CA	93011-0248	2340060340		110
234021047	PALAME SALVATORE		6417 SAN COMO PL	CAMARILLO CA	93012	2340210475	6417 SAN COMO LN	111
234021064	3 BROS REAL ESTATE LLC		10681 FOOTHILL BL #140	RANCHO CUCAMONGA CA	91730	2340210645	6428 SAN COMO LN	112
234036007	PACIFIC ROCK INC		PO BOX 255	SOMIS CA	93066	2340360070		113
234023032	DEWEY RICHARD A-CAROLYN J		6524 SAN COMO LN	CAMARILLO CA	93012	2340230325	6524 SAN COMO LN	114

Pac. Rock NOP (w/o duplicates)

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APN	NAME_1	NAME_2	MAIL_ADDR	CTY_STA	ZIP	APN10	SITUS	INDEX
234021042	WONG STEVEN W TR		34303 MIMOSA TERR	FREMONT CA	94555	2340210425	6377 SAN COMO LN	1
common								2
234023027	INGRAM RALPH L-JOAN K TRUST		6901 S SEPULVEDA BLVD	WESTCHESTER CA	90045-1511	2340230275	6481 SAN COMO LN	3
234020622	HARGREAVES R-HAIMOWITZ M TR	ATTN RICHARD HARGREAVES TTEE	6330 GITANA AVE	CAMARILLO CA	93012-8127	2340206225	6330 GITANA AV	4
234023035	FRENSDORFF BODO M-NELLY TR		6574 SAN COMO LN	CAMARILLO CA	93012-8150	2340230355	6574 SAN COMO LN	5
234021017	BENIOFF KATHRYN I TR		6342 IRENA AVE	CAMARILLO CA	93012-8134	2340210175	6342 IRENA AV	6
234021023	PILCHER THOMAS C JR TR		6309 GITANA AV	CAMARILLO CA	93012-8135	2340210235	6309 GITANA AV	7
234021054	FINCH BETTY J TR		6453 SAN COMO CT	CAMARILLO CA	93012-8144	2340210545	6453 SAN COMO CT	8
163018007	PLM HOLDINGS LLC ET AL	ATTN STEPHEN PETIT	626 B AVE	CORONADO CA	92188	1630180070		12
234036008	PACIFIC ROCK INC		PO BOX 255	SOMIS CA	93066	2340360080		13
236023015	CRAWFORD JAMES D JR SEP TR		PO BOX 3162	VENTURA CA	93006	2360230155	127 VIA SANDRA	14
236020008	KHARE SANJAY D	ARORA-KHARE TARUNA	291 WHITCLEM WAY	PALO ALTO CA	94306	2360200085	5380 VIA PISA	15
234021025	KESTER JAMES-CYNTHIA		6329 GITANA AV	CAMARILLO CA	93012	2340210255	6329 GITANA AV	17
234021044	PITZER DIANN REV LIV TRUST		6397 SAN COMO LN	CAMARILLO CA	93012-9428	2340210445	6397 SAN COMO LN	18
236042002	STEWART JONATHAN L TR	STEWART JOSEPH D TR	PO BOX 253	NEWBURY PARK CA	91319-0253	2360420025	5519 VIA OLAS	19
236020007	JOBY ESIA-YVONNE M	MASSAIS IBRAHIM-KAMRA	5372 VIA PISA	THOUSAND OAKS CA	91320-7007	2360200075	5372 VIA PISA	20
234004076	CHAMELEON SPRINGS LLC		PO BOX 11480	BEVERLY HILLS CA	90213	2340040760		22
234021027	DOEBLER PAUL D-TERRY M TR		6343 GITANA AVE	CAMARILLO CA	93012-8135	2340210275	6343 GITANA AV	23
234021045	LANG JOHN W-EUGENA M TR		6401 SAN COMO LN	CAMARILLO CA	93012-8143	2340210455	6401 SAN COMO LN	24
234021046	LUESEBRINK MARGARETE SURV TR		6411 SAN COMO LN	CAMARILLO CA	93012-8143	2340210465	6411 SAN COMO LN	25
234023023	EISLER PAUL-ANN TR		6535 SAN COMO LN	CAMARILLO CA	93012-8148	2340230235	6535 SAN COMO LN	26
234023034	GEIGER N LOU TR	ATTN DENISE C JENNINGS TTEE	6558 SAN COMO LN	CAMARILLO CA	93012-8150	2340230345	6558 SAN COMO LN	27
236023014	COTONE MARK-JANET TR		139 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230145	139 VIA SANDRA	28
236023028	MCDONNELL TODD K-CLARICE TR		134 VIA SANDRA	NEWBURY PARK CA	91320-6887	2360230285	134 VIA SANDRA	29
236020006	D SOUZA LANCY J-ASHA L TR		PO BOX 60072	PALO ALTO CA	94306	2360200065	5364 VIA PISA	30
234036003	THOUSAND OAKS CITY OF		2100 E THOUSAND OAKS BLVD	THOUSAND OAKS CA	91362-2996	2340360035		31
234020621	POLLEY STEPHEN K-CAROLE L TR		6316 GITANA AVE	CAMARILLO CA	93012	2340206215	6316 GITANA AV	35
234023025	FIERRO ROBERT T	HALSELL JEAN R	6507 SAN COMO LN	CAMARILLO CA	93012-8147	2340230255	6507 SAN COMO LN	36
234023036	BAKER H-J TR	ATTN HAROLD-JULIE BAKER TTEE	6590 SAN COMO LN	CAMARILLO CA	93012	2340230365	6590 SAN COMO LN	37
234036001	MOUNTAINS REC-CNSV AUTHORITY		3750 SOLSTICE CANYON RD	MALIBU CA	90265-2901	2340360010		38
236020011	LUITHLY JOSEPH R TR		1612 ASPENWALL RD	WESTLAKE VILLAGE CA	91361	2360200115	5365 VIA PISA	42
234023029	TURNEY KATHRYN E TR		6488 SAN COMO LN	CAMARILLO CA	93012-8146	2340230295	6488 SAN COMO LN	43
236023019	BRENT ANDREW B TR	ATTN RICHARD S BRENT CO-TTEE	PO BOX 85552	SAN DIEGO CA	92186	2360230195	122 VIA SANDRA	44
234004084	CAMARILLO SANITARY DISTRICT		PO BOX 248	CAMARILLO CA	93011-0248	2340040840		46
234021063	3 BROS REAL ESTATE LLC		10681 FOOTHILL BL #140	RANCHO CUCAMONGA CA	91730	2340210635	6434 SAN COMO LN	47
234023033	MCTHOMAS JOEL	VALENZUELA PATRICIA	6542 SAN COMO LN	CAMARILLO CA	93012-8150	2340230335	6542 SAN COMO LN	49
234021051	PALMER AL TR	SCHRAGE TR	6439 SAN COMO CT	CAMARILLO CA	93012-8144	2340210515	6439 SAN COMO CT	53
234021024	STABEN TOM		756 CALLE PLANO	CAMARILLO CA	93012	2340210245	6317 GITANA AV	54
234021057	HYMAN HAROLD-JUDITH M TR		6473 SAN COMO LN	CAMARILLO CA	93012	2340210575	6473 SAN COMO LN	55
234021060	SHIRAISHI GRACE E SURV TR	ATTN JAMES P SHIRAISHI TTEE	25685 PASEO LAURO CT	VALENCIA CA	91355	2340210605	6464 SAN COMO LN	56
234021059	SMITH TIMOTHY-MARY		6476 SAN COMO LN	CAMARILLO CA	93012	2340210595	6476 SAN COMO LN	57
236020010	JONES JOSHUA A-TARA T		5373 VIA PISA	THOUSAND OAKS CA	91320-7007	2360200105	5373 VIA PISA	58
234006025	MIDNIGHT SUN INC V	ATTN UBS AGRIVEST LLC	1920 TIENDA DR STE 204	LODI CA	95242-3932	2340060250		59
236023013	DENNING RANDALL-KATHERINE TR		151 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230135	151 VIA SANDRA	61
234021026	BESSERT MICHAEL A	FAY LAURA	6335 GITANA AV	CAMARILLO CA	93012	2340210265	6335 GITANA AV	62
236023016	COLLIER MATTHEW S-MARY H		115 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230165	115 VIA SANDRA	64
236023018	IRELAND MIKE L-NICOLE TRUST		110 VIA SANDRA	NEWBURY PARK CA	91320-6887	2360230185	110 VIA SANDRA	65
234020619	SHIVELY JOAN B TR		6262 GITANA AV	CAMARILLO CA	93012-8127	2340206195	6262 GITANA AV	67
234021061	RUOFF MARTHA J LIVING TR	ATTN RUSSELL AND TIM RUOFF	6458 SAN COMO LN	CAMARILLO CA	93012-8146	2340210615	6458 SAN COMO LN	68
234023024	OLMSTEAD GARY L		6521 SAN COMO LN	CAMARILLO CA	93012-8148	2340230245	6521 SAN COMO LN	69
236023017	BUTLER TODD W TR		103 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230175	103 VIA SANDRA	70
234020620	KILPATRICK DAVID-MARGARET TR		6276 GITANA AV	CAMARILLO CA	93012	2340206205	6276 GITANA AV	75
234021067	ELLIOTT THEODORE III-RITA TR		6390 SAN COMO LN	CAMARILLO CA	93012-8136	2340210675	6390 SAN COMO LN	76
234021048	ROSENFELD DOROTHY M TR	ROSENFELD DOROTHY M DEC TR	6425 SAN COMO LN	CAMARILLO CA	93012-8143	2340210485	6425 SAN COMO LN	77
234021016	GARZA-LAIRD MARTHA C TR		6334 IRENA AVE	CAMARILLO CA	93012-8134	2340210165	6334 IRENA AV	79
236042007	OPERATING ENG PENSION TR		100 E CORSON ST	PASADENA CA	91103	2360420075		80
234006012	CARRIAGE CEMETERY SERV INC	ATTN PROPERTY TAX DEPT	3040 POST OAK BLVD #300	HOUSTON TX	77056-6513	2340060120	2052 HOWARD RD	81
234023030	SPANN SUSAN C TR		6494 SAN COMO LN	CAMARILLO CA	93012-8146	2340230305	6494 SAN COMO LN	82
234023031	MILLER CALVIN G JR TR		6508 SAN COMO LN	CAMARILLO CA	93012	2340230315	6508 SAN COMO LN	83
234021041	JOHNSON EDWARD-DOROTHY V TR		6369 SAN COMO LN	CAMARILLO CA	93012-8137	2340210415	6369 SAN COMO LN	84
234020618	KINSLING HARRY R TR EST	ATTN H RANDALL KINSLING TTEE	5182 KINGSGROVE DR	SOMIS CA	93066-9718	2340206185	6248 GITANA AV	85
234021050	FOY W CHARLES		6431 SAN COMO CT	CAMARILLO CA	93012-8144	2340210505	6431 SAN COMO CT	86
234004085	VENTURA COUNTY FL CTRL DIST	ATTN R-W AGENT	800 S VICTORIA AVE	VENTURA CA	93009-0001	2340040850		87
234006038	GALWAY FARMS LLC	ATTN ERIC MAYER	4241 JUTLAND DR STE 207	SAN DIEGO CA	92117	2340060380		89
234021056	KEIM JULIA TR		6467 SAN COMO LN	CAMARILLO CA	93012	2340210565	6467 SAN COMO LN	90
234023026	APPEL KARL A-ELFRIEDE TRUST		6487 SAN COMO LN	CAMARILLO CA	93012-9429	2340230265	6487 SAN COMO LN	97

2

234021028	CHARI SRINIVAS-PREMA TR		6351 GITANA AV	CAMARILLO CA	93012	2340210285	6351 GITANA AV	100
234021066	ZELINSKI LOWELL F-MARIAM TR		6404 SAN COMO LN	CAMARILLO CA	93012-8145	2340210665	6404 SAN COMO LN	101
234021065	EADS PHILIP M	LAWRENCE LINDA D TR	448-3 TUOLUMNE AV #3	THOUSAND OAKS CA	91360	2340210655	6416 SAN COMO LN	102
234021055	RAPMUND ETHEL W TR		6459 SAN COMO CT	CAMARILLO CA	93012	2340210555	6459 SAN COMO CT	103
234021018	WRISLEY GEORGE L TR		6350 IRENA AV	CAMARILLO CA	93012	2340210185	6350 IRENA AV	104
236023012	FISH DANIEL-GRETCHEN		163 VIA SANDRA	THOUSAND OAKS CA	91320-6887	2360230125	163 VIA SANDRA	105
236020009	CALAGNA BILLY R TR		5381 VIA PISA	NEWBURY PARK CA	91320	2360200095	5381 VIA PISA	106
234021043	KELLY ROBERT R JR-HELEN TR		6385 SAN COMO LN	CAMARILLO CA	93012-9428	2340210435	6385 SAN COMO LN	109
234021047	PALAME SALVATORE		6417 SAN COMO PL	CAMARILLO CA	93012	2340210475	6417 SAN COMO LN	111
234023032	DEWEY RICHARD A-CAROLYN J		6524 SAN COMO LN	CAMARILLO CA	93012	2340230325	6524 SAN COMO LN	114

APPENDIX A-2

COMMENTS ON PACIFIC ROCK QUARRY MINE EXPANSION PROJECT NOP

Palermo Maintenance Corporation

Newbury Park, CA 91320

Ventura County Resource Management Agency
Planning Division
Attn.: Chris Stephens, Agency Director & Brian R. Baca, Manager, Commercial and Industrial Permit Section
800 South Victoria Avenue, L#1740
Ventura, CA 93009

BY FAX to 805 654 2509
E-mail: Chris.Stephens@Ventura.org
E-mail: Brian.baca@Ventura.org

September 26, 2017

Dear Sirs,

Notice of Preparation regarding Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003;

Palermo Maintenance Corporation is the Home Owners Association for the development known as Palermo and which comprises Via Sandra, Via Olas, Via Nicola and Via Mira Flores in the Dos Vientos development. There is a total of 71 homes on the four streets.

As you will see from a map, these streets are built into the hills just on the other side from the Pacific Rock Quarry. Indeed the quarry is visible from some of the properties on Via Sandra. We were surprised to see that the streets are, nevertheless not shown on the Vicinity Map which is Exhibit 1 to the Notice of Preparation which only shows streets on the same side of the hills as the quarry. That omission may result in residents being unaware of the project's relevance to them and unable to respond.

Present Situation
Noise and vibration from the quarry operations is an issue, particularly from the use of explosives to blast the bedrock and heavy equipment and vehicle operations.

The existing operations at the quarry also produce dust. Depending on wind direction the Palermo homes suffer from windblown dust. That is apparent from the fact that a layer of dust forms on outside table surfaces. It follows that residents are inhaling that dust, with as yet unknown health consequences.

Quarrying operations existed at the time that the homes in Palermo were built and sold. However, the current expansion proposal, if permitted, would significantly worsen the impact on the residents of Palermo.

C/O Community Property Management
♦ P.O. Box 2817 ♦ Camarillo, CA 93011♦
♦ 751 E. Daily Dr. Suite 300 ♦ Camarillo, CA 93010♦
(805) 987-8945 ♦ Fax: (805) 987-7906 ♦ Email: Debbie@cpm1.com

The Expansion Project's Negative Impacts
This proposal would:

- Expand the area that may be quarried by 77%.

- Expand the excavation area subject to reclamation by 213%. Not only increasing the scope of the project but also uses of equipment (use time and resulting noise and debris from 24/7 ongoing operations) and impact all properties located in Palermo.

- Bring the noise and vibration much closer to the Palermo streets.

- Increase dust generation and bring it closer to the Palermo streets. We consider that to be an issue which should be addressed in detail in the EIR in addition to the three suggested in the Notice

- Permit the nuisance and hazards of all the above to occur:
  - Not just 6 days every week but every day and for 16 ½ hours a day, from 5.30 a.m. until 10 p.m.; there would be not even one day's respite for the Palermo residents.
  - And for a further 25 years.

- Cut away the slope and potentially destabilize the hillside between Palermo and the quarry.

We therefore strongly urge that the application be rejected in its entirety.

Yours truly,
Palermo Maintenance Corporation
Board of Directors
c/o Community Property Management, Attn. Debbie Guthrie
751 E. Daily Dr. Suite 300
Camarillo, CA 93010
805-987-8945

Baca, Brian

From: Lindsey Johnson <lindseykate932@gmail.com>
Sent: Monday, October 02, 2017 7:09 AM
To: Baca, Brian
Subject: Pacific Rock Quarry Mining Expansion Project

Dear Mr. Baca,

This email is in regards to the Environmental Impact Report of the Pacific Rock Quarry Mining Expansion Project. I am not an expert in the field, but I am a concerned citizen who cares about our local open spaces and wildlife. I urge you to investigate the critical necessity that protected lands play in animal migrations and movements, specifically in the region slotted for mining. It had been well documented that mountain lions rely on that area to access the Santa Monica Mountains, crossing the 101 freeway. It is part of the wildlife corridor, where research has shown mountain lions move across the state. It is not just about that parcel of land we should focus on, but the greater ecosystem of Southern California, and how corporate greed can disrupt that balance. If this section of land is allowed to be mined, mountain lions will be further restricted their habitat and range. If not allowed to move freely over the land, the genetic diversity of the mountain lion could be affected - an indication which has already presented itself in groups restricted by Los Angeles' sprawl. This encroachment could lead to the species' demise in Southern California. The mountain lion is merely a single example of the type of environmental repercussions which could occur if our mountains are allowed to be mined and precious protected land is discarded. Please use this Environmental Impact Report to benefit the wildlife who depend on us to protect their habitat by preserving the wildlife corridor. I look forward to seeing a positive result of this report.

Thank you,

Lindsey Johnson

Baca, Brian

From: Robert Adams <radamsbc@gmail.com>
Sent: Monday, October 02, 2017 12:33 AM
To: Baca, Brian
Subject: Pacific Rock Quarry Mine Expansion Proiect

Greetings,

The proposed Pacific Rock Quarry expansion and its 37 year old EIR is completely inappropriate and absurd.

The entire EIR requires updating and will likely be challenged in court if not met to the community's satisfaction. Why would an EIR that predates any of the surrounding housing developments be considered as valid in any conceivable manner?

No alternative has been identified or proposed by Pacific Rock Quarry, which is a requirement of CEQA.

The proximity to a residential neighborhood and protected public land should be of the highest concern. How can a quarry exist within inches of protected public land, and within a few hundred feet of houses? Has any buffer zone been considered?

The amount of air pollution created from the quarry should be heavily scrutinized. Increasing the number and frequency of truck deliveries across an unpaved dirt road will inevitably increase dust and particulate volume. The prevailing wind will deposit the exhaust fumes, as well as dust from the road and the quarry activities itself into a residential neighborhood (a neighborhood that doesn't exist according to the 37 year old EIR). How will this air pollution be mitigated? Will the road be paved? Will the company use clean vehicles for delivery and operation? How will homes be sheltered from the degradation of air quality from this project? How will the state's limits on greenhouse gasses be considered in this EIR?

The noise created by the expansion of the project's boundary as well as the proposed increase in frequency of truck delivery requires attention. Thousand Oaks does not permit local deliveries before 7AM or after 9PM, and yet the project plans to increase its hours of operation to 5:30 AM and until 10PM. This is clearly outside of the realm of acceptability for a neighborhood that will be suffering the ill effects of terrible noise pollution for 16.5 hours every day, without any relief. How will this sound be mitigated? If any machine operation sound is able to be heard within the residential neighborhood, the project requires disapproval. Additionally, the proposed expansion to Sunday does a terrible disservice to the adjacent cemetery. No family member wishes to grieve the loss of their loved ones, while the preacher is yelling above the sound of bulldozers and the family is choking from the exhaust and dust particulates. Out of respect to the cemetery, no operations should exist on Sunday. Also, the hours must conform to Thousand Oaks delivery standards.

Worse yet, the project proposes using explosives as a part of their mining operations. This is absolutely inappropriate for the location. How will the community be warned of potential explosions? How will the company handle the potential relocating of families away from blast zones? How will children and veterans be affected by the sounds of explosions ripping through their backyards and shaking their entire house? Must Dos Vientos suffer the fate of a war zone just to satisfy the whims of a company who can't be bothered to find an alternative process? One must also ask how the explosives will be contained on site? What type and compound of explosives will be used, and will the explosions expose residents to any buried contaminants - such as naturally occurring asbestos?

Have any archaeological resources been identified in the subject boundary expansion? Chumash sites are located throughout the valley, and particularly along ridgelines. Pictographs have already been documented in the vicinity, and some were destroyed during the Conejo Grade projects. Has the CUP site been adequately studied?

One must ask about traffic along Howard Road. This road is shared by the Conejo Mountain Funeral Home, and Sundays (part of the proposed expansion) will witness large trucks encountering funeral processions along a very narrow road which has no medium, striping or delineation between oncoming traffic. The proposed expansion to Sunday should consider all funeral home traffic and potential conflicts between mourners and dump trucks.

How have the nearby agricultural resources been studied? Has the dust, exhaust fumes and possible contamination been studied? Will the farms be required to remove crops rather than have them destroyed by the effects of the quarry?

One must ask how the watersheds on Conejo Mountain will be protected? At least three watersheds have been identified by the state which cross the proposed project. Will this result in contamination of aquifers? How will this area be protected from flooding? Will the nearby cemetery serve as the catch basin during a 10 or 100 year flood event? How will this destabilization of Conejo Mountain affect surrounding farms, and residents? Camarillo Springs has already been subject to several landslides in recent years, what hope does this quarry expansion have of avoiding a similar fate?

Has the site been studied for Coccidioidomycosis (Valley Fever)? The spore has been found within the valley, and this project will create further exposure and potential infection from this disease. Residents cannot be exposed to potentially lethal airborne diseases from this project.

How will this project affect the potential for wildfires? We've already suffered several devastating wildfires in recent years on or around Conejo Mountain. All it will take it is a single errant flame to cause a blaze that will certainly destroy houses and blanket Dos Vientos with toxic smoke. We should not suffer this risk just for the sake of a quarry.

How will this project mitigate the visual impacts of the destroyed environment that it has created? The proposal makes no mention of remediation of quarried land back to a natural state. Will this eyesore forever remain as evidence to the small mindedness of county governance? How will the slope be returned to an acceptable level, to avoid further destabilization? How will the wasteland of a quarry be replanted so that endemic species can return and the visual impact of the quarry be eliminated?

How will the project mitigate its proposed boundary expansion versus the wildlife corridors and public land? The Santa Monica Mountains Conservancy and the Conejo Open Space Coservation Agency have both identified the subject parcels as being the highest priority for their acquisition. An existing wildlife corridor has been identified by SC Wildlands to traverse the proposed boundary location (and the county has determined wildlife corridors to be a priority concern). Will endangered and threatened endemic species be considered by this expansion project? A wildelife corridor requires half a mile to be optimally utilized by animals. The proposed expansion will reduce this corridor to feet and block the path of travel of mountain lions, deer, bobcats and other native fauna. What will be the fate of the 500 acres of land not being considered in the CUP? The EIR must require that this land is transferred to public ownership to offset the damages created by the quarry. The proposed boundary comes within inches of protected public land and within feet of a public trail. Will this expansion destabilize the trail and cause erosion of public land?

How will this expansion affect the viewshed from those recreating on public land? Will it be marred by the horrific site of a quarry? Will these very popular trails be closed due to blasting? How will the quarry protect trail users from the effects of the quarry, particularly the air issues and the risk of death from explosions? There are many trails that lead to an area within feet of the proposed blasting site - how will all of the spur trails be monitored? Will the company post guards and evacuate anyone in the area? Signs alone will not be sufficient, as they are often vandalized or removed.

How will potential blasting and air quality degradation affect public utilities? Southern California Edison have a large power line within feet of the proposed expansion. Will there be the potential for power loss to the region, due to the ill effects of the quarry and their practices?

Lastly, the owner and the quarry itself have been investigated by the state and Army Corp of Engineers for violations, including mining outside of their approved boundaries (at the site currently proposed for expansion). Why should this company be rewarded with an expansion? Given the long list of violations, how can we trust this company to even uphold the mitigation requirements that are set forth by the EIR update? How can we trust this company to properly handle explosives and hazardous materials? What will we suffer next by the illegal actions of this company? Any consultants must be handpicked by the County, and not the quarry, as there is a strong likelihood of bias if the company is allowed to perform their own studies and choose their own professionals. Please consult the following news report about the long list of violations this company has performed: http://archive.vcstar.com/news/county-contractor-mines-a-troubled-deal-ep-373753029-352567491.html

This expansion project has no place in our county and it should be clear from every possible study and impact that it should be denied. Our community deserves better than being subject to hazardous air, complete destruction of native habitats, fall under threat of erosion and flood impacts, and being within a blasting zone. Given its violation history, I doubt this company will spend the effort or time to properly mitigate anything. That they think an EIR from 1980 would be considered acceptable in the least degree is abhorrent. The entire 1980 EIR needs to be thrown out and a completely new study be done in its place. A company should not act as though a large residential community of thousands of people or an active cemetery does not exist.

Please, do every possible study and require every possible mitigation and involve the community every step of the way, including public community hearings.

We have our concerns

Robert Adams

CONEJO OPEN SPACE CONSERVATION AGENCY

September 28, 2017

Brian R. Baca – Manager, Commercial and Industrial Permit Section
Ventura County Resource Management Agency, Planning Division
800 S. Victoria Avenue, L#1740
Ventura, CA 93009

Subject: Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003

Dear Mr. Baca:

The Conejo Open Space Conservation Agency (COSCA) preserves, protects, and manages open space resources in the Conejo Valley. There are nearly 15,250 acres of protected open space within Thousand Oaks' city limits and COSCA owns and/or manages approximately 12,400 acres. The parcels (APNs 234-0-060-220 and 234-0-060-190) upon which the proposed quarry expansion would occur are located adjacent to the City of Thousand Oaks boundary, as well as COSCA and Mountains and Recreation Conservation Authority (MRCA) open space lands. They also comprise the western flank of Conejo Mountain (NOP Exhibits 1 – 4, posted 8/23/2017).

The parcels comprising Conejo Mountain (APNs 234-0-360-070 and 234-0-360-080) have been identified by COSCA as well as other agencies such as the Santa Monica Mountains Conservancy (SMMC), as a conservation priority for many reasons. With regard to biological resources, the western edge of the Conejo Valley is characterized by the distinctive topography of Conejo Mountain, which is a unit of the larger surrounding Conejo Volcanics geologic formation. The Conejo Mountain area is characterized by several sensitive habitat types and its volcanic substrate also supports many endemic plant species, including several species of *Dudleya*. The Conejo Mountain area also functions as a wildlife corridor between the Santa Monica and Santa Susana Mountains. Lastly, this area has high scenic and recreational value.

Our review of the information provided in the NOP regarding the proposed project and the associated environmental review generated several areas of concern. We request that the following issues be thoroughly addressed in the EIR:

A Joint Agency
City of Thousand Oaks/Conejo Recreation and Park District
2100 E. Thousand Oaks Blvd., Thousand Oaks, CA 91362

(805) 449-2100 (805) 495-6471

1. The mining area subject to the CUP will be tripled in size.
   The subsequent loss of habitat for native wildlife and plant species, including those that are special-status or otherwise sensitive, will be significant. What is the justification for the proposed expansion? Is there a demonstrated need for the material produced by this quarry?

2. Operational days and hours will increase.
   Increased quarry activity facilitated by more operational days and longer operational hours has significant potential to impact wildlife in the vicinity of the quarry. Light pollution associated with extended hours of night-time lighting may disrupt activities of nocturnal wildlife species. Noise and vibration associated with blasting may be disruptive to wildlife. Additionally, dust generated from blasting and subsequent sorting activities has high potential to be carried by prevailing westerly winds into adjacent habitat areas, thereby degrading existing habitat quality due to deposition of fine particulate matter.

3. Increased truck trips.
   The NOP is unclear about the current trip limit and future proposed limits. The freeway ramps (Santa Rosa Road/Pleasant Valley Road) on Highway 101 that quarry traffic will utilize are also shared by a high volume of drivers. Two sets of drivers – students from Camarillo High School and residents of the Leisure Village retirement community – may be particularly vulnerable to increased truck traffic. Clarification must be provided regarding the proposed increase in traffic.

4. Reclamation of the mining site to an end use of agricultural grazing.
   By definition, grazing is an activity performed by herbivorous species and requires the presence of grassland habitat. Such habitat is confined to areas that contain topsoil depths suitable to support grass species. Conejo Mountain and the Conejo Volcanics are not known for abundant topsoil nor expansive grassland habitat. While existing soil and overburden in the proposed expansion area may be stockpiled for the future reclamation activities, it is questionable that sufficient quantities exist with which to establish grassland habitat suitable for grazing upon implementation of proposed reclamation activities. While the applicant may have the ability to import soil from elsewhere for this purpose, it is not uncommon for soil formerly stockpiled at offsite locations to be contaminated with invasive plant seed and other material. The introduction of non-native invasive plant species in an area adjacent to native habitat puts the existing habitat area at risk for colonization by invasive species.

   In our region of California, 20 to 30 acres of grassland habitat is typically needed to support one animal, assuming the livestock are cattle. If we divide the proposed reclamation area of 173 acres by 25 acres (the midpoint in the acreage referenced above), 6.92 head of cattle could be supported. Does slightly less than 7 head of cattle constitute a viable operation? Importing non-native soil and attempting to create a habitat type which is not characteristic of the area is a questionable end condition for the site. A more appropriate end state would be the complete restoration of mined areas to habitat for native species (and thereby increasing the size of the available wildlife migration route), rather than attempting to support domestic livestock.

The final slope gradient is proposed to be 1:1 and would constitute graded benches 50 feet high and 50 feet wide. Perhaps the width of the bench is conceptualized to facilitate "agricultural grazing", however the prospect of including 50-foot high cliffs in an area conceived to support livestock appears inherently risky. It is also unlikely that these vertical faces will be conducive to vegetative establishment. As such, these rock faces will be vulnerable to erosion and the viewshed will include these unvegetated bands of sheer rock for the foreseeable future.

Lastly, reclamation to a questionable agricultural use does not provide adequate compensatory mitigation for losses to habitat and native plant species and understates the significance of project impacts. Mitigation measures that provide appropriate compensation for the impacts inherent to the proposed project are warranted and must be incorporated in the proposed project.

5. Environmental issues to be addressed in the EIR.

The NOP states, "The EIR will address the potential environmental impacts associated with the proposed modifications of the existing facility, and whether the project will have any new or different impacts than were addressed in the 1980 MND." Is this statement suggesting that a nearly 40-year old environmental document is somehow still relevant? Through the use of the word "whether", is this statement suggesting that there may not be "new or different" impacts associated with the proposed expansion? There is no question that there will be new and different impacts associated with the project – it is after all a proposed expansion, not only with regard to the project area footprint but also with regard to operational activity. Conditions in the surrounding areas have also changed in the last 37 years, so a new and thorough analysis is obligatory.

While the NOP lists the specific areas of analysis the EIR will include, it goes on to say that only biological resources, noise, visual resources will be addressed in detail. Based on the concerns presented above, we request that aesthetics, archeological resources, air quality, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, and wildlife corridors also be analyzed in detail. The proposed increases in quarry size and activity are significant. Focusing only on three assessment areas overlooks the extent to which impacts may occur in other important areas.

We look forward to the opportunity to review the draft EIR, and anticipate it will include a thorough discussion of project alternatives as well.

Thank you for your consideration,

Shelly Mason

Shelly Mason
Manager, Conejo Open Space Conservation Agency

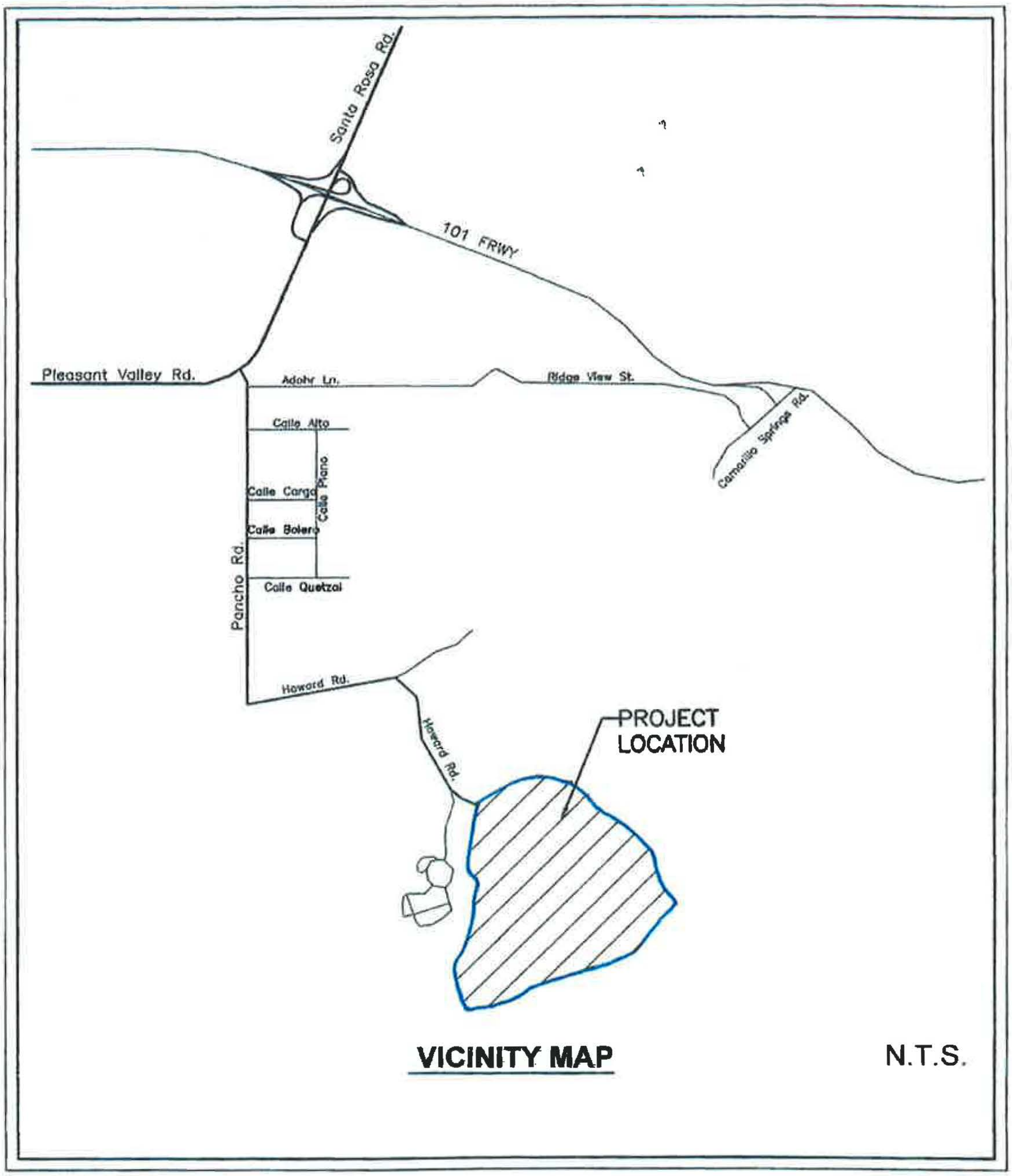
Attachments

Copy:
Mark Towne – Director, City of Thousand Oaks Community Development Department

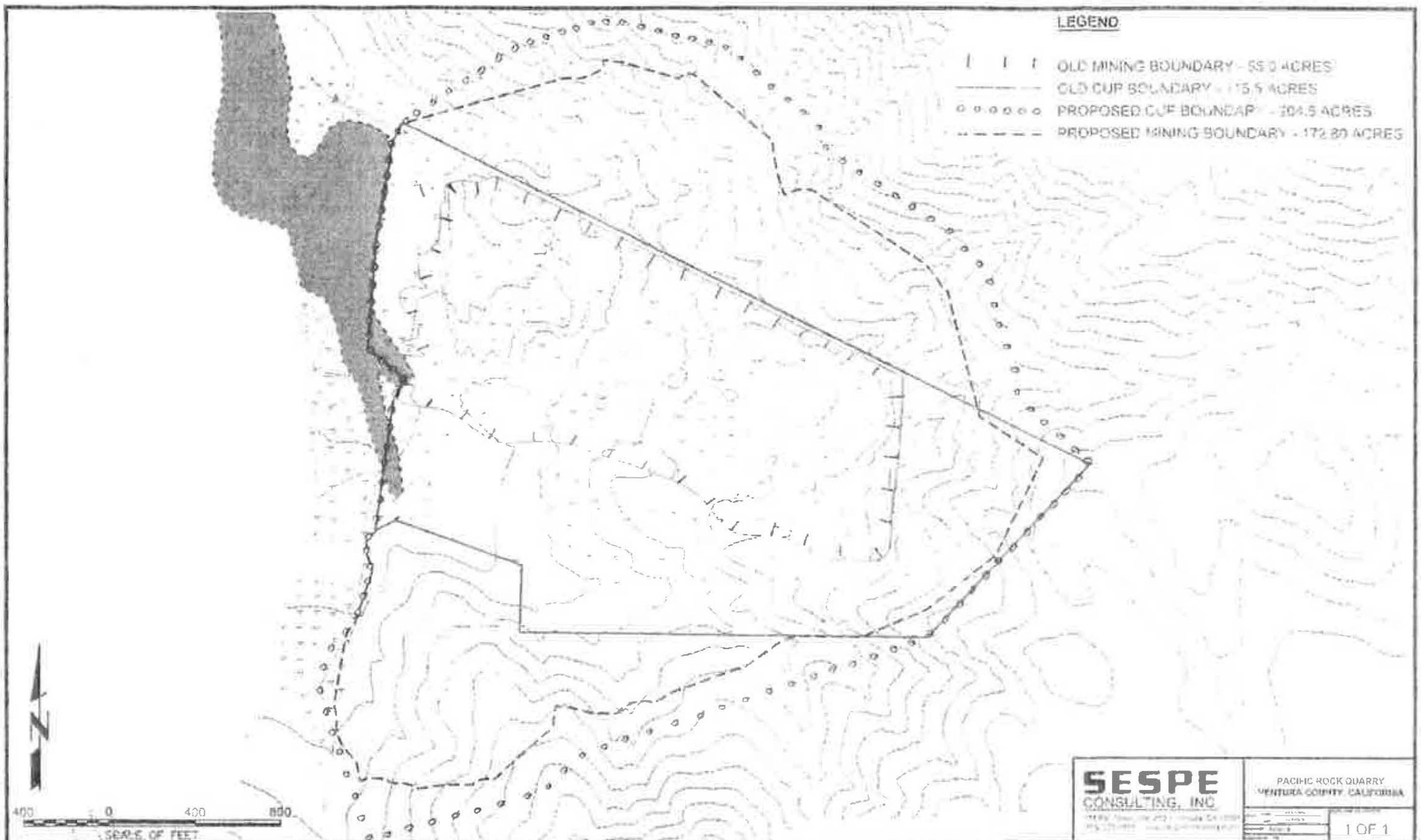
H:\COMMON\COSCA\Correspondence\Pacific Rock Quarry Expansion Comments 20170927.docx

A Joint Agency
City of Thousand Oaks/Conejo Recreation and Park District
2100 E. Thousand Oaks Blvd., Thousand Oaks, CA 91362

(805) 449-2100 (805) 495-6471



County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 1 – Vicinity Map



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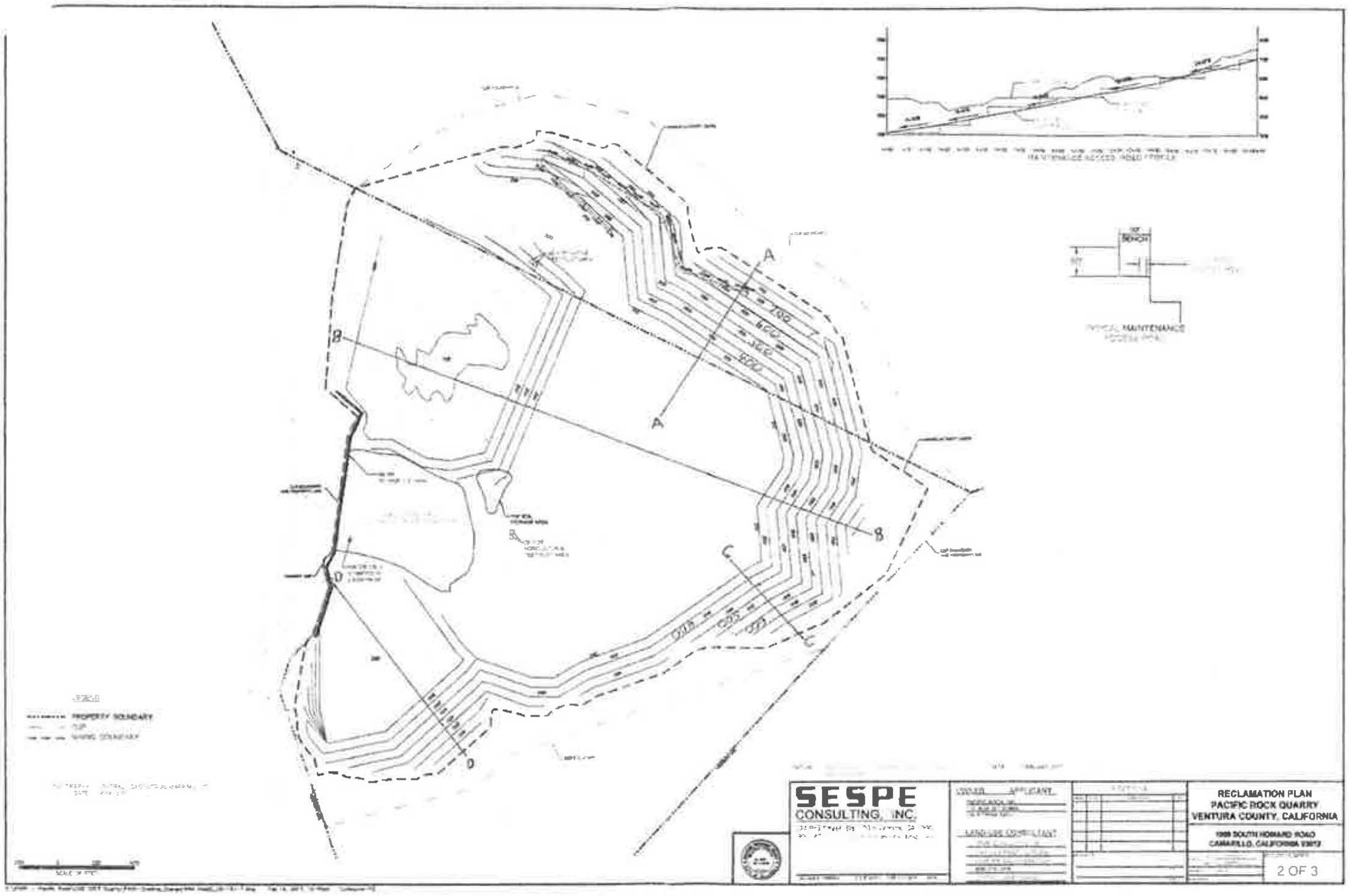
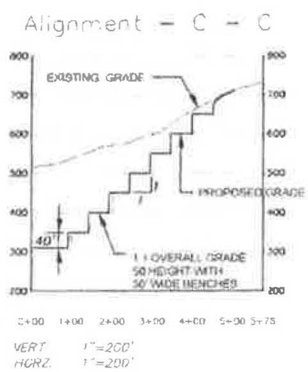
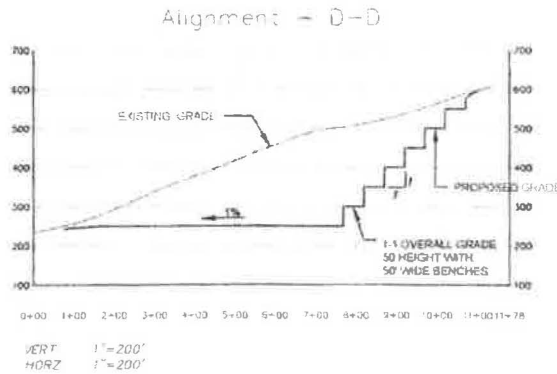
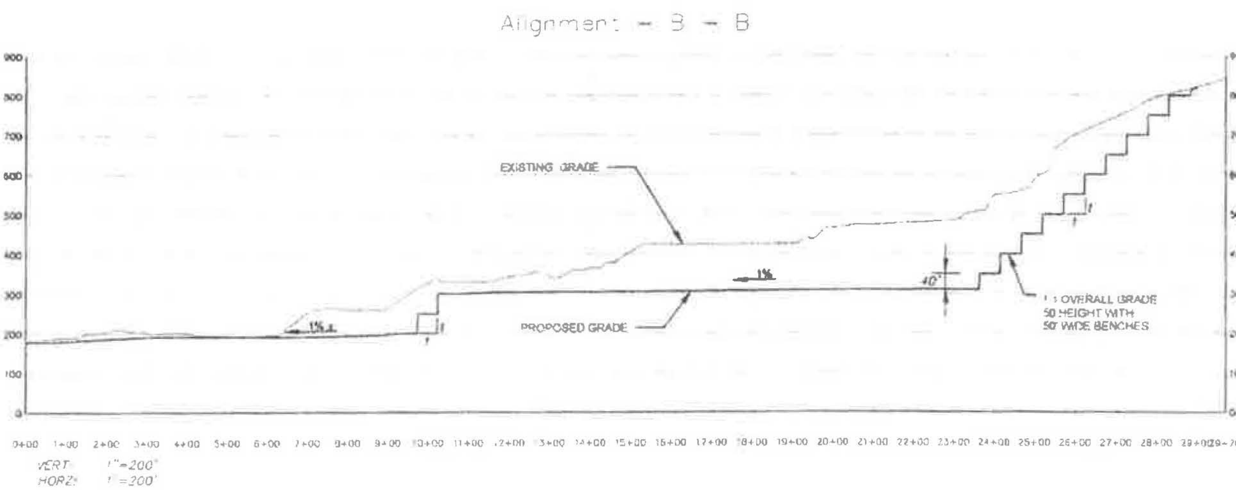
County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 2 – Site Plan

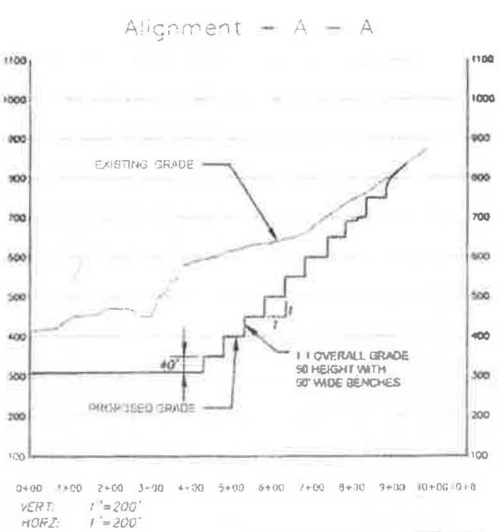


County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 3 – Reclamation Plan Map









CROSS - SECTIONS
PACIFIC ROCK QUARRY
VENTURA COUNTY, CALIFORNIA

1000 SOUTH HOWARD ROAD
CAMARILLO, CALIFORNIA 93012

FIGURE NUMBER

3 OF 3

S:\PA01 - Pacific Rock\CAD 2017 Quarry\PA01-Grading_Design(With Road)_02-15-17.dwg

County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 4 – Reclamation Plan
Cross Sections

City of Thousand Oaks Community Development Department
2100 Thousand Oaks Boulevard • Thousand Oaks, CA 91362
Planning Division • Phone 805/449.2323 • Fax 805/449 2350 • www.toaks.org
Building Division • Phone 805/449 2500 • Fax 805/449 2575 • www.toaks.org

Mark A. Towne
Community Development Director

September 28, 2017

Brian R. Baca, Manager
Commercial and Industrial Permit Section
Ventura County Resource Management Agency
Planning Division
800 S. Victoria Avenue, L# 1740
Ventura, CA 93009

Subject: Review of Pacific Rock Quarry Mine Expansion Project – Notice of Preparation (NOP) of an Environmental Impact Report (EIR); County Case No. LU10-003
1000 South Howard Road, Camarillo CA 93012
Interagency Referral, City of Thousand Oaks No.: IRC 2017-70372

Dear ~~Mr. Baca:~~ Brian

This letter is in response to the Notice of Preparation of an EIR for the Pacific Rock Mine Expansion Project. The City of Thousand Oaks is interested in this project because it is located adjacent to the City boundary and has the potential to impact nearby residential properties in the City. Specifically, the proposed mining boundary extends at least several hundred feet upslope to the City limits of Thousand Oaks and downslope from homes in the Thousand Oaks neighborhood know as Dos Vientos Ranch. Overall, the mining boundary is proposed to triple in size, from 55 acres to about 173 acres.

Project Understanding. According to the NOP, the project includes a request for approval of a modified Conditional Use Permit (CUP) and an amended Reclamation Plan to authorize expansion and continued operation of an existing surface mining facility for an additional 25-year period. For reference, the original exhibits 1-4 from Ventura County are attached. The request includes increases in the CUP boundary, mining excavation area, and operational days (from 6 to 7). Operations are proposed from 5:30 a.m. to 10:00 p.m., material haul truck traffic up to 120 one-way trips per operational day (with entire daily maximum potentially occurring during a.m. or p.m. peak traffic periods). The operation would involve excavation and export of 13.2 million tons of mined material. Finally, the request includes approval of the Reclamation Plan that results in an end use of agriculture (grazing) on benched areas and open space.

Surface mining activities would continue to be conducted at the facility using explosives to lift and loosen exposed bedrock. The material is then sorted, segregated by size and stockpiled on-site.

Potential Environmental Issues. The NOP states: "The EIR will address the potential environmental impacts associated with the proposed modifications of the existing facility, and whether the project will have any new or different impacts than were addressed in the 1980 MND." Reliance on the 1980 MND is not reasonable given that the document is outdated and unreliable for establishing baseline conditions. The updated EIR should address all issue areas in the context of the appropriate baseline conditions, the 25-year extended time frame, and the impacts of the proposed expansion of the mining excavation areas, operations and boundary.

According to the NOP, County staff has conducted a preliminary assessment of the proposed project and identified that three issue areas including biological resources, noise, and visual resources will be addressed in detail in the EIR. City staff concurs with the three identified issue areas be addressed in detail in the EIR. In addition, we request that, at minimum, the scope be expanded to include air quality, slope stability, and traffic impacts.

Detailed scoping comments. City staff requests that the specific issue areas include, at minimum, the following topics in the respective analyses:

- Project Description – Provide additional information to justify the request such as, calculated need for materials and where they will be used. Justify the necessity for 7 days/week and hours of operation. Describe the existing CUP parameters and provide a comparison of the differences in the current request, for example, days/hours of operation.
- Biological Resources – Impacts of excavation, and mining operations on native vegetation, sensitive habitat and wildlife species; analysis of effects on wildlife corridors; evaluation of reclamation plan with respect to revegetation and re-establishment of disturbed/destroyed habitat.
- Noise – Evaluation of impacts of explosives, mining operations, equipment and truck noise on adjacent residential uses.
- Visual Resources/Aesthetics – Evaluation of visual impacts of excavation and reclamation plan on adjacent residential and open space recreational areas including trails. Evaluation of lighting impacts on adjacent residential areas, freeway corridors and wildlife corridors. Provide photo simulations depicting before, during, and after views of the mined and reclaimed areas from public and adjacent residential areas.
- Air Quality – Conduct a Health Risk Assessment from truck and heavy equipment operations; analysis of truck trip air quality impacts on nearby sensitive uses, including, the effects of greenhouse gas emissions and dust.

- Traffic – Analyze the impacts of the estimated truck trips on local and state roadways; address impacts to peak hour traffic; assess the potential material destinations and vehicle miles travelled impacts.
- Alternatives and Mitigation – Evaluate potential mitigation measures and a reasonable selection of alternatives to the proposed project. Examples of alternatives include: reduced size of mined area; reduced amount of excavated material; reduced operational hours; alternative locations; restrictions on delivery distances; reduction of request on this site plus a second site with similar resources; and, modified reclamation plan.

Thank you for the opportunity to comment on the NOP for this project. We look forward to reviewing the Draft EIR.

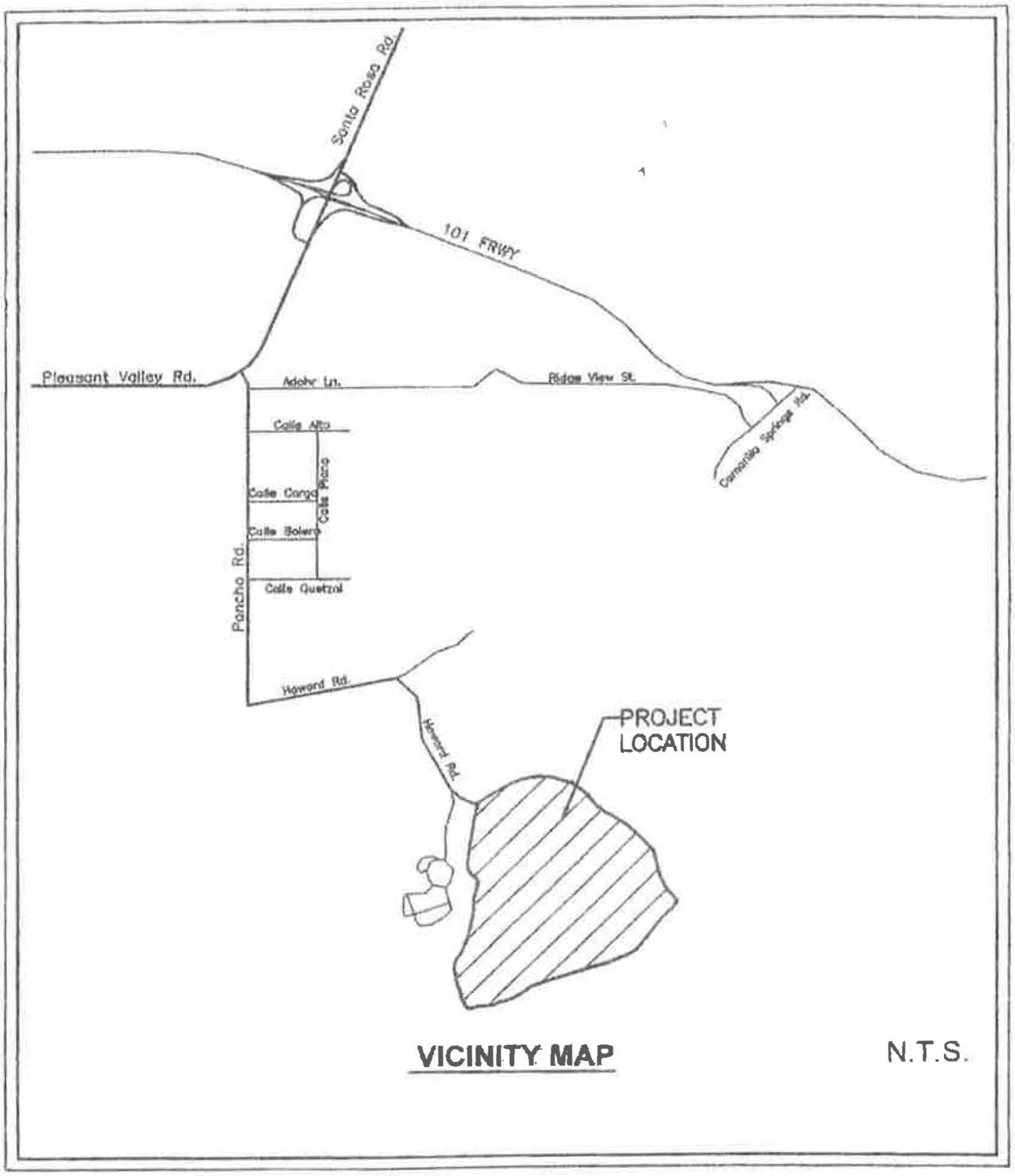
Sincerely,

Kari Finley

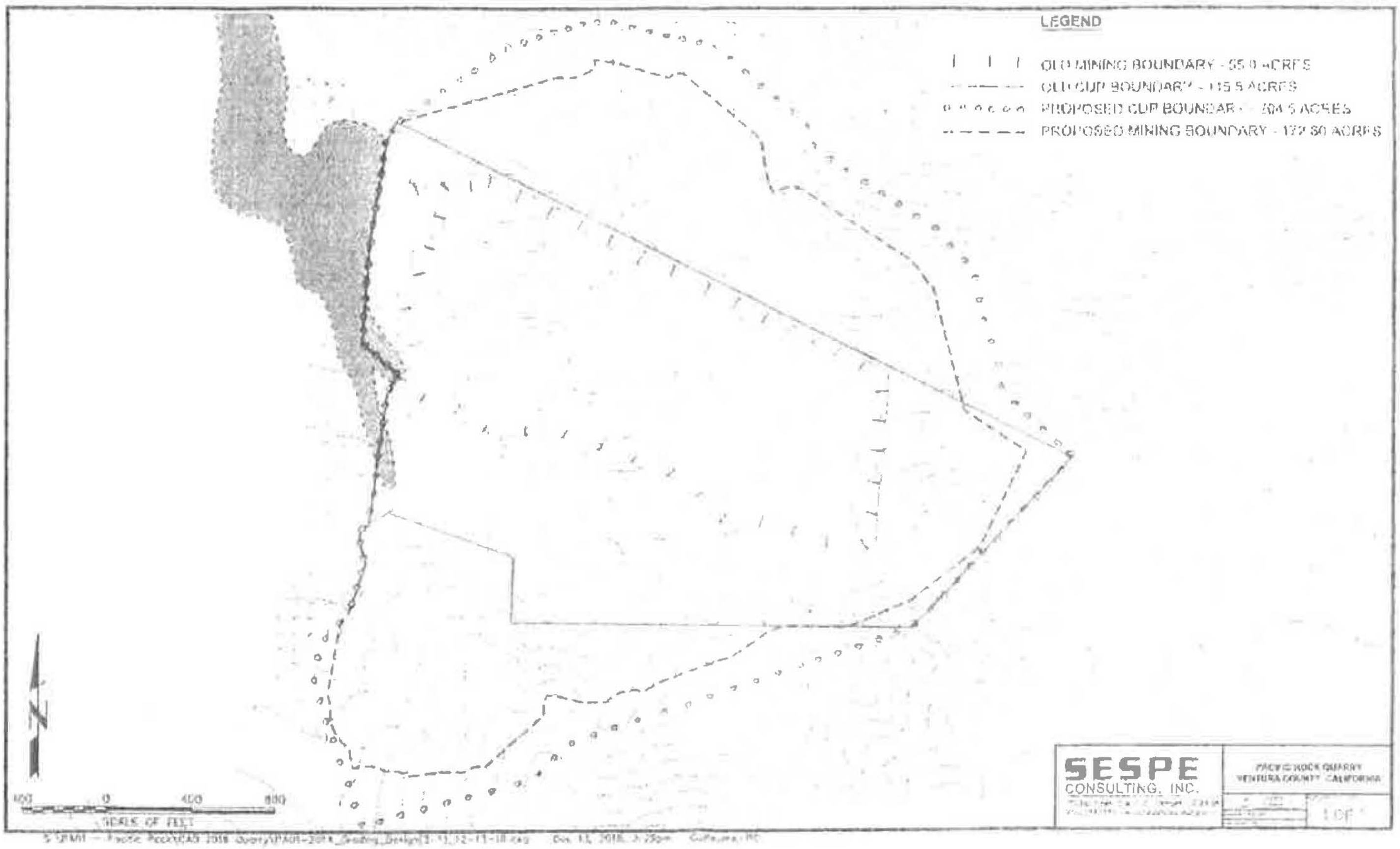
Kari Finley, Senior Planner

Attachments (Ventura County NOP exhibits 1-4)

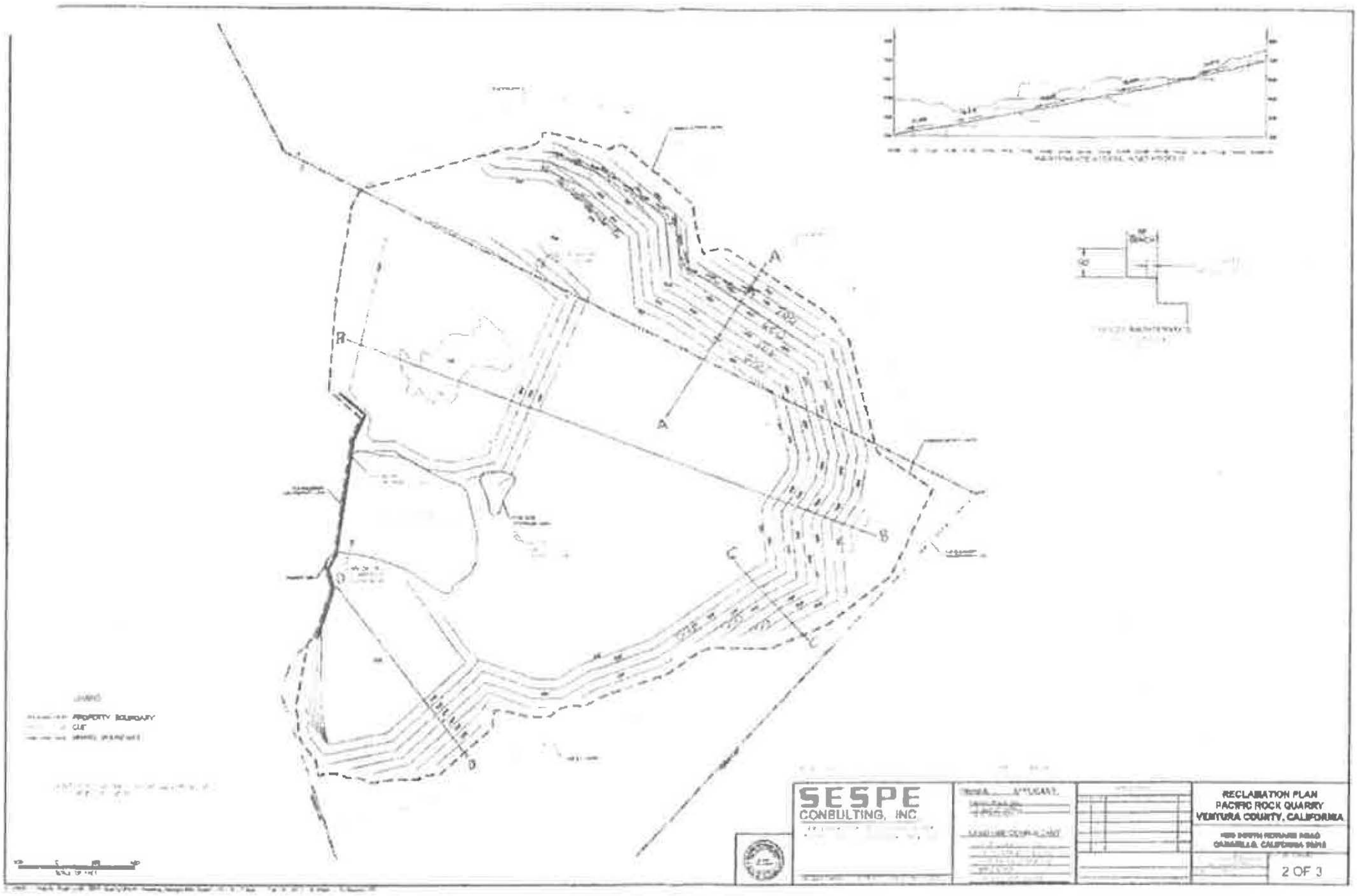
Copy:
Mark Towne – Director, Community Development Department



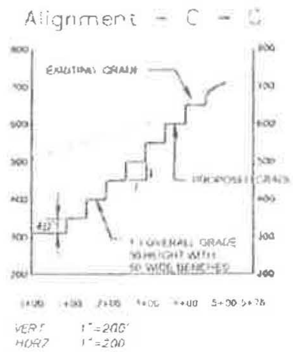
County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 1 – Vicinity Map

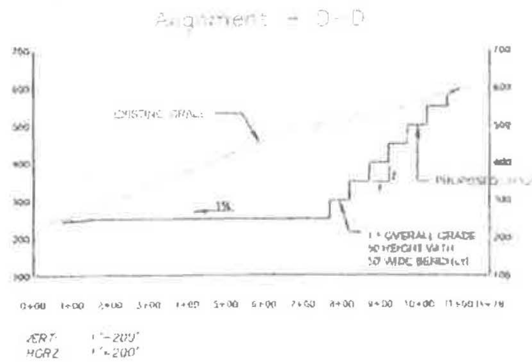


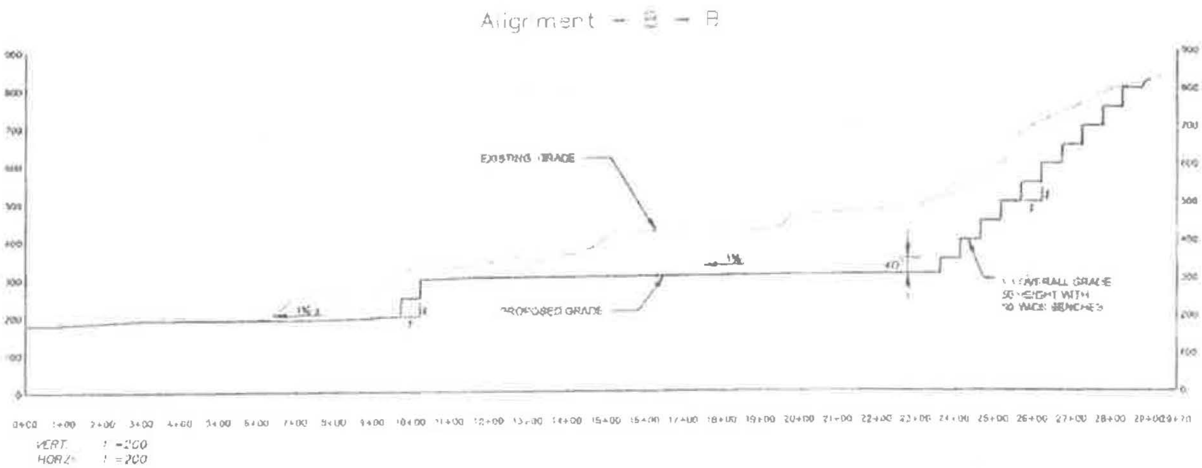
County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 2 – Site Plan

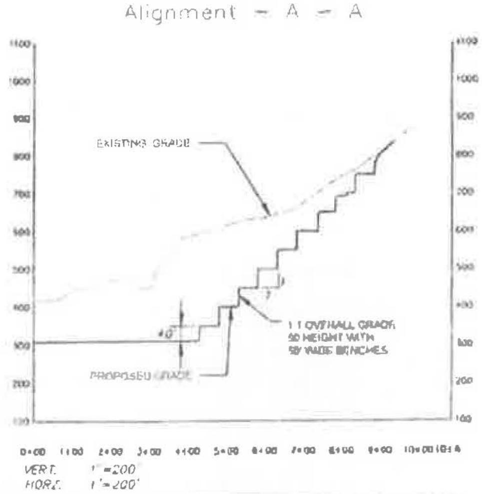


County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 3 – Reclamation Plan Map









CROSS - SECTIONS
PACIFIC ROCK QUARRY
VENTURA COUNTY, CALIFORNIA

1000 SOUTH HOWARD ROAD
CAMARILLO, CALIFORNIA 93012

FIGURE NUMBER
3 OF 3

County of Ventura
Notice of Preparation for EIR
LU10-0003
Exhibit 4 – Reclamation Plan
Cross Sections

Baca, Brian

From: Randy Denning <denningemail@gmail.com>
Sent: Friday, September 29, 2017 2:46 PM
To: Baca, Brian
Subject: Comments Regarding the Pacific Rock Quarry Mine Expansion Project (Case No. LU10-0003)
Attachments: Comments Re. Case LU10-0003.pdf

Dear Mr. Baca,

The attached letter is provided in response to the "Notice of Preparation of an EIR" (Case No. KU10-0003). My family and I live almost directly above the quarry, and as would be expected neither my family nor any of my neighbors that I have spoken to are in favor of the proposed quarry expansion. I appreciate the opportunity to provide my comments and input, and it is my hope that the impact of these changes on the surrounding homes and natural area will be a significant consideration in the decision whether to allow the expansion. I don't know how many comments you have received on this issue, but as I stated in my letter I believe that most homeowners in Dos Vientos are not aware of the changes being considered and would not be in favor.

Thank you for your time.

Randy Denning
151 Via Sandra
Newbury Park, CA 91320
805.373.4022

September 29, 2017

Ventura County Resource Management Agency, Planning Division
Attn.: Bria R. Baca, Manager, Commercial and Industrial
800 South Victoria Avenue, L#1740
Ventura, CA 93009

Subject: Comments Regarding the Pacific Rock Quarry Mine Expansion Project (Case No. LU10-0003)

Dear Mr. Baca,

I am writing in order to provide my opinion and strong objection to the request for expansion and continued operation of the Pacific Rock Mine surface mining facility for an additional 25-year period.

My home is located above the quarry, and the quarry is clearly visible from my house and yard as well as for others on my street. I purchased my home knowing that the quarry existed, and was willing to live with the inconveniences that it brought with it. However, an expansion would bring the quarry much closer to existing $1.5 - $2.5 million homes than any of us envisioned, and would significantly affect our quality of life. The issues surrounding these changes are significant:

- Allowing work to continue until 10 p.m., and in an expanded area, would require lights which add to light pollution and would be visible to roughly 7 to 12 homes on my street.
- The added dust, dirt, noise until 10:00 p.m. would affect our quality of life, and of those in adjacent neighborhoods.
- Current restrictions on landscaping and other outdoor activities do not allow noise before 7:00 a.m. or past 7:00 p.m., so I can't understand why operation from 5:30 a.m. until 10:00 p.m. with the noise that it would generate is even an option.
- Blasting would be required closer to our homes, and I would question why, for both safety and noise reasons, would be allowed so close to homes and in an area that receives very heavy use from hikers and cyclists.

In summary, the changes requested would significantly affect our quality of life, and possibly our home values. The quarry as it sits now already has a huge visual impact on an otherwise beautiful area with wildlife and many different types of plant material; allowing a significant enlargement of the footprint will just further increase the mines' negative visual impact, as viewed from both above and below it.

As a side note it was an accident that I happened to hear about this proposed change. My guess is that there are many people that would be negatively affected that won't be aware of the changes until it's too late and they have been approved. I ask that you consider the above as you are considering changes that benefit one person (the quarry owner), while negatively affecting many people, families, and neighborhoods.

Thanks for considering my comments.

Randall Denning

Randall Denning
151 Via Sandra
Newbury Park, CA 91320

Baca, Brian

From: Carolyn dewey <carolynjdewey@gmail.com>
Sent: Friday, September 22, 2017 3:43 PM
To: Baca, Brian
Subject: Public Comments -- Pacific Rock Quarry Mine Expansion Project

ATTN: Mr. Brian R. Baca, Ventura County Resource Management Agency, Planning Division

Public Comment for Notice of Preparation of an EIR - case No LU10-0003.

I am a resident of Camarillo Springs, a community north of the subject property and am in complete opposition to the subject Project, Case No LU10-0003. I oppose all requested entitlements as outlined in the project description of the Notice of Preparation of an EIR. It is my opinion that the increases in operational days and hours, truck traffic, sizes of mining excavation area, excavation and export of material and loss of agricultural areas are beyond the scope of what the citizens and land can bare. To think Ventura County would even consider subjecting residents to explosives, excavation and rock-hauling trucks from 5:30 am to 10:00 pm goes beyond all reasonableness.

Concerns to include in the EIR:
1. Stability of Conejo Mountain. The mountain has already endured extreme heat from the fire of 2013, which fractured its construct, according to geological reports. Explosives and excavation would only further endanger the surrounding community and put us at risk of mudslides and debris flow.

2. Traffic and road impacts from rock-hauling trucks would add further wear and tear to Conejo Mountain Road, Pancho Road, Pleasant Valley Road, as well as highway 101. Freeway traffic, which is already badly impacted from Camarillo Springs Road north and south, would be further impacted by large vehicles and rock. Potentially, residents of Camarillo Springs would have no roads north without contending with rock-hauling trucks. That presents accidents and safety issues ready to happen.

3. Air quality is generally good in this area. Please don't contaminate it with emissions from rock-hauling trucks and excavation equipment.

4. Aesthetics of the general area and particularly Conejo Mountain Cemetery are of particular concern. Conejo Mountain has already been scarred by excavation. To continue the use of explosives and the noise of excavation near this beautiful cemetery, which is a place of solace and comfort to those who mourn, is to be lacking in compassion.

5. Operational days and hours and noise. I repeat! It is beyond reasonableness to subject a community to explosives seven days a week from 5:30am to 10:00pm! And for 25 years!

Respectfully,
Carolyn Dewey
6524 San Como Lane
Camarillo
805-551-9556
carolyndewey@gmail.com

Sent from my iPad

Baca, Brian

From: Ron Kester <ronkester99@gmail.com>
Sent: Thursday, September 14, 2017 9:10 AM
To: Baca, Brian; Ron Kester
Subject: Pacific Rock Quarry Mine Expansion project (LU10-0003)... Comment

Greetings..

I am a resident of Camarillo Springs, that backs the north side of Conejo Mountain, and also the HOA Board president for The Springs , a community of over 500 retired citizens.

Besides the issues cited in your letter for the EIR, our primary concers are1. the Geological imopt to the moutain's stability, 2.Increased traffic volume and congestion along the entrance to Conejo Mountain Rd./PanchoRd, and ultimately Pleasant Valley Road.and 3. Impact on wildlife

1. Geological Impact... Our geological engineering firm found that the fire of 2013 burned so hot that it changed the surface geological construct of Conejo Mountain. The mountain fractured , and rocks literally exploded. Our concern is that any removal of mountain mass, or blasting may further destabilize the mountain, increasing the likelihood of landslides and debris flows.

2. Traffic....The increased truck traffic requested will further congest an already overloaded surrounding road system. The Conejo Mountain Rd. is the only ingress/egress to the industrial park and the Conejo Mountain Cemetary. Also the weight of the trucks will further damage those roads. The affect on Pleasant Valley Rd. will add congestion and danger to the only ingress/egress for over 2000 homes, and the incresed traffic on the rfreeway ramps will greatly increase the congestion and danger of freeway traffic.. which is already horrendous.

3. Wildlife.... Conejo Mountain acts as the only wildlife corridor from the Santa Monica Mountain Conservancy range to the Conejo Creef, and under the freeway to the northern areas. This corrodor is vital to continued wildlife migration, and a diverse wildlife population.
Noise from blasting, increased traffic and removal of mountain topography will negatively impact the already fragile ecosystem.

We request that the above study areas be added to the EIR scope,

We oppose the expansion, on the above grounds/concerns; and the added doubt that pacific Rock will abide by any ecological orenvironmental restrictions that may be defined. it is well documented by way of past Stae and County violations.

Thank you for your consideration of our concerns and suggestions

James R. Kester
6329 Gitana Ave
Camarillo, CA 93012

805 458 9095

ronkester99@gmail.com

CARRIAGE SERVICES

October 2, 2017

Ventura County Resource Management Agency
Planning Division
Attn: Brian R. Baca, Manager
Commercial & Industrial Permit Section
800 South Victoria Avenue, L#1740
Ventura, CA 93009

Via Email (brian.baca@ventura.org)
Via Fax (805-654-2509)

Re: Notice of Preparation of an EIR
Pacific Rock Quarry Mine Expansion
Project Case No. LU10-0003

Dear Mr. Baca:

I write this letter in response to the Notice of Preparation of an EIR, Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003 and on behalf of Conejo Mountain Funeral Home, Memorial Park, and Crematory ("Conejo Mountain"). Thank you in advance for your consideration of our comments.

By way of introduction, Conejo Mountain has been serving the Camarillo community since 1963. Conejo Mountain and I are committed to being the most professional and highest quality funeral home and cemetery services organization in our industry and community. Client families choose to celebrate their loved ones at Conejo Mountain due to the area's natural beauty and serenity. It is from this perspective that we have deep concerns over the proposed Pacific Rock Quarry Mine Expansion Project ("Expansion Project").

GENERAL FACTUAL BACKROUND

Conejo Mountain and Pacific Rock Quarry share an access road and, although a blue line creek is, in part, on Conejo Mountain land, the blue line creek drains runoff from both properties. As Pacific Rock Quarry operates, its work directly impacts Conejo Mountain and its client families via, among other things, dynamite noise, dust, shaking, large trucks, and un-aesthetic changes to the mountainside, and by the publicly viewable mining operation equipment and debris.

Over the years, work done by Pacific Rock Quarry on its property has directly affected Conejo Mountain, including potentially causing a devastating flood in 2014. Pacific Rock Quarry has a "reservoir" on its land, and Conejo Mountain has seen Pacific Rock remove natural rock formations that has altered the natural flow of water in rains. Expansion of Pacific Rock Quarry's operations could lead to significant future problems for Conejo Mountain, a site at which the dead are laid to rest in peace.

3040 Post Oak Boulevard Suite 300 Houston, Texas 77056 Phone (713) 332-8400 Fax (713) 332-8401

Comment to: "An Increase in the Area Subject to the CUP from 115.5 Acres to 204.5 Acres" & "An Increase in the Mining Excavation Area Subject to Reclamation from 55 Acres to 172.5 Acres"

A significant portion of the work Pacific Rock Quarry does is upslope from Conejo Mountain, and historical wind data suggests that dust and other pollutants from the mining operation head toward Conejo Mountain.[1] Exhibits 1, 2, and 3 of the Notice of Preparation of an EIR all show that a wind from the northeast will blow toward or near Conejo Mountain, especially given the basin on the north side of the mountain and Conejo Mountain's location in that basin. Consideration should be given to the impacts on Conejo Mountain, the deceased, and the families that visit their loved ones with respect to airborne pollutants, noise, and other activity by Pacific Rock Quarry.

In addition, Exhibits 2, 3, and 4 to the Notice of Preparation of an EIR provide elevation data for the site. All rain water runs downslope toward Conejo Mountain and threatens Conejo Mountain. Conejo Mountain should be assured that drainage — even heavy rain runoff — will not impact it as a result of the mining operation, and Pacific Rock Quarry should be required to create appropriate drainage channels to protect its downstream neighbor.

Of further note, the continued mining of the mountain destroys the natural beauty of the landscape, leaves piles of rock and debris in public view, and necessitates the storing of heavy earth moving equipment on site. None of these are, unfortunately, aesthetically pleasing or a service to the landscape.

Comment to: "Increase in Operational Days . . . from 6 Days per Week to 7 Days per Week."

Pacific Rock Quarry's activities impact Conejo Mountain, its client families, and the peaceful resting of the deceased — although Conejo Mountain understands that it and its community must co-exist with lawful mining operations that were in effect in a lesser proposed scope before Conejo Mountain was created. To be clear, Pacific Rock Quarry's mining operations includes use of dynamite, the loud movement of rock, dust and other air pollutants, and the usage of heavy trucks down the shared access road.

Comment to: Truck Haul Operations

Any increase in truck haul operations negatively impacts Conejo Mountain and may damage the access road. Pacific Rock Quarry trucks are loud (engine noise, loading) and make it more difficult for passenger vehicles to navigate the shared access road. The pm "Peak Period" (3:00 pm to 5:00 pm) during which it is proposed that Pacific Rock Quarry be entitled to 120 trips is when services occur and when many client families come to visit their loved ones and watch the sun lower. Conejo Mountain would ask for more limited truck haul operational guidelines.

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[1] https://www.windfinder.com/windstatistics/ventura_county_goverment_center (last visited 9/27/2017)

<u>Comment to: "Reclamation of the Mining Site to End Use of Agriculture (grazing) on Benched (near level) Areas that Would Remain on the Site and Open Space on the other Areas of the Site."</u>

It is difficult to describe the impact that "grazing" activities would have on Conejo Mountain, its client families, and the deceased that rest in peace. Livestock cause noise, smells, biological waste, and impact runoff. Moreover, it is not clear what such grazing or other agricultural activities would have to the downslope neighbor, especially when operated by a company that specializes in mining and not agriculture/livestock. Conejo Mountain asks that a careful analysis be done of all of these concerns before any end use of agriculture (grazing) is approved.

Should you have any questions, or need any additional information, please feel free to contact me at 713-332-8452.

Respectfully submitted,

Michael G. Elliott
Legal Counsel

CARRIAGE SERVICES

October 2, 2017

Ventura County Resource Management Agency
Planning Division
Attn: Brian R. Baca, Manager
Commercial & Industrial Permit Section
800 South Victoria Avenue, L#1740
Ventura, CA 93009

Via Email (brian.baca@ventura.org)
Via Fax (805-654-2509)

Re: Notice of Preparation of an EIR
Pacific Rock Quarry Mine Expansion
Project Case No. LU10-0003

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Should you have any questions, or need any additional information, please feel free to contact me at 713-332-8452.

Respectfully submitted,

Michael G. Elliott
Legal Counsel

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
San Diego, CA 92123
(858) 467-4201
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

October 2, 2017

Mr. Brian Baca, Manager
Commercial and Industrial Permit Section
Ventura County Resource Management Agency Planning Division
800 South Victoria Avenue, L#1740
Ventura, CA 93009
brian.baca@ventura.org

Subject: Pacific Rock Mine Expansion Project, Case No. LU10-0003
Notice of Preparation of an Environmental Impact Report
Ventura County, California

Dear Mr. Baca:

The California Department of Fish and Wildlife (Department, CDFW) has reviewed the above-referenced Notice of Preparation (NOP) of an Environmental Impact Report for the Pacific Rock Mine Expansion Project (Project). The existing mine facility is located on the western edge of the Santa Monica Mountains about two miles south of Highway 101. The address is: 1000 South Howard Road, Camarillo, CA 93012.

The mining area is located on the south flank/base of Conejo Mountain. Adjacent land uses include agriculture and a memorial park to the west, and extensive open space supporting wildlife habitat to the north, east and south. The existing mine was approved on June 17, 1980 under a Mitigated Negative Declaration and operates with a Conditional Use Permit (CUP).

The applicant requests that Ventura County, as lead agency, grant a modified CUP authorizing expansion and continued operation of a surface mining facility for an additional 25 years. The area subject to the existing CUP is about 115.5 acres, and the applicant requests to increase that area to 204.5 acres. Excavated material would total 13.2 million tons (or 19.8 million cubic yards) which would be exported from the site via trucks. Reclamation of the mining site would result in an end use of agriculture (grazing). Final quarry slopes would be at a 1:1 gradient. Other aspects of the proposed Project include increasing the days of operation, and amendment of the Reclamation Plan to increase the area subject to reclamation from 55 acres to 172.5 acres.

The following comments and recommendations have been prepared pursuant to the Department's authority as a Responsible Agency under CEQA Guidelines section 15381 over those aspects of the proposed project that come under the purview of the California Endangered Species Act (CESA; Fish and Game Code § 2050 *et seq.*), the Native Plant Protection Act (NPPA, Fish and Game Code § 1900 et seq.) and Fish and Game Code section 1600 *et seq.*, and pursuant to our authority as Trustee Agency with jurisdiction over natural resources affected by the project (California Environmental Quality Act, [CEQA] Guidelines § 15386) to assist the Lead Agency in avoiding or minimizing potential project impacts on biological resources.

Specific Comments

1. **Conejo buckwheat (*Eriogonum crocatum*)**. The Project is located in a region that supports the Conejo buckwheat, a Ventura County endemic species and designated as a state-listed rare plant pursuant to the NPPA. A Conejo buckwheat population is known to occur in the Project area and adjacent habitats (BioResources Consultants, 2017). The NPPA prohibits the take and/or possession of state-listed rare plants unless authorized by the Department or in certain limited circumstances. Take of Conejo buckwheat or other state-listed rare plants that could occur as a result of the Project may only be permitted through an incidental take permit (ITP) or other authorization issued by the Department pursuant to California Code of Regulations, Title 14, section 786.9 subdivision (b). The Department recommends early consultation for NPPA and CESA listed species.

   The Department recommends conducting surveys for Conejo buckwheat, in addition to any other rare, threatened or endangered plant that has the potential to occur in the region, and include survey results in the Project DEIR along with any proposed avoidance and minimization measures. Potentially suitable habitat for Conejo buckwheat should also be identified and avoided.

   Vegetation in this region was affected by the spring wildfire in 2013 and extended drought has hampered recovery in this area for species affected by the fire. The Department considers habitats capable of supporting Conejo buckwheat, and other sensitive plants, to include areas historically occupied, including areas that maintain a seed bank, which may allow population recovery once the current drought cycle ends. Past botanical assessments conducted before the Spring 2013 wildfire will therefore be important to include in establishing the environmental setting in the Project area.

   Regulations under NPPA require that impacts to Conejo buckwheat be fully mitigated. Where direct impacts cannot be avoided and where incidental take, if authorized, does not lead to jeopardy; the Department typically requires compensatory habitat be permanently protected using Conservation Easements, and managed to compensate for losses elsewhere.

   Botanical surveys for Conejo buckwheat should include: a) assessing areas that could be directly or indirectly impacted by the proposed Project; and b) assessing areas that may serve as proposed compensatory mitigation sites. Botanical assessments documented in the Initial Study Biological Assessment (ISBA)(BioResources Consultants, 2017) extended about 300 feet beyond the Project boundary; an area proposed for mining expansion upslope of the existing quarry is shown as "inaccessible" on a map and presumably was not surveyed (BioResources Consultants, 2017 Site and Survey Area Map). This area is shown as supporting numerous rare plants including Conejo buckwheat and federally listed threatened and/or endangered species of dudleyas.

   Expanded mining northward will encroach further into steep terrain on Conejo Mountain, could have adverse direct and indirect effects to biological resources, and could destabilize geologic features which support biological resources on upslope habitats beyond the Project area. CDFW recommends that expansion northward be deleted from the proposed Project and the EIR should include this as a Project alternative.

2. **Alteration of Streams**. The existing quarry operation has removed numerous ephemeral and intermittent streams in the Project area and two streams flow into existing culverts. On-site runoff from these two streams is generally directed into an existing pond and used for agricultural irrigation. CDFW has no records of Notification for stream alterations and or stream diversions in the Project area.

   In addition, there appear to be habitat disturbances beyond the perimeter of the existing CUP area affecting streams. The EIR should identify non-compliance issues resulting in impacts to sensitive species, habitats, and streams beyond the existing CUP area, and include effective compensatory mitigation and restoration of damaged areas associated with direct, indirect, temporal and cumulative impacts.

3. **Wildlife Movement and Protected Open Space**. The proposed Project includes expansion 250-500 feet upslope in an easterly direction beyond the existing quarry disturbance. The proposed construction footprint extends close to the edge of the parcel boundary, and adjoins protected open space on parcel 234-0-080-380 managed by the Mountains Recreation and Conservation Authority (MRCA) (103 acres).

   The MRCA open space parcel and adjacent wildlife habitats lie between the existing quarry footprint and the Dos Vientos residential housing tract; the habitat is about 1000 feet wide at its narrowest under current conditions. This location represents a functioning wildlife movement area allowing plant and animal species to reside there and move spatially between Conejo Mountain and the western Santa Monica Mountains.

   Proposed quarry expansion would remove habitat in this area, further reducing the width of this movement corridor by 1/3 or more. The MRCA open space parcel would not be providing an effective buffer to neutralize adverse edge effects associated with the nearby mining. These impacts will degrade the current wildlife values in this location.

   Habitats east of the existing CUP boundary proposed for mining expansion were documented in 2010 as supporting the state listed rare Conejo buckwheat and other rare, threatened and/or endangered plant species (BioResources Consultants, 2017).

   CDFW recommends that the DEIR include alternatives that eliminate mining expansion eastward to maintain and buffer protected open space values, existing wildlife movement corridors, and sensitive plant populations.

General Comments

1) Project Description and Alternatives. To enable the Department to adequately review and comment on the proposed project from the standpoint of the protection of plants, fish, and wildlife, we recommend the following information be included in the DEIR.

   a) A complete discussion of the purpose and need for, and description of, the proposed project, including all staging areas and access routes to the construction and staging areas.

   b) A range of feasible alternatives to project component location and design features to ensure that alternatives to the proposed project are fully considered and evaluated. The alternatives should avoid or otherwise minimize direct and indirect impacts to sensitive biological resources and wildlife movement areas.

2) Lake and Streambed Alteration Agreements (LSA). As a Responsible Agency under CEQA Guidelines section 15381, the Department has authority over activities in streams and/or lakes that will divert or obstruct the natural flow, or change the bed, channel, or bank (including vegetation associated with the stream or lake) of a river or stream, or use material from a streambed. For any such activities, the project applicant (or "entity") must provide written notification to the Department pursuant to section 1600 et seq. of the Fish and Game Code. Based on this notification and other information, the Department determines whether a Lake and Streambed Alteration Agreement (LSA) with the applicant is required prior to conducting the proposed activities. The Department's issuance of a LSA for a project that is subject to CEQA will require CEQA compliance actions by the Department as a Responsible Agency. As a Responsible Agency, the Department may consider the Environmental Impact Report of the local jurisdiction (Lead Agency) for the project. To minimize additional requirements by the Department pursuant to section 1600 *et seq.* and/or under CEQA, the document should fully identify the potential impacts to the stream or riparian resources and provide adequate avoidance, mitigation, monitoring and reporting commitments for issuance of the LSA.[1]

   a) The project area supports aquatic, riparian, and wetland habitats; therefore, a preliminary jurisdictional delineation of the streams and their associated riparian habitats should be included in the DEIR. The delineation should be conducted pursuant to the U. S. Fish and Wildlife Service wetland definition adopted by the Department.[2] Some wetland and riparian habitats subject to the Department's authority may extend beyond the jurisdictional limits of the U.S. Army Corps of Engineers' Section 404 permit and Regional Water Quality Control Board Section 401 Certification.

   b) In project areas which support ephemeral streams, herbaceous vegetation, woody vegetation, and woodlands also serve to protect the integrity of ephemeral channels and help maintain natural sedimentation processes; therefore, the Department recommends effective setbacks be established to maintain appropriately-sized vegetated buffer areas adjoining ephemeral drainages.

   c) Project-related changes in drainage patterns, runoff, and sedimentation should be included and evaluated in the environmental document.

3) Wetlands Resources. The Department, as described in Fish & Game Code § 703(a) is guided by the Fish and Game Commission's policies. The Wetlands Resources policy (http://www.fgc.ca.gov/policy/) of the Fish and Game Commission "...seek[s] to provide for the protection, preservation, restoration, enhancement and expansion of wetland habitat in California. Further, it is the policy of the Fish and Game Commission to strongly discourage

[1] A notification package for a LSA may be obtained by accessing the Department's web site at www.wildlife.ca.gov/habcon/1600.
[2] Cowardin, Lewis M., et al. 1970. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service.

development in or conversion of wetlands. It opposes, consistent with its legal authority, any development or conversion which would result in a reduction of wetland acreage or wetland habitat values. To that end, the Commission opposes wetland development proposals unless, at a minimum, project mitigation assures there will be "no net loss" of either wetland habitat values or acreage. The Commission strongly prefers mitigation which would achieve expansion of wetland acreage and enhancement of wetland habitat values.

The Wetlands Resources policy provides a framework for maintaining wetland resources and establishes mitigation guidance. The Department encourages avoidance of wetland resources as a primary mitigation measure and discourages the development or type conversion of wetlands to uplands. The Department encourages activities that would avoid the reduction of wetland acreage, function, or habitat values. Once avoidance and minimization measures have been exhausted, the project must include mitigation measures to assure a "no net loss" of either wetland habitat values, or acreage, for unavoidable impacts to wetland resources. Conversions include, but are not limited to, conversion to subsurface drains, placement of fill or building of structures within the wetland, and channelization or removal of materials from the streambed.

All wetlands and watercourses, whether ephemeral, intermittent, or perennial, should be retained and provided with substantial setbacks, which preserve the riparian and aquatic values and functions for the benefit of on-site and off-site wildlife populations. The Department recommends mitigation measures to compensate for unavoidable impacts be included in the DEIR and these measures should compensate for the loss of function and value.

4) California Endangered Species Act (CESA) and Native Plant Protection Act (NPPA). The Department considers adverse impacts to a species protected by CESA or NPPA, for the purposes of CEQA, to be significant without mitigation. Take of any endangered, threatened, candidate species, or state-listed rare plant species that results from the project is prohibited, except as authorized by state law (Fish and Game Code, §§ 1908, 2080, 2085; Cal. Code Regs., tit. 14, §783.2; § 786.9(b)). Consequently, if the project, project construction, or any project-related activity during the life of the project will result in take of a species designated as endangered or threatened, rare or a candidate for listing under CESA or the NPPA, the Department recommends that the project proponent seek appropriate take authorization prior to implementing the project.

Appropriate authorization from the Department may include an Incidental Take Permit (ITP) or a consistency determination in certain circumstances, among other options (Fish and Game Code §§ 2080.1, 2081, subds. (b), (c)). Early consultation is encouraged, as significant modification to a project and mitigation measures may be required in order to obtain a CESA or NPPA incidental take permit. Revisions to the Fish and Game Code, effective January 1998, may require that the Department issue a separate CEQA document for the issuance of an ITP unless the Project CEQA document addresses all project impacts to state-listed species and specifies a mitigation monitoring and reporting program that will meet the requirements of an ITP. For these reasons, biological mitigation monitoring and reporting proposals should be of sufficient detail and resolution to satisfy the requirements for an ITP.

5) Biological Baseline Assessment. To provide a complete assessment of the flora and fauna within and adjacent to the project area, with particular emphasis upon identifying endangered, threatened, sensitive, regionally and locally unique species, and sensitive habitats, the DEIR should include the following information.

   a) Information on the regional setting is critical to an assessment of environmental impacts; special emphasis should be placed on resources that are rare or unique to the region (CEQA Guidelines § 15125[c]).

   b) A thorough, recent, floristic-based assessment of special status plants and natural communities, following the Department's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (see http://www.dfg.ca.gov/habcon/plant/).

   c) Floristic, alliance- and/or association-based mapping and vegetation impact assessments conducted at the project site and within the neighboring vicinity. *The Manual of California Vegetation*, second edition, should be used to inform this mapping and assessment (Sawyer et al. 2009); Keeler-Wolf and Evens (2006) classification for the Santa Monica Mountains contains alliance and association-based keys applicable to the project area and should also be used. Adjoining habitat areas should be included in this assessment where site activities could lead to direct or indirect impacts offsite. Habitat mapping at the alliance level will help establish baseline vegetation conditions.

   d) A complete, recent, assessment of the biological resources associated with each habitat type on site and within adjacent areas that could also be affected by the project. The Department's California Natural Diversity Data Base (CNDDB) in Sacramento should be contacted to obtain current and historic information on any previously reported sensitive species and habitat. The Department recommends that CNDDB Field Survey Forms be completed and submitted to CNDDB to document survey results. Online forms can be obtained and submitted at http://www.dfg.ca.gov/biogeodata/cnddb/submitting_data_to_cnddb.asp.

   e) A complete, recent assessment of rare, threatened, and endangered, and other sensitive species on site and within the area of potential effect, including California Species of Special Concern (CSSC) and California Fully Protected Species (Fish and Game Code § 3511). Species to be addressed should include all those which meet the CEQA definition (see CEQA Guidelines § 15380). Seasonal variations in use of the project area should also be addressed. Focused species-specific surveys, conducted at the appropriate time of year and time of day when the sensitive species are active or otherwise identifiable, are required. Acceptable species-specific survey procedures should be developed in consultation with the Department and the U.S. Fish and Wildlife Service.

   f) Some aspects of the proposed project may warrant periodic updated surveys for certain sensitive taxa, particularly if quarry operations occur over a protracted time frame, or in phases.

6) Biological Direct, Indirect, and Cumulative Impacts. A thorough discussion of adverse direct, indirect, and cumulative impacts expected to affect biological resources, with specific

measures to offset such impacts should be addressed in the DEIR and include the following.

a) A discussion of potential adverse impacts from lighting, noise, fugitive dust, human activity, exotic species, and drainage. The latter subject should address project-related changes on drainage patterns onsite and downstream of the project area; the volume, velocity, and frequency of existing and post-project surface flows; polluted runoff; soil erosion and/or sedimentation in streams and water bodies; and post-project fate of runoff from the project site. The discussion should also address the proximity of the extraction activities to the water table, whether dewatering would be necessary and the potential resulting impacts on the habitat, if any, supported by the groundwater. Mitigation measures proposed to alleviate such impacts should be included.

b) A discussion regarding indirect project impacts to biological resources, including resources on nearby public lands, open space, adjacent natural habitats, riparian ecosystems, and any designated and/or proposed or existing reserve lands. Impacts on, and maintenance of, wildlife corridor/movement areas, including access to undisturbed habitats in adjacent areas, should be fully evaluated in the DEIR.

c) A cumulative effects analysis, as described under CEQA Guidelines section 15130, should be included. General and specific plans, as well as past, present, and anticipated future projects, should be analyzed relative to their impacts on similar plant communities and wildlife habitats. Unauthorized impacts from quarry activities outside their approved CUP boundary should also be addressed.

7) Avoidance, Minimization, and Mitigation for Sensitive Plants Communities. The DEIR should include measures to fully avoid and otherwise protect sensitive plant communities from project-related direct and indirect impacts. The Department considers these communities to be imperiled habitats having both local and regional significance. Plant communities, alliances, and associations with a statewide ranking of S-1, S-2, S-3 and S-4 should be considered sensitive and declining at the local and regional level. These ranks can be obtained by querying the CNDDB and are included in *The Manual of California Vegetation* (Sawyer et al. 2009), and Keeler-Wolf and Evens (2006).

8) Compensatory Mitigation. The DEIR should include mitigation measures for adverse project-related impacts to sensitive plants, animals, and habitats, including pollinator habitat. Mitigation measures should emphasize avoidance and reduction of project impacts. For unavoidable impacts, compensatory off-site habitat protection, which would permanently preserve and protect the suite of common and sensitive species adversely affected by mining, should be provided. Reclamation of the mining pit, which would occur many years into the future once mining ceases, does not constitute effective mitigation for habitat loss.

   Compensatory habitat should be of high quality and contain effectively buffered core habitat that can be preserved in perpetuity. Setbacks several hundred feet distant from quarry activities are appropriate.

9) Long-Term Management of Mitigation Lands. For proposed preservation and/or restoration, the DEIR should include measures to protect the targeted habitat values from direct and indirect negative impacts in perpetuity. The objective should be to offset the project-induced qualitative and quantitative losses of wildlife habitat values. Issues that should be

addressed include, but are not limited to, restrictions on access, proposed land dedications, monitoring and management programs, control of illegal dumping, water pollution, and increased human intrusion. An appropriate non-wasting endowment should be set aside to provide for long-term management of mitigation lands.

10) Nesting Birds. The Department recommends that measures be taken to avoid project impacts to nesting birds. Migratory nongame native bird species are protected by international treaty under the Federal Migratory Bird Treaty Act (MBTA) of 1918 (Title 50, § 10.13, Code of Federal Regulations). Sections 3503, 3503.5, and 3513 of the California Fish and Game Code prohibit take of all birds and their active nests including raptors and other migratory nongame birds (as listed under the Federal MBTA). Proposed project activities (including, but not limited to, vegetation grubbing and grading) should occur outside of the avian breeding season which generally runs from February 1st through September 1st (as early as January 1st for some raptors) to avoid take of birds or their eggs. If avoidance of the avian breeding season is not feasible, the Department recommends surveys by a qualified biologist with experience in conducting breeding bird surveys to detect protected native birds occurring in suitable nesting habitat that is to be disturbed and any other such habitat within 300 feet of the disturbance area (within 500 feet for raptors). Project personnel, including all contractors working on site, should be instructed on the sensitivity of the area. Reductions in the nest buffer distance may be appropriate depending on the avian species involved, ambient levels of human activity, screening vegetation, or possibly other factors.

11) Translocation/Salvage of Plants and Animal Species. Translocation and transplantation is the process of moving an individual from the project site and permanently moving it to a new location. The Department generally does not support the use of translocation or transplantation as the primary mitigation strategy for unavoidable impacts to rare, threatened, or endangered plant or animal species. Studies have shown that these efforts are experimental and the outcome unreliable. The Department has found that permanent preservation and management of habitat capable of supporting these species is often a more effective long-term strategy for conserving sensitive plants, animals, and their habitats.

12) Moving out of Harm's Way. The proposed project is likely to result in clearing of natural habitats that support indigenous wildlife. To avoid direct mortality, the Department recommends a qualified biological monitor approved by the Department be on site prior to and during vegetation grubbing and ground disturbing activities to move out of harm's way special status species or other wildlife of low mobility that would be injured or killed by grubbing or project-related construction activities. It should be noted that the temporary relocation of on-site wildlife does not constitute effective mitigation for the purposes of offsetting project impacts associated with habitat loss.

13) Wildlife Movement and Connectivity. The project area supports significant biological resources and is located adjacent to a regional wildlife movement corridor. The project area contains habitat connections and supports movement across the broader landscape, sustaining both transitory and permanent wildlife populations. On-site features, which contribute to habitat connectivity, should be evaluated and maintained. Aspects of the project could create physical barriers to wildlife movement from direct or indirect project-related activities. Indirect impacts from lighting, noise, dust, and increased human activity may displace wildlife in the general area.

14) Reclamation Plan. Amendment of the existing Reclamation Plan is included in the Project description. Only 55 acres of the existing 115.5 acres CUP area is currently included in the existing Reclamation Plan. The proposed Project would expand quarry operations and when mining ends, 172.5.acres would be reclaimed. The quarry's location and proximity to sensitive species and wildlife habitats affiliated with Conejo Mountain suggest that reclamation may not be adequate to ensure that the site is stable, fully vegetated, and not subject to weed invasions which could spread to adjacent areas. About 60 acres of quarried land would not be subject to reclamation. The DEIR should evaluate adverse effects from weed invasion likely to occur on disturbed quarry lands not subject to reclamation. The potential end use as livestock grazing also suggests that the reclaimed site would not successfully be revegetated to a stable, native plant community and weeds are likely to establish.

We appreciate the opportunity to comment on the referenced NOP. Questions regarding this letter and further coordination on these issues should be directed to Ms. Mary Meyer, Senior Environmental Scientist (Specialist), at (805) 640-8019 or Mary.Meyer@wildlife.ca.gov.

Sincerely,

Betty J Courtney

Betty J. Courtney
Environmental Program Manager I
South Coast Region

ec. Christine Found-Jackson, Newbury Park
Mary Meyer, Ojai
Brock Warmuth, Ventura
Roger Root, Ventura Field Office, USFWS
Scott Morgan, State Clearinghouse

Literature Cited

BioResources Consultants, February 16, 2017. Initial Study Biological Assessment. Prepared for the County of Ventura. 76 pp.

Keeler-Wolf, T, and J. Evens. 2006. Vegetation classification of the Santa Monica Mountains National Recreation Area and environs in Ventura and Los Angeles counties, California. Unpublished report to the National Park Service. California Department of Fish and Game and California Native Plant Society, Sacramento CA. 711 pp.

Sawyer, John G., Todd Keeler-Wolf, Julie Evens, 2009, A Manual of California Vegetation. 2nd ed. California Native Plant Society Press. 1300 pp.

Baca, Brian

From: Dan Bonfiglio <dan@mrdosvientos.com>
Sent: Monday, October 02, 2017 3:45 PM
To: Baca, Brian
Subject: RE: DOS VIENTOS RANCH COMMUNITY ASSOCIATION -Pacific Rock Quarry Notice Attached

I would like to register my vehement opposition to granting Pacific Rock an expansion of their mining operation. They have been there long enough (and on an expired permit, as I understand). This 319% expansion will affect our environment, health and property values.

Please, please, please deny their application!

Dan Bonfiglio
Former President of the Dos Vientos Ranch Community Association
and Broker Associate
Keller Williams Realty
CalBRE 10106916
805-402-9383 cell/text

Baca, Brian

From:	Brian Buck <brian@bucksinla.com>
Sent:	Monday, October 02, 2017 3:57 PM
To:	Baca, Brian
Subject:	Deny: Pacific Rock Quarry Mine Expansion Project

Dear Mr. Baca,

This is in regard to the application for modification of the Pacific Rock Quarry Mine Expansion Project, Case No. LU10-003. As a resident of the area and long-time Ventura County resident, I'm requesting that you deny the expansion of this project.

I recently became aware of this request and find it will irrefutably create lasting harm to our community, property values, and the overall environmental balance of our beautiful county. At no point in time has mining ever contributed to the long-term health and welfare of a community. This project is no different. The expansion of this project will do nothing for our residents and will only benefit Pacific Rock while leading to long-term devastation of our community.

Each element of this project should be denied for the following reasons:

- Increasing the size of this project by 77% is an irresponsible expansion that only benefits Pacific Rock.
- Increasing excavation by 213% is excessive and will create irreversible harm to our environment.
- Increasing operational days to allow it to run 7 days will set a precedent for other similar projects.
- Allowing hauling between 530A - 10P only furthers disrupts the tranquil nature of our community and surrounding neighborhoods.
- Allowing continued truck traffic will lead to unwanted traffic congestion.
- Allowing peak period truck hauling will have unwanted impact on morning and evening commutes.
- Increased excavations allowance will promote the rapid decay of the surrounding environment.
- Ending the use of agricultural use will continue to undermine the delicate agriculture community our county was founded on.

As a resident of Newbury Park who shares the same Santa Monica mountains as this mining project, I beg you to deny this expansion. It might be the right thing to do for Pacific Rock Quarry but it's not the right thing to do for the residents of my neighborhood and our community. Please put the people of Ventura before the wants of one business.

Thank you for considering my request.

Brian Buck
Newbury Park Resident
35+ year Ventura County Resident

Brian Buck
310-567-6573
brian@bucksinla.com

Baca, Brian

From:	RosaLinda Diaz <prism4@me.com>
Sent:	Monday, October 02, 2017 4:09 PM
To:	Baca, Brian
Subject:	RE: Pacific Rock Mining in Newbury Park and Camarillo

Dear Mr. Baca,
Please do not approve Pacific Rock's request to expand their mining operations in our beautiful community. I live in Newbury Park. With the exception of the recent LAX flight diversions over our airspace - this is a lovely and quiet community. It is a place to find solace and peace. A place to hike and be in wonderment of nature - not a place where our natural resources - yes, I'm counting the quietness of our community as a natural resource — should be disrupted for the sake of business operations. Please deny Pacific Rock's request.

Sincerely,
RosaLinda Diaz
Newbury Park resident of 12 years.

City of Camarillo

Department of Community Development

601 Carmen Drive, Camarillo CA 93010 | 805.388.5360 p | 805.388.5388 f

October 2, 2017

Brian R. Baca, Manager, Commercial and Industrial Permit Section
Ventura County Resource Management Agency, Planning Division
800 S. Victoria Avenue, L#1740
Ventura, CA 93009

Subject: Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003, Notice of Preparation

Dear Mr. Baca:

The purpose of this letter is to provide written comments to the Ventura County Resource Management Agency, Planning Division, in response to the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for Pacific Rock Quarry Mine Expansion Project. The City of Camarillo understands that the applicant request a modification to the existing Conditional Use Permit (CUP) be granted along with an amended Reclamation Plan to authorize the expansion and continued operation of an existing surface mining facility for an additional 25-year period.

The NOP explains that staff has conducted a preliminary assessment of the proposed project and plans to address biological resources, noise, and visual resources in detail in the EIR. In addition to those items, the City respectfully requests that the following environmental issues also be addressed in detail in the EIR, for the reasons listed below:

- Traffic and Circulation
- Aesthetics
- Geology and Soils

Traffic and Circulation

Pleasant Valley Road and Santa Rosa Road are both designated as primary arterial streets in the Circulation Element of the City of Camarillo's General Plan. Primary arterial streets are intended to provide for the movement of large volumes of traffic between major traffic generators. Direct vehicular access should be provided to and from these arterials at limited intervals, through the use of well-designed, controlled, and safe intersections. The primary arterial is designed to accommodate four to six lanes of traffic with a capacity of 30,000 to 45,000 ADT (Average Daily Trips). A LOS (Level of Service) of "C" can accommodate between 24,000 and 36,000 ADT. The EIR should address the additional trips on Pleasant Valley Road and Santa Rosa Road as a result of the proposed project.

In addition to daily traffic impacts to Pleasant Valley Road and to Santa Rosa Road, the EIR should address typical weekday peak hour traffic impacts. Of major concern is the statement in the NOP that the entire daily maximum truck traffic of 120 trips per operational weekday could occur during either the AM or PM street peak traffic period. Since all project traffic must utilize the intersection of Pleasant Valley Road and Pancho Road, the EIR needs to include analyses of peak hour traffic impacts at that intersection.

Circulation Element Objective 8.1 is to promote safe and efficient movement of goods via truck and rail with minimum disruptions to residential areas. Circulation Element Policy 8.1.1 states that the City shall identify truck routes that sustain an effective transport of commodities while minimizing the negative impacts on local circulation and on noise-sensitive land uses. The EIR should address the truck route to and from the quarry through the City and disclose any impacts to the noise-sensitive land uses along the route.

Aesthetics

Section 10.2.2 of the City's Community Design Element defines our community character, in part, by Camarillo's setting, which is surrounded by open space that is protected by SOAR, CURB initiatives and CURB Element, as well as by the Camarillo Hills, Calleguas Mountains, and Conejo Mountain which provides a dramatic backdrop for the city. The EIR should address any aesthetic impacts that will result from the proposed project.

Geology and Soils

Exhibit 11-4 of the City's Safety Element demonstrates that this project site is located within an area susceptible to liquefaction. The EIR should address any potential liquefaction hazard and disclose any potential significant impacts resulting from the proposed project.

We appreciate receiving a copy of the NOP for this project. Please provide the City with notification when the Draft EIR is posted for public review. If you have any additional questions, please contact me at 805.388.5362.

Sincerely,

Joseph R. Vacca, Director
Department of Community Development
City of Camarillo

cc: Dave Klotzle, Director of Public Works
Bill Golubics, Deputy Director/Transportation

Baca, Brian

From: Lin, Sharon <Sharon_Lin@intuit.com>
Sent: Monday, October 02, 2017 4:26 PM
To: Baca, Brian
Subject: Please no more mining!

The residents of Dos Vientos are already suffering from increased nightly noise pollution from the recent air traffic patterns. I own two homes and I am deeply concerned about my quality of life and our property values.

Please say no to more mining, longer hours, and weekend operation. We can't take any more!

Sharon Lin
Group Operations Manager, Small Business Group

O 818-436-7925 **M** 818-585-7073
Twitter | LinkedIn | Facebook
intuit.com

Intuit Inc.

Baca, Brian

From: JOHN SANDSTROM <johnsandstrom@icloud.com>

Sent: Monday, October 02, 2017 4:30 PM
To: Baca, Brian
Subject: Pacific Rock

Dear Brian,

I am a resident of Newbury Park living at 5015 via Santana. Please do not allow Pacific Rock to expand its hours and days of operations. Noise created on weekends early hours of the morning and late evenings is unreasonable. We moved into this neighborhood for the quiet environment. What is being asked by Pacific Rock is unreasonable.

Sincerely, John Sandstrom

Sent from my iPhone

Baca, Brian

From: Julie Ganner <jganner1@aol.com>
Sent: Monday, October 02, 2017 4:32 PM
To: Baca, Brian
Subject: Conejo Mountain Rock Expansion

PLEASE DO NOT allow this man to expand his mining operation. He has no regard for his surrounding community, the environment, or causing a public noise nuisance.
Please do not allow him to expand the land used for mining or his hours of operation.
We beg you to take all the negative factors into consideration that this expansion will cause Ventura county and its neighbors. His mining practice is already a nightmare to deal with for local neighbors in Newbury Park.
Sincerely,
Julie Ganner
818-399-6715
Jganner1@aol.com

Sent from my iPhone

Baca, Brian

From: Talksalot <talksalot@earthlink.net>
Sent: Monday, October 02, 2017 4:35 PM
To: Baca, Brian
Subject: Pacific Rock

Dear Mr Baca,

I write to you today, as a resident of Newbury Park, to voice my concern over the proposed expansion of the Pacific Rock site as well as their request to reduce the clean up protocol. This is dangerous! This is unacceptable! This is NOT in the best interests of the men, women and children who call this area our home and we expect our government to protect us from the reaches of a business enterprise that so clearly impacts the health of our beautiful lands and the health of our families.

Regards,
Martha Malamis Coronado

Baca, Brian

From:	Jennifer St. Amand <jenstamand@hotmail.com>
Sent:	Monday, October 02, 2017 4:41 PM
To:	Baca, Brian
Subject:	Please do not support Pacific Rock!

Dear Mr. Baca,
I am a resident of Dos Vientos in Newbury Park. I am writing to express my horror that Pacific Rock may be allowed to expand their operations on Conejo Mountain. I am gravely concerned about an expansion of either the hours of operation or, most certainly, the scope of the mining/acreage involved.
Please do not allow this damage to our land, natural habitats, property values, and quality of life to occur.

I appreciate your willingness to hear the concerns of Ventura County residents.

Sincerely,
Jennifer St. Amand
Newbury Park

Sent from my iPhone

Baca, Brian

From: Keith <kbstamand@hotmail.com>
Sent: Monday, October 02, 2017 4:40 PM
To: Baca, Brian
Subject: Opposed to expansion of Pacific Rock mining

Hi Mr. Baca,

I am writing to voice my opposition to the expansion of mining by the Pacific Rock company on Conejo Mountain.

This is based on concerns regarding the additional noise, adverse environmental impact, and declining property values and natural beauty of the area that would ensue if the sought after expansion permit is granted.

Thank you for your consideration.

Kind regards,

Keith St. Amand, MD
Dos Vientos/Newbury Park resident x 4.5 yrs

Baca, Brian

From:	Manny Garcia <themannygarcia@yahoo.com>
Sent:	Monday, October 02, 2017 4:50 PM
To:	Baca, Brian
Cc:	Maurice Garcia
Subject:	RE: Pacific Rock Quarry Mine expansion

Mr. Baca

My wife and I are residents of Dos Vientos and wish to be placed on your mailing/notification lists for information/action regarding the Pacific Rock Quarry Mine Expansion Project.

Our preliminary objections to the Application include but are not limited to the intrusion on open space , noise, pollution, dirt, damage to the mountain and possibly to nearby homes and the effect of property values.

Thank you for consideration of the foregoing. Kindly acknowledge receipt of this e mail.

Maurice and Judith Garcia
5478 Via Nicola
Newbury Park CA 91320

e mail: themannygarcia@yahoo.com

Baca, Brian

From: Daniel Gavin <gotgavin@verizon.net>
Sent: Monday, October 02, 2017 4:50 PM
To: Baca, Brian
Subject: Comment - Pacific Rock Mine

I live near the mine/quarry and have HIGH CONCERNS about the expansion application. I would like to be informed of any hearings on the matter, studies submitted, etc.

Thank you.
Dan Gavin
135 Via Ricardo

Baca, Brian

From: Katie Yant <ky74261@gmail.com>
Sent: Monday, October 02, 2017 4:56 PM
To: Baca, Brian
Subject: No mining expansion

I oppose the expansion of Pacific Rock mining operation.
I am a Newbury Park resident.
Thank you.
- Katie Yant

Baca, Brian

From: Stacy M Gleason <smdoscher@icloud.com>
Sent: Monday, October 02, 2017 5:06 PM
To: Baca, Brian
Subject: Against the mining and expansion

Please note that I am a resident here and would like to make my opinion known that I am against the expansion of Pacific Rock mining.

I am not sure what other information you might need from me but please feel free to contact me.

Sincerely,

Stacy Gleason

Sent from my iPhone

Baca, Brian

From: Mark Goldstein <MGoldstein@socalip.com>
Sent: Monday, October 02, 2017 5:12 PM
To: Baca, Brian
Subject: Pacific Rock expansion Ca no. LU10-0003

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 5261 Via Rincon, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased used of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,

/mark/
Mark A. Goldstein
5261 Via Rincon
Newbury Park, CA 91320
mobile 818-636-5796

Baca, Brian

From:	Vicki Brill <vickibrill@verizon.net>
Sent:	Monday, October 02, 2017 5:32 PM
To:	Baca, Brian
Subject:	Mining expansion application

Hi Brian –
Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 3339 Michael Dr, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Thank you for your consideration

Vicki Brill

Sent from AOL Mobile Mail

Baca, Brian

From: thekarencollins@gmail.com
Sent: Monday, October 02, 2017 5:35 PM
To: Baca, Brian
Subject: Conejo mountain rock

I live around the corner from this site. They are not an environmentally friendly company and are petitioning to minimize cleaning up after they finish mining. We are 100% against this 319% expansion.
Milt Dorsey & Karen Collins
875 Corte Safiro
Camarillo CA 93012

Baca, Brian

From: Shafferlaw@gmail.com
Sent: Monday, October 02, 2017 5:40 PM
To: Baca, Brian
Subject: Pacific Rock Excavation

Dear Mr. Baca:

My family and I live in Dos Vientos and were just informed today that Pacific Rock has applied to expand its project, which will negatively impact our neighborhood.

I am wondering why our residents were not given proper notice about this nuisance?

Please advise regarding the status of this matter and what is being to protect our neighborhood.

Sincerely,

Christina Shaffer,
Attorney at Law

Sent from my iPhone

Baca, Brian

From: Lesley Moresi <moresiphotography@gmail.com>
Sent: Monday, October 02, 2017 5:43 PM
To: Baca, Brian
Subject: Please deny expasion of Pacific Rock

Brian,
I just received news today that Pacific Rock has a request to expand their mining operation by 319%. My home in Dos Vientos is just over the hill from this site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts on us and our children.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the request expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.
Lesley Moresi

Baca, Brian

From: MyDcTv puppy <mydctv1@gmail.com>
Sent: Monday, October 02, 2017 5:44 PM
To: Baca, Brian
Subject: Pacific Rock - please deny

Brian,
I just received news today that Pacific Rock has a request to expand their mining operation by 319%. My home in Dos Vientos is just over the hill from this site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts on us and our children.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the request expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.
Thank you

Baca, Brian

From: Deborahann Sankovich <deborahannsankovich@gmail.com>
Sent: Monday, October 02, 2017 5:45 PM
To: Baca, Brian
Subject: Pacific Rock Mining Operation

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home in Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Thank You,

Deborahann Sankovich

Baca, Brian

From: Jolina Fizdale <jolina@dwconline.net>
Sent: Monday, October 02, 2017 5:53 PM
To: Baca, Brian
Subject: RE: DOS VIENTOS RANCH COMMUNITY ASSOCIATION -Pacific Rock Quarry Notice Attached

Hi Brian,

We are residents of Dos Vientos and we have just been notified today that Pacific Rock wants to expand mining near our community. I strongly oppose this, as it will certainly negatively affect our community, and could pose serious health concerns.

I am requesting that this application for expansion is denied, that our community is properly notified, and that a thorough environmental impact study is done and disclosed to all Dos Vientos residents prior to any future mining.

Thank you,

Gregory and Jolina Elia

Sent from my iPhone

Baca, Brian

From:	Sharon Selinski <okenogirl@gmail.com>
Sent:	Monday, October 02, 2017 5:56 PM
To:	Baca, Brian
Subject:	Conejo Mountain mining. . .

Dear Sir:

Our lovely little town is no longer the quiet peaceful village it was. We now have airliners flying at low altitude starting at 4:00 a.m. We may have to endure another assault to our ears and noses with mining operations starting in the wee hours all seven days of the week.

An expansion of operations of more than 300% is outrageous. Please do not allow this to proceed.

--

Have a nice day!

Sharon
Selinski
72 Donald Avenue
Newbury Park, CA 91320

Baca, Brian

From: Bre Collier <brecollier@aol.com>
Sent: Monday, October 02, 2017 5:56 PM
To: Baca, Brian
Subject: Mining

I just received word today from our HOA that Pacific Rock has a request to expand their mining operation by 319%. I live at 5297 Via Capote Newbury Park and I am vehemently opposed to the expansion. The air and noise from the Pacific Rock site to my neighborhood in Dos Vientos would be adversely impacted. The increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, I would like to suggest this request be denied.

Thank you,

Bre Collier
805-375-1937

Baca, Brian

From: Harriet <bklyndame@aol.com>
Sent: Monday, October 02, 2017 5:45 PM
To: Baca, Brian
Subject: Against Pacific Rock Expansion

We live in Dos Vientos, Newbury Park and have just learned of Pacific Rock intention to destroy our quality of life with the application of expansion.

We are against the application from Pacific Rock to expand their mining operations and increasing the scope of the number of acres as well as adding hours of operations and additional days. We are outraged and disappointed that not only will this company make the environment a disaster for 25 years, but also have the gall to not clean up the area to the standards that they currently have to do based on their current contract.

Please, please DO NOT ALLOW THIS COMPANY to destroy why most people have moved here for. Our health, additional noise till late at night, 7 days a week, and the loss of our property values are all at stake.

Harriet and David Sheinberg
465 Via Del Lago
Newbury Park, CA 91320

Harriet

Sent from my iPad

Baca, Brian

From: Rahul Jindani <rahuljindani@gmail.com>
Sent: Monday, October 02, 2017 5:59 PM
To: Baca, Brian
Subject: LU10-0003 Notice of Preparation EIR. Pacific Rock Quarry Mine, applicant

Hi Mr. Brian Baca,

This email is regarding LU10-0003 application.
I live in Dos Vientos and am concerned with this application for two reasons:
a. Environmentally, changing the natural landscape by removing hills/ mountains is not a good idea. We need to protect our environment for future generations. There is lot of other land in the country where we can create land for Agriculture. In majority (or all) of those areas, you will not be able to raise a hill or mountain, similar to one which we are breaking apart.

b. It is not a good idea to consider the planned activities as safe. We could be introducing small cracks which may seem trivial, but when an Earth Quake or Land slide occurs those human introduced activities could cause disaster that could have been avoided. Since I live close to the area of activity, I am concerned about the impact it will have on my neighbors and me. I am hoping you will never hear about one of you wrote to you to not approve this does not die in one of such incidents.

I strongly request to not only cancel this request, but cancel the entire mining activity. You will be doing a big favor to generations to come.

Sincerely,

Rahul Jindani
Phone 805-277-5101

Baca, Brian

From:	Penny Brady <lyriclines@gmail.com>
Sent:	Monday, October 02, 2017 6:27 PM
To:	Baca, Brian
Subject:	Pacific Rock expansion

to: brian.baca@ventura.org Brian
I just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 216 Via Antonio, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As someone with asthma, I do not need more dust in the air! As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,
Penny Brady
216 Via Antonio,
Newbury Park, CA

Baca, Brian

From: merleen gholdston <gholdston.m@gmail.com>
Sent: Monday, October 02, 2017 6:30 PM
To: Baca, Brian
Subject: Pacific Rock expanding near Conejo grade

I live in the Oakridge Estates Tract of homes north of the Conejo grade. Has consideration been given to the impacts of expanded mining operations by Pacific Rock? It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Thank you,
Merleen Gholdston

Baca, Brian

From: Margaret Wiesehan <peglondon@icloud.com>
Sent: Tuesday, October 03, 2017 12:25 PM
To: Baca, Brian
Subject: Increasing digging in Newbury Park

Please do not allow the expansion of this company's work plan in our community. Seven days a week?! 5:30am- 10pm?! Please let those of us who live and make this community the lovely place it is maintain the quality of life we work hard to maintain here.
Thank you.

Baca, Brian

From: Laura Grieder <thegrieders@yahoo.com>
Sent: Tuesday, October 03, 2017 3:25 PM
To: Baca, Brian

Brian –

Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at Via Mira Flores, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Thank you,

Grieder Family

Baca, Brian

From: Fred Medick <fredm04@gmail.com>
Sent: Tuesday, October 03, 2017 3:43 PM
To: Baca, Brian
Cc: Daniela Pallafacchina
Subject: Pacific Rock mining

Brian,

I just learned today that Pacific Rock has a request to expand their mining operation by 319%. My home at 4571 Via Pluma, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,

Fred Medick

Baca, Brian

From: Conor Logan <conorlogan@gmail.com>
Sent: Tuesday, October 03, 2017 3:48 PM
To: Baca, Brian
Subject: NO to Conejo Rock Mining

A big vote NO to their continued claim and attempt to widen scope and hours/days of operations.

Thanks

Conor

Baca, Brian

From:	Steve Johnson <sfjohnso@gmail.com>
Sent:	Tuesday, October 03, 2017 3:54 PM
To:	Parks, Linda
Cc:	Baca, Brian
Subject:	Re: Pacific Rock: Continued operation, Expanded operation

Dear Ms. Parks, Mr. Baca -

I have heard from our Nextdoor.com community that Pacific Rock is applying once again for permission to expand mining operations. Can this possibly correct?

If so, my objections to their continued operation, let alone expansion, still stand. It's time to get the Santa Monica Mountains Conservancy to acquire that land, and put this to rest permanently.

Again, I would welcome the opportunity to make public comments at any upcoming hearing, as, I'm sure, would other hikers in our community.

Thanks again for your continued attention to this matter on behalf of your constituents.

Steven F. Johnson
483 Highview Street
Newbury Park, California 91320

On Fri, Aug 12, 2016 at 4:18 PM, Parks, Linda <Linda.Parks@ventura.org> wrote:

Dear Mr. Johnson,

Thank you for your email expressing concern with the operation of Pacific Rock Quarry on Conejo Mountain. I share your concern regarding the impact to natural resources there and the potential to allow for the operation to occur as a vested right without County regulation on its permit. I apologize for the length of time it took to respond, however I wanted to have full information on this issue, which was in flux at the time I received your email.

I'm happy to report that the application for Vested Rights is being withdrawn. This was reported to me by the Planning Director earlier this week.

Pacific Rock Quarry is operating under the provisions of a compliance agreement which requires the operator to operate the facility pursuant to specific conditions (CUP 3817-3). Under the provisions of the compliance agreement, the Operator will be submitting a revised modification application by December 16, 2016 to address previous incomplete items required by the Planning Division.

The Planning Division has created a notification list for people interested in updates on Conejo Mountain permits. You can be added to the list to receive information on the required December 16, 2016 submittal and other public notices relative to the Pacific Rock modification application (Case No. LU10-003). To get on the interested party list sign up at:

http://vcrma.org/planning/programs/smara/index.html

Thank you so much for taking the time to provide input, and for continuing to follow this issue.

--Linda

Linda Parks

Supervisor, District 2

625 West Hillcrest Drive

Thousand Oaks, CA 91360

(805) 214-2510

From: Steve Johnson [mailto:sfjohnso@gmail.com]
Sent: Tuesday, June 21, 2016 7:13 PM
To: Parks, Linda <Linda.Parks@ventura.org>
Subject: Pacific Rock Vested Rights application

Dear Ms. Parks -

It's been my pleasure to live in Newbury Park and enjoy the abundant outdoor recreation opportunities in the area, and I thank you for your contributions in this regard.

I understand that Pacific Rock has applied for a Vested Rights declaration to release them from supervision and permitting for their quarry operation on Conejo Mountain. While I respect their right to do so, I also respect the fact that a previous agreement was to have them cease operations by 2010, restore the property, and allocate it to recreational use.

Please do your utmost to ensure that Pacific Rock does not obtain the Vested Rights declaration, that the company continue to remain subject to supervision and permitting, and that it is converted appropriately to its previously intended use, as soon as possible.

With my best regards,

- Steve

Steven F. Johnson

483 Highview Street

Newbury Park, CA 91320

805-279-4665

Baca, Brian

From: Lisa Campbell <lisa.c.campbell99@gmail.com>
Sent: Tuesday, October 03, 2017 5:01 PM
To: Baca, Brian
Subject: Pacific Rock Mining

Brian,
Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 814 Verna Ave, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Casa Conejo. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Thank you,
Lisa Campbell

Baca, Brian

From: Barbara Williams <barbsk80@icloud.com>
Sent: Tuesday, October 03, 2017 6:18 PM
To: Baca, Brian
Subject: No to Pacific Rock

I adamantly oppose any expansion to either the operations or hours for Pacific Rock. Staben has not been a good neighbor to us in Camarillo Springs. Pacific Rock changed the creek between them and Conejo Mountain Memorial Park causing damage. They even delayed fixing what they screwed up. We in Camarillo Springs value our piece and quiet and do not need additional noise and dust.

Staben jerked around Camarillo Springs when trying to win a contract with the City of Camarillo for additional work on the Conejo Mountain debris platforms. Staben took rock from the debris flow rock and debris removal, which was paid for by the City of Camarillo/Natural Resources Conservation Service and resold it. None of that profit was used to help the community in which he purchased damaged homes for pennies on the dollar. Yes, he took advantage of people devastated by the December 2014 debris flows.

Think of the people visiting loved ones at Conejo Mountain Memorial Park or trying to have a service. Please deny the request.

Barbara Williams
Camarillo Springs

Sent from my iPad

Baca, Brian

From: Diane Gudermuth <diane_gudermuth@yahoo.com>
Sent: Tuesday, October 03, 2017 9:58 PM
To: Baca, Brian
Subject: Conejo ROCK ...

Please don't give these guys free range to spoil our way of life further! I'm getting so discoraged, rethinking staying around here for retirement. 5 am to 10 pm, tractors tearing into the terrain, 25 years, no clean up? Sounds like a nightmare. Hope I'm just adding mine to lots of voices. Heard last minute. Shouldn't we have received something in the mail given the impact on property values, etc.?

Diane Gudermuth
Homeowner, Business owner, Voter

Sent from Yahoo Mail on Android

STATE OF CALIFORNIA
Edmund G. Brown Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
Environmental and Cultural Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691
Phone (916) 373-3710
Fax (916) 373-5471
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov
Twitter: @CA_NAHC

SEP 20 2017

September 14, 2017

Brian R. Baca
Ventura County
800 South Victoria Ave.
Ventura, CA 93009

RE: SCH#2017081052 Pacific Rock Quarry Mine Expansion Project, Ventura County

Dear Mr. Baca,

The Native American Heritage Commission has received the Notice of Preparation (NOP), Draft Environmental Impact Report (DEIR) or Early Consultation for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code § 21000 et seq.), specifically Public Resources Code section 21084.1, states that a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, § 15064.5 (b) (CEQA Guidelines Section 15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an environmental impact report (EIR) shall be prepared. (Pub. Resources Code § 21080 (d); Cal. Code Regs., tit. 14, § 15064 subd.(a)(1) (CEQA Guidelines § 15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources with the area of project effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code § 21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code § 21084.3 (a)). **AB 52 applies to any project for which a notice of preparation or a notice of negative declaration or mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. § 800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments. **Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.**

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code § 21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code § 21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code § 21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or environmental impact report. (Pub. Resources Code § 21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code § 65352.4 (SB 18). (Pub. Resources Code § 21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code § 21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code § 21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public, consistent with Government Code sections 6254 (r) and 6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public. (Pub. Resources Code § 21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code section 21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code § 21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
   a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
   b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code § 21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code section 21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code section 21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code § 21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code section 21084.3 (b). (Pub. Resources Code § 21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
       i. Planning and construction to avoid the resources and protect the cultural and natural context.
       ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
       i. Protecting the cultural character and integrity of the resource.
       ii. Protecting the traditional use of the resource.
       iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code § 21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a nonfederally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code § 815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code § 5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An environmental impact report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code sections 21080.3.1 and 21080.3.2 and concluded pursuant to Public Resources Code section 21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code section 21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code § 21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code § 65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code § 65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code section 65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code sections 5097.9 and 5097.993 that are within the city's or county's jurisdiction. (Gov. Code § 65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have been already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.

b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:

a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.

b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.

a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, section 15064.5(f) (CEQA Guidelines section 15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.

b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.

c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code section 7050.5, Public Resources Code section 5097.98, and Cal. Code Regs., tit. 14, section 15064.5, subdivisions (d) and (e) (CEQA Guidelines section 15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions, please contact me at my email address: frank.lienert@nahc.ca.gov

Sincerely,

Frank Lienert
Associate Governmental Program Analyst

cc: State Clearinghouse

OCT 0 2 2017

STATE OF CALIFORNIA–NATURAL RESOURCES AGENCY EDMUND G. BROWN, JR., *Governor*

SANTA MONICA MOUNTAINS CONSERVANCY

RAMIREZ CANYON PARK
5750 RAMIREZ CANYON ROAD
MALIBU, CALIFORNIA 90265
PHONE (310) 589-3200
FAX (310) 589-3207
WWW.SMMC.CA.GOV

September 25, 2017

Brian R. Baca, Manager, Commercial and Industrial Permit Section
Ventura County Resource Management Agency
Planning Division
800 South Victoria Avenue, L#1740
Ventura, California 93009

Notice of Preparation Comments - Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003, SCH NO. 2017081052

Dear Mr. Baca:

The Santa Monica Mountains Conservancy (Conservancy) offers the following comments on the Notice of Preparation (NOP) of a draft Environmental Impact Report (DEIR) for the proposed Pacific Rock Quarry Mine Expansion Project on 204.5 acres near Camarillo. The MRCA owns an open space parcel (APN 234-0-080-380) that abuts the subject property. The quarry also abuts Conejo Open Space Conservation Authority (COSCA) open space.

The proposed expansion of mining operations would more than triple the total area subject to mining activity (from 55 acres to 172.5 acres). The proposed eastward mining perimeter expansion would be less than 50 feet from MRCA and COSCA parkland. This expansion would likely result in significant adverse impacts to open space and habitat values and the ground water retention capability of the public parkland due to the increased noise, dust, and disturbance over long time periods. The DEIR must consider project alternatives that provide for minimum 750-foot-wide, non-disturbance buffers from all adjacent parkland. If any existing mining boundary is less than 750 feet from parkland, that boundary must be maintained and not reduced.

The DEIR should analyze the delineation of zones of planned mining activity and non-activity on a rolling five-year basis over the course of the Conditional Use Permit (CUP) in order to minimize disturbance of adjacent habitat areas. Those areas identified as non-active within the proposed mining area should remain native habitat prior to active mining and be reclaimed as native habitat as quickly as feasible following mining cessation.

Additionally, the proposed project anticipates increasing operational days to 7 days per week with up to 120 one-way truck trips per operational day. This increase in operational hours and truck traffic will generate more dust and diesel exhaust emissions. EIR project alternatives should consider a paving plan for the unpaved portions of the quarry that receive the bulk of the truck traffic for the anticipated 25-year extension of the CUP.

Because there are several unnamed tributaries to Conejo Creek in the heart of the proposed project disturbance zone, and the proposed project anticipates expanding into the steep slopes of Conejo Mountain, DEIR alternatives should evaluate the use of over-sized, concrete-free drainage detention basins to minimize sedimentation of downstream waterways. The recent fire and mudslides to affect this area (2013 and 2014, respectively) are evidence that Conejo Mountain and the surrounding hillsides are susceptible to debris flow events. The soft-bottom, concrete-free detention basins should be over-sized to capture sediment for a 100-year, 24-hour storm event and to dramatically reduce (or eliminate) sediment removal intervals. Examination of Ventura County's GIS CountyView indicates a portion of the existing active mining area is already with a 100-year Floodplain area, thus potential flood impacts to adjacent properties must also be analyzed in the DEIR.

Conejo Mountain is the last remaining undeveloped open space between the western Santa Monica Mountains and the Santa Rosa Valley. Therefore, the EIR must include alternatives that permanently preserve viable habitat for north-south wildlife passage between Conejo Creek and the Dos Vientos subdivision. The Conservancy requests that DEIR alternatives include a permanently protected contiguous habitat area along the northern, eastern, and southern boundaries of the property. Permanent protection can only be achieved via a fee simple or conservation easement dedication to a public agency. Permanent protection of all areas outside of the proposed and existing disturbance footprints is essential assure that no further development of the property occurs.

Any areas that are no longer part of the active mining operation must be required to be rehabilitated to as close to natural conditions as possible and remain permanently free of all fencing and wildlife movement barriers.

The Conservancy recommends that any new project approvals include the requirement for a large bond or endowment to absolutely insure that sufficient funds will be available to adequately rehabilitate the site at the expiration of the mining operation. Such a requirement must be adjusted for inflation to guarantee adequate reclamation.

Please address any questions or future correspondence to Paul Edelman by phone at (310) 589-3200 ext. 128, at the above letterhead address, or by email at edelman@smmc.ca.gov.

Sincerely,

IRMA MUÑOZ
Chairperson

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

IN REPLY REFER TO:
08EVEN00-2017-CPA-0226

September 29, 2017

Brian R. Baca, Manager,
Ventura County Resource Management Agency
Planning Division
800 South Victoria Avenue, L#1740
Ventura, California 93009

Subject: Comments on the Notice of Preparation of a Draft Environmental Impact Report for the Pacific Rock Quarry Mine Expansion Project (Case No. LU10-0003), Ventura County, California

Dear Mr. Baca:

This letter provides the U.S. Fish and Wildlife Service's (Service) comments on the Notice of Preparation (NOP) regarding the Draft Environmental Impact Report (DEIR) for the Pacific Rock Quarry Mine Expansion Project (Project), located at the western edge of the Santa Monica Mountains, approximately 2.0 miles south of U.S. Highway 101 in the Camarillo area, Ventura County (County), California. Pacific Rock, Inc. is proposing to expand an existing surface mining facility from 115.5 acres to 204.5 acres and to continue operations under a modified Conditional Use Permit (CUP) for an additional 25-year period.

The mission of the U.S. Fish and Wildlife Service (Service) is working with others to conserve, protect, and enhance fish, wildlife, plants, and their habitats for the continuing benefit of the American people. To assist in meeting this goal, the Service provides comments on public notices issued for projects that may have an impact on those resources, especially federally-listed plants and wildlife. The Service's responsibilities include administering the Endangered Species Act of 1973, as amended (Act), including sections 7, 9, and 10.

According to the NOP, the DEIR would address the potential environmental impacts associated with the proposed modifications of the existing facility, and whether the Project will have any new or different impacts than were addressed in the 1980 Mitigated Negative Declaration. In the NOP, the County requested the public to assist the Planning Division identify any issues that should be addressed in the DEIR. The NOP identifies issues in the areas of biological resources, noise, and visual resources that will be analyzed in the DEIR. We encourage you to work with us and the California Department of Fish and Wildlife to ensure that you have the most recent information regarding resources under our respective jurisdictions, to help avoid adverse impacts to listed species, and to provide an accurate depiction of Federal and State permitting processes.

City of Camarillo

Department of Community Development

601 Carmen Drive, Camarillo CA 93010 | 805.388.5360 p | 805.388.5388 f

October 2, 2017

Brian R. Baca, Manager, Commercial and Industrial Permit Section
Ventura County Resource Management Agency, Planning Division
800 S. Victoria Avenue, L#1740
Ventura, CA 93009

Subject: Pacific Rock Quarry Mine Expansion Project, Case No. LU10-0003, Notice of Preparation

Dear Mr. Baca:

The purpose of this letter is to provide written comments to the Ventura County Resource Management Agency, Planning Division, in response to the Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for Pacific Rock Quarry Mine Expansion Project. The City of Camarillo understands that the applicant request a modification to the existing Conditional Use Permit (CUP) be granted along with an amended Reclamation Plan to authorize the expansion and continued operation of an existing surface mining facility for an additional 25-year period.

The NOP explains that staff has conducted a preliminary assessment of the proposed project and plans to address biological resources, noise, and visual resources in detail in the EIR. In addition to those items, the City respectfully requests that the following environmental issues also be addressed in detail in the EIR, for the reasons listed below:

- Traffic and Circulation
- Aesthetics
- Geology and Soils

Traffic and Circulation

Pleasant Valley Road and Santa Rosa Road are both designated as primary arterial streets in the Circulation Element of the City of Camarillo's General Plan. Primary arterial streets are intended to provide for the movement of large volumes of traffic between major traffic generators. Direct vehicular access should be provided to and from these arterials at limited intervals, through the use of well-designed, controlled, and safe intersections. The primary arterial is designed to accommodate four to six lanes of traffic with a capacity of 30,000 to 45,000 ADT (Average Daily Trips). A LOS (Level of Service) of "C" can accommodate between 24,000 and 36,000 ADT. The EIR should address the additional trips on Pleasant Valley Road and Santa Rosa Road as a result of the proposed project.

In addition to daily traffic impacts to Pleasant Valley Road and to Santa Rosa Road, the EIR should address typical weekday peak hour traffic impacts. Of major concern is the statement in the NOP that the entire daily maximum truck traffic of 120 trips per operational weekday could occur during either the AM or PM street peak traffic period. Since all project traffic must utilize the intersection of Pleasant Valley Road and Pancho Road, the EIR needs to include analyses of peak hour traffic impacts at that intersection.

Circulation Element Objective 8.1 is to promote safe and efficient movement of goods via truck and rail with minimum disruptions to residential areas. Circulation Element Policy 8.1.1 states that the City shall identify truck routes that sustain an effective transport of commodities while minimizing the negative impacts on local circulation and on noise-sensitive land uses. The EIR should address the truck route to and from the quarry through the City and disclose any impacts to the noise-sensitive land uses along the route.

Aesthetics

Section 10.2.2 of the City's Community Design Element defines our community character, in part, by Camarillo's setting, which is surrounded by open space that is protected by SOAR, CURB initiatives and CURB Element, as well as by the Camarillo Hills, Calleguas Mountains, and Conejo Mountain which provides a dramatic backdrop for the city. The EIR should address any aesthetic impacts that will result from the proposed project.

Geology and Soils

Exhibit 11-4 of the City's Safety Element demonstrates that this project site is located within an area susceptible to liquefaction. The EIR should address any potential liquefaction hazard and disclose any potential significant impacts resulting from the proposed project.

We appreciate receiving a copy of the NOP for this project. Please provide the City with notification when the Draft EIR is posted for public review. If you have any additional questions, please contact me at 805.388.5362.

Sincerely,

Joseph R. Vacca, Director
Department of Community Development
City of Camarillo

cc: Dave Klotzle, Director of Public Works
Bill Golubics, Deputy Director/Transportation

DEPARTMENT OF TRANSPORTATION
DISTRICT 7
100 S. MAIN STREET, MS 16
LOS ANGELES, CA 90012
PHONE (213) 897-8391
FAX (213) 897-1337
TTY 711
www.dot.ca.gov

OCT 02 2017

Serious Drought.
Making Conservation
a California Way of Life.

September 27, 2017

Mr. Brian R. Baca
Ventura County
800 South Victoria Avenue
Ventura, CA 93009

RE: Pacific Rock Quarry Mine Expansion
Project, LU10-0003
Vic. LA-101/ PM 10.764 to 12.297
SCH # 2017081052
GTS # VEN-2017-00080AL-NOP

Dear Mr. Baca:

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above referenced project. The Project to modify Conditional use Permit (CUP) be granted and an amended Reclamation plan be approved to authorize the expansion and continued operation of an existing surface mining facility for an additional 25-year period.

The mission of Caltrans is to provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability. We provide these comments consistent with the State's smart mobility goals that support a vibrant economy, and build communities, not sprawl.

However, the development is in a suburban/rural area, where vehicles are a dominant mode choice. Caltrans is aware of challenges that the region faces in identifying viable solutions to alleviating congestion on State and Local facilities. With limited room to expand vehicular capacity, any development should incorporate multi-modal and complete streets transportation elements that will actively promote alternatives to car/truck use and better manage existing parking assets. Prioritizing and allocating space to efficient modes of travel such as bicycling and public transit can allow streets to transport more people in a fixed amount of right-of-way.

While the State is in transition to VMT per capita for traffic analysis, we would like to provide the following suggested comment for your consideration in the interim.

For any future project, we encourage the Lead Agency to integrate transportation and land use in a way that reduces Vehicle Miles Traveled (VMT) and Greenhouse Gas (GHG) emissions by

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facilitating the provision of more proximate goods and services to shorten trip lengths, and achieve a high level of non-motorized travel and transit use. We also encourage the Lead Agency to evaluate the potential of Transportation Demand Management (TDM) strategies and Intelligent Transportation System (ITS) applications in order to better manage the transportation network, as well as transit service and bicycle or pedestrian connectivity improvements.

Given that Caltrans current guidelines are in the process of being updated, and if the Lead Agency is still using LOS methodology, an operation impact analysis should be prepared to analyze the following information:

1. Construction/truck/operation traffic impacts on US-101 and all significantly impacted streets, crossroads and controlling intersections at the State facilities.
2. Off-ramp queuing analysis including US-101 NB/SB to Santa Rosa Rd./Pleasant Valley Rd. and to Camarillo Spring Rd. Such queuing analysis at the off-ramp during AM/PM peak hours should be conducted based on HCM for existing condition, existing plus project condition, and future (cumulative) plus project condition. The Lead Agency may contact Caltrans for further queuing analysis requirements.
3. Convert truck volume to PCE, Passenger Car Equivalent.
4. Traffic volume counts that include anticipated AM and PM peak-hour volumes.
5. Level of service (LOS) before and after expansion.
6. Discussion of mitigation measures appropriate to alleviate anticipated truck/operation traffic impacts.
7. A truck management policy limiting truck utilizing on/off ramps during the peak hours to reduce the potential for truck platooning that may negatively affect merge movements.

Analysis should include existing traffic, traffic generated by the project, existing plus project, and cumulative traffic generated from all specific planning developments in the area, and traffic growth other than from the project and developments, if any.

If you have any questions, please feel free to contact Mr. Alan Lin the project coordinator at (213) 897-8391 and refer to GTS # VEN-2017-00080-AL.

Sincerely,

For

DIANNA WATSON
IGR/CEQA Branch Chief

cc: Scott Morgan, State Clearinghouse

Baca, Brian

From: Mike Mesko <Mike.Mesko@patagonia.com>
Sent: Monday, October 02, 2017 7:23 PM
To: Baca, Brian
Subject: no more mining

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at [***], Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Baca, Brian

From:	Steve and Linda Allen <STELIN@VERIZON.NET>
Sent:	Monday, October 02, 2017 7:27 PM
To:	Baca, Brian
Subject:	Pacific Rock Quarry Mine Expansion Case No LU 10-0003

Dear Mr. Baca:

We oppose the proposed Expansion of the Pacific Rock Quarry on Conejo Mountain.

Thank you for your kind attention to this matter, Mr. Steven and Mrs. Linda Allen
4820 Via don Luis
Newbury Park, CA 91320
Dos Vientos Ranch

Baca, Brian

From: Herman Colligan <namreh57@gmail.com>
Sent: Monday, October 02, 2017 7:41 PM
To: Baca, Brian
Subject: RE: DOS VIENTOS RANCH COMMUNITY ASSOCIATION -Pacific Rock Quarry Notice Attached

As a resident of Newbury Park, I object to the expansion of this rock quarry and its expanded operation. I urge the rejection of this proposal as I believe it will have an impact on the lives of surrounding residents.

Thanks,

Herman Colligan
5248 Via Capote
Newbury Park, CA. 91320

Sent from my iPhone

Baca, Brian

From: Michelle Endler <endlers4@icloud.com>
Sent: Monday, October 02, 2017 8:05 PM
To: Baca, Brian
Subject: Pacific Rock

I live in Dos Vientos and I am against the expansion of the rock mining. Little has been published to the public on this matter; especially considering the impact it will have on our living.
Please find a more remote location for such a large mining project.
Michelle Endler

Sent from my iPhone

Baca, Brian

From: Scott Vroman <ksvkav@yahoo.com>
Sent: Monday, October 02, 2017 8:34 PM
To: Baca, Brian
Cc: Rich Woolf; Dan Bonfiglio
Subject: Conejo Mountain Rock Quarry, Pacific Rock

Dear Mr. Baca,

The Dos Vientos community sits on top of this operation. I would like to know why this application for expansion is just now being publicized and DV has not been given time for proper public input.

I have great concerns with how Mr. Staben has operated in the past both on his farm in Moorpark and his rock plant. He over blasted his quarry several years ago and also expanded his home in Moorpark without permits. Due to the proximity of the quarry to our community and his past business practices, I feel the hours if operation from 5:00 Am to 10:00 PM seven days a week constitutes a public nuisance when considering blasting, crushing and hauling operations.

Regards,

K. Scott Vroman
Newbury Park resident

Baca, Brian

From: Nissim, Tina (ES) <Tina.Nissim@adp.com>
Sent: Monday, October 02, 2017 8:37 PM
To: Baca, Brian
Subject: Mining in newbury park

Brian – as you may know Pacific Rock has a request to expand their mining operation by 319%. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

We have the right to be involved in these decisions in our neighborhood. Thank you
Tina Nissim.

Sent from my iPhone

This message and any attachments are intended only for the use of the addressee and may contain information that is privileged and confidential. If the reader of the message is not the intended recipient or an authorized representative of the intended recipient, you are hereby notified that any dissemination of this communication is strictly prohibited. If you have received this communication in error, notify the sender immediately by return email and delete the message and any attachments from your system.

Baca, Brian

From: Julie Woolley <juliewoolley@verizon.net>
Sent: Monday, October 02, 2017 8:57 PM
To: Baca, Brian
Subject: Pacific Rock expansion application should be DENIED!

Brian,
Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 4363 Via Entrada, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.
Thank you,
Julie Woolley

Baca, Brian

From: Karen Kurtenbach <kkrtnbch@aol.com>
Sent: Monday, October 02, 2017 9:00 PM
To: Baca, Brian
Subject: Pacific Rock

Brian – Just received word today from a neighbor that Pacific Rock has a request to expand their mining operation by 319%. My home on Via Mirabella, in Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Karen and Jeff Kurtenbach
47 Via Mirabella
Newbury Park, CA 91320

Baca, Brian

From: Leigh Rens <leigh.rens@gmail.com>
Sent: Monday, October 02, 2017 9:04 PM
To: Baca, Brian
Subject: Pacific Rock mining application

This e-mail it sent to oppose the application of Pacific Rock'

The land belongs to the public and is not in a rural area but will affect and impact our neighborhood negatively'

- they plan to mine 24/7 - noise dust, rock blasting near fault lines
- they plan to minimize cleanup leaving who knows what chemicals seaping into our groundwater
- they have no regard for environment or the esthetic value of the surroundings so close to our neighborhoods
- they will negatively impact the value of our homes and city
- they are seeking a huge land use grant at our expense when they have already proven to be unreliable(removed from the good guys list)

We say NO!

Kind regards'

Mr L Rens - 186 Via Katrina, Newbury Park, CA, 91320 - 310 497-7187

Baca, Brian

From: ashlianderic@aol.com
Sent: Monday, October 02, 2017 9:19 PM
To: Baca, Brian
Subject: pacific rock mining

Dear Brian Baca,

It has been brought to my attention by a nieghbour that there is an application from Pacific Rock to expand their mining operation. Including the expanding of their hours or operation from 5:50 am to 10:00 pm, increasing the scope of operations from 55 acres to 172, and increasing the number of work days to seven days a week. Their request also apparently includes a modification to the existing reclamation requirement when they're done - meaning they want to minimize their clean-up.

This is certainly not what the resident of Newbury Park are happy to hear. There is the potential for health risks with airbourne waste, noise pollution, property values decreasing, wildlife disruption etc... We moved to Conejo Valley becasue of the proximity to nature, the protected open space - let's keep the peace and quiet and natural environment.

Most sincerely,
Ashli Shapiro
805.376.9449

Baca, Brian

From:	Lisa Gunn <helobrew@aol.com>
Sent:	Monday, October 02, 2017 9:34 PM
To:	Baca, Brian
Subject:	Mining project.

Hello I live here in Dos Vientos and what this mining company is requesting to expand is absolutely ridiculous. People live on that ridge line. This expansion is far to much 319%?? Come on. We won't stand for this. This needs to be reviewed and redirected. I've been watching this for 25 years and it's just getting bigger by the month and not to mention the unsightly entrance as we go into the cemetery there. You people have no respect.

Home Owner Of DV for 19 years now..
Have a Happy Day,
Lisa Gunn ☺

Baca, Brian

From: Lisa Hansen <dr_lhansen@yahoo.com>
Sent: Monday, October 02, 2017 9:35 PM
To: Baca, Brian
Subject: Stop Pacific Rock Mining

Dear Mr. Baca,

Please stop the expansion of Pacific Rock mining permit! This is a disaster for the health of our citizens and property values of our community.
I am a resident of Dos Vientos in Newbury Park.

Lisa E. Hansen, D.D.S.
Cosmetic, General and Implant Dentistry
1987 Royal Ave, Suite 4
Simi Valley, CA 93065
(805) 527-3306

Baca, Brian

From: Gina <younggina2@aol.com>
Sent: Monday, October 02, 2017 9:41 PM
To: Baca, Brian
Subject: Mining

I completely object to the increase in the mining at Conejo Mountain. They cannot be allowed to destroy our beautiful Conejo Valley. I hope you seriously consider my opinion and the opinions of the members of this beautiful area.
Sincerely, Gina Young.

Sent from my iPhone

Baca, Brian

From: Sherry Shoop <boyd_shoop@yahoo.com>
Sent: Monday, October 02, 2017 9:42 PM
To: Baca, Brian
Subject: Pacific Rock protest

Dear Brian,
I am in string disagreement with Pacific Rock's application to expand their operations in land use as well as constant operations as they expand hours and days. Many of us purchased homes in Newbury Park for the pastoral beauty and peace. This is not only an intrusion on this, but to think it could continue for 25 years potentially is unsettling. As a company that has also fallen off the "Good Guy" list, I don't have much faith that a deal with them will benefit anyone other than them.

I appreciate your consideration in this request.

Sincerely,
Cheryl Shoop

Sent from my iPhone

Baca, Brian

From: Bruce Irish <bwirish@gmail.com>
Sent: Monday, October 02, 2017 9:49 PM
To: Baca, Brian
Cc: Bruce Irish
Subject: Resident concerns over Pacific Rock Plans

Greetings Brian,

I just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 5288 Via Dolores, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

I am also a COSCA volunteer for the Powerline trail (Edison Road) which skirts very close to the existing mining area - there are warning signs adjoining the trail. As a frequent hiker and guide on this trail multiple times a week, I also have concerns that the impacts on the adjoining open space protected by COSCA and set aside for peaceful, quiet enjoyment and healthful activity may be negatively impacted by increased mining noise and air quality. In particular, these concerns are heightened with the planned mining increase to essentially a daily dawn-to-dusk activity.

I haven't seen an indication that COSCA has been consulted in the planning as would be expected. For this reason as well, the plan should be denied due to incomplete consultation with relevant stakeholders and nearby residents.

Thank you.

Regards,
Bruce

Sent from my iPad

Baca, Brian

From: Jaime Taylor <jaimeataylor@gmail.com>
Sent: Monday, October 02, 2017 10:23 PM
To: Baca, Brian
Subject: Pacific Rock

Please, just say 'No' to the expansion.

Baca, Brian

From: Judy Lloyd <jl@dlloyd.com>
Sent: Monday, October 02, 2017 10:26 PM
To: Baca, Brian
Subject: Pacific Rock Mining Expansion

Dear Mr. Baca,
I understand that Pacific Rock Mining has applied to increase the size and scope of its operations in the Conejo mountains. I am opposed to this. We need to preserve what is left of this mountain. This type of operation should be located in an isolated area or the desert, not here. There is already a huge scar on the mountains from their operation, and they should not be allowed to make it bigger. Please do not allow this expansion.
Sincerely,
Judy Lloyd,
Newbury Park

Baca, Brian

From: Jo-Anne <wizozzy3@gmail.com>
Sent: Monday, October 02, 2017 10:48 PM
To: Baca, Brian
Subject: Pacific rock expansion

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 4678 Calle San Juan, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. Already impacted by the dust and dirt, it seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will further negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Jo-Anne Guerriere
Sent from my iPhone

Baca, Brian

From:	Julie Goldstein <jblgmom13@gmail.com>
Sent:	Monday, October 02, 2017 10:59 PM
To:	Baca, Brian
Subject:	Pacific Rock Expansion Case no. LU10-0003

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 5261 Via Rincon, Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased used of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,

Julie Goldstein

5261 Via Rincon

Newbury Park, CA 91320

mobile 818-634-1263

Baca, Brian

From: Mike McMaster <mikemcmaster33@gmail.com>
Sent: Tuesday, October 03, 2017 12:07 AM
To: Baca, Brian
Subject: Conejo mining

Can you please let me know if residents of Dos Vientos were notified of this mining renewal? I know very little with no information I would oppose the renewal. With education I may feel different but I just learned about it today through neighbors.

Thanks

Mike Mcmaster
4998 Via Santana

Sent from my iPhone

Baca, Brian

From:	Kristen <kristenwatts@yahoo.com>
Sent:	Tuesday, October 03, 2017 4:01 AM
To:	Baca, Brian
Subject:	Pacific Rock

Hi Brian,

I live in Dos Vientos and have concerns about the mining project. As a community we have received little to no information have concerns with the noise, pollution and health risks to our family and children.

You have provided no opportunity in a venue to allow neighbors to understand be educated and weigh in on the mining project that is in or back yard.

Please provide additional information and include our voiced concerns with this project.

Warm Regards,

Kristen Watts
Find your new wellness!
Associate #347437
http://voxxlife.com/KristenWatts/
http://www.ylwebsite.com/watts
805-405-6942

Baca, Brian

From: J C <skrappostpapperskorg@gmail.com>
Sent: Tuesday, October 03, 2017 4:54 AM
To: Baca, Brian
Subject: Pacific Rock mining expansion

Good Morning Brian,

From my understanding, you are the Surface Mining and Reclamation Program Coordinator for Ventura County.

This week you've definitely had an increase in emails from residents and home owners about Pacific Rock. We live in the surrounding areas of Newbury Park and Camarillo are extremely concerned about the news that they are expanding.

Many of us found out today that Pacific Rock has a request to expand their mining operation by 319%! My neighborhood in Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to this area. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and
reported to neighboring property owners.

Thank you for your time and service to the county.

Jason Carroll

Sent from my iPhone

Baca, Brian

From: Marion Ried <marion.ried@verizon.net>
Sent: Tuesday, October 03, 2017 5:40 AM
To: Baca, Brian
Subject: Conejo Mtn

We have lived in Newbury Park since 1977 and have watched the progression of development over the past 40+ years. We own an home on Coronado Cir (in which our son, brother, and father reside) and one on Calle Linda Vista. It is unimaginable that these hills could be slated for further mining and destruction rather than being added to the Conservancy as was suggested months ago.
These hills are the focal point of this community through the spring blooming and 'greening' to the fall burning with the wildfires and Santana Winds. My son has grown up hiking and bicycling in those hills and my husband (now retired firefighter LA Co.) has fought those wildfires in an effort to preserve them for all of us. The flags of patriotism placed up there are a symbol of how the community feels about them with all of their beauty. The mining and destruction certainly cannot be the fate of our community's last bastions of open space and the homes of our wildlife critters and foliage.
Please know that we do NOT support this expansion of mining and are in favor of the Conservancy acquisition. It is sad that the community is not made more aware of situations like this before it becomes too late to voice an opinion.
Marion and Peter Ried
3809 Calle linda Vista
Newbury Park, CA 91320

Baca, Brian

From: Lynn <lynnmariesavoie@yahoo.com>
Sent: Tuesday, October 03, 2017 6:43 AM
To: Baca, Brian
Subject: Pacific Rock

Brian,
I Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 874 Fernhill Court , Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood next to Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, I/we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Respectfully,

Lynn Savoie
874 Fernhill Court
Newbury Park, CA 91320

Baca, Brian

From: Roy Nissim, D.C. <rnissimdc@gmail.com>
Sent: Tuesday, October 03, 2017 6:47 AM
To: Baca, Brian
Subject: Mining in Newbury Park

Brian.

Pacific Rock has a request to expand their mining operation by 319%. Importantly, the prevailing westerly winds carry air and noise pollution from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increase sound, dust and related pollution from the increase use of explosives and equipment will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have not received any information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to the neighboring property owners.

Thank you.

--
Roy Nissim, D.C., A.R.T.

Baca, Brian

From: Josephine Louie <josephine.louie@gmail.com>
Sent: Tuesday, October 03, 2017 8:59 AM
To: Baca, Brian
Subject: opposition to Pacific Rock Mine's request for expansion

Dear Mr. Baca,

As residents of Newbury Park in Dos Vientos, we are writing in full opposition of Pacific Rock Mine's request for expansion of their mining operation.

We express our complete support to recognize the original intent of the Conditional Use Permit of 2000 to close the quarrying operation of Conejo Mountain in 2010 and make the area open space land.

Conejo Mountain is a beautiful and important part of our local Conejo Valley/Camarillo ecosystem. We feel strongly that it is pertinent for this area to remain in its natural state for the fantastic wildlife in the area, its natural beauty, as well as recreational value. This is what attracted us to move here 15 years ago. We want to see this beauty preserved and protected for generations to come.

Please do not further delay the reclamation process of Conejo Mountain. It is long overdue and needs to take place immediately. Thank you.

Sincerely,

Andrew and Josephine Louie

Baca, Brian

From: Susie Ellis <susiellis@verizon.net>
Sent: Friday, October 06, 2017 8:37 PM
To: Baca, Brian
Subject: Re: Pacific Rock mining

Dear Brian,

I just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 2940 Felton Street in Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts. As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,

Susie Ellis

Baca, Brian

From:	Sheryl Hall <hallrns@gmail.com>
Sent:	Friday, October 06, 2017 9:18 PM
To:	Baca, Brian
Subject:	Pacific Rock

Brian – Just received word today that Pacific Rock has a request to expand their mining operation by 319%. Our home at 652 Martinique Place , Newbury Park is just over the hill from the Pacific Rock site. Importantly, the prevailing westerly winds carry air and noise from the Pacific Rock site to my neighborhood in Dos Vientos Ranch. It seems that the increased sound, dust and related pollution from the increased use of explosives and equipment operation will negatively impact the quality of life in my neighborhood and have resulting residual negative health impacts.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Sincerely,
Ron and Sheryl Hall

Sent from my iPhone

Baca, Brian

From: Charlene Ohlrich <charohlrich@sbcglobal.net>
Sent: Saturday, October 07, 2017 6:51 AM
To: Baca, Brian
Subject: Conejo Mountain Rock Mining Expansion

Hello Brian:

The information on rock mining expansion on Conejo mountain is circulating throughout Camarillo, Newbury Park and other communities on social media sites. Disastrous if allowed to happen in this region for so many reasons - even tsunsmis!!

This destruction cannot be approved.

Charlene Ohlrich
6118 Paseo Encantada
Camarillo, CA 93012

Baca, Brian

From: Jan Martin <jan@mrplogistics.com>
Sent: Friday, October 06, 2017 4:04 PM
To: Baca, Brian
Subject: Pacific Rock Mining expansion proposal

Brian –

Just received word today that Pacific Rock has a request to expand their mining operation by 319%. My home at 3940 Maurice Drive, Newbury Park is just over the hill from the Pacific Rock site.

As a neighbor, we have received no information about the Pacific Rock expansion application until today and no information about the impact of the requested expansion. I therefore request the application be denied until all neighbors of the Pacific Rock site are given full information about the requested expansion. I also request the application be denied until a full environmental impact study is performed and reported to neighboring property owners.

Jan Martin

Baca, Brian

From: Matt Barker <mattbarkerfilms@gmail.com>
Sent: Wednesday, October 04, 2017 1:33 PM
To: Baca, Brian
Subject: Pacific Rock

Dear Mr. Baca,

Please do not approve the proposed permit for Pacific Rock increasing hours and size. I live adjacent to Pacific Rock in Newbury Park and this will dramatically lower our quality of living with larger noise, dust, and dirt impacts. Pacific Rock will adversely impact the neighborhoods of Ventura County.

Thanks for your kind consideration.

Matt Barker

APPENDIX A-3
SCOPING MEETING SIGN-IN AND NOTES

EIR Scoping Meeting - Attendance Roster

County of Ventura · Resource Management Agency · Planning Division

800 S. Victoria Avenue, Ventura, CA 93009-1740 · (805) 654-2478 · ventura.org/rma/planning

Meeting Topic: Pacific Rock, LU10-0003

Date: September 14, 2017 **Place: Room 311, Government Center** **Time: 10:00 a.m.**

NAME (Please Print)	REPRESENTING	PHONE	E-MAIL	Do you wish to be notified of the decision?
Tom Pilcher	Self	805 987 2311	Ronkester99@gmail.com	Yes
Michelle D'Anna	City of Camarillo	805-388-5370	mdanna@cityofcamarillo.org	Yes

Pac Rock Scoping meeting
9-14-17

① Michelle D'Anna - City of Camarillo

② Thomas Pilscher (Camarillo Springs)
- Ron Kester has sent in an email
- Traffic
- Geological impact: Any further blasting will cause landsliding on the other side
- 2014-15 landslides in Camarillo Springs (debris flows)
- Heavy steel nets we installed

- Traffic
  - PV Road / Pancho and Ridgeview Road
    Serious congestion at peak hour
  - Adding 120 trips/day

Ridgeview & ~~[illegible]~~ 101 are the two access points out of Camarillo springs

APPENDIX B-1

AIR QUALITY, HEALTH RISK, AND CLIMATE CHANGE IMPACT ASSESSMENT

BENCHMARK RESOURCES

SESPE
CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, CA 93001
Office (805) 275-1515 • Fax (805) 667-8104

AIR QUALITY, HEALTH RISK, AND CLIMATE CHANGE IMPACT ASSESSMENT

Pacific Rock Quarry Expansion Project
Ventura County, California

March 29, 2019

Prepared for: Pacific Rock, Inc.
P.O. Box 257
Somis, CA 93066

Prepared by:

Scott D. Cohen

Scott Cohen P.E., C.I.H. – Project Manager III

Andre Almeida 3/29/2019

Andre Almeida – Engineer II

Sespe Consulting, Inc.
374 Poli Street, Suite 200
Ventura, California 93001
(805) 275-1515

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SESPE CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, CA 93001
Office (805) 275-1515 • Fax (805) 667-8104

AIR QUALITY, HEALTH RISK, AND CLIMATE CHANGE IMPACT ASSESSMENT

Pacific Rock Quarry CUP Application
Ventura County California

March 29, 2019

EXECUTIVE SUMMARY

This Air Quality, Health Risk, and Climate Change Impact Assessment (Report) has been prepared to quantify and determine the significance of air quality, health risk, and climate change impacts associated with the mining area expansion and annual production increase proposed in the Conditional Use Permit Modification Application (Project) for the Pacific Rock Quarry in unincorporated portion of Ventura County between the cities of Camarillo and Thousand Oaks.

The following Project features would affect emissions characteristics from sources associated with the Project and are assessed herein:

- Change of the excavation area to include areas outside of the existing mine.
- Increase in annual production to a maximum of 468,000 tons per year while maintaining hourly and daily maximum production rates equal to or less than historical levels.
- Allow various portable concrete crushing plant(s) to operate on-site and process up to 50,000 cubic yards or approximately 100,000 tons per year based on the bulk density of Portland cement concrete found in EPA AP-42 emissions inventory guidance.
- Allow import of up to 100,000 cubic yards or approximately 150,000 tons per year of fill material needed for reclamation of the site.
- Ensure that daily and hourly maximum production remains unchanged. These values are derived from historical maximum daily truck trip value of 60 trips per day (i.e., 30 loads x 2 trips per load) and assuming 25-tons of material hauled per load. Each newly proposed material identified above would substitute for native aggregates that were shipped in the past.

Project emissions were quantified using CalEEMod and EMFAC2017 emissions factors and equipment descriptions provided by the Applicant (e.g., off-road vehicle quantity, types, and engine specifications). This Report uses Ventura County Air Pollution Control District (VCAPCD) calculation methods in combination with current best practices such as methodology in the *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Health Risk Assessments* (HRA Guidelines, 2015) to quantify Project impacts on global, regional, and local environmental conditions. Project emissions are compared to VCAPCD recommended criteria for each significance threshold analyzed. Local pollutant concentrations of toxic air contaminants (TAC) were calculated using EPA AERMOD (dispersion) and CARB HARP2 (health risk) modeling software.

This Report presents a conservative assessment of chronic health impacts by assessing the annual emissions as if they would be occurring on a greenfield site. Alternatively, the Report could have subtracted the baseline annual emissions from the future annual emissions with the Project to determine the Project's contribution to chronic health impacts. On an hourly basis, the HRA modeled the change in location of mining with no change in the activity level from the baseline level (i.e., 60 truck-trips per day).

Air Quality and Greenhouse Gasses (GHG) significance thresholds in the Ventura County Air Quality Assessment Guidelines (VCAPCD, 2003) which correspond to the State CEQA Guidelines Appendix G Environmental Checklist Form Items (California Code of Regulations, Title 14) and are listed below along with associated criteria recommended by Ventura County:

1. Air Quality

a) The Project would not conflict with or obstruct implementation of any applicable air quality plan because the Project does not induce population growth (see Section 2.5.1).

b) The project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard. Project non-attainment pollutant emissions were evaluated using ozone precursor daily thresholds of 25 lb/day NOx and 25 lb/day VOC and considering that daily emissions would continue to be limited to historical levels by ensuring that daily truck trips would remain unchanged by the Project (see Section 2.5.2).

c) The Project would not expose sensitive receptors to substantial pollutant concentrations which are assessed in terms of human health risk reported in Table ES1 (see Section 2.5.3).

Table ES1. Project Health Risk Impacts and Comparison to Significance Thresholds

Model Receptor # – Type – Location	Excess Cancer Cases per Million People Exposed	Max Chronic Hazard Index	Max Acute Hazard Index
136 – MEIR (Cancer, Chronic) – North of Project	1.0	0.024	< 0.010
109 – MEIR (Acute) – East of Project	0.33	0.0057	< 0.010
103 – MEIW (Cancer, Chronic, Acute) – Funeral Home	1.4	0.26	0.021
194 – PMI – Project Boundary (UTM 316339, 3783949)	N/A	N/A	0.079
Significance Criteria	**10**	**1.0**	**1.0**
Threshold Exceeded?	**No**	**No**	**No**

Source: Appendix D

Note: These receptors represent locations of highest exposure. Discrepancies between table and appendix values may exist due to rounding. MEIR: Maximum Exposed Individual Receptor; MEIW: Maximum Exposed Individual Worker; PMI: Point of Maximum Impact

d) Project emissions would not result in other effects (e.g., odor) that may adversely affect a substantial number of people. Historical effects (e.g., odor from diesel-fueled equipment) were not the subject of complaints and new/additional activities with such effects are not proposed by the Project (see Section 2.5.4)

2. Greenhouse Gasses

a) The Project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. (see Section 3.5.1).

Greenhouse gas emissions from the project are displayed in Table ES2 below, primarily for disclosure purposes. The Project would emit GHGs from electricity use and fuel burned in vehicle engines. Electricity and transportation fuel suppliers and importers are required to report emissions under the Cap-and-Trade which is designed to reduce GHG emissions as needed to achieve emissions reductions described in related planning documents which primarily consists of the AB 32 Scoping Plan. Thus, the emissions reductions will occur at a level in the supply chain above the Project, which will have no choice but to use fuel and electricity having GHG intensities that are consistent with the Scoping Plan.

Table ES2. Project Greenhouse Gas Emissions

Activity	CO_2e (MT/yr)
Electricity Use	1,184.5
Vehicle Engine Emissions	2,075.2
Project Emissions – Total	3,259.7

Source: Appendix D

Note: Values above may differ from values in Appendix D due to rounding and conversion to Metric Tons

b) The Project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs. Potential conflicts with applicable air quality plans have been analyzed and ruled out (see Section 3.5.2).

The discussion for impact 2.a. above addresses this impact also. Consistency with the applicable plan (AB 32 Scoping Plan) will be ensured for electricity and transportation fuels used by the Project by producers and importers of those energy sources thought compliance with the Cap-and-Trade Program. Therefore, consistency with the applicable plan is assured and the Project GHG impact is less than significant.

SESPE CONSULTING, INC.
374 Poli Street, Suite 200 • Ventura, CA 93001
Office (805) 275-1515 • Fax (805) 667-8104

Air Quality and Climate Change Impact Assessment

Pacific Rock Quarry CUP Application
Ventura County California

March 29, 2019

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APPENDICES

1.0 INTRODUCTION AND PROJECT DESCRIPTION

The Applicant is submitting this Conditional Use Permit Modification Application to continue the existing permitted operations approved under CUP 3817-3. Proposed modifications to CUP 3817-3 include: extend the life of the existing permitted operations for approximately 30 years; expand the mining area, extend the operational days from 6 to 7 days per week (to include material load out on Sundays) with additional material load out hours and limited extended 24 hour operations (60 days maximum per year); allow construction and mobile mining equipment in outdoor storage areas; replace an existing mobile home to be used as a primary residence; increase total annual production to 468,000 tons per year.

The following Project features specified by The Application would affect air emissions and were assessed in this HRA.

- Change of the excavation area to include areas outside of the existing mine.
- Increase in production to a maximum of 468,000 tons per year.

The proposed actions are analyzed in this Air Quality and Climate Change Impact Report (Report) and heretofore referred to as the "Project". The features described in this report are those that affect air quality.

This Report presents technical information and analysis describing reasonably foreseeable changes to the environment that would occur with the Project. Project impacts on regional and local environmental setting are assessed for operation phases of the project using current standard practices and the State CEQA Guidelines (14 CCR §15000 et. seq.). This Report follows the *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments* (OEHHA, 2015).

This report has two primary sections: air quality and greenhouse gas (GHG). Each is divided into the following sub-sections:

- **Regulatory Setting**. This subsection describes the characteristics of pollutants as well as federal, state[1], and local regulations that apply to the Project.
- **Environmental Setting**. This subsection describes the existing physical environment (i.e., CEQA baseline)[2] for the region and areas adjacent to the Project site.
- **Significance Thresholds**. This subsection presents the state CEQA Guidelines Appendix G checklist items which are the primary thresholds used along with the VCAPCD significance criteria that are applied to determine the significance of the Project.

[1] The words "federal," "national," and "state" are capitalized when referring to a specific rule, regulation or other item that could be unique (e.g., State CEQA Guidelines in preceding paragraph). The words are not capitalized when describing items in general terms not specific to this nation or state. As presented in this bullet; federal, state and local are levels of government/regulation; and thus, are not capitalized.

[2] The word "baseline" is capitalized in this report when referring to the Project Baseline and is not capitalized when referring to the concept of baseline under CEQA and/or baselines for other projects, plans, regulations, etc.

- **Methodology**. This subsection describes the design features of the Project, emissions calculation methods, emissions that are in the Baseline for the Project, and health risk assessment (HRA) methods.
- **Project-Level Impacts and Mitigation Measures**. This subsection presents the results of Project impact analyses; compares each impact to significance thresholds; determines significance of project effects; proposes mitigation measures to reduce significant impacts to less than significant levels or the maximum extent feasible.

2.0 AIR QUALITY

This AQCCIA follows the *Air Toxics Hot Spots Program Guidance Manual for the Preparation of Risk Assessments* (OEHHA, 2015).

2.1 Regulatory Setting

2.1.1 Characteristics of Air Pollutants

Both the state and the federal governments have established health-based criteria called Ambient Air Quality Standards (AAQS) for six air pollutants. These "criteria pollutants" are ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), lead (Pb), and suspended particulate matter ($PM_{2.5}$ and PM_{10}). Each criteria pollutant is described more fully below and associated AAQS are presented in Table 1.

Many constituents in air emissions other than criteria pollutants may result in health effects and are regulated as toxic air contaminants (TACs) using health risk assessment methods (i.e., as opposed to comparing concentration of criteria pollutant to an AAQS). Diesel particulate matter (DPM) and respirable crystalline silica (RCS) are two TACs of concern associated with Project sources and are also discussed below. Appendix C contains information from the American Thoracic Society (ATS) on what constitutes an adverse health effect from air pollution which is the standard used by the Office of Environmental Health Hazard Assessment (OEHHA) and CARB in setting AAQS and exposure levels used for health risk assessment (HRA).

Ozone – Ozone (smog) is formed by photochemical reactions between oxides of nitrogen (NO_X) and volatile organic compounds (VOC), rather than being directly emitted. Generally, air districts prioritize NOx reductions over VOC reductions because NOx reductions would have greater effect on reducing ozone concentrations and be more protective of public health.

O_3 is a pungent, colorless gas typical of photochemical smog. Elevated O_3 concentrations may result in reduced lung function, particularly during vigorous physical activity. This health effect is particularly acute in sensitive receptors such as the sick, the elderly, and young children. O_3 levels peak during summer and early fall.

Breathing ground-level ozone can result in a number of health effects that are observed in broad segments of the population. Some of these effects include: induction of respiratory symptoms; decrements in lung function; and inflammation of airways. Respiratory symptoms may include: coughing; throat irritation; pain, burning, or discomfort in the chest when taking a deep breath; and chest tightness, wheezing, or shortness of breath. In addition to these effects, evidence from observational studies indicates that higher daily ozone concentrations are associated with increased asthma attacks, increased hospital admissions, increased daily mortality, and other markers of morbidity. The consistency and coherence of the evidence for effects upon asthmatics suggests that ozone can make asthma symptoms worse and can increase sensitivity to asthma triggers.

Carbon Monoxide – Carbon monoxide (CO) is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairments to central nervous system functions.
The severity of symptoms due to CO exposure increases with the blood carboxyhemoglobin (COHb) level. The first signs of CO exposure include mild headache and breathlessness with moderate exercise. Continued exposure may lead to more severe headache, irritability, impaired judgment and memory, and rapid onset of fatigue. Persons that may be more sensitive to CO exposure include those having an existing cardiovascular disease or anemia; fetuses of pregnant women; smokers; and persons exposed to methylene chloride.

Nitrogen Oxides – Nitrogen oxides (NO_X) is a generic term for the mono-nitrogen oxides which include nitric oxide (NO) and nitrogen dioxide (NO_2). NO is a colorless, odorless gas and NO_2 is a reddish brown gas. NO_X is formed from fuel combustion under high temperature or pressure. NO_X is a primary component of the photochemical smog reaction. It also contributes to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition (i.e., acid rain). NO_X decreases lung function and may reduce resistance to infection. Acute exposure to NO_2 may cause pulmonary edema, pneumonitis, and bronchitis. NO_2 is considered a relatively insoluble, reactive gas, such as phosgene and ozone. Once inhaled, NO_2 reaches the lower respiratory tract, affecting mainly the bronchioles and the adjacent alveolar spaces, where it may produce pulmonary edema within hours.

Sulfur Dioxide – Sulfur dioxide (SO_2) is a colorless, irritating gas formed primarily from combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight. People with asthma and children are particularly sensitive to and are at increased risk from the effects of SO_2 air pollution

Lead – Lead (Pb) was phased out of use in gasoline and paint. It is present at trace concentrations in a variety of other materials including most natural materials extracted from the earth's crust. Once in the bloodstream, Pb can cause damage to the brain, nervous system, and other body systems. Children are highly susceptible to the effects of Pb.

Particulate Matter – Particulate matter (PM) pollution consists of very small liquid and solid particles floating in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. Particulate matter is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industrial sources undergo chemical reactions in the atmosphere. PM_{10} refers to particles less than or equal to 10 microns in aerodynamic diameter. $PM_{2.5}$ refers to particles less than or equal to 2.5 microns in aerodynamic diameter and are a subset of PM_{10}.

There are sources of PM_{10} in both urban and rural areas. PM_{10} and $PM_{2.5}$ are emitted from stationary and mobile sources, including diesel trucks and other motor vehicles, power plants, industrial processing, wood burning stoves and fireplaces, wildfires, dust from roads, construction, landfills, and agriculture, and fugitive windblown dust. Because particles originate from a variety of sources, their chemical and physical compositions vary widely. In addition, it is now believed that $PM_{2.5}$ concentrations are highly dependent on several precursors which, like NOx and ROG for ozone, undergo chemical reactions in the environment that changes them to $PM_{2.5}$.

PM_{10} and $PM_{2.5}$ particles are small enough to be inhaled into, and lodge in, the deepest parts of the lung, evading the respiratory system's natural defenses. Health problems may occur as the body reacts to these foreign particles.

Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, and coughing, bronchitis, and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non health-related effects include reduced visibility and soiling of buildings. PM_{10} can increase the number and severity of asthma attacks, cause or aggravate bronchitis and other lung diseases, and reduce the body's ability to fight infections. PM_{10} and $PM_{2.5}$ can aggravate respiratory disease, and cause lung damage, cancer, and premature death.

Although particulate matter can cause health problems for everyone, certain people are especially vulnerable to adverse health effects of PM_{10}. These "sensitive populations" include children, the elderly, exercising adults, and those suffering from chronic lung disease such as asthma or bronchitis. Of greatest concern are recent studies that link PM_{10} exposure to the premature death of people who already have heart and lung disease, especially the elderly. Acidic PM_{10} can also damage manmade materials and is a major cause of reduced visibility in many parts of the United States.

Respirable Crystalline Silica – Respirable crystalline silica (RCS) refers to crystalline silicon dioxide with aerodynamic diameter less than four (4) microns (i.e., 0.0004 cm). Crystalline silica or quartz is ubiquitous in nature. Most dust generated by construction and mining activities including blasting produces dust particles larger than 4 microns. These particles are too large to reach the alveoli of the lungs which are the target organ. Thus, RCS constitutes a tiny fraction of the dust from these sources and does not represent a significant health risk to neighbors of these types of projects. In order to result in toxic effects the silica needs to be crystalline, smaller than 4 microns, inhaled, and not exhaled.

Inhalation of RCS initially causes respiratory irritation and an inflammatory reaction in the lungs. Silicosis results from chronic exposure; it is characterized by the presence of histologically unique silicotic nodules and by fibrotic scarring of the lung. Lung diseases other than cancer associated with silica exposure include silicosis, tuberculosis/silicotuberculosis, chronic bronchitis, small airways disease, and emphysema. Ambient air exposures do not cause concern but levels to which workers (e.g., miners, sandblasters) may be exposed have been shown to cause cancer.

Diesel Particulate Matter – Diesel particulate matter (DPM) is used as a surrogate for the mixture of compounds in diesel exhaust that have the potential to contribute to mutations in cells that can lead to cancer. These compounds include, but are not limited to, arsenic, benzene, formaldehyde, and nickel.

Long-term exposure to diesel exhaust particles poses the highest cancer risk of any TAC evaluated by OEHHA. CARB has estimated that about 70 percent of the cancer risk that the average Californian faces from breathing TACs stems from diesel exhaust particles. In a comprehensive assessment of diesel exhaust, OEHHA analyzed more than 30 studies of people who worked around diesel equipment, including truck drivers, railroad workers, and equipment operators. The studies showed these workers were more likely than workers who were not exposed to diesel emissions to develop lung cancer. These studies provide strong evidence that long-term occupational exposure to diesel exhaust increases the risk of lung cancer. Other researchers and scientific organizations, including the National Institute for Occupational Safety and Health (NIOSH), have calculated similar cancer risks from diesel exhaust as those calculated by OEHHA.

Exposure to diesel exhaust can have immediate health effects. Diesel exhaust can irritate the eyes, nose, throat and lungs, and it can cause coughs, headaches, lightheadedness, and nausea. People with allergies, existing cardiovascular disease, the elderly, and children considered sensitive populations for DPM exposure. Exposure to diesel exhaust also causes inflammation in the lungs, which may aggravate chronic respiratory symptoms and increase the frequency or intensity of asthma attacks.

2.1.2 Federal

The Clean Air Act (CAA) is the comprehensive Federal law that regulates air emissions from stationary and mobile sources. Congress established much of the basic structure of the CAA in 1970, and made major revisions in 1977 and 1990. Table 1 presents Federal and State AAQS. "The Clean Air Act in a Nutshell: How It Works" (EPA, 2013) contains a thorough yet concise summary of how US EPA implements the CAA. Table 2 also identifies how the CAA applies to the Project.

New Source Performance Standards – Title 40, Code of Federal Regulations (CFR), Part 60

Subpart OOO (Nonmetallic Mineral Processing Plants) is applicable to new, modified, or reconstructed nonmetallic mineral processing facilities (with certain exceptions, such as fixed sand and gravel plants and crushed stone plants with capacities of 25 tons per hour or less, or portable sand and gravel plants and crushed stone plants with capacities of 150 tons per hour or less). Subpart OOO restricts emissions from affected facilities equipped with capture systems used to capture and transport particulate matter to a control device. Emissions are prohibited in excess of 0.032 grams per dry standard cubic meter (g/dscm) (0.014 grains per dry standard cubic feet (gr/dscf)), and from exhibiting visible emissions based on quarterly monitoring. Subpart OOO also prohibits the discharge of any fugitive emissions from affected facilities without capture systems and the discharge of fugitive emissions escaping capture systems that exhibit greater than 7 percent opacity (12 percent for crushers without capture systems).

Regulations Affecting New Diesel Engines

US EPA regulates emissions from new non-road (i.e., off-road, portable, and stationary) internal combustion engines by tiered standards (e.g., compression-ignition engines in 40 CFR 89.112, 40 CFR 1039.101, and 40 CFR 1039.102). Emissions from new non-road engines are regulated using standards that apply by model year, class of vehicle, and fuel type (e.g. heavy-heavy duty diesel engines in 40 CFR 86.004-11, 40 CFR 86.007-11, and 40 CFR 86.099-11). These regulations affect manufacturers but are relevant to the Project because diesel engines are the primary source of Project combustion emissions.

2.1.3 State

2.1.3.1 Criteria Pollutants

The State of California began to set California ambient air quality standards (CAAQS) in 1969. The CAAQS are generally more stringent than the NAAQS. In addition to the six criteria pollutants covered by the NAAQS, there are CAAQS standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. These standards are listed in Table 1.

Originally, there were no attainment deadlines for the CAAQS. However, the California Clean Air Act (CCAA) provided a timeframe and a planning structure to promote their attainment. The CCAA required nonattainment areas in the State to prepare attainment plans and proposed to classify each such area on the basis of the submitted plan. CAAQS attainment plans require a minimum 5 percent annual reduction in the emissions of nonattainment pollutants unless all feasible measures have been implemented.

Table 1 State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		National Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 $\mu g/m^3$)		0.070 ppm (137 $\mu g/m^3$)		
Respirable Particulate Matter (PM_{10})[9]	24 Hour	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		—		
Fine Particulate Matter ($PM_{2.5}$)[9]	24 Hour	—	—	35 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	12.0 $\mu g/m^3$	15 $\mu g/m^3$	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 $\mu g/m^3$)	Gas Phase Chemi-luminescence	100 ppb (188 $\mu g/m^3$)	—	Gas Phase Chemi-luminescence
	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)		0.053 ppm (100 $\mu g/m^3$)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 $\mu g/m^3$)	Ultraviolet Fluorescence	75 ppb (196 $\mu g/m^3$)	—	Ultraviolet Flourescence; Spectro-photometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1,300 $\mu g/m^3$)	
	24 Hour	0.04 ppm (105 $\mu g/m^3$)		0.14 ppm (for certain areas)[11]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[11]	—	
Lead[12,13]	30 Day Average	1.5 $\mu g/m^3$	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 $\mu g/m^3$ (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 $\mu g/m^3$		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	**No National Standards**		
Sulfates	24 Hour	25 $\mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

Footnotes on next page. Source: CARB, May 4, 2016

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the US EPA for further clarification and current National policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent measurement method, which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard, may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.
6. Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the US EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the US EPA.
8. On October 1, 2015, the National 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. On December 14, 2012, the National annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3. The existing National 24- hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m^3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m^3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.
10. To attain the 1-hour National standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the National 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the National 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the National standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour National standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 National standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved. Note that the 1-hour National standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour National standard to the California standard the units can be converted to ppm. In this case, the National standard of 75 ppb is identical to 0.075 ppm.
12. The CARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The National standard for lead was revised on October 15, 2008 to a rolling 3-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, CARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Table 2 Applicability of US EPA Activities under the CAA to the Project

US EPA Activity	Applicable to Project Sources?
Establish air quality standards.	Yes, see **Impact AQ-2**.
Designate quality of air in attainment areas.	No, the Project is not an attainment area.
Administrate state implementation plans.	No, the Project is not a SIP.
Require additional programs in nonattainment areas.	Yes, the Project would comply with VCAPCD programs and rules that address nonattainment.
Provide guidance on control techniques.	No, the Project would employ standard controls.
Regulate interstate air pollution.	No, the Project is not a state.
Require plans to maintain clean air after a nonattainment area meets the standard.	Yes, the Project would comply with VCAPCD programs and rules that maintain attainment.
Preserve clean air in attainment areas.	Yes, the Project would comply with VCAPCD programs and rules that preserve attainment.
Adopt National standards for new stationary sources.	Yes, the project will comply with federal law.
Adopt National standards or guidelines for consumer and commercial products.	No, the Project does not buy products that emit air pollutant from vendors outside the country.
Adopt National standards for new vehicles and engines, and fuels.	No, the Project does not manufacture vehicles, engines, or fuels.
Regulate emissions from oil drilling on the Outer Continental Shelf.	No, the Project is not located on the Outer Continental Shelf.
Regulate hazardous air pollutants.	Yes, see **Impact AQ-2**.
Protect visibility in National parks by regulating regional haze.	No, does not include a major stationary source.
Control acid rain by regulating NO_2 and SO_2 emissions from power plants.	No, the Project does not include a power plant or other major source of combustion pollutants.
Protect stratospheric ozone by regulating ozone-depleting compounds (e.g., chlorofluorocarbons).	No, the Project would purchase refrigerants and other classes of products from a U.S. vendor.
Regulate major sources of air pollution by administrating a Federal operating permit program.	No, the Project is a minor source that does not require a Federal operating permit.

Source: (EPA, 2013).

2.1.3.2 Toxic Air Contaminants

California's comprehensive air toxics program was established in the early 1980s. The Toxic Air Contaminant Identification and Control Act (AB 1807, 1983) created California's program to reduce exposure to air toxics. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987) requires a Statewide air toxics inventory, notification of people exposed to a significant health risk, and facility plans to reduce these risks.

Under AB 1807, CARB is required to use certain criteria when prioritizing pollutants for control of air toxics. In selecting substances for review, CARB must consider criteria relating to "the risk of harm to public health, amount or potential amount of emissions, manner of, and exposure to, usage of the substance in California, persistence in the atmosphere, and ambient concentrations in the community." AB 1807 also requires CARB to use available information gathered from the AB 2588 program to include in the prioritization of compounds. The list of TACs includes all Federal HAPs plus the following pollutants: 1,2-dibromoethane, 1,2-dichloroethane, hexavalent chromium, cadmium, inorganic arsenic, nickel, inorganic lead, diesel particulate matter, and environmental tobacco smoke (17 CCR § 93000 and §93001).

Under AB 2588, industrial facilities are required to report air toxic emissions, ascertain health risks and notify nearby residents of significant risks. In September 1992, the Hot Spots Act was amended by Senate Bill 1731, which required facilities that pose a significant health risk to reduce their risk through a risk management plan. The emissions inventory and risk assessment methodologies from the AB 2588 Program are used in this AQCCIA as discussed in the methodology subchapter (Sections 2.4).

Diesel Emissions

In July 2007, CARB adopted an airborne toxic control measure (ATCM) for in-use off-road diesel vehicles (13 CCR § 2449 et seq.). This regulation requires that fleets meet requirements for NO_x and particulate matter emissions rates. Where fleet average requirements cannot be met, best available control technology (BACT) requirements apply. The regulation also includes recordkeeping and reporting requirements. In response to AB 8 2X, the regulation was revised in July 2009 (effective December 3, 2009) to postpone compliance in 2011 and 2012 for existing fleets. On December 17, 2010, CARB adopted additional revisions to further delay the compliance deadlines, reflect reductions in diesel emissions due to the poor economy, and rectify overestimates of diesel emissions that supported previous rule making. The 2010 revisions delayed the first compliance date until January 1, 2014 for large fleets, with final compliance by January 1, 2023. The compliance dates for medium fleets were delayed until January 1, 2017, and final compliance date of January 1, 2023. The compliance dates for small fleets were delayed until January 1, 2019, and final compliance date of January 1, 2028. The fleet average targets were made more stringent in future compliance years, to compensate for reductions that would not occur in early years. The revisions also accelerate the phase-out of equipment, preventing older equipment from being added to fleets over time.

On October 28, 2011 (effective December 14, 2011), the Executive Officer of CARB approved amendments to the ATCM regulation that included revisions to the applicability section, definitions, and fleet average schedule by combining the PM and NO_x fleet average targets. The amended fleet average targets are based on the NO_x fleet average emissions factors from previous versions of the rule with credit given for PM reduction. The PM performance requirements were removed. The BACT requirements, which apply when a fleet cannot comply with the fleet average requirements, were restructured and clarified. Other amendments to the regulations included minor administrative changes.

Naturally Occurring Asbestos (NOA)

ATCMs for naturally-occurring asbestos (NOA) that have been adopted by CARB include the following:

- Asbestos ATCM for Surfacing Applications (17 CCR § 93106) restricts the asbestos content of material used in surfacing applications such as unpaved roads, parking lots, driveways, and walkways. The ATCM excludes “sand and gravel operations” from requirements except for those allowing the Air Pollution Control Officer (APCO) to require geologic evaluation or asbestos testing. "Sand and gravel operation" means any aggregate-producing facility operating in alluvial deposits.
- Asbestos ATCM for Construction, Grading, Quarrying, and Surface Mining Operations (17 CCR § 93105) requires the implementation of mitigation measures to minimize emissions of asbestos-laden dust. Applicable to the South Site Project, the ATCM states that the “APCO may provide an exemption for crushing, screening and conveying equipment, stockpiles, and off-site material transport at a sand and gravel operation if the operation processes only materials from an alluvial deposit.”

While previous mining took place only within alluvial deposits, on the North Site, the Project proposes to mine underlying hard rock and therefore is no longer excluded from 17 CCR § 93105. Additionally, it is possible that geologic evaluation or asbestos testing may be required by the APCO.

2.1.4 Ventura County Air Pollution Control District

The Ventura County Air Quality Assessment Guidelines (VCAPCD, 2003) contains the following information related to HRA for TACs.

> *“Toxic air contaminants (TACs), also referred to as hazardous air pollutants, are air pollutants (excluding O_3, CO, SO_2, and NO_2) that may reasonably be anticipated to cause cancer, developmental effects, reproductive dysfunction, neurological disorders, heritable gene mutations, or other serious or irreversible acute or chronic health effects in humans.*
>
> *TACs are regulated under different federal and state regulatory processes than ozone and the other criteria air pollutants. Health effects of TACs may occur at extremely low levels and it is typically difficult to identify levels of exposure that do not produce adverse health effects.*
>
> *TACs generally consist of four types: organic chemicals, such as benzene, dioxins, toluene, and percholorethylene; inorganic chemicals such as chlorine and arsenic; fibers such as asbestos; and metals such as mercury, cadmium, chromium, and nickel. These air contaminants are defined by the U.S. EPA, the State of California, and other governmental agencies. Currently, more than 900 substances are regulated TACs under federal, state, and local regulations. Appendix D, Major Toxic Air Contaminant Regulations and Common Toxic Air Contaminant*

Sources and Substances, presents the major federal and state programs and regulations to reduce toxic air contaminant emissions.

Sources: *Toxic air contaminants are produced by a great variety of sources, including industrial facilities such as refineries, chemical plants, chrome plating operations, and surface coating operations; commercial facilities such as dry cleaners and gasoline stations, motor vehicles, especially diesel-powered vehicles; and, consumer products. TACs can be released as a result of normal industrial operations, as well as from accidental releases during process upset conditions.*

Effects: *Health effects from TACs vary with the type of pollutant, the concentration of the pollutant, the duration of exposure, and the exposure pathway. TACs usually get into the body through breathing, although they can also be ingested, or absorbed through the skin.*

Adverse effects on people tend to be either acute (short-term) or chronic (long-term). Acute effects result from short-term, high levels of airborne toxic substances. These effects may include nausea, skin irritation, caridiopulomary distress, and even death. Chronic effects result from long-term, low level exposure to airborne toxic substances. Effects can range from relatively minor to life-threatening. Less serious chronic effects can include skin rashes, dry skin, coughing throat irritation, and headaches. More serious chronic effects can include lung, liver, and kidney damage; nervous system damage; miscarriages, and genetic and birth defects; and, cancer. Many TACs can have both carcinogenic and non-carcinogenic health effects.

With regards to criteria pollutants, the Ventura County Air Quality Assessment Guidelines include thresholds for Reactive Organic Compounds and Nitrogen Oxides in units of pounds per day of emissions, in addition to specifying that causing an exceedances of state or federal standards constitutes a significant adverse air quality impact.

2.2 Environmental Setting

The environmental setting includes the existing physical setting that is compared to future conditions with the Project to determine the Project's impact. Besides emissions, the air quality environment is affected by terrain and meteorology (weather).

Terrain plays a role in air dispersion mechanics, and therefore the resulting levels of air pollutants in a given area. Mountains that surround valley areas tend to retain air within the valley and limit the dispersion of pollutants. Meteorology causes year-to-year changes in air quality trends that can mask or overstate the benefits of emission reductions. Unlike terrain, meteorology affects pollutant concentrations differently depending upon the pollutant as discussed in the following examples:

- Ozone is formed in the atmosphere as sunlight initiates a complex set of chemical reactions. On hot sunny days, the abundant sunlight starts the ozone-forming processes and high temperatures promote fast chemical reactions. If the air is stagnant, the ozone formed is not dispersed or diluted by cleaner air from outside the area, thus, the highest ozone concentrations usually occur on hot and sunny days with light breezes or calm air. In some areas, high ozone levels may result from transport of pollutants from upwind regions. Since hot and sunny summer days typically lead to high ozone, it is un-surprising that cold and cloudy winter days have much lower ozone concentrations. (CARB, 2014).

- Ambient PM is comprised of primary PM that is directly emitted and secondary PM that forms in the atmosphere through chemical and physical processes. Primary PM includes dust and soot, while secondary PM includes particulate nitrates and sulfates. Some areas are subject to strong winds that lift dust into the air resulting in high concentrations of primary PM. In other situations, cold, calm, and humid air can promote the buildup of secondary PM. Relatively high PM levels in valley areas usually occur in the winter under these meteorological conditions. The lowest PM concentrations often occur on rainy winter days when winds disperse PM and rain washes PM out of the air. (CARB, 2014).

2.2.1 Regional Setting

Ventura County APCD describes the meteorology of the southern portion of the South Central Coast Air Basin (SCCAB) which also includes Santa Barbara and San Luis Obispo Counties as followings:

> *The air above Ventura County often exhibits weak vertical and horizontal dispersion characteristics, which limit the dispersion of emissions and cause increased ambient air pollutant levels. Persistent temperature inversions prevent vertical dispersion. The inversions act as a "ceiling" that prevents pollutants from rising and dispersing. Mountain ranges act as "walls" that inhibit horizontal dispersion of air pollutants.*
>
> *The diurnal land/sea breeze pattern common in Ventura County recirculates air contaminants. Air pollutants are pushed toward the ocean during the early morning by the land breeze, and toward the east during the afternoon, by the sea breeze. This creates a "sloshing" effect, causing pollutants to remain in the area for several days. Residual emissions from previous days accumulate and chemically react with new emissions in the presence of sunlight, thereby increasing ambient air pollutant levels*
>
> *This pollutant "sloshing" effect happens most predominantly from May through October ("smog" season). Air temperatures are usually higher and sunlight more intense during the "smog" season. This explains why Ventura County experiences the most exceedances of the state and federal ozone standards during this six-month period. (VCAPCD, 2003)*.

Local wind data are compiled and processed by VCAPCD into electronic files suitable for use in a plume dispersion model. A windrose from Camarillo Airport data files downloaded from CARB and used in the modeling for this Project is presented in Figure 6 (Appendix A). The receptors modeled are shown in Figure 4 and Figure 5.

2.2.2 Project Site and Local Setting

Table 3 Number of Days Exceeding Air Quality Standards

Area	Year	Days Exceeding State 1-Hour O_3	Days Exceeding State 8-Hour O_3	Days Exceeding Federal 0.08 ppm 8-Hour O_3	Days Exceeding State 24-Hour PM_{10}[a]	Days Exceeding Federal 24-Hour $PM_{2.5}$[a]
South Central Coast Air Basin	2013	3	12	2	98.1	2.9
	2014	3	16	2	88.3	1.9
	2015	1	14	0	69.2	0
	2016	2	11	1	77.1	9.5
	2017	3	22	3	29.5	9.7

Source: CARB iADAM Statistical Analysis Tool

a Measurements of PM_{10} and $PM_{2.5}$ are usually collected every 6 days and 3 days, respectively. "Number of days exceeding the standards" are mathematical estimates.

2.2.3 Health Effects Setting

NAAQS/CAAQS and Reference Exposure Levels (REL) that are used for health risk assessment are designated for each pollutant at a level where no "adverse health effect" would occur to sensitive populations. The OEHHA relies upon the definition of "adverse health effect" published by American Thoracic Society (ATS). ATS published a definition in 1985 and then amended the definition in 2000 to address issues not covered by the 1985 definition. From the 1985 definition, "adverse respiratory health effect" means:

> *Medically significant physiologic or pathologic changes generally evidenced by one or more of the following:*
>
> 1. *Interference with the normal activity of the affected person or persons;*
> 2. *Episodic respiratory illness;*
> 3. *Incapacitating illness;*
> 4. *Permanent respiratory injury; and/or*
> 5. *Progressive respiratory dysfunction.* (OEHHA, 2004).

The 2000 ATS publication (see copy in Appendix C) recommends that the following "dimensions" of adverse effects be considered when determining whether an effect is an adverse health effect:

1. Biomarkers*: These should be considered, however it must be kept in mind that few biomarkers have been validated sufficiently to establish their use for defining a point at which a response becomes adverse, consequently, not all changes in biomarkers should necessarily be considered adverse.*
2. Quality of life*: In recent years, decreased health-related quality of life has become widely accepted as an adverse health effect. The review committee concluded that reduction in quality*

of life, whether in healthy persons or persons with chronic respiratory disease, should be considered as an adverse effect.

3. *Physiological impact: The committee recommended that small, transient reductions in pulmonary function should not necessarily be regarded as adverse, although permanent loss of lung function should be considered adverse. The committee also recommended that reversible loss of lung function in conjunction with symptoms should be considered adverse.*
4. *Symptoms: Air pollution-related symptoms associated with reduced quality of life or with a change in clinical status (i.e., requiring medical care or a change in medications) should be considered adverse at the individual level. At the population level, the committee suggested that any detectable increase in symptom frequency should be considered adverse.*
5. *Clinical outcomes: Detectable effects of air pollution on clinical measures should be considered adverse. More specifically, the ATS committee cited as examples increases in emergency department visits for asthma or hospitalizations for pneumonia, at the population level, or an increased need to use bronchodilator medication, at the individual level. The committee recommended that: "no level of effect of air pollution on population-level clinical indicators can be considered acceptable."*
6. *Mortality: Increased mortality should clearly be judged as adverse.*
7. *Population health versus individual risk: The committee concluded that a shift in risk factor distribution, and hence the risk profile of an exposed population, should be considered adverse when the relationship between the risk factor and the disease is causal, even if there is no immediate occurrence of obvious illness*. (OEHHA, 6/2004).

Based on ATS recommendations above, many health outcomes found to be associated with criteria pollutants could be considered adverse, including pulmonary function changes accompanied by symptoms, pulmonary function changes and respiratory symptoms that reduce quality of life, large changes in pulmonary function, clinical outcomes such as emergency department visits for asthma, hospitalization for respiratory and cardiovascular disease, and mortality. In addition, outcomes such as increase in airway reactivity and inflammation may be considered adverse if they signify increases in the potential risk profile of the population.

> *With regard to sensitivity, the 1970 Clean Air Act recognized that some persons were so ill as to need controlled environments, e.g., persons in intensive care units or newborn infants in nurseries; the act stated that the standards might not necessarily protect such individuals. It further stated, however, that the standards should protect "particularly sensitive citizens such as bronchial asthmatics and emphysematics who in the normal course of daily activity are exposed to the ambient environment.* (ATS, 2000).

Finally, according to ATS, research now shows that some highly susceptible individuals may respond to common exposures at or close to natural background pollutant levels that are often unavoidable. A copy of the relevant ATS document, "WHAT CONSTITUTES AN ADVERSE HEALTH EFFECT OF AIR POLLUTION?" is provided in Appendix C.

2.3 Significance Thresholds

The CEQA Guideline Appendix G checklist was used along with both VCAPCD and SJVAPCD CEQA Guidelines and the GAMAQI to determine whether the Project would result in a significant air quality impact. Project impacts represent the change between baseline and the future conditions associated with the proposed operations, and are the metrics compared to thresholds to determine significance.

2.3.1 CEQA Guidelines Appendix G

The Environmental Checklist Form in Appendix G of the CEQA Guidelines presents questions about projects that, if true for a particular project, would be considered a significant impact. This Report considers the following Environmental Checklist Form questions to be the Significance Thresholds against which Project air quality impacts are judged.

Would the project:

a) *Conflict with or obstruct implementation of applicable air quality plan?*

b) *Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard?*

c) *Expose sensitive receptors to substantial pollutant concentrations?*

d) *Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?*

2.3.2 CEQA Significance Criteria

As specified in section 2.1.4, the VCAPCD outlines TAC based health impact thresholds. In order to appropriately categories the relative significance of criteria pollutant emissions, this Report also references thresholds outlined by the SJVAPCD under CEQA. The combined set of Significance Criteria are presented in Table 4 and used to evaluate the Environmental Checklist Form questions in Section 3.3.1 above.

Table 4 Air Quality Significance Thresholds

Recommended Toxic Air Contaminants (TACs), Odor Thresholds (VCAPCD) [b]	
TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Chronic & Acute Hazard Index ≥ 1.0 (project increment)
Odor	More than one confirmed complaint per year averaged over a three-year period, or three unconfirmed complaints per year averaged over a three-year period.
Ambient Air Quality Standards (SJVAPCD) [d]	
Screening Criteria	100 lb/day of any criteria pollutant after implementation of mitigation measures.

Recommended Toxic Air Contaminants (TACs), Odor Thresholds (VCAPCD) [b]	
Modeling Criteria	If modeling is required because emissions exceed the screening criteria, then the project would have a significant impact on an AAQS if the project concentration plus background concentration measured at the closest air monitoring station exceeds the most stringent AAQS (see Table 1 above) or Significant Impact Level in cases where background concentration already exceeds or nearly exceeds the AAQS.

Based on VCAPCD "Ventura County Air Quality Assessment Guidelines". (VCAPCD, 2003, p. 3.5)
and SJVAPCD "Air Quality Thresholds of Significance – Criteria Pollutants". (San Joaquin Valley Air Pollution Control District, 2015)

2.4 Methodology

This Report evaluates historical and potential future emissions from on-site sources including aggregates mining and aggregates processing.

2.4.1 Project Design Features and Assumptions

Impacts assessment incorporates the following general assumptions:

- The excavation and associated equipment would operate in compliance with applicable air quality regulations.
    - Diesel engines would comply with applicable State regulations (e.g., ATCM) including establishment of an idling policy, and limiting idle time to less than five minutes (13 CCR §2449).
    - Fugitive dust emissions would be controlled through implementation of controls and compliance measures as outlined in VCAPCD Permit 00489.
- The Project would not store hazardous substances or acutely hazardous substances in quantities that would trigger chemical accident prevention provisions of the CAA or the implementing regulation (40 CFR Part 68).

Design features of the Project include:

- Emissions characteristics of off-road vehicle engines in any particular year match those in CalEEmod. Specific assumptions with for vehicle engines are in Appendix D.

2.4.2 Emissions Calculations Methodologies

Emissions from combustion sources associated with the Project primarily consist of non-road diesel engines in off-road vehicles. Emissions from dust sources associated with Project include windblown dust and other storage pile area emissions (e.g., loading and handling), dozer/quarrying emissions, drop emissions from material transfer, and processing plants. Emissions are calculated in Appendix D using the methods presented below.

Non-Road Engines

Emissions from off-road engines were calculated using the CalEEMod default method and emissions factors. Engine emissions rates decrease over time as the fleet is turned over and controls are implemented to comply with CARB regulations (i.e., In-Use Off-Road ATCM). Appendix A of the CalEEMod User's Guide contains the following equation for quantifying off-road engine emissions.

$$Emissions_{DieselEx} = \sum_{i} (EF_i \times Pop_i \times AvgHP_i \times Load_i \times Activity_i)$$

Where:

EF	=	Emission factor (g/bhp-hr) as processed from OFFROAD2011 or engine data.
Pop	=	Population, or the number of pieces of equipment.
AvgHP	=	Maximum rated average horsepower.
Load	=	Load factor.
Activity	=	Hours of operation.
i	=	Equipment type.

Quarrying

Quarrying emissions calculations used San Diego Air Pollution Control District (SDAPCD) standard emissions factors. Quarrying/mining emissions were calculated using the SDAPCD standard mining emissions factor (0.021 lbs fugitive dust per ton quarried).

Storage Pile Emissions

Storage pile emissions were calculated using the Storage Cycle* Emission Factor from AP42 13.2.4

Storage Pile and Aggregates Handling Emissions

Storage pile and Aggregates Handling emissions were calculated using the Storage Cycle Emission Factor from AP-42 Section 13.2.4. The mean wind speed variable in this report was assumed to be the CalEEMod default appendix value for the project area.

$$EF = k(0.0032)\frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

Where: EF = emission factor (lb/ton).
k = particle size multiplier (dimensionless: 0.35 for PM_{10}).
U = mean wind speed, (miles per hour [mph]).
M = material moisture content (%).

Travel on Roads

Road dust emissions are calculated using AP-42 equations (Appendix D). AP-42 Section 13.2.2 (for unpaved roads) and Section 13.2.1 (for paved roads).

$$(Unpaved)\ \ E_{ext} = \left[k\left(\frac{s}{12}\right)^{0.9} \times \left(\frac{W}{3}\right)^{0.45}\right]$$

$$(Paved)\ \ EF\ (\frac{lb}{vmt}) = [k(sL)^{0.91} \times (W)^{01.02}]$$

Where for Unpaved Roads:

Eext = particulate emission factor (having units matching the units of k),
k = particle size multiplier units of interest (e.g. 1.5 lb/VMT for PM_{10}),
s = surface material silt content (%), and
W = average weight (tons) of the vehicles traveling the road

Where for Paved Roads:

K = particle size multiplier (having units of lb/vmt),
sL = road surface silt loading (g/m^2), and
W = average truck weight.

A control factor of 80% was applied based on facility air permit compliance regarding road based fugitive dust emissions. All parameters for road dust calculations are available in the Appendix D.

2.4.3 CEQA Baseline

Baseline consists of physical conditions prior to preparing this Report. Sespe calculated the Baseline emissions by analyzing engine information and production records provided by Pacific Rock.

It was conservatively assumed that there were no baseline emissions Annually. As the project is not proposing to increase operations on an hourly standpoint, no increases were modeled on an hourly basis. This effectively establishes the baseline as the current operational level of 500 tons of production per hour.

2.4.4 Operation Phase Emissions

Maximum operation phase activity is outlined in Table 5.

Table 5 Operation Phase Maximum Activity

Material Produced	Max Hour	Annual
Aggregate	500 tons	3,000,000 tons

Emissions are quantified in Table 6 and Table 7, and in Appendix D using the methodology and assumptions discussed above. Significance of the operation phase emissions is determined in Section 2.5.

Table 6 Operation Phase Maximum Hour Emissions

	Max Project lb/hr					
Source	**ROG**	**CO**	**NOX**	**PM10**	**PM2.5**	**SOX**
Quarrying Fugitive Emissions	-	-	-	5.25	1.53	-
Quarrying Engine Emissions	0.17	1.20	2.05	0.075	0.069	0.0038
Off-Road Haul - Mine to Processing Area (Fugitive)	-	-	-	8.39	1.78	-
Off-Road Haul - Mine to Processing Area (Engine)	0.18	0.99	1.78	0.065	0.059	0.0033
Processing Area Drop/Storage	0.17	1.07	1.77	0.46	0.18	0.0027
Plant/Aggregate Processing	-	-	-	3.09	0.90	-
Loadout Processing Area Drop/Storage	-	-	-	0.39	0.11	-
On-road Onsite Haul Engine Emissions	0.0054	0.023	0.14	0.0049	0.0033	0.0003
On-road Onsite Haul Fugitive Emissions	-	-	-	15.38	3.26	-
Total	0.52	3.29	5.74	33.11	7.90	0.010

Source: Appendix D

Note: Numbers in table may differ slightly from calculation results due to rounding.

Table 7 Operation Phase Maximum Year Emissions

	Max Project ton/yr					
Source	**ROG**	**CO**	**NOX**	**PM10**	**PM2.5**	**SOX**
Quarrying Fugitive Emissions	-	-	-	2.46	0.72	-
Quarrying Engine Emissions	0.027	0.19	0.32	0.012	0.011	0.00059
Off-Road Haul - Mine to Processing Area (Fugitive)	-	-	-	3.93	0.83	-
Off-Road Haul - Mine to Processing Area (Engine)	0.08	0.46	0.83	0.030	0.028	0.002
Processing Area Drop/Storage	-	-	-	0.18	0.053	-
Plant/Aggregate Processing	0.076	0.559	0.799	1.49	0.46	0.001
Loadout Processing Area Drop/Storage	-	-	-	0.18	0.05	-
On-road Onsite Haul Engine Emissions	0.003	0.011	0.064	0.002	0.002	0.000159
On-road Onsite Haul Fugitive Emissions	-	-	-	7.20	1.53	-
Total	0.28	1.61	4.35	15.56	3.73	0.0093

Source: Appendix D

Note: Numbers in table may differ slightly from calculation results due to rounding.

2.4.5 Health Risk Assessment

HRA was performed using current best practices including methods from the HRA Guidelines (OEHHA, 2015). The four steps involved in the risk assessment process are: 1) hazard identification, 2) exposure assessment, 3) dose-response assessment, and 4) risk characterization. These four steps were used to assess health risk for the Project and each is discussed in the subchapters below.

Hazard Identification and Quantification

For air toxics sources, hazard identification involves the pollutant(s) of concern emitted by a facility, and the types of adverse health effects associated with exposure to the chemical(s), including whether a pollutant is a potential human carcinogen or is associated with other types of adverse health effects. Appendix A of the HRA Guidelines includes a list of TACs that are used for HRA in California.

DPM is the primary TAC emitted by off-road engines used in mining projects. DPM has an assigned cancer potency factor (CPF) and a non-cancer reference exposure level (REL) that are used to evaluate the health risk.

Soil Sampling

Fugitive dust is generally inert but does contain trace metals and RCS. In absence of site-specific soil data, air district or ARB standard TAC speciations are used to determine the health risk associated with fugitive dust emissions. These speciations are intentionally conservative, and replacing them with more accurate data obtained via sampling allows for a more accurate HRA. Table 8 shows Arsenic and Nickel TAC concentrations in soil assumed in this analysis. Concentrations are based on San Diego APCD Standards as well as soil sample studies available in Appendix B.

Table 8 Fugitive TAC Speciation Assumptions

Emission Source	Constituent (TAC)	SDAPCD Standard Value (ppm)	Value Used in HRA (ppm)
Road Dust	Arsenic	21.0	10.0
Road Dust	Nickel	19.0	10.0
Aggregate Processing	Arsenic	22.0	10.0
Aggregate Processing	Nickel	28.0	10.0
Quarrying	Arsenic	20.0	10.0
Quarrying	Nickel	20.0	10.0

SDAPCD standard speciation profiles and data described in Table 8 were combined with calculated PM10 emissions to determine the mass of each TAC, and dispersion coefficients to quantitatively predict the ground level concentration (GLC) of each TAC, to which individuals may be exposed (see exposure assessment subsection below). The concentrations were then combined with exposure parameters to quantify the dose received by each receptor and for each exposure pathway. In the case of non-cancer risk, the exposures were then summed on a target organ by target organ basis using HARP2 to determine the maximum hazard index (HI) among the target organs in the body. The maximum target organ HI was then compared to the non-cancer significance criteria (i.e., 1.0 HI) as discussed in the following subsections.

The HRA considered whether health risk from asbestos should be quantified. It was determined based on review of available maps (California Department of Conservation, Division of Mines and Geology, 2000) and language in the Asbestos ATCM's (17CCR §93105 and §93106) that asbestos is unlikely to be a concern.

Exposure Assessment

The purpose of exposure assessment is to estimate the extent of public exposure to emitted substances. For the Hot Spots program, in practice this means estimating exposures for those emitted substances for which potential cancer risk or noncancer health hazards for acute, repeated 8-hour, and chronic exposures will be evaluated. This involves emission quantification, modeling of environmental transport, evaluation of environmental fate, identification of exposure routes, identification of exposed populations, and estimation of short-term (e.g., 1-hour maximum), 8-hour average, and long-term (annual) exposure levels.

Hot Spots Analysis and Reporting Program (HARP2) software developed by CARB can be used to model ground level concentrations at specific off-site locations. HARP2 incorporates the US EPA-approved dispersion model, American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD). AERMOD is a gaussian steady-state plume model based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. CARB recommends AERMOD for HRA performed under Hot Spots risk assessments (OEHHA, 2015).

In this HRA, the air dispersion modeling was performed using AERMOD View by Lakes Environmental (Version 9.4.0 running AERMOD executable Version 16216r). Pollutant GLC plot files were generated using the multi-chemical batcher function of AERMOD View. The HARP2 Risk Module was invoked by command line call to generate risk plot files as described in the Appendix E of the *User Manual for the Health Risk Assessment Standalone Tool* (CARB, 2015). Air dispersion modeling consisted of four steps:

:

1. Annual average and maximum one-hour GLCs are estimated. Air dispersion modeling results are expressed as concentration for each source receptor combination per amount of substance emitted per time in units of micrograms per cubic meter per gram per second, or (µg/m^3)/(g/s). This value, referred to as Chi over Q and sometimes written as (X/Q) is referred to as the dilution factor.

2. When multiple substances are evaluated, the X/Q is normally utilized since it is based on an emission rate of one gram per second. The X/Q at the receptor point of interest is multiplied by the substance-specific emission rate (in g/s) to yield the substance-specific GLC in units of µg/m^3. The following equations illustrate this point.

$$GLC = \left(\frac{X}{Q}\right) \times Q_{Substance}$$

$$\frac{X}{Q} = (Chi\ over\ Q)\ in\ \left(\frac{\mu g/m^3}{g/s}\right), from\ model\ results\ with\ unit\ emission\ rate$$

$$Q_{Substance} = substance\ emission\ rate\ \left({g}/{s}\right)$$

3. The applicable exposure pathways (e.g., inhalation, soil contact, fish consumption) are identified for the emitted substances, and the receptor locations are identified. This determines which exposure algorithms are ultimately used to estimate dose. After the exposure pathways are identified, the fate and transport algorithms are used to estimate concentrations in the applicable exposure media (e.g., soil or water) and the exposure algorithms are used to determine the substance-specific dose.

4. The dose is used with cancer and noncancer health values to calculate the potential health impacts for the receptor. An example calculation using the high-end point-estimates for the inhalation (breathing) exposure pathway can be found in Appendix I of the HRA Guidelines (OEHHA, 2015).

AERMOD was used as described above to calculate a X/Q for each source-receptor combination by setting the emission rate for each source in the model to one gram per second (1 g/s). Other parameters used in AERMOD describe overall control of the model domain and functionality (e.g., coordinate system, terrain, non-default options, etc.), receptors (e.g., location, height), sources (e.g., size, location, exhaust velocity, temperature, operating schedule), meteorology (hourly wind speed and direction, surface and upper air files provided by ARB), and output file options.

The Control Pathway of AERMOD was set to provide output in concentration units of $\mu g/m^3$; and both wet and dry plume depletion were disabled. Terrain Options within AERMOD were set to “Flat & Elevated” and digital terrain files were downloaded through AERMOD from the National Elevation Database in geotiff format “NED GEOTIFF”. Averaging options were set to 1-hour and the period of the meteorological data file (i.e., five years) as provided by ARB. The rural dispersion coefficient was used. Algorithms to include deposition, exponential decay and low wind (beta) were not used.

Receptors were modeled at ground level (i.e. no flagpole height). 100 cartesian grid receptors, 63 discrete receptors, and 44 fence-line/plant boundary receptors were modeled. Residential receptors can be found in Table 9 Receptors that were modeled are identified in Figures 4 and 5 (Appendix A). Source parameters are summarized in Table 10. In order to obtain the most conservative possible health risk assessment, the model assumes mining takes place as close as possible to residential receptors, and emit TACs 24 hours per day, 7 days per week, 365 days per year.

The model was segmented into three (3) intervals based on the Project specifications and HRA best practices (see “Inhaltion Dose” in section 2.4.5). The segments represent project years 1 – 2, years 3 – 16, and years 17 - 30. Worker receptors were modeled for a total of 25 years per ARB guidelines.

Output of the dispersion model in the form of plot files, one for each combination of source and averaging period, containing X/Q values were combined with pollutant emissions rate by the AERMOD View multichemical batcher. Exposure parameters discussed below were assigned to HRACalc.exe input file (HRAInput.hra) that was used with the GLC plot files to predict the cancer and non-cancer risk at each receptor. Modeling files are provided in electronic format Appendix E.

Table 9 Discrete Residential Receptors

ID Number	UTM Coordinates (meters E, meters N)	Description
109	316741.78, 3783884.46	Residence
110	316657.97, 3783802.75	Residence
111	316454.72, 3783619.41	Residence
112	316525.25, 3783638.32	Residence
113	316723.76, 3783842.96	Residence
114	316481.83, 3783625.37	Residence
115	316435.19, 3783583.44	Residence
116	316934.9, 3783882.22	Residence
117	316935.15, 3783866.62	Residence
118	316941.95, 3783914.2	Residence
119	316968.41, 3783922.94	Residence
120	316997.06, 3783921.25	Residence
121	316357.58, 3783157.78	Residence
122	316401.07, 3783150.27	Residence
123	316145.9, 3782939.71	Residence
124	316295.72, 3782903.87	Residence
125	315900.97, 3782417.69	Residence
126	315792.12, 3782243.53	Residence
127	317133.07, 3783905.51	Residence
128	317142.37, 3783933.43	Residence
129	317147.3, 3783979.41	Residence
130	317154.42, 3784013.35	Residence
131	317170.84, 3784042.91	Residence
132	316319.16, 3786096.79	Residence
133	316417.7, 3786055.57	Residence
134	316473.73, 3786011.78	Residence
135	316507.87, 3785967.34	Residence
136	316534.27, 3785931.27	Residence
137	316594.81, 3785966.69	Residence

ID Number	UTM Coordinates (meters E, meters N)	Description
138	316646.98, 3785969.27	Residence
139	316687.85, 3785960.36	Residence
140	316764.71, 3785995.2	Residence
141	316798.67, 3785975.02	Residence
142	316851.45, 3785958.88	Residence
143	316903.9, 3785950.81	Residence
144	316952.32, 3785954.85	Residence
145	317008.02, 3785953.4	Residence
146	317065.38, 3785943.12	Residence
147	317116.8, 3785926.5	Residence
148	317246.77, 3785925.13	Residence
149	317371.82, 3785893.3	Residence
150	317471.86, 3785853.13	Residence
151	317579.48, 3785808.41	Residence
152	317778.8, 3785801.59	Residence
153	319270, 3783853.6	Residence
154	319338.56, 3784028.55	Residence
155	319303.1, 3784177.5	Residence
156	319513.52, 3784378.46	Residence
157	319364.57, 3784638.53	Residence
158	319336.2, 3784837.13	Residence
159	319383.48, 3785054.64	Residence
160	319303.1, 3785094.84	Residence
161	319128.14, 3785440.02	Residence
162	319140.86, 3785661.43	Residence

Note: Project is in UTM Zone 11N.

Table 10 Model Source Object Parameters

AERMOD ID	Project Segment	Emissions Description	Type
BM	Baseline	Baseline Mining Sink	Volume Source
ONRD	Future	On-Road Vehicle Emissions	Volume Line Source
OFRD	Future	Off-Road Vehicle Emissions	Volume Line Source
PLNT	Future	Processing Plant Emissions	Volume Source
FMHE	Future	Mining Max Hour (East)	Volume Source
FMHSW	Future	Mining Max Hour (South-West)	Volume Source
FMHN	Future	Mining Max Hour (North)	Volume Source
FMHS	Future	Mining Max Hour (South)	Volume Source
LDOT	Future	Loadout Area Emissions	Volume Source
FMY1	Future	Mining Max Year (North East)	Volume Source
FMY2	Future	Mining Max Year (East)	Volume Source
FMY3	Future	Mining Max Year (South-West)	Volume Source
FMY4	Future	Mining Max Year (North)	Volume Source

Note: Not all modeling object were utilized for HRA results. See modeling files (Appendix E).

After emissions exit the source, the substances are dispersed in the air. In addition to being inhaled, particulates deposit on vegetation, on soil, and in water at a rate that is dependent on the particle size. A deposition rate of 0.02 m/s was used for the Project HRA. Other model pathways used to estimate concentrations in environmental media include air, soil, water, vegetation, and animal products.

The concentration of the substance in soil (Cs) is a function of the deposition, accumulation period, chemical specific soil half-life, mixing depth, and soil bulk density. Concentrations in vegetation, animal products, and mother's milk are predicated on the concentrations estimate to be in the air, water, and soil. The Project HRA includes air, soil ingestion, home grown produce, and mother's milk as pathways of exposure. Detailed discussion of the methodologies used to determine the concentrations in various media to which receptors may be exposed is located in Subchapter 5.3 of the HRA Guidelines.

Once the concentrations of substances are estimated in air, soil, water, plants, and animal products, they are used to evaluate estimated exposure to people. Exposure is evaluated by calculating the daily dose in milligrams per kilogram body weight per day (mg/kg/d). The HRA Guidelines describe the algorithms used by HARP2 to calculate this dose for exposure through inhalation, dermal absorption, and ingestion pathways. All chemicals are assessed for exposure through inhalation. Semi and non-volatile multi-pathway substances (e.g., earth metals in fugitive dust), the soil ingestion pathway and the dermal soil exposure pathway are assessed. The mother's milk pathway is used depending on the multi-pathway substance released. The Project HRA assessed each of these four pathways.

Inhalation Dose

The dose through the inhalation route is estimated for cancer risk assessment and noncancer hazard assessment. Both residential and off-site worker exposures are considered. Since residential exposure includes near-continuous long-term exposure at a residence and workers are exposed only during working hours (i.e., 8 hours/day), treating all receptors as residential results in a conservative assessment of health risk.

Exposure through inhalation is a function of the breathing rate, the exposure frequency, and the concentration of a substance in the air. For residential exposure, the breathing rates are determined for specific age groups, so inhalation dose (Dose-air) is typically calculated for each of these age groups: 3rd trimester, 0<2, 2<9, 9<16, 16<30 and 16-70 years though short projects may not affect all age groups. OEHHA used the mother's breathing rates to estimate dose for the 3rd trimester fetus assuming the dose to the fetus during the 3rd trimester is the same as the mother's dose. These age-specific groupings are needed in order to properly use the age sensitivity factors for cancer risk assessment. Tier 1 evaluations and the Project HRA use the high-end point estimate (i.e., the 95th percentiles) breathing rates for the inhalation pathway in order to avoid underestimating cancer risk to the public, including children. The following equation is used to determine dose for the inhalation pathway.

$$Dose_{Air} = C_{Air} \times \left\{\frac{BR}{BW}\right\} \times A \times EF \times 10^{-6}$$

Where:
$Dose_{Air}$ = Dose through inhalation (mg/kg/d)
C_{Air} = Concentration in air (µg/m^3)
{BR/BW} = Daily breathing rate normalized to body weight (L/kg body weight-day)
A = Inhalation absorption factor (unitless)
EF = Exposure frequency (unitless), days/365 days
10^{-6} = Micrograms to milligrams conversion, liters to cubic meters conversion

The breathing rate normalized to body weight term, {BR/BW}, has several values used to assess cancer risk for each age bin designated in the HRA Guidelines (i.e., third trimester, 0 to 2, 2 to 16 and 16 to 70 years). These values and the parametric model distributions from which they are derived are provided in the HRA Guidelines. The inhalation absorption factor, A, is recommended to be assigned a value of one (i.e., 100% of dose is absorbed) but may also be assigned the value determined by the toxicological study upon which the CPF for the substance is based. Exposure frequency is recommended to be 350 days for residential exposures. Table 11 presents the mean and high-end point estimates for intake rates that were assumed in the Project HRA.

Table 11 Point Estimates of Residential Daily Breathing Rates by Age Group

Estimate	3rd Trimester[1] (L/kg BW-day)[2]	0<2 Years (L/kg BW-day)	2<16 Years (L/kg BW-day)	16<30 Years (L/kg BW-day)
Mean (65%ile)[3]	225	658	452	210
High-End (95%ile)	361	1090	745	335

Source: (OEHHA, 2015, pp. 5-25).

[1] 3rd trimester breathing rates based on breathing rate of pregnant women using the assumption that the dose to the fetus during the 3rd trimester is the same as that to the mother.
[2] Values are in units of liters of air per kilogram of body weight per day.
[3] Mean values were not used in the HRA and are provided for informational purposes only.

Non-cancer health risks were unaffected by age and determined in HARP2 by dividing the GLC of each pollutant at each receptor by the corresponding reference exposure level (REL, units of $\mu g/m^3$) resulting in a hazard index (HI). The HIs for pollutants affecting each target organ were then summed to determine the total HI for each target organ. The target organ with the greatest HI is reported as the non-cancer health risk at each receptor.

Annual residential dose was calculated by HARP2 using the GLC (mg/m^3), the intake rate (L/kg-day), 350 days/yr exposure frequency, and an assumption that the entire mass of pollutants inhaled is absorbed into the body of the individual exposed (i.e., no pollutants are exhaled). A fraction of time at home (FAH) of 85% was applied for individuals of any age, and determined to be acceptable because schools are located beyond the 1 in one million cancer risk contour.

Inhalation dose of each pollutant at each receptor was then multiplied in HARP2 by the inhalation cancer slope factor for the pollutant to estimate annual cancer risk in units of excess cancer cases per million individuals exposed. The total cancer risk from inhalation was then calculated by summing the annual risk from each pollutant and year of exposure. Residential cancer risk assumed exposure duration of 60 years total and exposure was assessed using OEHHA Derived Method.

The Derived Method of dose calculation in HARP2 was used. It consists of the high-end point estimate (i.e., 95th percentile) for the two driving (dominant) exposure pathways (e.g., soil and breast milk) and the mean (65th percentile) point estimate for the remaining pathways. In non-cancer chronic assessments, the inhalation pathway is always considered a driving pathway, the next two risk driving pathways will use the 95th percentile, and the remaining pathways will use the mean intake rate.

Ingestion Pathway

The average concentration of pollutants in soil is a function of the deposition, accumulation period, chemical specific half-life, mixing depth, and soil bulk density. As discussed above, the controlled deposition rate (0.02 m/s) was applied. Equations and parameters used to estimate the concentration of pollutant in the soil from the GLC can be found in the HRA Guidelines (p. 5-6 to 5-8).

The dose from residential soil ingestion was calculated for each age group. The dose is calculated by HARP2 based on the concentration in soil, pollutant specific gastrointestinal relative absorption fraction (GRAF, unitless), soil ingestion rate (mg/kg-day), and exposure frequency using the equation presented in the HRA Guidelines (p. 5-43). For simplicity, GRAF was assigned a value of one which represents the entire mass of pollutant being absorbed. Soil ingestion rates estimates are shown in Table 12.

Table 12 Soil Ingestion Rate Point Estimates by Age Group

Estimate	3rd Trimester[1] (mg/kg BW-yr)[2]	0<2 Years (mg/kg BW-yr)	2<16 Years (mg/kg BW-yr)	16<30 Years (mg/kg BW-yr)
Mean (65%ile)[3]	0.7	20	3	0.7
High-End (95%ile)	3	40	10	3

Source: (OEHHA, 2015, pp. 5-44).

1 3rd trimester is assumed to be the mother's soil ingestion rate.

2 Values are in units of milligrams of pollutant ingested per kilogram of body weight per year.

3 Geometric mean (GM) values were not used in the HRA and are provided for informational purposes only.

Dermal Pathway

Exposure through dermal absorption (dose-dermal) is a function of the soil or dust loading of the exposed skin surface, the amount of skin surface area exposed, and the concentration and availability of the pollutant. The annual dermal load (ADL) is a composite of the body surface area per kg body weight, exposure frequency, and soil adherence to the skin. High-end point estimates of ADL for individuals located in a mixed climate were used.

Table 13 Annual Dermal Loading Point Estimates by Age Group

Estimate	3rd Trimester[1] (mg/kg BW-yr)[2]	0<2 Years (mg/kg BW-yr)	2<16 Years (mg/kg BW-yr)	16<30 Years (mg/kg BW-yr)
Mean (65%ile)[3]	1,100	2,200	5,700	1,100
High-End (95%ile)	2,400	2,900	8,100	2,400

Source: (OEHHA, 2015, pp. 5-37).

1 3rd trimester based on ADL of mother normalized to body weight assuming exposure to the mother and feus are the same.

2 Values are in units of milligrams of pollutant on skin per kilogram of body weight per year.

3 Mean values were not used in the HRA and are provided for informational purposes only.

High-end ADL was combined with the concentration of pollutant in soil, the fraction absorbed across skin (pollutant-specific factor), the exposure duration (i.e., 30-year residency) using equations presented in the HRA Guidelines (pg. 5-41) to estimate the dermal dose for each residential receptor. Worker receptors used the adult ADL and a 25-year exposure duration for the health risk calculation.

Mother's Milk Pathway

Estimates of the concentration of pollutants in mother's milk require the use of the air, water, and soil environmental fate evaluations. Infants would be exposed to the pollutants in concentrations equal to the concentrations at which the mother is exposed from birth up to 25 years of age when the infant is assumed to be born. The exposed infant is assumed to be fully breastfed for the first year of life. The summed average dose daily dose (mg/kg-day) from each pathway is calculated for the nursing mother using equations in the HRA Guidelines (p. 5-59). Breast milk intake rates of 101 and 139 g/kg-day are used by HARP2.

Dose-Response Assessment

Dose-response assessment is the process of characterizing the relationship between exposure to an agent and incidence of an adverse health effect in exposed populations. In quantitative carcinogenic risk assessment, the dose-response relationship is expressed in terms of a potency slope that is used to calculate the probability or risk of cancer associated with intensity of the exposure. Cancer potency factors (CPF) are expressed as the 95th percent upper confidence limit of the slope of the dose response curve estimated assuming continuous lifetime exposure to a substance. Typically, potency factors are expressed as units of inverse dose (e.g., (mg/kg BW/day)$^{-1}$) and as a Unit Risk Factor (URF) for a 70-year lifetime exposure in units of inverse concentration (e.g., (µg/m3)$^{-1}$). It is assumed in cancer risk assessments that risk is directly proportional to dose and that there is no threshold for carcinogenesis. (OEHHA, 2015).

For noncarcinogenic effects, dose-response data developed from animal or human studies are used to develop acute, repeated 8-hour, and continuous exposure Reference Exposure Levels (RELs). The non-cancer RELs are defined as the concentration at which no adverse noncancer health effects are anticipated even in sensitive members of the general population, with infrequent one-hour exposures, repeated 8-hour exposures over a significant fraction of a lifetime, or continuous exposure over a significant fraction of a lifetime, respectively. The most sensitive health effect is chosen to develop the REL when the chemical affects multiple organ systems. Unlike cancer health effects, noncancer health effects are generally assumed to have thresholds for adverse effects. In other words, injury from a pollutant will not occur until exposure to that pollutant has reached or exceeded a certain concentration (i.e., threshold) and/or dose. The acute, 8-hour, and chronic RELs are air concentrations intended to be less than the threshold for health effects in the general population. (OEHHA, 2015).

The actual threshold for health effects in the general population is generally not known with precision. Uncertainty factors are applied to the Lowest Observed Adverse Effects Level (LOAEL) or No Observed Adverse Effects Level (NOAEL) or Benchmark Concentration values from animal or human studies ensure that the RELs are set lower than the threshold for health effects in nearly all individuals.

Risk Characterization

Risk characterization is the final step of the HRA. In this step, information developed through the exposure assessment is combined with information from the dose-response assessment to characterize risks at each receptor. OEHHA conducts the dose-response assessment during the development of CPFs and RELs. These are used in conjunction with the exposure estimates to assess cancer risk and hazard from noncancer toxicity of emitted chemicals. Under the Hot Spots program, risk characterizations present both individual and population-wide health risks.

A general summary of the risk characterization components includes the following:

- The locations of the point of maximum impact (PMI), the maximum exposed individual receptor (MEIR), and the maximum exposed individual worker (MEIW) are identified. The PMI, MEIW, and MEIR for cancer risk and for noncancer hazard indices may not occur at the same location; and should be identified.

- The location of any specified sensitive receptors (e.g., schools, hospitals, daycare, or eldercare facilities) are identified.
- Estimates of population-wide cancer burden are assessed.

Cancer Risk

Cancer risk is calculated by multiplying the daily inhalation or oral dose, by a CPF, the age sensitivity factor (ASF), the frequency of time spent at home (FAH) (for residents only), and the exposure duration divided by averaging time, to yield the excess cancer risk. As described below, excess cancer risk is calculated separately for each age grouping and summed to yield cancer risk at the receptor location. A brief description of the age sensitivity factors, exposure duration, and frequency of time spent at home are included below. These factors are discussed in various technical support documents to the HRA Guidelines.

OEHHA has determined that young animals are more sensitive than adult animals to exposure to many carcinogens. Therefore, OEHHA developed age sensitivity factors (ASFs) to take into account the increased sensitivity to carcinogens during early-in-life exposure. In the absence of chemical-specific data, OEHHA recommends a default ASF of 10 for the third trimester to age 2 years, and an ASF of 3 for ages 2 through 15 years to account for potential increased sensitivity to carcinogens during childhood. These values manifest in the intake parameters presented below.

FAH during the day can be used to adjust exposure duration and cancer risk from a specific facility's emissions, based on the assumption that exposure to the facility's emissions are not occurring away from home. From the third trimester to age <2 years, 85% of time is spent at home. From age 2 through <16 years, 72% of time is spent at home. From age 16 years and greater, 73% of time is spent at home. Facilities with a school within the 1×10^{-6} (or greater) isopleth are directed to use FAH = 1 for the child age groups (3rd Trimester, 0<2 years, and 2<16 years).

For residential inhalation exposure, cancer risk must be separately calculated for specified age groups because of age differences in sensitivity to carcinogens and age differences in intake rates (per kg body weight). Separate risk estimates for these age groups provide a health-protective estimate of cancer risk by accounting for greater susceptibility in early life, including both age-related sensitivity and amount of exposure. The following equation illustrates the formula for calculating residential inhalation cancer risk.

$$RISK_{inh-res} = DOSE_{air} \times CPF \times ASF \times \frac{ED}{AT} \times FAH$$

Where:

$RISK_{inh-res}$	= Residential inhalation cancer risk
$DOSE_{air}$	= Daily inhalation dose (mg/kg-day)
CPF	= Cancer potency factor $(mg/kg\text{-}day)^{-1}$
ASF	= Age sensitivity factor for a specified age group (unitless)
ED	= Exposure duration (in years) for a specified age group
AT	= Averaging time for lifetime cancer risk (years)

FAH = Fraction of time spent at home (unitless)

Cancer risks calculated for individual age groups are summed to estimate the total cancer risk over the exposure duration. Cancer risk is expressed in "chances per million" (cancer risk × 10^{-6}) but may also be expressed in other ways, such as "chances per 100,000" or "chances per 10 million" (cancer risk × 10^{-7}).

For assessment of off-site worker cancer risk at the MEIW, the default assumes working age begins at 16 years. The daily inhalation dose ($DOSE_{air}$) is based on the adjusted 8-hour concentration at the MEIW (for non-continuous sources) and amount of time the off-site worker's schedule overlaps with the facility's emission schedule. Additional consideration for off-site worker cancer risk assessment is whether there are women of child bearing age at the MEIW location and whether the MEIW has a daycare center. Under most circumstances, cancer risk accumulated by inhalation is calculated using the following equation:

$$RISK_{inh-work} = DOSE_{air} \times CPF \times ASF \times \frac{ED}{AT}$$

Where:

$RISK_{inh-work}$ = Worker inhalation cancer risk
$DOSE_{air}$ = Daily inhalation dose (mg/kg-day)
CPF = Cancer potency factor $(\text{mg/kg-day})^{-1}$
ASF = Age sensitivity factor for a specified age group (one for working age 16 to 70)
ED = Exposure duration (in years) for a specified age group (25 years)
AT = Averaging time for lifetime cancer risk (70 years)

As discussed previously, some substances (e.g., semi-volatile organics and metals) are carcinogenic regardless of how they enter the body. Exposures to these substances are called multi-pathway. HRA for a facility that emits a multi-pathway pollutant must, at a minimum, evaluate doses from soil ingestion and dermal exposure. If polycyclic aromatic hydrocarbons, lead, dioxins, furans, or polychlorinated biphenyls are emitted, then the breast-milk consumption pathway becomes mandatory for residential receptors. OEHHA has developed transfer coefficients for these chemicals from the mother to breast milk. The other exposure pathways (e.g., ingestion of homegrown produce or fish) are only evaluated for if the facility impacts that exposure medium and the receptor under evaluation can be exposed to that medium or pathway. For example, if the facility does not impact a fishable body of water, or the impacted water body does not sustain fish that are consumed by anglers, then the fish pathway will not be considered for that facility or receptor.

Non-inhalation residential cancer risk is calculated using the same steps as inhalation cancer risk. The pathway under evaluation (e.g., soil ingestion) is multiplied by the substance-specific oral slope factor, expressed in units of inverse dose (i.e., $(\text{mg/kg/day})^{-1}$), the appropriate ASF, and exposure duration divided by averaging time to yield the cancer risk for a specified age grouping. Cancer risk for each age group is summed as appropriate for the exposure duration.

If multiple substances are emitted, the substance-specific cancer risks for each exposure pathway is summed to give the (total) multi-pathway cancer risk at the receptor location. HARP2 displays the multi-pathway risk for each carcinogenic substance and a breakdown of the cancer risk from each exposure pathway.

This HRA evaluates mother's milk due to presence of lead in fugitive dust. The default assumption inherent in the intake rate is that the infant's only source of food is breast milk for the first year (e.g., is fully breastfed), which is one-half of the 0<2 year age group used in the Hot Spots program. Thus, the cancer risk by the mother's milk pathway is calculated with a slightly modified equation using a different exposure duration. Once the cancer risk is determined for the mother's milk pathway then it is summed with the other risks to calculate the total cancer risk for the receptor.

For facilities with large emission footprints (e.g., refineries, ports, or rail yards, etc.), population-based health impacts provide a better illustration of the potential population-wide impacts of emissions since large numbers of people may be exposed to the emissions. The individual cancer risk approach discussed up to this point has some inherent limitations in terms of protecting public health. A small facility with a single stack can impact a few individuals with an individual cancer risk that is unacceptable, whereas a large facility may have an individual cancer risk that is less than the acceptable limit for individual risk but exposes many more people. Thus, the population-wide impacts are larger for the large facility. Population-wide risk is independent of individual risk, and assumes that a population (not necessarily the same individuals) will live in the impacted zone over a 70-year period.

To evaluate population risk, the cancer burden method accounts for the number of excess cancer cases that could occur in a population. The cancer burden is calculated by multiplying the cancer risk at a census block centroid by the number of people who live in the census block, and adding up the estimated number of potential cancer cases across the zone of impact. The result of this calculation is a single number that is intended to estimate of the number of potential cancer cases within the population that was exposed to the emissions.

Cancer burden is independent of how many people move in or out of the vicinity of an individual facility. For example, if 10,000 people are exposed to a carcinogen at a concentration with a $1{\times}10^{-5}$ cancer risk for a lifetime the cancer burden is 0.1, and if 100,000 people are exposed to a $1{\times}10^{-5}$ risk the cancer burden is 1.

OEHHA recommends that exposure from projects longer than 2 months but less than 6 months be assumed to last 6 months (e.g., a 2-month project would be evaluated as if it lasted 6 months). Exposure from projects lasting more than 6 months should be evaluated for the duration of the project. In all cases, for assessing risk to residential receptors, the exposure should be assumed to start in the third trimester to allow for the use of the ASFs. Thus, for example, if one is evaluating a proposed 10-year project, the cancer risks for the residents would be calculated based on exposures starting in the third trimester through the first ten years of life.

Emissions calculated for the Baseline (see Section 2.4.3) and Project (see Section 2.4.4) were determined for each time segment during the Project's life corresponding to cancer risk age bins. Cancer risk results for each time segment were then summed to determine the Project cancer risk impact at each receptor.

Non-Cancer Risk

Estimates of noncancer inhalation health impacts are determined by dividing an airborne concentration at the receptor by the appropriate REL. This is termed the Hazard Index (HI) Approach. A REL is used as an indicator of potential noncancer health impacts and is defined as the concentration at which no adverse noncancer health effects are anticipated. When a health impact calculation is performed for a single substance, then it is called the hazard quotient (HQ). Each REL for a substance will have one or more target organ systems (e.g., respiratory system, nervous system, etc.) where the substance can have a noncancer health impact. Thus, all HQs have specified target organ systems associated with them. The sum of the HQs of all chemicals emitted that impact the same target organ is the HI. Inhalation RELs for noncancer health impacts have been developed for acute, 8-hour chronic, and continuous chronic exposures to a number of substances.

Acute RELs are designed to protect against the maximum 1-hour ground level concentration at a receptor. Chronic RELs protect against long-term exposure to the annual average air concentration spread over 24 hours/day, 7 days/week. 8-hour RELs are designed to protect people with daily 8-hour schedules, such as off-site workers, in an impacted zone. The 8-hour RELs are used for typical daily work shifts of 8 hours and represent concentrations at or below which health impacts would not be expected even for sensitive subpopulations in the general population with repeated chronic daily 8-hour exposures. The 8-hour RELs can be used to evaluate the potential for health impacts (including effects of repeated exposures) in off-site workers, and to children and teachers exposed during school hours.

Acute, 8-hour, and chronic RELs are needed because the dose metrics and even the health impact endpoints may be different with the different exposure durations of acute, daily 8-hour, and chronic exposures. Also, although chronic REL values are lower or set the same as 8-hour RELs, there are some cases such as special meteorological situations (e.g., significant diurnal-nocturnal meteorological differences) or intermittent exposures where the 8-hour REL may be more protective than the chronic REL.

As discussed above, in order to calculate the acute, 8-hour, or chronic HQ, the maximum ground-level concentration (in units of µg/m^3) during the appropriate period of time (i.e., 1-hour acute, 8-hour, and 1-year chronic) is divided by the corresponding REL (in µg/m^3) for the substance. If a receptor is exposed to multiple substances that target the same organ system, then the HQs for the individual substances are summed to obtain a Hazard Index (HI) for that target organ as shown in the following equations.

$$HI_{Organ1} = \frac{C_{air,1}}{REL_1} + \frac{C_{air,2}}{REL_2} + \cdots + \frac{C_{air,n,}}{REL_n}$$

or

$$HI_{Organ1} = HQ_1 + HQ_2 + \cdots + HQ_n$$

A HI of 1.0 or less indicates that adverse health effects are not expected to result from exposure to emissions of that substance. As the HI increases above one, the probability of human health effects increases by an undefined but relative amount. However, HI above one is not necessarily indicative of health impacts due to the application of uncertainty factors in deriving the RELs.

There are non-cancer multi-pathway pollutants that are assessed for inhalation, ingestion, and other non-inhalation pathways. Nickel and arsenic are two that are found in fugitive dust and so the non-inhalation exposures to these metals are assessed for the corresponding target organs. Specifically, nickel effects the respiratory, hematologic, and alimentary systems while arsenic affects development, the skin, the nervous system, and the cardiovascular system.

2.5 Project-Level Impacts and Mitigation Measures

Project impact is compared to each threshold of significance (Section 2.3) and is evaluated in the following subsections. Mitigation measures are proposed for impacts if project impact is predicted to exceed a threshold. Mitigated impact is then assessed to evaluate the effect of the mitigation and determine if additional mitigation is necessary.

2.5.1 Conflict With or Obstruction to the Implementation of an Air Quality Plan

Impact Statement

Impact AQ-1: *Would the Project conflict with or obstruct implementation of the applicable air quality plan?* **(Appendix G Threshold Criteria (a))**

Impact Analysis

> *An environmental document for a proposed project must address project consistency with the AQMP. Project consistency with the AQMP can be determined by comparing the actual population growth in the county with the projected growth rates used in the AQMP. The projected growth rate in population is used as an indicator of future emissions from population-related emission categories in the AQMP. These emission estimates are used, in part, to project the date by which Ventura County will attain the federal ozone standard. The County of Ventura Planning Division maintains an ongoing population tracking system. Therefore, a demonstration of consistency with the population forecasts used in the most recently adopted AQMP should be used for assessing project consistency with the AQMP.*

In summary, the Project would not conflict with or obstruct specific control measures and generally would not affect attainment goals in an air quality plan. The AQMPs represent a broader legislative agenda which can be represented in the form of district rules and thresholds such as the ones which are analyzed in this Report.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

2.5.2 Net Increase of any Criteria Pollutant

Impact Statement

Impact AQ-3: *Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?* **(Appendix G Threshold Criteria (b))**

Impact Analysis

CEQA defines cumulative impacts as two or more individual effects which, when considered together, are either significant or "cumulatively considerable", meaning they add considerably to a significant environmental impact. An adequate cumulative impact analysis considers a project over time and in conjunction with other past, present, and reasonably foreseeable future projects whose impacts might compound those of the project being assessed.

By its very nature, air pollution is largely a cumulative impact. The nonattainment status of regional pollutants is a result of past and present development. Future attainment of State and Federal ambient air quality standards is a function of successful implementation of the VCAPCD's attainment plans. Consequently, the VCAPCD's application of thresholds of significance for criteria pollutants is relevant to the determination of whether a project's individual emissions would have a cumulatively significant impact on air quality. Regional impacts on criteria pollutants are determined by assessing emissions from permit-exempt sources only (e.g., vehicular engines) as discussed in the following passage:

> *Emissions from equipment or operations requiring APCD permits are not counted towards the air quality significance thresholds. This is for two reasons. First, such equipment or processes are subject to the District's New Source Review permit system, which is designed to produce a net air quality improvement. Second, facilities are required to mitigate emissions from equipment or processes subject to APCD permit by using emission offsets and by installing Best Available Control Technology (BACT) on the process or equipment. (VCAPCD, 2003, pp. 1-1 to 1-2).*

As specified in Section 2.3, Significance thresholds for Criteria pollutants outlined by the VCAPCD are stated in terms of health risk and daily increase. The project does not propose a daily increase in criteria pollutants and Health risk concerns are addressed in Section 2.5.3.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

2.5.3 Exposure of Sensitive Receptors to Substantial Pollutant Concentrations

Impact Statement

Impact AQ-4: *Would the Project expose sensitive receptors to substantial pollutant concentrations?* **(Appendix G Threshold Criteria (d))**

Impact Analysis

Determination of whether project emissions would expose sensitive receptors to substantial pollutant concentrations is a function of assessing potential health risks. Sensitive receptors are facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors. When evaluating whether a development proposal has the potential to result in localized impacts, the nature of the air pollutant emissions, the proximity between the emitting facility and sensitive receptors, the direction of prevailing winds, and local topography must be considered.

Health Risk Assessment was performed as discussed in Section 2.4.5 to evaluate the effects of TACs including DPM from vehicles and various substances found in fugitive dust emissions (i.e., metals and crystalline silica). Health risks from operation of the Project are presented in Table 14.

Table 14 Health Risk Impacts

Model Receptor # – Type – Location	Excess Cancer Cases per Million People Exposed	Max Chronic Hazard Index	Max Acute Hazard Index
136 – MEIR (Cancer, Chronic) – North of Project	1.0	0.024	< 0.010
109 – MEIR (Acute) – East of Project	0.33	0.0057	< 0.010
103 – MEIW (Cancer, Chronic, Acute) – Funeral Home	1.4	0.26	0.021
194 – PMI – Project Boundary (UTM 316339, 3783949)	N/A	N/A	0.079
Significance Criteria	**10**	**1.0**	**1.0**
Threshold Exceeded?	**No**	**No**	**No**

Source: Appendix E

Note: These receptors represent locations of highest exposure. Discrepancies between table and appendix values may exist due to rounding. MEIR: Maximum Exposed Individual Receptor; MEIW: Maximum Exposed Individual Worker; PMI: Point of Maximum Impact

Level of Significance Before Mitigation

Less than significant.

2.5.4 Other Emissions Affecting a Substantial Number of People

Impact Statement

Impact AQ-5: *Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?* **(Appendix G Threshold Criteria (e))**

Impact Analysis

Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact and the variety of odor sources, there are no quantitative or formulaic methodologies to determine the presence of a significant odor impact.

The intensity of an odor source's operations and its proximity to sensitive receptors influences the potential significance of odor emissions Odor intensity would decrease rapidly with distance and is not expected to be frequently (or at all) detectable at locations outside of the Project site boundary. Given the large site upon which the odors will dissipate, and the fact that the existing facility has not generated an odor that generated complaints in the past; objectionable odors affecting a substantial number of people are unlikely to result from the Project.

Level of Significance Before Mitigation

Less than significant.

Mitigation Measures

None required.

Level of Significance After Mitigation

Not applicable.

3.0 GREENHOUSE GASES

This section of the AQCCIA assesses GHG impacts of the Project. The methodologies used and the information provided in this section are supported by calculations in Appendix D.

3.1 Regulatory Setting

3.1.1 Characteristics of Climate Pollutants

The accumulation of GHGs in the atmosphere contributes to the regulation of the earth's temperature. Some GHGs can remain in the atmosphere for long periods of time (i.e., long-lived). The following six GHGs are recognized under the Kyoto Protocol and have been found by the International Panel on Climate Change (IPCC) to have an effect on global climate change. In addition, California has identified "short-lived" climate pollutants.

Long-Lived Climate Pollutants

In general, there are six (6) compounds/classes of GHGs that are counted when emissions are inventoried. Each GHG exhibits a different global warming potential (GWP). The mass of emissions of each GHG is multiplied by its GWP to determine the carbon dioxide equivalent (CO_2e) potential for global warming. GWPs have changed over time by the Intergovernmental Panel on Climate Change (IPCC) which is considered an authority on GHGs and their effects. The CAP and CARB emissions inventories and plans use GWPs that are an iteration or two behind and the most recent IPCC publication. Characteristics of each long-lived GHG and the associated GWP is presented below.

Carbon Dioxide (CO_2) is an odorless, colorless natural GHG. CO_2 is emitted from natural and anthropogenic sources. Natural sources include the following: decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic sources include burning coal, oil, natural gas, and wood. By definition, CO_2 has a GWP equal to one (1).

Methane (CH_4) is a flammable GHG. A natural source of CH_4 is from the anaerobic decay of organic matter. Geological deposits, known as natural gas fields, also contain CH_4, which is extracted for fuel. Other sources include landfills, fermentation of manure, and ruminants such as cattle. CH_4 has a GWP equal to 25.

Nitrous Oxide (N_2O) is a colorless GHG. N_2O is produced by microbial processes in soil and water, including those reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. N_2O has a GWP equal to 298.

Hydrofluorocarbons (HFCs) are synthetic chemicals that are used as a substitute for chlorofluorocarbons (CFCs). Of all the GHGs, they are one of three groups with the highest global warming potential. HFCs are human made for applications such as air conditioners and refrigerants. HFCs have GWPs that range from 124 (HFC 125a) to 14,300 (HFC 23).

Perfluorocarbons (PFCs) have stable molecular structures and do not break down through the chemical processes in the lower atmosphere; therefore, PFCs have long atmospheric lifetimes, between 10,000 and 50,000 years. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing. PFCs have GWPs that range from 7,390 (PFC 14) to 12,200 (PFC 116).

Sulfur Hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection. SF_6 has a GWP equal to 22,800.

Short-Lived Climate Pollutants

Short-lived climate pollutants are climate forcers that remain in the atmosphere for a much shorter period of time than longer-lived climate pollutants, such as carbon dioxide (CO_2). Their relative potency, when measured in terms of how they heat the atmosphere, can be tens, hundreds, or even thousands of times greater than that of CO_2. The impacts of short-lived climate pollutants are especially strong over the short term. Reducing these emissions can make an immediate beneficial impact on climate change.

Black carbon is a component of fine particulate matter, which has been identified as a leading environmental risk factor for premature death. It is produced from the incomplete combustion of fossil fuels and biomass burning, particularly from older diesel engines and forest fires. Black carbon warms the atmosphere by absorbing solar radiation, influences cloud formation, and darkens the surface of snow and ice, which accelerates heat absorption and melting. Diesel particulate matter emissions are a major source of black carbon and are also toxic air contaminants that have been regulated and controlled in California for several decades in order to protect public health.

Fluorinated gases (F-gases) are the fastest growing source of greenhouse gas emissions in California and globally. They include ozone-depleting substances that are being phased out globally under the Montreal Protocol, and their primary substitute, hydrofluorocarbons (HFCs). Most F-gas emissions come from leaks of these gases in refrigeration and air-conditioning systems. Emissions also come from aerosol propellants, fire suppressants, and foam-expansion agents.

Methane (CH_4) is the principal component of natural gas. Its emissions contribute to background ozone in the lower atmosphere (troposphere), which itself is a powerful greenhouse gas and contributes to ground level air pollution. The atmospheric concentration of methane is growing as a result of human activities in the agricultural, waste treatment, and oil and gas sectors. Capturing methane from these sources can improve pipeline safety, and provide fuel for vehicles and industrial operations that displaces fossil natural gas use.

3.1.2 Federal

In 2007 the Supreme Court found that GHGs are air pollutants covered by the Clean Air Act, and the EPA Endangerment Findings concluded the elements CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 threatened public health for both current and future generations. Since, 04 CFR Part 98 has been amended to require collection of GHG data to inform future policy decision.

3.1.3 State

The following tables were copied from the California government website for climate change (climatechange.ca.gov) and list the California legislation (Table 15), regulations, (Table 16), and executive orders (Table 17) through the end of 2015. More recent developments are discussed immediately following the tables.

Table 15 California Climate Change Legislation

Date	Legislation	Description
October 7, 2015	Senate Bill 350 (De León, Chapter 547, Statutes of 2015)	Clean Energy and Pollution Reduction Act of 2015 Establishes targets to increase retail sales of renewable electricity to 50 percent by 2030 and double the energy efficiency savings in electricity and natural gas end uses by 2030.
September 21, 2014	Senate Bill 605 (Lara, Chapter 523, Statutes of 2014)	Short-lived climate pollutants Requires the State Air Resources Board to complete a comprehensive strategy to reduce emissions of short-lived climate pollutants by January 1, 2016.
September 21, 2014	Senate Bill 1275, (De León, Chapter 530, Statutes of 2014)	Charge Ahead California Initiative Establishes a State goal of 1 million zero-emission and near-zero-emission vehicles in service by 2020. Amends the enhanced fleet modernization program to provide a mobility option. Establishes the Charge Ahead California Initiative requiring planning and reporting on vehicle incentive programs, and increasing access to and benefits from zero-emission vehicles for disadvantaged, low-income, and moderate-income communities and consumers.
September 21, 2014	Senate Bill1204 (Lara, Chapter 524, Statutes of 2014)	California Clean Truck, Bus, and Off-Road Vehicle and Equipment Technology Program Creates the California Clean Truck, Bus, and Off-Road Vehicle and Equipment Technology Program funded by the Greenhouse Gas Reduction Fund for development, demonstration, precommercial pilot, and early commercial deployment of zero- and near-zero emission truck, bus, and off-road vehicle and equipment technologies, with priority given to projects benefiting disadvantaged communities.
September 28, 2013	Assembly Bill 8 (Perea, Chapter 401, Statutes of 2013)	Alternative fuel and vehicle technologies: funding programs Extends until January 1, 2024, extra fees on vehicle registrations, boat registrations, and tire sales in order to fund the AB 118, Carl Moyer, and AB 923 programs that support the production, distribution, and sale of alternative fuels and vehicle technologies and air emissions reduction efforts. The bill suspends until 2024 ARB's regulation requiring gasoline refiners to provide hydrogen fueling stations and appropriates up to $220 million, of AB 118 money to create a hydrogen fueling infrastructure in the State.
September 28, 2013	Assembly Bill 1092 (Levine, Chapter 410, Statutes of 2013)	Building standards: electric vehicle charging infrastructure Requires the Building Standards Commission to adopt mandatory building standards for the installation of future electric vehicle charging infrastructure for parking spaces in multifamily dwellings and nonresidential development.

Date	Legislation	Description
September 30, 2012	Senate Bill 535 (De León, Chapter 830, Statutes of 2012)	Greenhouse Gas Reduction Fund and Disadvantaged Communities Requires the California Environmental Protection Agency to identify disadvantaged communities; requires that 25% of all funds allocated pursuant to an investment plan for the use of moneys collected through a cap-and-trade program be allocated to projects that benefit disadvantaged communities and 10 those 25% be use within disadvantaged communities; and requires the Department of Finance to include a description of how these requirements are fulfilled in an annual report.
September 30, 2012	Assembly Bill 1532 (J. Perez, Chapter 807, Statutes of 2012)	Greenhouse Gas Reduction Fund in the Budget Requires the Department of Finance to develop and submit to the Legislature an investment plan every three years for the use of the Greenhouse Gas Reduction Fund; requires revenue collected pursuant to a market-based compliance mechanism to be appropriated in the Annual Budget Act; requires the department to report annually to the Legislature on the status of projects funded; and specifies that findings issued by the Governor related to "linkage" as part of a market-base compliance mechanism are not subject to judicial review.
April 12, 2011	Senate Bill X1-2 (Simitian, Chapter 1, Statutes of 2011)	Governor Edmund G. Brown, Jr. signed Senate Bill X1-2 into law to codify the ambitious 33 percent by 2020 goal. SBX1-2 directs California Public Utilities Commission's Renewable Energy Resources Program to increase the amount of electricity generated from eligible renewable energy resources per year to an amount that equals at least 20% of the total electricity sold to retail customers in California per year by December 31, 2013, 25% by December 31, 2016 and 33% by December 31, 2020. The new RPS goals applies to all electricity retailers in the State including publicly owned utilities (POUs), investor-owned utilities, electricity service providers, and community choice aggregators. This new RPS preempts the California Air Resources Boards' 33 percent Renewable Electricity Standard.
September 29, 2011	Assembly Bill 1504 (Skinner, Chapter 534, Statutes of 2010)	Forest resources and carbon sequestration. Bill requires Department of Forestry and Fire Protection and Air Resources Board to assess the capacity of its forest and rangeland regulations to meet or exceed the State's greenhouse goals, pursuant to AB 32.
September 30, 2008	Senate Bill 375 (Steinberg, Chapter 728, Statutes of 2008)	Sustainable Communities & Climate Protection Act of 2008 requires Air Resources Board to develop regional greenhouse gas emission reduction targets for passenger vehicles. ARB is to establish targets for 2020 and 2035 for each region covered by one of the State's 18 metropolitan planning organizations. For more information on SB 375, see the ARB Sustainable Communities page.
October 14, 2007	Assembly Bill 118 (Núñez, Chapter 750, Statutes of 2007)	Alternative Fuels and Vehicles Technologies The bill would create the Alternative and Renewable Fuel and Vehicle Technology Program, to be administered by the Energy Commission, to provide funding to public projects to develop and deploy innovative technologies that transform California's fuel and vehicle types to help attain the State's climate change policies.
August 24, 2007	Senate Bill 97 (Dutton, Chapter 187, Statutes of 2007)	Directs Governor's Office of Planning and Research to develop CEQA guidelines "for the mitigation of greenhouse gas emissions or the effects of greenhouse gas emissions." For more information see the OPR CEQA and Climate Change page.

Date	Legislation	Description
July 18. 2006	Assembly Bill 1803 (Committee on Budget, Chapter 77, Statutes of 2006)	Greenhouse gas inventory transferred to Air Resources Board from the Energy Commission.
August 21, 2006	Senate Bill 1 (Murray, Chapter 132, Statutes of 2006)	California's Million Solar Roofs plan is enhanced by PUC and CEC's adoption of the California Solar Initiative. SB1 directs PUC and CEC to expand this program to more customers, and requiring the State's municipal utilities to create their own solar rebate programs. This bill would require beginning January 1, 2011, a seller of new homes to offer the option of a solar energy system to all customers negotiating to purchase a new home constructed on land meeting certain criteria and to disclose certain information.
September 26, 2006	Senate Bill 107 (Simitian, Chapter 464, Statutes of 2006)	SB 107 directs California Public Utilities Commission's Renewable Energy Resources Program to increase the amount of renewable electricity (Renewable Portfolio Standard) generated per year, from 17% to an amount that equals at least 20% of the total electricity sold to retail customers in California per year by December 31, 2010.
September 27, 2006	Assembly Bill 32 (Núñez, Chapter 488, Statutes of 2006)	California Global Warming Solutions Act of 2006. This bill would require Air Resources Board (ARB) to adopt a statewide greenhouse gas emissions limit equivalent to the statewide greenhouse gas emissions levels in 1990 to be achieved by 2020. ARB shall adopt regulations to require the reporting and verification of statewide greenhouse gas emissions and to monitor and enforce compliance with this program. AB 32 directs Climate Action Team established by the Governor to coordinate the efforts set forth under Executive Order S-3-05 to continue its role in coordinating overall climate policy. See more information on AB 32 at ARB.
September 12, 2002	Senate Bill 1078 (Sher, Chapter 516, Statutes of 2002)	This bill establishes the California Renewables Portfolio Standard Program, which requires electric utilities and other entities under the jurisdiction of the California Public Utilities Commission to meet 20% of their renewable power by December 31, 2017 for the purposes of increasing the diversity, reliability, public health and environmental benefits of the energy mix.
September 7, 2002	Senate Bill 812 (Sher, Chapter 423, Statutes of 2002)	This bill added forest management practices to the California Climate Action Registry members' reportable emissions actions and directed the Registry to adopt forestry procedures and protocols to monitor, estimate, calculate, report and certify carbon stores and carbon dioxide emissions that resulted from the conservation-based management of forests in California.
July 22, 2002	Assembly Bill 1493 (Pavley, Chapter 200, Statutes of 2002)	The "Pavley" bill requires the registry, in consultation with ARB, to adopt procedures and protocols for the reporting and certification of reductions in greenhouse gas emissions from mobile sources for use by the ARB in granting the emission reduction credits. This bill requires the ARB to develop and adopt, by January 1, 2005, regulations that achieve the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks. For more information on AB 1493 Pavley I, see the ARB Clean Car Standards page.

Date	Legislation	Description
October 11, 2001	Senate Bill 527 (Sher, Chapter 769, Statutes of 2001)	This bill revises the functions and duties of the California Climate Action Registry and requires the Registry, in coordination with CEC to adopt third-party verification metrics, developing GHG emissions protocols and qualifying third-party organizations to provide technical assistance and certification of emissions baselines and inventories. SB 527 amended SB 1771 to emphasize third-party verification.
September 30, 2000	Senate Bill 1771 (Sher, Chapter 1018, Statutes of 2000)	SB 1771 establishes the creation of the non-profit organization, the California Climate Action Registry and specifies functions and responsibilities to develop a process to identify and qualify third-party organizations approved to provide technical assistance and advice in monitoring greenhouse gas emissions, and setting greenhouse gas (GHG) emissions baselines in coordination with CEC. Also, the bill directs the Registry to enable participating entities to voluntarily record their annual GHG emissions inventories. Also, SB 1771 directs CEC to update the State's greenhouse gas inventory from an existing 1998 report and continuing to update it every five years.
September 28, 1988	Assembly Bill 4420 (Sher, Chapter 1506, Statutes of 1988)	The California Energy Commission (CEC) was statutorily directed to prepare and maintain the inventory of greenhouse gas emissions (GHG) and to study the effects of GHGs and the climate change impacts on the State's energy supply and demand, economy, environment, agriculture, and water supplies. The study also required recommendations for avoiding, reducing, and addressing related impacts - and required the CEC to coordinate the study and any research with federal, state, academic, and industry research projects.

Source: (climatechange.ca.gov, 2017)

Table 16 California Climate Change Regulations

Regulations	Description
Low Carbon Fuel Standard	In September 2015, the Air Resources Board re-adopted the Low Carbon Fuel Standard, to settle issues arising from lawsuits. The requirement is still a 10 percent reduction in the carbon intensity of transportation fuels.
Cap & Trade Offset Protocols	The Air Resources Board has adopted five protocols for offset compliance projects. In addition to the original four protocols adopted in 2011, ARB has adopted: Mine Methane Capture (MMC) Projects Compliance Offset Protocol, adopted April 2014
Cap & Trade Link with Quebec	California linked its cap-and-trade program with Quebec's program in January 2014. Linkage allows for the use of compliance instruments from Quebec's greenhouse gas emission trading system to meet compliance obligations pursuant to the California Cap-and-Trade Regulation, and the reciprocal approval of compliance instruments issued by California to meet compliance obligations in the external trading program.
Building Energy Efficiency Standards	The Energy Commission's 2013 Building Energy Efficiency Standards are 25 percent more efficient than previous standards for residential construction and 30 percent better for nonresidential construction. The Standards, which took effect on January 1, 2014, offer builders better windows, insulation, lighting, ventilation systems and other features that reduce energy consumption in homes and businesses.
Advanced Clean Cars Standard	The Advanced Clean Cars Program, approved in January 2012, will achieve additional GHG reductions from passenger vehicles for model years 2017-2025. This Program represents a new approach to passenger vehicles – cars and light trucks -- by combining the control of smog-causing pollutants and GHG emissions into a single coordinated package of standards known as Low Emission Vehicles (LEV) III. The new approach also includes efforts under the Zero-Emission Vehicle Program to support and accelerate the numbers of plug-in hybrids and zero-emission vehicles in California.
Water Appliance Standards	The Energy Commission's 2015 Water Appliance Standards are projected to save 10 billion gallons in the first year, increasing over time to 100 billion gallons of water per year. The energy efficiency and water standards require water appliances to consume less water thereby using less energy while performing the same function. The standards apply to: toilets and urinals; residential lavatory faucets; kitchen faucets; public lavatory faucets.
Cap & Trade Rulemaking Activities	A proposed California cap on greenhouse gas emissions and a market-based compliance mechanisms, including compliance offset protocols. OAL approved the rulemaking and filed it with the Secretary of State on December 13, 2011. The regulation will become effective on the January 1, 2012.
Low Carbon Fuel Standards (LCFS)	The regulations are designed to reduce the carbon intensity (CI) of transportation fuels used in California by at least 10 percent by the year 2020. The Air Resources Board approved the LCFS regulation for adoption on April 23, 2009. The regulation entered into full effect on April 15, 2010. Based upon feedback from stakeholders, amendments to the regulations were proposed by the Board in December 2011.
33% Renewable Portfolio Standard	On May 5, 2011, the Commission adopted the Order Instituting Rulemaking (R.) 11-05-005 to open a new proceeding for the implementation and administration of the 33% RPS Program. The primary focus of the R.11-05-005 proceeding was the implementation of the new 33% RPS law, Senate Bill (SB) 2 (1X) (Simitian), stats. 2011.

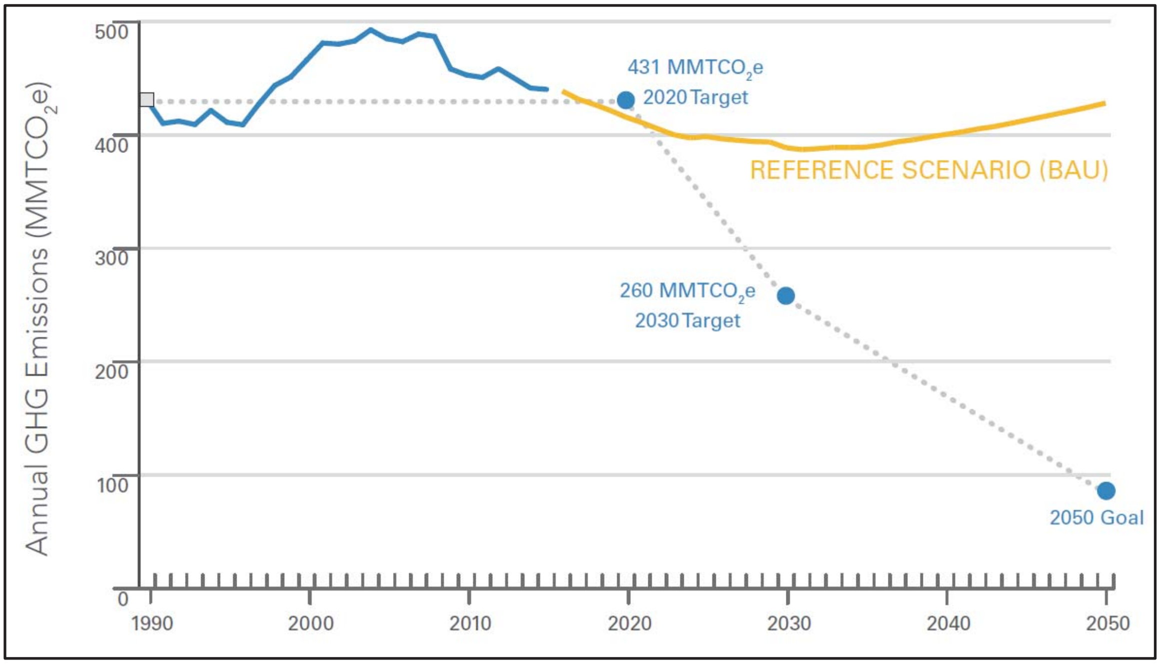
Table 17 California Climate Change Executive Orders

Date	Executive Order	Description
April 29, 2015	B-30-15	EO-B-30-15 sets a greenhouse gas (GHG) emissions target for 2030 at 40 percent below 1990 levels.
April 25, 2012	B-18-12	EO-B-18-12 calls for significant reductions in State agencies' energy purchases and GHG emissions. The Executive Order included a Green Building Action Plan, which provided additional details and specific requirements for the implementation of the Executive Order
March 23, 2012	B-16-12	EO-B-16-12 orders State agencies to facilitate the rapid commercialization of zero-emission vehicles (ZEVs). The Executive Order sets a target for the number of 1.5 million ZEVs in California by 2025. Also the Executive Order sets as a target for 2050 a reduction of GHG emissions from the transportation sector equaling 80 percent less than 1990 levels.
November 14, 2008	S-13-08	EO-S-13-08 directs State agencies to plan for sea level rise and climate impacts through coordination of the State Climate Adaptation Strategy.
January 18, 2007	S-01-07	EO-S-01-07 establishes the 2020 target and Low Carbon Fuel Standard. The EO directs the Secretary of Cal/EPA as coordinator of 2020 target activities and requires the Secretary to report back to the Governor and Legislature biannually on progress toward meeting the 2020 target.
October 18, 2006	S-20-06	EO-S-20-06 establishes responsibilities and roles of the Secretary of Cal/EPA and State agencies in climate change.
April 25, 2006	S-06-06	EO-S-06-06 directs Secretary of Cal/EPA to participate in the Bio-Energy Interagency Working Group and addresses biofuels and bioenergy from renewable resources.
June 1, 2005	S-03-05	EO-S-3-05 establishes greenhouse gas emission reduction targets, creates the Climate Action Team and directs the Secretary of Cal/EPA to coordinate efforts with meeting the targets with the heads of other State agencies. The EO requires the Secretary to report back to the Governor and Legislature biannually on progress toward meeting the GHG targets, GHG impacts to California, Mitigation and Adaptation Plans.
December 14, 2004	S-20-04	EO-S-20-04 (Green Buildings) directs State agencies to reduce energy use in State owned buildings by 20% by 2015 and increase energy efficiency.

Source: (climatechange.ca.gov, 2017)

On December 14, 2017, CARB approved the 2017 Climate Change Scoping Plan Update (Scoping Plan) which aims to reduce GHG emissions according to the following graphic. The Scoping Plan "is a package of economically viable and technologically feasible actions to not just keep California on track to achieve its 2030 target, but stay on track for a low- to zero-carbon economy by involving every part of the state. Every sector, every local government, every region, every resident is part of the solution. The Plan underscores that there is no single solution but rather a balanced mix of strategies to achieve the GHG target. This Plan highlights the fact that a balanced mix of strategies provides California with the greatest level of certainty in meeting the target at a low cost while also improving public health, investing in disadvantaged and low-income communities, protecting consumers, and supporting economic growth, jobs and energy diversity. Successful implementation of this Plan relies, in part, on long-term funding plans to inform future appropriations necessary to achieve California's long-term targets." (2017 Scoping Plan, p. ES4).

Chart 1 2030 Target Scoping Plan Reference Scenario



Source: Figure 6 (2017 Scoping Plan, p. 24)

The development of the Scoping Plan began by first modeling a Reference Scenario (BAU). The Reference Scenario is the forecasted statewide GHG emissions through 2030 with existing policies and programs, but without any further action to reduce GHGs. [2017 Scoping Plan] Figure 6 [above] provides the modeling results for a Reference Scenario for this Scoping Plan. The graph shows the State is expected to reduce emissions below the 2020 statewide GHG target, but additional effort will be needed to maintain and continue GHG reductions to meet the mid- (2030) and long-term (2050) targets. Figure 6 depicts a linear, straight-line path to the 2030 target. It should be noted that in any year, GHG emissions may be higher or lower than the straight line. That is to be expected as periods of economic recession or increased economic activity, annual variations in hydropower, and many other factors may influence a single or several years of GHG emissions in the State. CARB's annual GHG reporting and inventory will provide data on progress towards achieving the 2030 target.
(2017 Scoping Plan, p. 23).

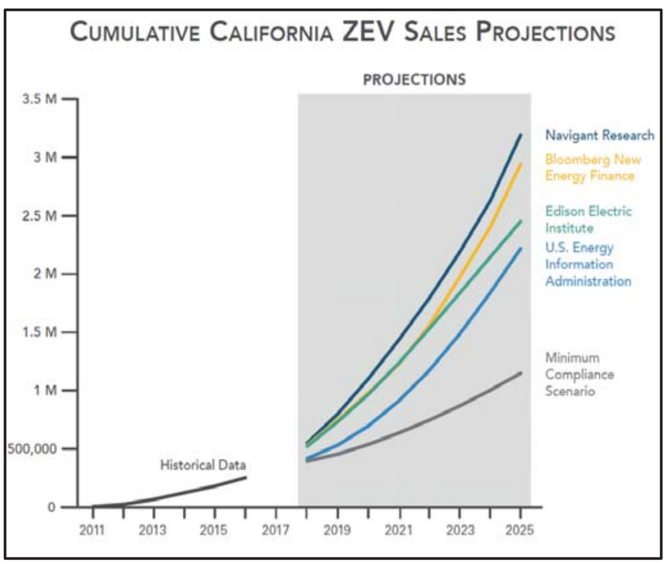
The Scoping Plan states that the California Legislature has shaped the State's climate change program, setting out clear policy objectives over the next decade including:

- *40% reduction in GHG emissions by 2030;*
- *50% renewable electricity;*
- *Double energy efficiency savings;*
- *Support for clean cars;*
- *Integrate land use, transit, and affordable housing to curb auto trips;*
- *Prioritize direct reductions;*
- *Identify air pollution, health, and social benefits of climate policies;*
- *Slash "super pollutants" (i.e., hydrofluorocarbons or HFCs);*
- *Protect and manage natural and working lands;*
- *Invest in disadvantaged communities; and*
- *Strong support for Cap-and-Trade.*

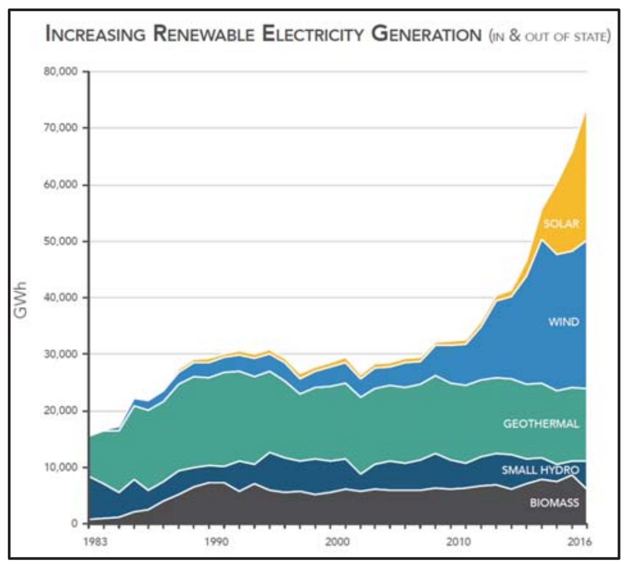
(2017 Scoping Plan, p. ES6).

Illustrations from the Scoping Plan that pertain to future emissions from the sectors representing the greatest GHG emissions, transportation and electricity use, are reproduced below.

Chart 2 2017 Scoping Plan GHG Exhibits



Source: **(2017 Scoping Plan, p. ES5)**



Source: (2017 Scoping Plan, p. ES9)

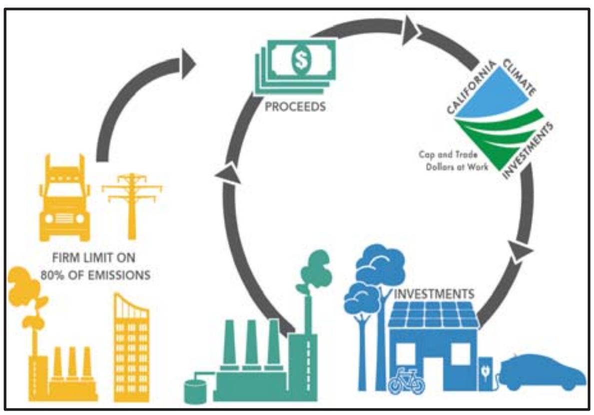
In addition to technology forcing and incentivizing regulations, the Cap-and-Trade Program is critical to meeting the Scoping Plan objectives. CARB states:

> *The Cap-and-Trade Program is fundamental to meeting California's long-range climate targets at low cost. The Cap-and-Trade Program includes GHG emissions from transportation, electricity, industrial, agricultural, waste, residential and commercial sources, and caps them while complementing the other measures needed to meet the 2030 GHG target. Altogether,*

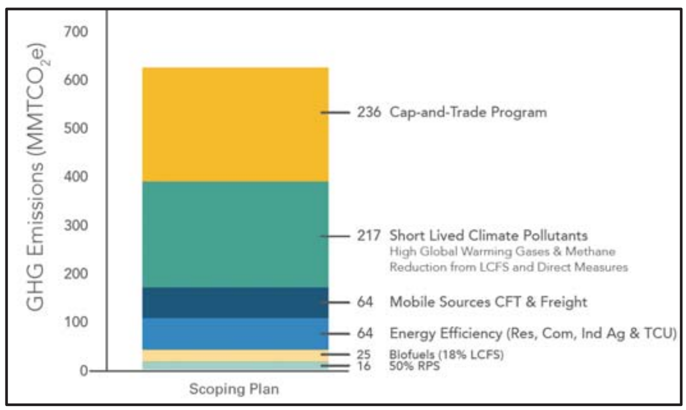
the emissions covered by the Cap-and-Trade program total 80 percent of all GHG emissions in California. California's response to climate change has led to many innovative programs designed to reduce GHG emissions, including the Renewable Portfolio and Low Carbon Transportation Standards, but the Cap-and-Trade Program guarantees GHG emissions reductions through a strict overall emissions limit that decreases each year, while trading provides businesses with flexibility in their approach to reducing emissions. The Cap-and-Trade Program also generates revenue when the allowances to emit pollution are auctioned. Some of the revenue is returned directly to electricity ratepayers, and the rest is dedicated to reducing GHG emissions by making Legislatively directed investments in California with an emphasis on programs or projects that benefit disadvantaged and low-income communities. (2017 Scoping Plan, p. ES16).

The following illustrations presents how CARB believes money will flow from the Cap-and-Trade program to enable state-funded investments and the amount of GHG emissions reduction that will be achieved overall and from Cap-and-Trade which is required to cover the gap between reductions from other measures in the Scoping Plan and the 2030 Target.

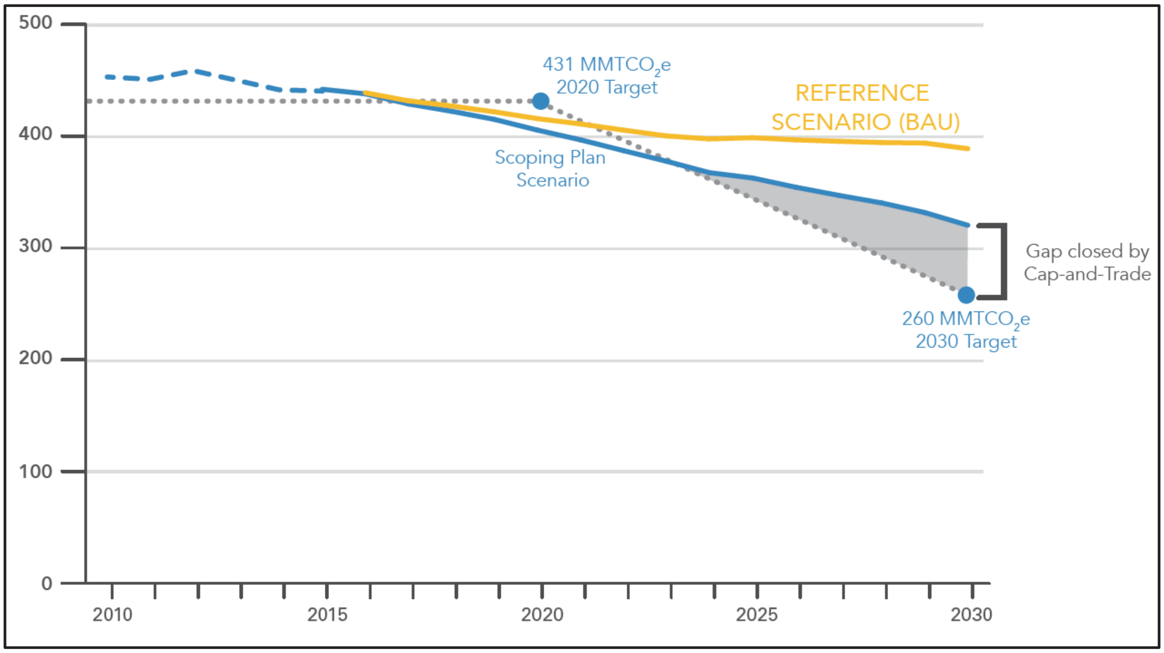
Chart 3 2017 Scoping Plan Cap-and-Trade Exhibits



Source: California's Carbon Pricing and Investment Overview (2017 Scoping Plan, p. ES16).



Source: Scoping Plan Scenario – Estimated Cumulative GHG Reductions by Measure (2021 – 2030) (2017 Scoping Plan, p. 28).



Source: 2017 Scoping Plan Reference Scenario (2017 Scoping Plan, p. 24).

Reference Scenario 2030 emissions estimate of 389 $MMTCO_2e$ to the 2030 target of 260 $MMTCO_2e$ and the level of 2030 emissions with the known commitments, estimated to be 320 $MMTCO_2e$. The known commitments are expected to result in emissions that are 60 $MMTCO_2e$ above the target in 2030, and have a cumulative emissions reduction gap of about 236 $MMTCO_2e$. This means the known commitments do not decline fast enough to achieve the 2030 target. The remaining 236 $MMTCO_2e$ of estimated GHG emissions reductions would not be achieved unless further action is taken to reduce GHGs. Consequently, for the Scoping Plan Scenario, the Post-2020 Cap-and-Trade Program would need to deliver 236 $MMTCO_2e$ cumulative GHG emissions reductions from 2021 through 2030. If the estimated GHG reductions from the known commitments are not realized due to delays in implementation or technology deployment, the post-2020 Cap-and-Trade Program would deliver the additional GHG reductions in the sectors it covers to ensure the 2030 target is achieved.

Table 18 Climate Change Policies and Measures

Recommended Action	Applies to Project?
Implement SB 350 by 2030: • Increase the Renewables Portfolio Standard to 50 percent of retail sales by 2030 and ensure grid reliability. • Establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas end uses by 2030. • Reduce GHG emissions in the electricity sector through the implementation of the above measures and other actions as modeled in IRPs to meet GHG emissions reductions planning targets in the IRP process. Load-serving entities and publicly- owned utilities meet GHG emissions reductions planning targets through a combination of measures as described in IRPs.	No, Project will purchase grid electricity, not administrate it.
Implement Mobile Source Strategy (Cleaner Technology and Fuels): • At least 1.5 million zero emission and plug-in hybrid light-duty electric vehicles by 2025. • At least 4.2 million zero emission and plug-in hybrid light-duty electric vehicles by 2030. • Further increase GHG stringency on all light-duty vehicles beyond existing Advanced Clean Cars regulations. • Medium- and heavy-duty GHG Phase 2. • Innovative Clean Transit: Transition to a suite of to-be-determined innovative clean transit options. Assumed 20 percent of new urban buses purchased beginning in 2018 will be zero emission buses with the penetration of zero-emission technology ramped up to 100 percent of new sales in 2030. Also, new natural gas buses, starting in 2018, and diesel buses, starting in 2020, meet the optional heavy-duty low-NO_X standard. • Last Mile Delivery: New regulation that would result in the use of low NO_X or cleaner engines and the deployment of increasing numbers of zero-emission trucks primarily for class 3-7 last mile delivery trucks in California. This measure assumes ZEVs comprise 2.5 percent of new Class 3–7 truck sales in local fleets starting in 2020, increasing to 10 percent in 2025 and remaining flat through 2030. • Further reduce VMT through continued implementation of SB 375 and regional Sustainable Communities Strategies; forthcoming statewide implementation of SB 743; and potential additional VMT reduction strategies not specified in the Mobile Source Strategy but included in the document "Potential VMT Reduction Strategies for Discussion."	No, Project vehicles are heavy-heavy duty and were not subject to heavy-duty GHG Phase 1 regulations. Thus, they would be unlikely to be subject to these measures.
Increase stringency of SB 375 Sustainable Communities Strategy (2035 targets).	No, Project does not affect SB 375 targets.
By 2019, adjust performance measures used to select and design transportation facilities. • Harmonize project performance with emissions reductions, and increase competitiveness of transit and active transportation modes (e.g. via guideline documents, funding programs, project selection, etc.).	No, Project does not affect viability of transit or active modes.

Recommended Action	Applies to Project?
By 2019, develop pricing policies to support low-GHG transportation (e.g. low-emission vehicle zones for heavy duty, road user, parking pricing, transit discounts).	No, Project does not affect government pricing policies.
Implement California Sustainable Freight Action Plan: • Improve freight system efficiency. • Deploy over 100,000 freight vehicles and equipment capable of zero emission operation and maximize both zero and near-zero emission freight vehicles and equipment powered by renewable energy by 2030.	No, Project does not affect whether Freight Action Plan can be implemented.
Adopt a Low Carbon Fuel Standard with a CI reduction of 18 percent.	No, Project does not affect CARB's ability to adopt standards.
Implement the Short-Lived Climate Pollutant Strategy by 2030: • 40 percent reduction in methane and hydrofluorocarbon emissions below 2013 levels. • 50 percent reduction in black carbon emissions below 2013 levels.	No, Project does not affect whether SLCP strategy can be implemented.
By 2019, develop regulations and programs to support organic waste landfill reduction goals in the SLCP and SB 1383.	No, Project does not affect CARB's ability to adopt regulations.
Implement the post-2020 Cap-and-Trade Program with declining annual caps.	No, Project does not affect CARB's ability to implement Cap-and-Trade.
By 2018, develop Integrated Natural and Working Lands Implementation Plan to secure California's land base as a net carbon sink: • Protect land from conversion through conservation easements and other incentives. • Increase the long-term resilience of carbon storage in the land base and enhance sequestration capacity • Utilize wood and agricultural products to increase the amount of carbon stored in the natural and built environments • Establish scenario projections to serve as the foundation for the Implementation Plan	No, Project does not affect ability to develop such a plan.
Establish a carbon accounting framework for natural and working lands as described in SB 859 by 2018.	No, Project does not affect ability to establish such a framework.

Recommended Action	Applies to Project?
Implement Forest Carbon Plan	No, Project does not affect ability to implement such a plan.
Identify and expand funding and financing mechanisms to support GHG reductions across all sectors.	No, Project does not affect whether CARB can identify and expand funding.

Source: (CARB, 2017, pp. 103-104).

Table 19 shows the amount of change in GHG emissions by Scoping Plan sector. Note that Project sources mainly fall into the electric power and transportation sectors with exception of the portable generator which would be in the industrial sector but is likely to be owned and operated by a contractor.

Table 19 Estimated Change in GHG Emissions by Sector

Scoping Plan Category	1990 ($MMTCO_2e$)	2030 Scoping Plan Ranges ($MMTCO_2e$)
Agriculture	26	24–25
Residential and Commercial	44	38–40
Electric Power	108	30–53
High GWP	3	8–11
Industrial	98	83–90
Recycling and Waste	7	8–9
Transportation (Including TCU)	152	103–111
Natural Working Lands Net Sink*	-7***	TBD
Sub Total	431	294–339
Cap-and-Trade Program	n/a	34–79
Total	**431**	**260**

Source: (2017 Scoping Plan, p. 31).

* Work is underway through 2017 to estimate the range of potential sequestration benefits from the natural and working lands sector.

** The SLCP will reduce emissions in this sector by 40 percent from 2013 levels. However, the 2030 levels are still higher than the 1990 levels as emissions in this sector have grown between 1990 and 2013.

*** This number reflects net results and is different than the intervention targets discussed in Chapter 4.

3.1.4 Ventura County Air Pollution Control District

VCAPCD provided guidance to lead agencies in Ventura County in a report to the Board entitled Greenhouse Gas Thresholds of Significance Options for Land Use Development Projects in Ventura County (VCAPCD, 11/8/2011). The report concludes:

> "*The most common approach is a tiered approach involving first, applicability of any CEQA exemptions, followed by project consistency with a local climate action plan, and then an efficiency-based threshold (Threshold Option 2.7) and/or a bright line gap-based threshold (Threshold Option 3.2).*"

Review of the Wayne J Sand and Gravel Re-circulated Draft EIR (March, 2015) reveals that, Ventura County used a screening threshold of 10,000 metric tonnes of carbon dioxide equivalent per year ($MTCO_2e$/yr) which is based upon thresholds adopted by neighboring air districts (i.e., Santa Barbara, South Coast) and consistent with the tiered significance threshold approach used in SCAQMD.

3.2 Environmental Setting

Gases that trap heat in the atmosphere are GHGs, analogous to the way a greenhouse retains heat. Consequently, these GHG emissions are believed to directly affect the global climate.

Climate change refers to global changes in the average weather of the Earth as measured by changes in wind patterns, storms, precipitation, and temperature. While climate change is global in scale, California-specific impacts from predicted changes in the climate may result in a loss of snow-pack, increased risk of large wildfires, and a potential reduction in the quality and quantity of certain agricultural products.

3.2.1 Effects Attributed to GHG Emissions

The most recent GHG policy document issued by CARB is the next Scoping Plan update published in November 2017 (2017 Scoping Plan). This document Reports updates findings in the field of climate science since the last Scoping Plan update and is the source of the quoted text below (footnotes omitted, see https://www.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf for a complete copy).

> *"Climate scientists agree that global warming and other shifts in the climate system observed over the past century are caused by human activities. These recorded changes are occurring at an unprecedented rate.11 According to new research, unabated GHG emissions could allow sea levels to rise up to ten feet by the end of this century–an outcome that could devastate coastal communities in California and around the world.*
>
> *California is already feeling the effects of climate change, and projections show that these effects will continue and worsen over the coming centuries. The impacts of climate change have been documented by the Office of Environmental Health Hazard Assessment (OEHHA) in the Indicators of Climate Change Report, which details the following changes that are occurring already:*

- *A recorded increase in annual average temperatures, as well as increases in daily minimum and maximum temperatures.*
- *An increase in the occurrence of extreme events, including wildfire and heat waves.*
- *A reduction in spring runoff volumes, as a result of declining snowpack.*
- *A decrease in winter chill hours, necessary for the production of high-value fruit and nut crops.*
- *Changes in the timing and location of species sightings, including migration upslope of flora and fauna, and earlier appearance of Central Valley butterflies.*

In addition to these trends, the State's current conditions point to a changing climate. California's recent historic drought incited land subsidence, pest invasions that killed over 100 million trees, and water shortages throughout the State. Recent scientific studies show that such extreme drought conditions are more likely to occur under a changing climate. The total statewide economic cost of the 2013–2014 drought was estimated at $2.2 billion, with a total loss of 17,100 jobs. In the Central Valley, the drought cost California agriculture about $2.7 billion and more than 20,000 jobs in 2015, which highlights the critical need for developing drought resilience. Drought affects other sectors as well. An analysis of the amount of water consumed in meeting California's energy needs between 1990 and 2012 shows that while California's energy policies have supported climate mitigation efforts, the performance of these policies have increased vulnerability to climate impacts, especially greater hydrologic uncertainty.

Several publications carefully examined the potential role of climate change in the recent California drought. One study examined both precipitation and runoff in the Sacramento and San Joaquin River basins, and found that 10 of the past 14 years between 2000 and 2014 have been below normal, and recent years have been the driest and hottest in the full instrumental record from 1895 through November 2014. In another study, the authors show that the increasing co-occurrence of dry years with warm years raises the risk of drought, highlighting the critical role of elevated temperatures in altering water availability and increasing overall drought intensity and impact. Generally, there is growing risk of unprecedented drought in the western United States driven primarily by rising temperatures, regardless of whether or not there is a clear precipitation trend.

According to the U.S. Forest Service Report, National Insect and Disease Forest Risk Assessment, 2013– 2027, California is at risk of losing 12 percent of the total area of forests and woodlands in the State due to insects and disease, or over 5.7 million acres. Some species are expected to lose significant amounts of their total basal area (e.g., whitebark pine is projected to lose 60 percent of its basal area; and lodgepole pine is projected to lose 40 percent). While future climate change is not modeled within the risk assessment, and current drought conditions are not accounted for in these estimates, the projected climate changes over a 15 year period (2013-2027) are expected to significantly increase the number of acres at risk, and will increase the risk from already highly destructive pests such as the mountain pine beetle. Extensive tree mortality is already prevalent in California. The western pine beetle and other bark beetles have killed a majority of the ponderosa pine in the foothills of *the central and southern Sierra Nevada Mountains. A recent aerial survey by the U.S. Forest Service identified more than 100 million dead trees in California. As there is usually a lag time between drought years and tree mortality, we are now beginning to see a sharp rise in mortality from the past four years of drought. In response to the very high levels of tree mortality, Governor Brown issued an Emergency Proclamation on October 30, 2015, that directed state agencies to identify and take action to reduce wildfire risk through the removal and use of the dead trees.*

A warming climate also causes sea level to rise; first, by warming the oceans which causes the water to expand, and second, by melting land ice which transfers water to the ocean. Even if storms do not become more intense or frequent, sea level rise itself will magnify the adverse impact of any storm surge and high waves on the California coast. Some observational studies Report that the largest waves are already getting higher and winds are getting stronger. Further, as temperatures warm and GHG concentrations increase more carbon dioxide dissolves in the ocean, making it more acidic. More acidic ocean water affects a wide variety of marine species, including species that people rely on for food. Recent projections indicate that if no significant GHG mitigation efforts are taken, the San Francisco Bay Area may experience sea level rise between 1.6 to 3.4 feet, and in an extreme scenario involving the rapid loss of the Antarctic ice sheet, sea levels along California's coastline could rise up to 10 feet by 2100. This change is likely to have substantial ecological and economic consequences in California and worldwide.

While more intense dry periods are anticipated under warmer conditions, extremes on the wet end of the spectrum are also expected to increase due to more frequent warm, wet atmospheric river events and a higher proportion of precipitation falling as rain instead of snow. In recent years, atmospheric rivers have also been recognized as the cause of the large majority of major floods in rivers all along the U.S. West Coast and as the source of 30-50 percent of all precipitation in the same region. These extreme precipitation events, together with the rising snowline, often cause devastating floods in major river basins (e.g., California's Russian River). It was estimated that the top 50 observed floods in the U.S. Pacific Northwest were due to atmospheric rivers. Looking ahead, the frequency and severity of atmospheric rivers on the U.S. West Coast will increase due to higher atmospheric water vapor that occurs with rising temperature, leading to more frequent flooding.

Climate change can drive extreme weather events such as coastal storm surges, drought, wildfires, floods, and heat waves, and disrupt environmental systems including our forests and oceans. As GHG emissions continue to accumulate and climate disruption grows, such destructive events will become more frequent. Several recent studies project increased precipitation within hurricanes over ocean regions. The primary physical mechanism for this increase is higher water vapor in the warmer atmosphere, which enhances moisture convergence in a storm for a given circulation strength. Since hurricanes are responsible for many of the most extreme precipitation events, such events are likely to become more extreme. Anthropogenic warming by the end of the 21st century will likely cause tropical cyclones globally to become more intense on average. This change implies an even larger percentage increase in the destructive potential per storm, assuming no changes in storm *size. Thus, the historical record, which once set our expectations for the traditional range of weather and other natural events, is becoming an increasingly unreliable predictor of the conditions we will face in the future. Consequently, the best available science must drive effective climate policy.*

California is committed to further supporting new research on ways to mitigate climate change and how to understand its ongoing and projected impacts. California's Fourth Climate Change Assessment and Indicators of Change Report will further update our understanding of the many impacts from climate change in a way that directly informs State agencies' efforts to safeguard the State's people, economy, and environment.

Together, historical data, current conditions, and future projections provide a picture of California's changing climate, with two important messages:

- *Change is already being experienced and documented across California, and some of these changes have been directly linked to changing climatic conditions.*
- *Even with the uncertainty in future climate conditions, every scenario estimates further change in future conditions.*

It is critical that California continue to take steps to reduce GHG emissions in order to avoid the worst of the projected impacts of climate change. At the same time, the State is taking steps to make the State more resilient to ongoing and projected climate impacts as laid out by the Safeguarding California Plan.37 The Safeguarding California Plan is being updated in 2017 to present new policy recommendations and provide a roadmap of all the actions and next steps that state government is taking to adapt to the ongoing and inevitable effects of climate change. The Draft Safeguarding California Plan38 is available and will be finalized after workshops and public comments. California's continuing efforts are vital steps toward minimizing the impact of GHG emissions and a three-pronged approach of reducing emissions, preparing for impacts, and conducting cutting-edge research can serve as a model for action. " (CARB, 2017).

3.2.2 Emissions Inventories

CARB's most recent GHG emission inventory, the 2016 Edition, tracks the emissions of seven GHGs identified in the California Health and Safety Code for years 2000 to 2014. In 2014, total GHG emissions were 441.5 $MMTCO_2e$, a decrease of 2.8 $MMTCO_2e$ compared to 2013. This represents an overall decrease of 9.4% since peak levels in 2004. During the 2000 to 2014 period, per capita GHG emissions in California dropped from a peak in 2001 of 13.9 tonnes per person to 11.4 tonnes per person in 2014; an 18% decrease. Overall trends in the inventory also demonstrate that the carbon intensity of California's economy (the amount of carbon pollution per million dollars of gross domestic product (GDP)) is declining, representing a 28% decline since the 2001 peak, while the State's GDP has grown 28% during this period (Trend Report, 2016, p. 1).

The transportation sector remains the largest source of GHG emissions in the State, accounting for 36% of the inventory, and shows a small increase in emissions in 2014. Emissions from the electricity sector continue to decline due to growing zero-GHG energy generation sources. Emissions from the remaining sectors have remained relatively constant, although emissions from high-GWP gases have continued to climb as they replace ozone depleting substances banned under the Montreal Protocol (Trend Report, 2016, p. 2).

3.3 Significance Thresholds

The Environmental Checklist Form in Appendix G of the CEQA Guidelines presents questions about projects that, if true for a particular project, would be considered a significant impact. This document considers the following Environmental Checklist Form questions to be the Significance Thresholds for GHG emissions from this Project.

Would the project:

a) Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?

3.4 Methodology

3.4.1 CEQA Baseline

This Report conservatively assumes no baseline emissions.

3.4.2 Operation Phase

Operation Phase aggregate plant electricity use and engine emissions have been converted to CO2e emissions and combined in Appendix D. They are are summarized in Table 20 below.

Table 20 Operation Phase Max Year GHG Emissions

Activity	CO_2e (MT/yr)
Electricity Use	1,184.5
Vehicle Engine Emissions	2,075.2
Project Emissions – Total	3,259.7

Source: Appendix D

Note: Values in Table may differ slightly from appendix values as they have been converted to Metric Tons.

3.5 Project-Level Impacts and Mitigation Measures

3.5.1 Generate GHG Emissions That May Have a Significant Impact on the Environment

Impact Statement

Impact GHG-1: *Would the Project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?* **(Appendix G Threshold Criteria (a)).**

Impact Analysis

Project emissions of GHGs are presented in Table 21 primarily for purposes of disclosure. Electricity and transportation fuel suppliers and importers are required to report emissions under the Cap-and-Trade which is designed to reduce GHG emissions as needed to achieve emissions reductions described in related planning documents which primarily consists of the AB 32 Scoping Plan. Thus, the emissions reductions will occur at a level in the supply chain above the Project which will have no choice but to use fuel and electricity having GHG intensities that are consistent with the Scoping Plan. Additionally, the total project emissions do not exceed the SCAQMD screening threshold of 10,000 MT/yr.

Table 21 Project Greenhouse Gas Emissions

Activity	CO_2e (MT/yr)
Electricity Use	1,184.5
Vehicle Engine Emissions	2,075.2
Project Emissions – Total	3,259.7

Source: Appendix D

Level of Significance Before Mitigation

Less than significant

Mitigation Measures

None required

Level of Significance After Mitigation

Not applicable

3.5.2 Conflict With an Applicable Plan, Policy or Regulation that Reduces GHGs

Impact Statement

Impact GHG-1: *Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs?* **(Appendix G Threshold Criteria (b)).**

Impact Analysis

Project emissions are evaluated with respect to consistency with the following plans and policies that have been adopted to reduce GHG emissions:

Table 22 Adopted Greenhouse Gas Policies

Plan/Policy	Consistent?
A local jurisdiction's qualified climate action plan or GHG reduction plan.	As detailed in section 4.1.5, the project is consistent because no local climate action or GHG reduction plans apply to the project.
AB 32, SB 32 and the Scoping Plan,	As described previously, AB 32 requires that the CARB adopt regulations to require the reporting and verification of statewide greenhouse emissions and monitor and enforce compliance with the program. The 2017 Scoping Plan is the most recent GHG policy document issued by CARB. Currently, in accordance with AB 32, the SCAQMD has set an interim GHG screening threshold of 10,000 $MTCO_2e$/yr is for industrial projects. Referring to Section 3.5.1 above, total Project GHG emissions are estimated to be below the 10,000 $MTCO_2e$/yr threshold. As such, the Project is consistent with the emissions reductions targets outlined in AB 32 and the 2017 Scoping Plan.
Executive Order B-30-15 goals.	The Project is consistent with the Executive Order B-30-15 goals which apply to the fuel and electricity sectors as a whole. The fuels and electricity used by the Project would be subject to the cap-and-trade program as well as other Scoping Plans and related control measures (e.g., renewable energy portfolio, low carbon fuel standard) that are applied higher up in the supply chain. There is no plan, policy or regulation adopted for the purpose of reducing emissions of GHGs specifically from mining projects. Thus, the sources that are affected by such plans and policies would be consistent with those plans, policies, and/or regulations by virtue of using fuels and electricity that has been produced for consumption within California.

The discussion for impact GHG-1 above addresses this impact also. Consistency with the applicable plan (AB 32 Scoping Plan) will be ensured for electricity and transportation fuels used by the Project by producers and importers of those energy sources thought compliance with the Cap-and-Trade Program. Therefore, consistency with the applicable plan is assured and the Project GHG impact is less than significant.

Level of Significance Before Mitigation

Less than significant

Mitigation Measures

None required

Level of Significance After Mitigation

Not applicable.

4.0 ACRONYMS

AADT	average annual daily trips
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
ADJ_U*	adjusted friction velocity
ADL	annual dermal load
AERMET	AERMOD Meteorological Processor
AERMOD	American Meteorological Society/Environmental Protection Agency Regulatory Model
APCO	Air Pollution Control Officer
AQCCIA	Air Quality and Climate Change Impact Assessment
ASF	age sensitivity factors
ATCM	airborne toxic control measure
ATS	American Thoracic Society
BACM	best available control measure
BACT	best available control technology
BAU	business-as-usual
BPS	best performance standard
BR	breathing rate
BW	body weight
CAAA	Clean Air Act Amendments
CAAQS	California ambient air quality standards
CAFE	corporate average fuel economy
CalEPA	California Environmental Protection Agency
CAP	climate action plan
CAPCOA	California Air Pollution Control Officers Association
CAT	Climate Action Team
CBE	Communities for a Better Environment
CCAA	California Clean Air Act
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide

CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CPF	cancer potency factor
CPUC	California Public Utility Commission
CUPA	Certified Unified Permitting Agency
DPM	Diesel particulate matter
DWR	Department of Water Resources
FAH	fraction of time at home
FED	functionally equivalent document
FPMP	fugitive PM_{10} management plan
g/dscm	grams per dry standard cubic meter
GAMAQI	Guidance for Assessing and Mitigating Air Quality Impacts
GLC	ground level concentration
GM	geometric mean
GRAF	gastrointestinal relative absorption fraction
gr/dscf	grains per dry standard cubic feet
GWP	global warming potential
HARP2	Hot Spots Analysis and Reporting Program
HFC	hydrofluorocarbon
HI	hazard index
hp	horsepower
HQ	hazard quotient
IPCC	International Panel on Climate Change
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LOAEL	lowest observed adverse effects level
MACT	maximum achievable control technology
MEIR	maximum exposed individual receptor
MEIW	maximum exposed individual worker
MPO	metropolitan planning organizations
MT	metric tonnes
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NMHC	non-methane hydrocarbons

N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
NOAEL	no observed adverse effects level
NSPS	New Source Performance Standards
NSR	New Source Review
NHTSA	National Highway Traffic Safety Administration
O_3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
OPR	Governor's Office of Planning and Research
Pb	Lead
PCC	Portland cement concrete
PERP	Portable Equipment Registration Program
PFC	perfluorocarbon
PM	Particulate matter
PM_{10}	PM with aerodynamic diameter less than 10 microns
$PM_{2.5}$	PM with aerodynamic diameter less than 2.5 microns
PMI	point of maximum impact
RACM	reasonably available control measure
RCS	respirable crystalline silica
REL	reference exposure level
RICE	reciprocating internal combustion engine
SB	Senate Bill
SF_6	sulfur hexafluoride
SIP	state implementation plan
SJVAPCD	South Coast Air Quality Management District
SO_2	sulfur dioxide
TAC	toxic air contaminant
tpy	tons per year
TVP	true vapor pressure
U.S.	United States
US EPA	United States Environmental Protection Agency

VDE	visible dust emissions
VMT	vehicle miles traveled
VOC	volatile organic compounds
WAF	worker adjustment factor
WRCC	Western Regional Climate Center

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APPENDEIX A FIGURES

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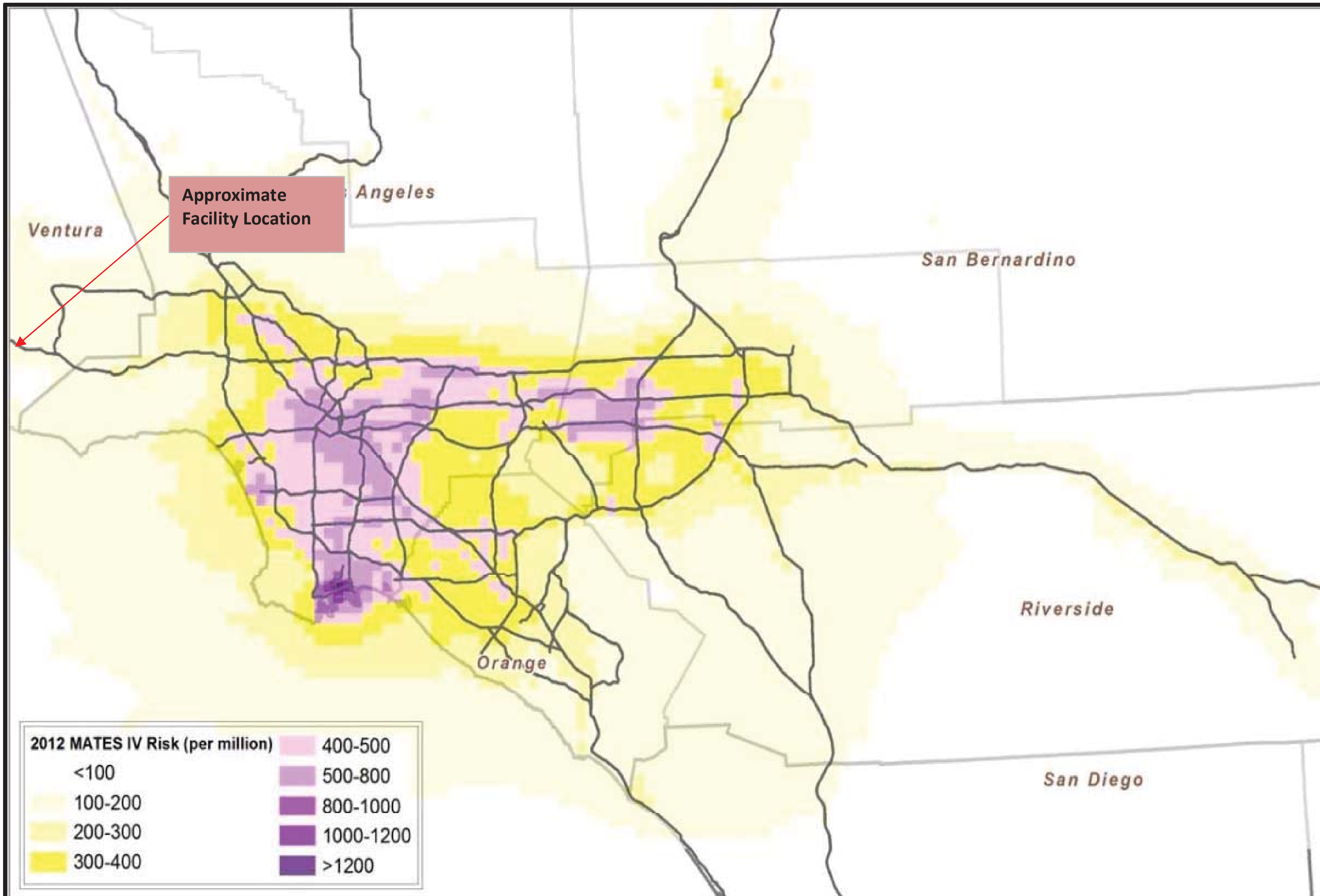
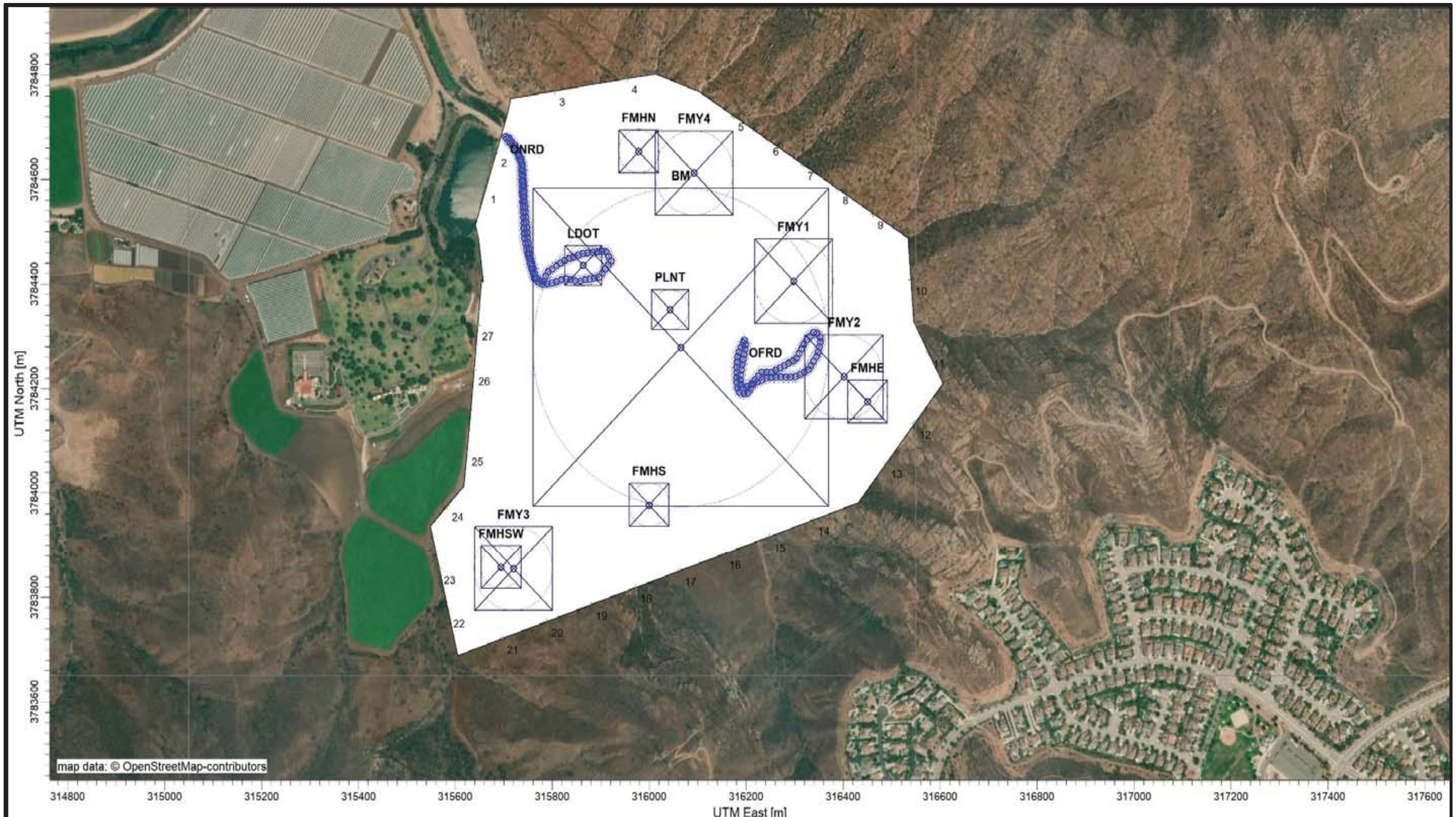
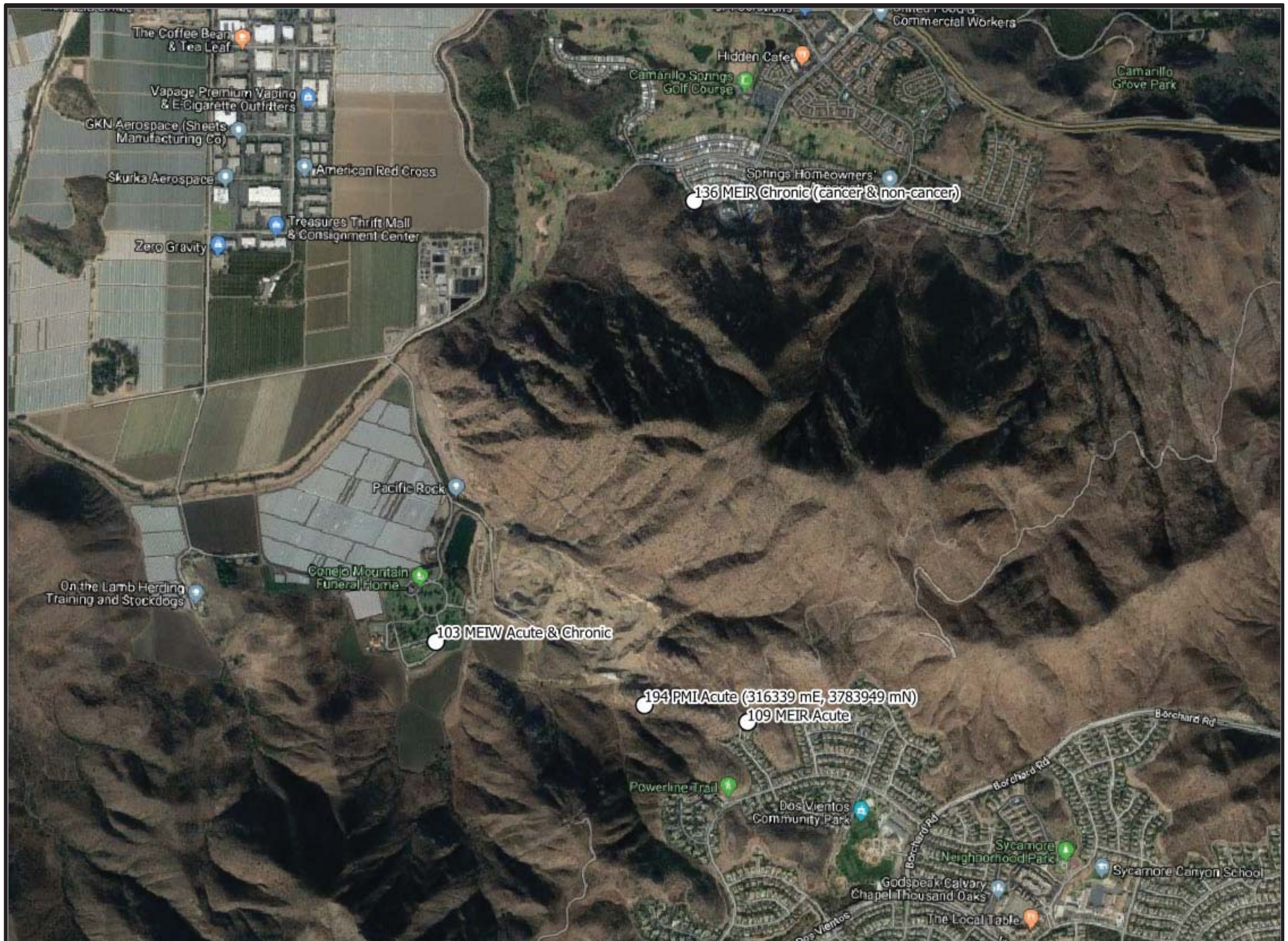


Source: Multiple Air Toxics Exposure Study in the South Coast Air Basin MATES IV Final Report, South Coast AQMD, May 2015	SESPE CONSULTING, INC.	FIGURE 1	2012 MATES IV Cancer Risk Pacific Rock Quarry 1000 South Howard Road Camarillo, CA 93012		
		PROJECT #:	PA01.09.01	DATE:	3/21/19
		SCALE:	NOT TO SCALE	DRAWN BY:	ADA

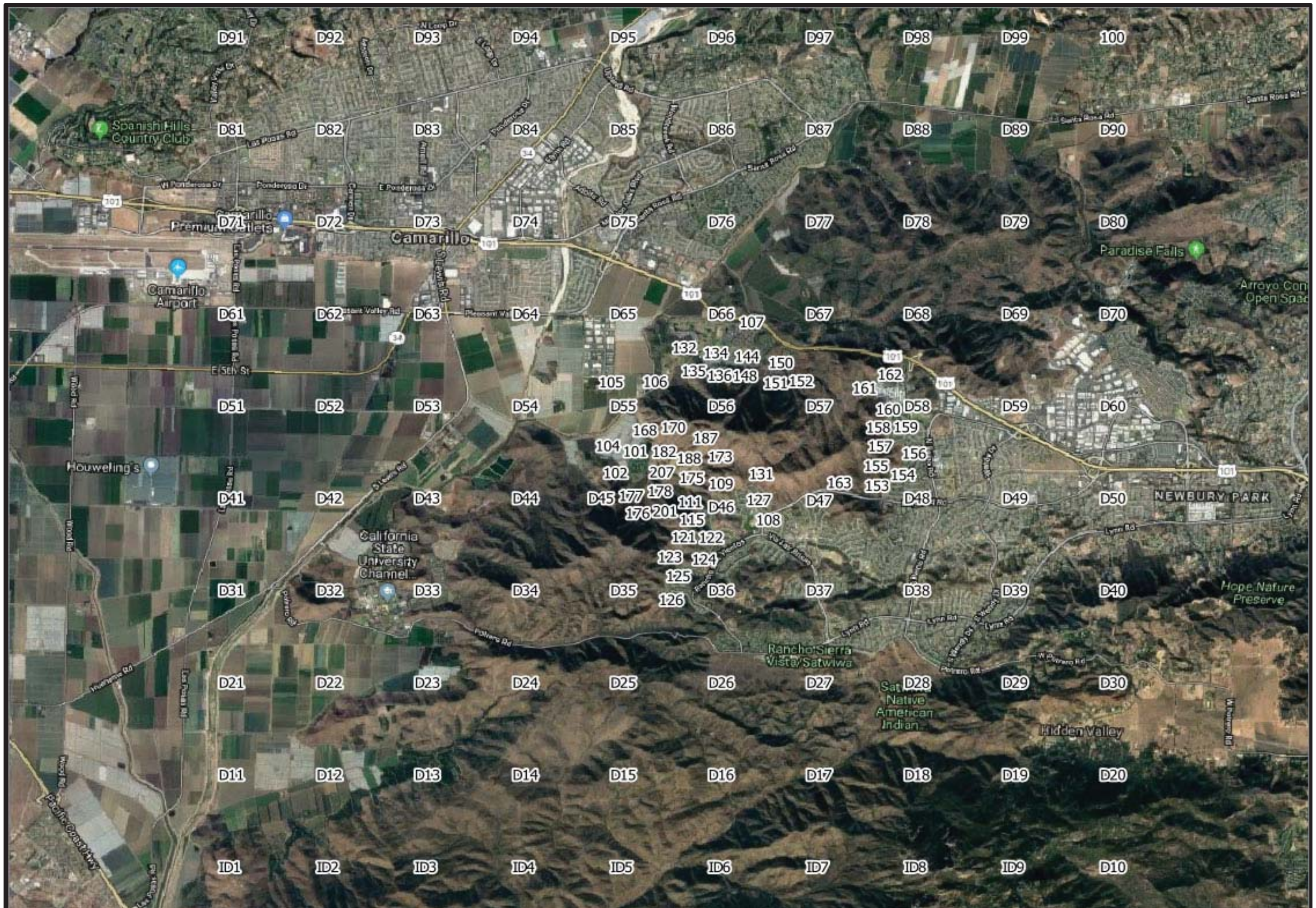
Source: Google Earth	SESPE CONSULTING, INC.	**FIGURE** 2	**On-Site Haul Routes** Pacific Rock Quarry 1000 South Howard Road Camarillo, CA 93012	
		PROJECT #: PA01.09.01	DATE:	3/21/19
		SCALE: AS SHOWN	DRAWN BY:	ADA



Source: Lakes AERMOD View	SESPE CONSULTING, INC.	**FIGURE** 3		**Model Source Objects** Pacific Rock Quarry 1000 South Howard Road Camarillo, CA 93012	
		PROJECT #:	PA01.09.01	DATE:	3/21/19
		SCALE:	AS SHOWN	DRAWN BY:	ADA



Source: Google Earth	SESPE CONSULTING, INC.	FIGURE 4	**Modeled Receptors (Local)** Pacific Rock Quarry 1000 South Howard Road Camarillo, CA 93012		
		PROJECT #:	PA01.09.01	DATE:	3/21/19
		SCALE:	NOT TO SCALE	DRAWN BY:	ADA



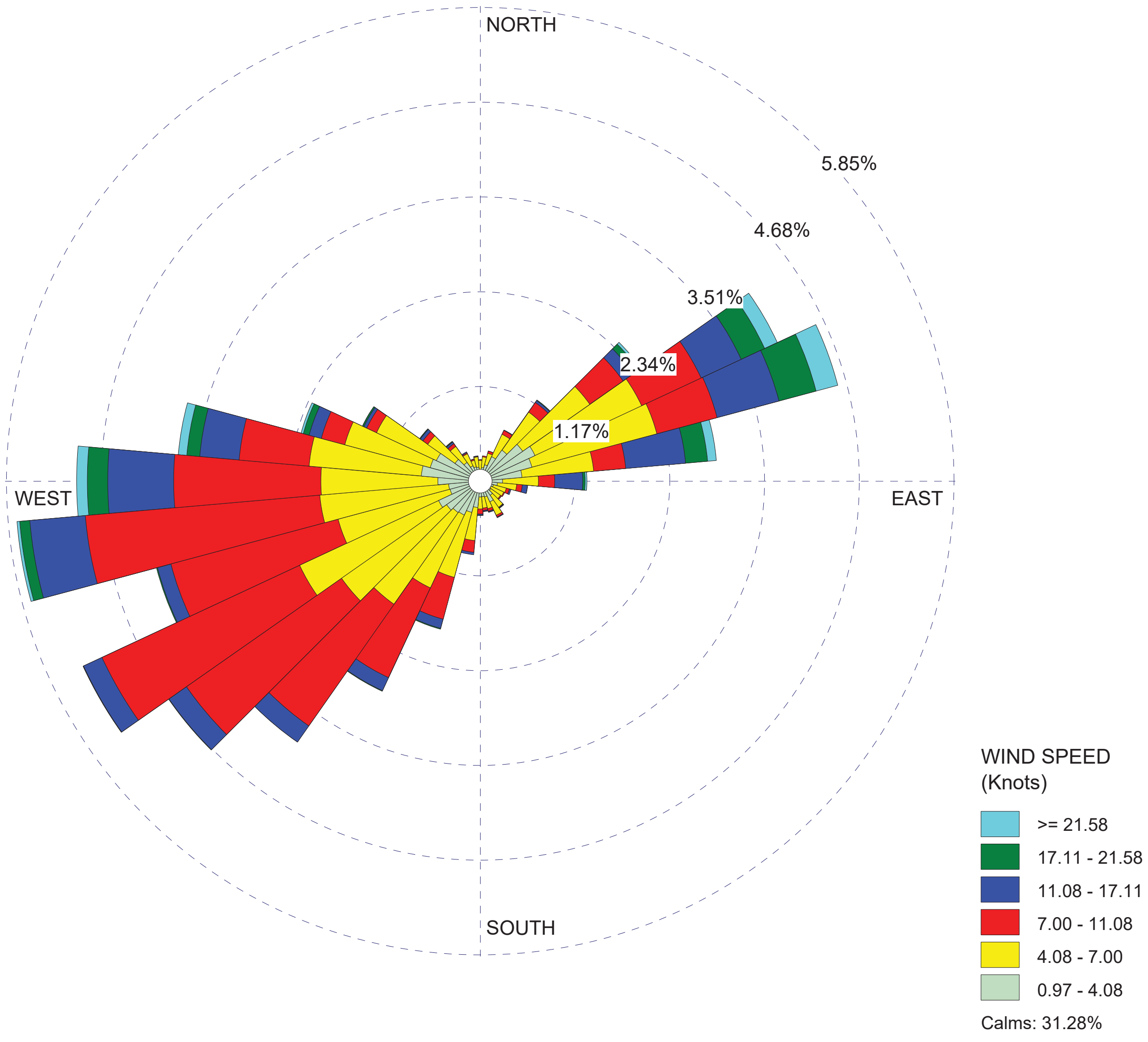
Source: Google Earth	SESPE CONSULTING, INC.	FIGURE 5	Modeled Receptors (Regional) Pacific Rock Quarry 1000 South Howard Road Camarillo, CA 93012		
		PROJECT #:	PA01.09.01	DATE:	3/21/19
		SCALE:	NOT TO SCALE	DRAWN BY:	ADA

WIND ROSE PLOT:

Figure 6: Windrose for Station 23136

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS: Meterorological Data from California Air Resources Board	DATA PERIOD: **Start Date: 1/1/2009 - 00:00** **End Date: 1/2/2014 - 23:59**	COMPANY NAME: Sespe Consulting, Inc.	
		MODELER: ADA	
	CALM WINDS: **31.28%**	TOTAL COUNT: **42907 hrs.**	
	AVG. WIND SPEED: **5.06 Knots**	DATE: **3/28/2019**	PROJECT NO.: **PA01.09.01**

WRPLOT View - Lakes Environmental Software

APPENDEIX B LITERATURE REGARDING AGGREGATES

A Note on the Environmental Costs of Aggregates
Map Sheet 52 Report
Open File Report 99-09 (Partial)
Caltrans Aggregate Availability Memo
DTSC Report: Inorganic Chemicals in Ground Water and Soil
DTSC Report: Determination of a southern California Regional Background Arsenic Concentration in Soil

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DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS AND POLICY
DIVISION OF AGRICULTURE AND NATURAL RESOURCES
UNIVERSITY OF CALIFORNIA AT BERKELEY

WORKING PAPER NO. 994

A NOTE ON THE ENVIRONMENTAL COSTS OF AGGREGATES

by

Peter Berck

California Agricultural Experiment Station
Giannini Foundation of Agricultural Economics
January 2005

A Note on the Environmental Costs of Aggregates

by Peter Berck*
January 10, 2005

Abstract:

The opening of a new site for the production of aggregates has both direct and indirect impacts on the environment. The indirect impacts include changes in the environmental costs of hauling aggregates and possible changes in the level of construction activity. In this note, we show that the most likely effect of a new aggregate site is to reduce the truck miles used for aggregate hauling, which is an environmental benefit. We also show that the change in construction activity induced by a new site is likely to be extremely small.

---

* Peter Berck is Professor of Agricultural and Resource Economics. I would like to thank Atanu Dey for able research assistance. The remaining errors are mine.

A Note on the Environmental Costs of Aggregates

The opening of a new quarry for aggregates will change the pattern of transportation of aggregates in the area served by the quarry. In this note, we will show that, so long as aggregate producers are cost minimizing, the new pattern of transportation requires less truck transport than the pattern of transportation that existed before the opening of the new quarry. Since the costs of providing aggregates falls, it is reasonable to assume that the price of delivered aggregates also will fall. This note also shows that the demand expansion effect is of very small magnitude. Since the demand increase from a new quarry is quite small, the dominant effect is that the quarries are on average closer to the users of aggregates and, as a result, the truck mileage for aggregate hauling decreases. To summarize the effects of a new quarry project:

> a) The project in itself will not significantly increase the demand for construction materials in the region through market forces, which include the downward pressure on pricing.
>
> b) Truck traffic (i.e. vehicle miles traveled) in the region will not increase and may decrease as a result of the project.

As a result, the effect of a new quarry project will be to reduce the air emissions from aggregate trucking. The reduction in emissions should be included as a positive impact of a quarry project in any analysis of the environmental consequences of a new quarry.

The remainder of this note provides a brief description of the economics of construction materials and explains why these points must be true.

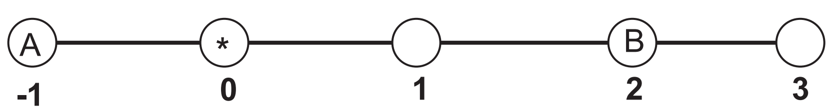
Based upon the available evidence, a project would decrease haul distances for aggregates and would therefore decrease emissions from trucks, rather than increase them.

There are two economic facts that are important to understand in evaluating the likely addition or subtraction to truck traffic from a new quarry. One is the economics of location. The second is the demand for aggregates, which is the quantity of aggregates used as a function of price.

That a new site leads to smaller haul distance is a matter of geometry and economics. Transportation is a major element in the cost of delivered aggregate, so new sites are chosen, within the limits placed by the natural availability of aggregates, to minimize transport costs.

An example should make this fact clear. Consider diagram 1. Circles represent aggregate-using projects of equal size. The five projects shown are located at miles marked –1, 0, 1, 2, and 3. Two of the project sites are marked with the letters A and B, and they are potential locations for aggregate production. The location at mile 0 is an existing aggregate production site and it is marked by an asterisk (*). The scale is in miles. For simplicity, each project uses one unit of aggregate.

Diagram 1



With only one aggregate production site at mile 0, the miles traveled to supply the five projects is seven: zero miles for project at mile 0, one mile for each for the projects at mile –1 and 1, two miles for the project at 2 and three miles for the project at 3 for a total of 7 miles. If an additional aggregate production site is started at A, the miles traveled decreases to six, because there is no transportation required for the aggregate-using project at A and all other projects are served by the original site. However, if the new site is placed at B instead of being placed at A, transport distance falls to three miles because then two projects have aggregate production at their location and thus have zero transportation requirements, and the three remaining sites each require a one-mile transport. Each aggregate production site supplies 2.5 units of aggregates, that is, half the total required by the five projects. Since cost depends on distance and, markets minimize costs, the free market system always will choose a point like B, the one with the lowest cost. In this case it is also the lowest transport distance.

Other forms of industrial organization lead to higher prices being charged for aggregates, but the effect of additional suppliers is to lower prices and haul distances. Appendix A elucidates the case where the price depends upon the delivered costs of the second most efficient producer.

The second issue for the siting of aggregate production is the possibility that lower delivered costs lead to more projects or more use of aggregates in existing projects. The degree to which decrease in the price of a good, in this case construction material, leads to an increase in the quantity of that material used is described by the elasticity of demand. The elasticity of demand is the percent increase in use caused by a one percent decrease in price.

A search of the economic literature found no articles estimating a positive elasticity of demand for aggregates. A review by the Susan Kohler[†] finds that only population and not price is correlated with aggregate usage. In other words, a reduction in the price of aggregate does not lead to an increase in demand for it.

While it is a theoretical possibility that the quantity of aggregates demanded (that is, the quantity used in projects) is responsive to price, two facts about construction make this unlikely. First, the cost of aggregates is usually a tenth or less of the cost of a project. Second, the building of projects -- housing, roads, and commercial construction -- is not very sensitive to the costs of producing them.

[†] *Map Sheet 52. Aggregate Availability in California.* by Susan L. Kohler. California Department of Conservation. California Geological Survey. Sacramento. 2002.

Although we have not found literature on the elasticity of demand for either public projects or contract construction, there is an empirical literature on the elasticity of demand for housing[‡]. In these studies, a one percent change in the price leads to about a half percent change in the quantity of housing consumed. Public projects, like roads, are budgeted, often from specials funds, like road taxes. In that case, a one percent decrease in the costs of *all* projects in a taxing jurisdiction would lead to a one percent increase in the quantity of roads built. Since aggregates are very expensive to ship, the quarry being considered likely would only change the costs of nearby road construction, perhaps for just one county.

For example, Monterey County has a population of 400,000 while the state population is 33.9 million people.[§] Assuming that road construction is roughly proportional to population, about 1.2 percent of road construction would be in Monterey. So, if a new quarry in Monterrey decreased the price of aggregates in Monterrey by 1 percent and left the price the same in the rest of the state, then the average price in the whole state would fall by about 0.01 percent, which is negligible. A project that affects only a small part of a taxing jurisdiction has only a small effect on that jurisdiction's costs and can have no major affect on the quantity of services supplied by that jurisdiction.

We know of no evidence of elasticities for construction work as high as one. We estimate the elasticity of demand for projects using aggregates to be much less than one, likely under a half in the private sector and near zero in the public sector.

Given that projects will be built, there is some possibility of substituting of other structural materials for aggregates in buildings. However these substitute materials too would be trucked. The realistic possibility for roads is that there are no materials to substitute for aggregates. I do not believe this pathway to greater use of aggregates in building would be triggered by the transport savings from a new aggregate source or that it would result in an increase in net truck miles.

[‡] Hanushek, Eric A., John Quigley. "What is the price elasticity of housing demand?" *Review of Economics and Statistics.* August, 1980.
[§] Population figures are for the year 2000.

Since a change in price of aggregates does not lead to either a substantial substitution of other materials for aggregates or a substantial increase in the quantity of projects, the demand for aggregates is very inelastic. This inelasticity of demand is exactly the reason that the State of California can use a fixed per-capita consumption rate for forecasting the need for construction materials.

An example will make clear how the transport advantage and elasticity of demand arguments fit together. Let us consider a new quarry that, through its transportation advantage over existing quarries, would save 12.5 miles of trucking on each and every project in the study area. We shall assume that the average truck haul pre-project was 25 miles.

According to the *Map Sheet 52: Aggregate Availability in California,* the cost of construction aggregate doubles every 25-35 miles from the point of production. The following calculations are carried out assuming that a 25 mile haul doubles the cost. Assuming that a unit of aggregate costs $1 at the production site, then its delivered cost at a project site 25 miles away is $2. If the haul distance were to be reduced to 12.5 miles due to a new quarry, then half of the transportation costs – or $0.50 – would be saved. This represents a cost savings of 25 percent in the delivered cost of aggregate and is entirely due to a 50 percent decrease in miles traveled.

The only way for a new quarry to influence the quantity of construction is through the price of aggregates. This example presents the competitive case, where the delivered price decreases by the full amount of the transport cost savings. In the competitive case, the effect on the quantity of construction will be extremely moderate, as demonstrated below. (Appendix A presents a less than perfectly competitive example.)

In keeping with the fact that the cost of aggregate accounts for less than 10 percent of the total cost of a construction project, a price reduction of 25 percent on aggregate is a cost saving of 2.5 percent or less on the project. Let us assume a very liberal price elasticity of demand for construction of 0.5. In other words, 2.5 percent reduction in the cost of construction would lead to 1.25 percent increase in the quantity of construction demanded. This increased quantity of delivered aggregate leads to additional truck haul miles. The number of increased miles from the increased aggregate sales is 1.25 percent of the original quantity times the new haul distance which is 50% of the original distance. Therefore, the percentage increase in truck haul miles occasioned by a decrease in aggregate price will be 0.625 percent because the new aggregate location is only half as far away.

In this example, the new quarry saves 50 percent of truck trip miles through location and contributes 0.625 percent of new truck trip miles from demand increase. This leads to a net decrease of 49.375 percent in truck miles. The following Table 1 summarizes the net reduction of truck haul miles for three different scenarios – the new aggregate project site located at 12.5, 6.25, and 2.5 miles from a construction site.

Table 1

Distance to New Quarry (miles)	Decrease in haul miles (%)**	Decrease in delivered aggregate cost (%)	Decrease in construction cost (%)	Increase in construction quantity (%)	Increase in haul miles from additional construction(%)††	Net decrease in miles hauled (%)
12.5	50	25	2.5	1.25	0.62	**49.4**
6.25	25	37.5	3.75	1.85	0.46	**74.5**
2.5 miles	90	45	4.5	2.25	0.22	**89.8**

There is a general rule to be deduced from the example: The percent decrease in cost for the delivery of aggregates equals the percent decrease in miles driven, while the increase in the use of aggregates equals the elasticity of demand for a final product (such as roads) times the cost share of aggregates in making the product times the decrease in cost. Since the elasticity of demand for a final product is much less than one, and the cost

** This decrease is with respect to the pre-project haul miles.
†† This increase is with respect to the pre-project haul miles.

share of aggregates in making the product is about 8 percent, a new quarry must decrease truck miles and decrease NOX and other emissions from trucks.

Appendix A

Spatial Models with Imperfect Competition

When a producer has a price advantage over other producers because of lower transport costs, the producer can exploit that advantage by charging consumers a price greater than its marginal cost. Marginal cost is the cost of producing one incremental unit.
In this appendix, I will briefly investigate one model of spatial competition that is derived from a classical model of Hotelling [‡‡]

In Hotelling's model, two stores (which are analogous to production sites) can relocate at no cost and then compete based on price. Since consumers are some distance from the store, they see the price of a product as the amount they pay for the product plus the cost of travel. They go to the store with the least total cost (cost of product plus cost of travel). The stores seek to make the most money they can make. The price the consumer will pay is the largest price that the store the consumer goes to can charge without losing the customer to the other store.[§§] In Hotelling's model, the two stores will locate next to each other, split the market in half, and charge the competitive price. While the pricing rule of the Hotelling model may well apply to aggregates, the assumption of complete location flexibility is not applicable.

Returning to the model of diagram 1, shown above., I now consider the effects on pricing of adding one aggregate production site with competition in prices. Consider the case where both aggregate production sites and aggregate-using projects exist at location A and *. The production site at * would be willing to supply the project at location A at its marginal cost of production (mc) plus the cost of transport for one mile, for a total of mc + 1 c. This is higher than the marginal plus transport costs that production site A has for

---

[5] Hotelling, Harold. 1929. "Stability in Competition." Economic Journal 39:41-57
[6] Salop, Steven C. 1979. "Monopolistic Competition with Outside Goods." *The Bell Journal of Economics.* Salop models the competition between stores in terms of quantity, so that the price for consumers near a store is determined as a monopolist would determine price. With a very low elasticity of demand as is true for aggregates, the price competition model of Hotelling seems more appropriate.

supplying the project at A. However, the site at A can charge up to mc+c without losing the customer. The site charges mc+c while its costs are mc and makes c units of pure profit. The site at * prices in the same way—a price just high enough to avoid the site at A from taking the customer. For the sites to the right of *, the prices are mc+2, mc+3, and mc+ 4. In each case, this is the highest price site * can charge without losing the customer to site A.

In this model, one of the best places for a new site would be at B. The new site would sell ½ unit to the project between it and * at a price of mc + c, a whole unit to the project located at B at a price of mc + 2c (the price at which the site at * would be willing to supply aggregate), and a whole unit to the project located to its right at a price of mc + 3c. The result of adding the new site would be that the price for each project to the right of the project at * fell by c.

With competitive (marginal cost) pricing as described in the body of the note, the addition of the new site at B would result in the prices paid by projects decreasing by four, while with imperfect competition as described in this appendix, the new site would result in the prices paid by projects decreasing only by three. Compared to the competitive case cited above, the imperfect competition example results in smaller changes in prices and therefore a larger decrease in truck traffic.

MAP SHEET 52

(UPDATED 2018)

AGGREGATE SUSTAINABILITY IN CALIFORNIA

2018

CALIFORNIA GEOLOGICAL SURVEY
Department of Conservation

STATE OF CALIFORNIA
EDMUND G. BROWN, JR.
GOVERNOR

THE NATURAL RESOURCES AGENCY
JOHN LAIRD
SECRETARY FOR RESOURCES

DEPARTMENT OF CONSERVATION
DAVID BUNN
DIRECTOR

CALIFORNIA GEOLOGICAL SURVEY
JOHN G. PARRISH, PH.D., *STATE GEOLOGIST*

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"The Department of Conservation makes no warranties as to the suitability of this product for any particular purpose."

MAP SHEET 52

(UPDATED 2018)

AGGREGATE SUSTAINABILITY IN CALIFORNIA

By

John P. Clinkenbeard (PG #4731)
and
Fred W. Gius (PG #7788)

2018

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TABLES

INTRODUCTION

Sand, gravel, and crushed stone are “construction materials.” These commodities, collectively referred to as aggregate, provide the bulk and strength to Portland Cement Concrete (PCC), Asphaltic Concrete (AC, commonly called “black top”), plaster, and stucco. Aggregate is also used as road base, subbase, railroad ballast, and fill. Aggregate normally provides 80 to 100 percent of the material volume in the above uses.

The building and paving industries in California consume large quantities of aggregate and future demand for this commodity is expected to increase throughout California. Aggregate materials are essential to modern society, both to maintain the existing infrastructure and to provide for new construction. Therefore, aggregate materials are a resource of great importance to the economy of any area. Because aggregate is a low unit-value, high-bulk-weight commodity, it must be obtained from nearby sources to minimize economic and environmental costs associated with transportation. If nearby sources do not exist, then transportation costs can quickly exceed the value of the aggregate. Transporting aggregate from distant sources results in increased construction costs, fuel consumption, greenhouse gas emissions, air pollution, traffic congestion, and road maintenance.

To give an idea of the scale of these impacts, from 1987 to 2016, California consumed an average of about 180 million tons of construction aggregate (all grades) per year. Moving in 25 ton truckloads that is 7.2 million truck trips per year. With an average 25-mile haul (50-mile round trip) that amounts to 360 million truck miles traveled, more than 51 million gallons of diesel fuel used, and more than 570,000 tons of carbon dioxide emissions produced annually. If the haul distance is doubled to 50 miles (100-mile round trip) the numbers double to 720 million truck miles traveled, more than 102 million gallons of diesel fuel used, and over 1.1 million tons of carbon dioxide emissions produced.

Land-use planners and decision makers in California are faced with balancing a wide variety of needs in planning for a sustainable future for their communities and regions. Mining is often seen as a controversial land use during the permitting process. However, there are benefits to having local sources of construction aggregate. Increasingly, as existing permitted aggregate supplies are depleted, local land-use decisions regarding aggregate resources can have regional impacts that go beyond local jurisdictional boundaries.

These factors, universal need, increasing demand, the economic and environmental costs of transportation, and multiple land-use pressures make information about the availability and demand for aggregate valuable to land-use planners and decision makers charged with planning for a sustainable future for California’s citizens.

California Geological Survey (CGS) Map Sheet 52 and this accompanying report provide general information about the current availability of, and future demand for, California’s permitted aggregate reserves. Map Sheet 52 was originally published in 2002 (Kohler, 2002) and subsequently updated in 2006 (Kohler, 2006) and 2012 (Clinkenbeard, 2012). Map Sheet 52 (2018) is an update of the version published in 2012.

Map Sheet 52 updates data from 49 reports compiled by the CGS for more than 30 aggregate study areas throughout the state (see Appendix). These study areas cover about 30 percent of the state and provide aggregate for about 85 percent of California's population. This report is divided into three parts:

- Part I - provides data sources and methods used to derive the information presented.
- Part II - compares the updated 2018 Map Sheet 52 to the prior (2012) map.
- Part III - an overview of construction aggregate.

All aggregate data and any reference to "aggregate" in this report and on the map, pertain to "construction aggregate," defined as alluvial sand and gravel or crushed stone that meets standard specifications for use in PCC or AC unless otherwise noted.

The estimates of permitted resources, aggregate demand, and years of permitted reserves remaining on Map Sheet 52 (2018) and in this report, are based on conditions as of January 1, 2017 and do not reflect changes, such as production, mine closures, or new or expanded permits, that may have occurred since that time. Although the statewide and regional information presented on the map and in this report may be useful to decision-makers, it should not be used as a basis for local land-use decisions. The more detailed information on the location and estimated amounts of permitted and non-permitted resources, and future regional demands contained in each of the aggregate studies employed in the compilation of Map Sheet 52 should be used for local land-use and decision-making purposes.

PART I: DESCRIPTION OF MAP SHEET 52, AGGREGATE SUSTAINABILITY IN CALIFORNIA

Map Sheet 52 is a statewide map showing a compilation of data about aggregate availability collected over a period of about 40 years and updated to January 1, 2017. The purpose of the map is to compare projected aggregate demand for the next 50 years with currently permitted aggregate reserves in various regions of the state. The map also shows the projected years of permitted reserves remaining and highlights regions where less than 10 years of permitted aggregate supply remain. The following sections describe data sources and methodology used in the development of the map.

Mineral Land Classification Reports and Aggregate Studies

Aggregate reserves and projected aggregate demand shown on Map Sheet 52 are updated from mineral land classification reports published by CGS between 1979 and 2017 (see Appendix). They were prepared in response to California's Surface Mining and Reclamation Act of 1975 (SMARA) that requires the State Geologist to classify land based on the known or inferred mineral resource potential of that land. SMARA, its regulations and guidelines, are described in Special Publication 51 (State Mining and Geology Board, 2000). The regulations and guidelines can be found on the State Mining and Geology Board website at http://www.conservation.ca.gov/smgb.

The Mineral Land Classification process identifies lands that contain economically significant mineral deposits. The primary goal of mineral land classification is to ensure that the mineral resource potential of lands is recognized and considered in land-use planning. The classification process includes an assessment of the quantity, quality, and extent of aggregate deposits in a study area.

Mineral land classification reports may be specific to aggregate resources, may contain information about both aggregate and other mineral resources, or they may only contain information on minerals other than aggregate. Reports that focus on aggregate include aggregate resource classification and mapping, estimates of permitted and non-permitted aggregate resources, projected 50-year demand for aggregate resources, and an estimate of when the permitted reserves will be depleted. Map Sheet 52 is a statewide updated summary of 50-year demands and permitted resources for all regional SMARA classification reports pertaining to construction aggregate.

Mineral land classification studies for aggregate may use either a Production-Consumption (P-C) region or a county as the study area boundary. A P-C region is one or more aggregate production districts (a group of producing aggregate mines) and the market area they serve. P-C regions sometimes cross county boundaries. Mineral land classification reports include information from one or more P-C regions, or from a county. For ease in discussion, the area covered by each P-C region or county aggregate study is referred to as an "aggregate study area." SMARA guidelines recommend that the State Geologist periodically review the mineral land classification in defined study regions to determine if new classifications are necessary. The projected 50-year forecast of aggregate demand in the region may also be revised.

The index map of aggregate studies shown in the lower left-hand corner of Map Sheet 52 shows the latest reports that cover an aggregate study area. Earlier reports covering the same areas or portions of areas are referenced in the Appendix with an asterisk (“*”). Original mineral land classification reports and update reports are listed in the Appendix and can be found on the CGS Information Warehouse at http://maps.conservation.ca.gov/cgs/informationwarehouse/.

Fifty-Year Aggregate Demand Forecast

The fifty-year aggregate demand forecast for each of the aggregate study areas is presented on Map Sheet 52 as a pie chart (See *Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves* section), and is presented in Table 1 of this report. The demand information may be new, or updated from previously published mineral land classification reports. The demand forecast information depicted on Map Sheet 52 is for the period January 1, 2017 through December 2066.

The aggregate study areas with the greatest projected future demand for aggregate are the South San Francisco Bay and Temescal Valley-Orange County areas. Each is expected to require more than a billion tons of aggregate by the end of 2066. Other areas with projected high demands are Western San Diego County, San Gabriel Valley, San Bernardino, Sacramento County, and Palmdale. Each of these areas is projected to need more than 500 million tons of aggregate in the next 50 years. Aggregate study areas having smaller demands generally are in rural, less populated areas. The aggregate study areas of El Dorado County, Glenn County, Nevada County, Shasta County, and Tehama County are all projected to require less than 100 million tons of aggregate over the next 50 years.

Methodology

The steps used for forecasting California’s 50-year aggregate needs using the per capita consumption model are:

1. Collecting yearly historical production and population data.

2. Dividing yearly aggregate production by the population for that same year to determine annual historical per capita consumption.

3. Determining the average of the annual historical per capita consumption values for the range of years being used.

4. Projecting yearly population for a 50-year period from the beginning of 2017 through 2066.

5. Multiplying each year of projected population by the average historical per capita consumption and adding the results for each year to obtain the 50-year aggregate demand.

Table 1. Comparison of 50-Year Demand to Permitted Aggregate Reserves for Aggregate Study Areas as of January 1, 2017.

AGGREGATE STUDY AREA[1]	**50-Year Demand** (million tons)	**Permitted Aggregate Reserves** (million tons)	**Permitted Aggregate Reserves Compared to 50-Year Demand** (percent)	**Projected Years Remaining**
Bakersfield P-C Region	338	1,708	505	More than 50
Barstow-Victorville P-C Region	163	117	72	31 to 40
Claremont-Upland P-C Region	202	90	45	21 to 30
El Dorado County	82	15	18	11 to 20
Fresno P-C Region	305	556	182	More than 50
Glenn County	41	22	54	21 to 30
Merced County	154	61	40	21 to 30
Monterey Bay P-C Region	333	297	89	41 to 50
Nevada County	41	52	127	More than 50
North San Francisco Bay P-C Region	492	263	53	21 to 30
Palmdale P-C Region	569	163	29	11 to 20
Palm Springs P-C Region	238	163	68	31 to 40
Placer County	188	387	206	More than 50
Sacramento County	724	327	45	21 to 30
Sacramento-Fairfield P-C Region	295	109	37	21 to 30
San Bernardino P-C Region	939	156	17	11 to 20
San Fernando Valley/ Saugus-Newhall[2]	**387**	**17**	**4**	**10 or fewer**
San Gabriel Valley P-C Region	751	297	40	21 to 30
San Luis Obispo-Santa Barbara P-C Region	226	58	26	11 to 20
Shasta County	82	49	60	31 to 40
South San Francisco Bay P-C Region	1,320	506	38	21 to 30
Stanislaus County	160	39	24	11 to 20
Stockton-Lodi P-C Region	409	203	50	21 to 30
Tehama County	49	30	61	31 to 40
Temescal Valley-Orange County[2]	1,079	862	80	41 to 50
Tulare County	130	53	41	21 to 30
Ventura County[2]	241	84	35	11 to 20
Western San Diego County P-C Region	763	265	35	11 to 20
Yuba City-Marysville P-C Region	344	679	197	More than 50
Total	11,045	7,628	69	

[1] Aggregate study areas follow either a Production-Consumption (P-C) region boundary or a county boundary. A P-C region includes one or more aggregate production districts and the market area that those districts serve. Aggregate resources are evaluated within the boundaries of the P-C Region. County studies evaluate all aggregate resources within the county boundary.

[2] Two P-C regions have been combined into one study area.

Bold = study area with ten or fewer years of permitted reserves.

For this update, the range of years of historical production and population data used were generally from 1980-2016.

The per capita consumption model has proved to be effective for projecting aggregate demand in major metropolitan areas. However, the per capita model may not work well in county aggregate studies or in P-C regions that import or export a large percentage of aggregate resulting in a low correlation between P-C region production and population. In such areas, projections may be made based on historical production or, multiple projections based on differing assumptions may be used to better characterize a range of future demand.

For regions that export large amounts of aggregate to neighboring P-C regions, projections are based on an historical production model where 50-year aggregate demand is determined by extending a best-fit line of historical aggregate production data for a county or region. This model was used to project Yuba City-Marysville's 50-year demand because the region exports about 70 percent of its aggregate into neighboring areas such as Sacramento County and Placer County. The 50-year demand for Glenn and Tehama counties, the Palmdale P-C Region, and the Temescal Valley-Orange County area was also projected using this method.

Permitted Aggregate Reserves

Approximately 7.6 billion tons of permitted aggregate reserves lie within the aggregate study areas shown on Map Sheet 52. Permitted aggregate reserves are aggregate deposits that have been determined to be acceptable for commercial use, exist within properties owned or leased by aggregate producing companies, and have permits allowing mining of aggregate material. A "permit" is a legal authorization or approval by a lead agency, the absence of which would preclude mining operations. Although some permitted reserves face legal challenges, these reserves are included in this study pending resolution of those challenges.

In California, mining permits usually are issued by local lead agencies (county or city governments). Map Sheet 52 shows permitted aggregate reserves as a percentage of the 50-year demand on each pie chart (See *Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves* section). Beneath the study area name located next to its corresponding pie chart is the permitted resource in tons along with the 50-year demand. These figures are also given in Table 1.

Permitted aggregate resource calculations shown on the map and in Table 1 initially were determined from information provided in reclamation plans, mining plans, and use permits issued by the lead agencies. When information was inadequate to make reliable independent calculations, CGS staff used resource estimates provided by mine operators or owners. These data were checked against rough calculations made by CGS staff, and any major discrepancies were discussed with the mine operators or owners. Permitted reserve calculations have been updated to account for production from 2010-2016 and are current as of the beginning of 2017.

Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves

Fifty-year aggregate demand compared to the currently permitted aggregate reserves is represented by a pie chart for each aggregate study area on Map Sheet 52. Each pie chart is in the approximate center of the aggregate study area it represents. There are four different sizes of charts, each representing a 50-year demand range. The smallest pie chart represents 50-year demands of less than 200 million tons, while the largest chart represents demands of over 800 million tons. The 50-year demand (in tons) is shown on the map with the amount of permitted reserves beneath the study area name located next to its corresponding pie chart (permitted reserves, left / 50-year demand, right). The whole pie represents the total 50-year aggregate demand for a particular aggregate study area. The blue portion of the pie represents the permitted aggregate resource (shown as a percentage of the 50-year demand) while the purple-colored portion of the pie represents that portion of the 50-year demand that will not be met by the currently permitted reserves. For example, if the blue portion is 25 percent and the purple portion is 75 percent of a pie chart that represents a total demand of 400 million tons, the permitted reserves are 100 million tons, and the region will need an additional 300 million tons of aggregate to supply the area for the next 50 years. The pie representing the Bakersfield aggregate study area is completely colored blue, showing permitted aggregate reserves are equal to or greater than the area's 50-year aggregate demand. Detailed examples are provided in the legend of Map Sheet 52.

Except for the Bakersfield P-C Region, Fresno P-C Region, Nevada County, Placer County, and the Yuba City-Marysville P-C Region, all the aggregate study areas have less permitted aggregate reserves than they are projected to need for the next 50 years. Fifteen of the aggregate study areas shown on the map have less than half of the permitted reserves they are projected to need in the next 50 years.

Estimates of Years of Permitted Reserves Remaining

The right-hand column of Table 1 indicates the projected years of permitted reserves remaining for the various aggregate study areas. Calculations of depletion years are made by comparing the currently permitted reserves to the projected annual aggregate consumption in the study area on a year-by-year basis. This is not the same as dividing the total projected 50-year demand for aggregate by 50 because, as population increases, so does the projected annual consumption of aggregate for a study area. Data are presented as ranges; 10 or fewer, 11-20, 21-30, 31-40, 41-50, and more than 50 years. This information is included on Map Sheet 52 beneath the study area name along with the permitted reserves and the projected 50-year demand. These estimates are based on conditions as of January 1, 2017 and do not reflect changes, such as new or expanded permits, that may have occurred since that time.

Only one of the aggregate study areas in Table 1, the San Fernando Valley-Saugus Newhall area, is projected to have less than 10 years of permitted aggregate reserves remaining as of January 1, 2017.

Seven of the aggregate study areas in Table 1 have between 11 and 20 years of permitted aggregate reserves remaining, ten have between 21 and 30 years of permitted aggregate reserves remaining, four have 31 to 40 years remaining, two have 41 to 50 years, and five have more than 50 years of permitted reserves remaining.

These numbers are estimates and the actual lifespan of existing permitted reserves in a study area can be influenced by many factors. In periods of high economic growth, demand may increase, shortening the life of permitted reserves. Large projects, such as the construction or maintenance of major infrastructure, or rebuilding after a disaster such as an earthquake could also deplete permitted reserves more rapidly. Increased demand from neighboring regions with dwindling or depleted permitted reserves may also accelerate the depletion of permitted reserves in a study area. Conversely, a slow economy may reduce demand for a period of time, extending the life of permitted reserves, or new or expanded permits may be granted in a study area, increasing the permitted reserves and the lifespan of permitted reserves in that area.

Non-Permitted Aggregate Resources

Non-permitted aggregate resources are deposits that may meet specifications for construction aggregate, are recoverable with existing technology, have no land use overlying them that is incompatible with mining, and currently are not permitted for mining. While not shown on Map Sheet 52, non-permitted aggregate resources are identified and discussed in each of the mineral land classification reports used to compile the map (See Appendix).

There are approximately 74 billion tons of non-permitted construction aggregate resources in the aggregate study areas shown on Map Sheet 52. While this number seems large, it is unlikely that all of these resources will ever be mined because of social, environmental, or economic factors. The location of aggregate resources too close to urban or environmentally sensitive areas can limit or prevent their development. Resources may also be located too far from a potential market to be economic. Despite such possible constraints, non-permitted aggregate resources are the most likely future sources of construction aggregate potentially available to meet California's continuing demand. Factors used to calculate non-permitted resource amounts and to determine the aerial extent of these resources, are given in each of the mineral land classification reports listed in the Appendix.

Aggregate Production Areas and Districts

Aggregate production areas are shown on Map Sheet 52 by five different sizes of triangle. A triangle may represent one or more active aggregate mines. The relative size of each symbol corresponds to the amount of yearly production for each mine or group of mines. Yearly production was based on data from the Department of Conservation's Division of Mine Reclamation (DMR) records for the calendar year 2016.

The smallest triangle represents an area that produced less than 0.5 million tons of aggregate in 2016. These triangles often represent a single mine operation and many are in rural parts of the state. The largest triangle represents aggregate mining districts with production of more than 5 million tons in 2016. Only two aggregate production districts fall into this category – the Temescal Valley District in western Riverside County and the San Gabriel Valley District in Los Angeles County.

PART II: COMPARISONS BETWEEN THE PRIOR (2012) AND THE UPDATED (2018) MAP SHEET 52

The prior version of Map Sheet 52 was published in 2012. Permitted aggregate resource data for that map were current as of January 1, 2011. Work conducted for that study took place during 2011/2012. The latest aggregate production and location data available for the prior map were from 2010 records. The aggregate demand projections for the prior map were based on California Department of Finance (DOF) county population projections from the 2010 U.S. census. Fifty-year aggregate demand from January 1, 2011 through the year 2060 was determined for the included study areas.

This updated Map Sheet 52 was completed and published in 2018. Permitted aggregate resource data for the updated map is current as of January 1, 2017. All work conducted for the updated study took place during 2017/2018. The latest aggregate production and location data available for the updated map are from 2016 records. The aggregate demand projections for the updated map were based on DOF county population estimates and projections for 2010 to 2060 (DOF, 2018). Fifty-year aggregate demand from January 1, 2017 through the year 2066 was determined for the included study areas.

Changes have occurred in both aggregate supplies (permitted aggregate reserves) and in 50-year aggregate demand since Map Sheet 52 (2012) was completed. Changes in permitted aggregate reserves are shown in Table 2. Changes in 50-year demand are shown in Table 3.

Aggregate Study Area Changes

Six aggregate study areas on the original (2002) Map Sheet 52 were modified for the 2006 map, resulting in three fewer study areas. They included the Southern California P-C regions of Orange County, Temescal Valley, San Fernando Valley, Saugus-Newhall, Western Ventura County, and Simi Valley. These regions were combined into three regions when they began to run out of permitted reserves and became dependent on aggregate sources from neighboring regions. The importation of aggregate from neighboring regions typically results in longer haul distances, higher costs, and increased carbon dioxide emissions, air pollution, traffic congestion, and highway maintenance. The shift in supply area also results in more rapid depletion of permitted reserves in neighboring regions.

In the 2006 and 2012 versions of Map Sheet 52, information for eastern and western Merced County and northern and southern Tulare county were reported. This was because separate market regions existed in those study areas. While those separate market regions may still exist, in this update, information is reported for Merced and Tulare counties and not for the eastern and western or northern and southern areas, respectively.

Table 2. Comparison of Permitted Aggregate Reserves Between Map Sheet 52, 2012 and Map Sheet 52, 2018.

AGGREGATE STUDY AREA	Map Sheet 52, 2012 Permitted Aggregate Reserves as of 1/1/11 (million tons)	Map Sheet 52, 2018 Permitted Aggregate Reserves as of 1/1/17 (million tons)	Percent Difference
Bakersfield P-C Region	143	1,708	1,094
Barstow Victorville P-C Region	124	117	-6
Claremont-Upland P-C Region	109	90	-17
El Dorado County	18	15	-17
Fresno P-C Region	46	556	1,109
Glenn County	33	22	-33
Merced County**	N/A**	61	N/A**
Monterey Bay P-C Region	323	297	-8
Nevada County	26	52	100
North San Francisco Bay P-C Region	110	263	139
Palmdale P-C Region	152	163	7
Palm Springs P-C Region	152	163	7
Placer County	152	387	155
Sacramento County	42	327	679
Sacramento-Fairfield P-C Region	128	109	-15
San Bernardino P-C Region	241	156	-35
San Fernando Valley/Saugus-Newhall*	77	17	-78
San Gabriel Valley P-C Region	322	297	-8
San Luis Obispo-Santa Barbara P-C Region	75	58	-23
Shasta County	52	49	-6
South San Francisco Bay P-C Region	404	506	25
Stanislaus County	45	39	-13
Stockton Lodi P-C Region	232	203	-13
Tehama County	32	30	-6
Temescal Valley-Orange County*	297	862	190
Tulare County**	N/A**	53	N/A**
Ventura County (combined Western Ventura County and Simi Valley P-C Region)*	96	84	-13
Western San Diego County P-C Region	167	265	59
Yuba City-Marysville P-C Region	392	679	73
Total	4,067	7,628	88

* Two P-C Regions have been combined into one study area.
** In Map Sheet 52 (2012) separate values for east and west Merced County and north and south Tulare County were presented. In this update, information is given only for the counties as a whole and not the parts.

Table 3. Comparison of 50-Year Demand Between Map Sheet 52, 2012 and Map Sheet 52, 2018.

AGGREGATE STUDY AREA	Map Sheet 52, 2012 50-Year Demand as of 1/1/11 (million tons)	Map Sheet 52, 2018 50-Year Demand as of 1/1/17 (million tons)	Percent Difference
Bakersfield P-C Region	438	338	-23
Barstow-Victorville P-C Region	159	163	3
Claremont-Upland P-C Region	203	202	0
El Dorado County	76	82	8
Fresno P-C Region	435	305	-30
Glenn County	59	41	-31
Merced County**	N/A**	154	N/A**
Monterey Bay P-C Region	346	333	-4
Nevada County	100	41	-59
North San Francisco Bay P-C Region	521	492	-6
Palmdale P-C Region	577	569	-1
Placer County	151	238	58
Palm Springs P-C Region	295	188	-36
Sacramento County	670	724	8
Sacramento-Fairfield P-C Region	196	295	51
San Bernardino P-C Region	993	939	-5
San Fernando Valley/Saugus-Newhall*	476	387	-19
San Gabriel Valley P-C Region	809	751	-7
San Luis Obispo-Santa Barbara P-C Region	240	226	-6
Shasta County	93	82	-12
South San Francisco Bay P-C Region	1,381	1,320	-4
Stanislaus County	214	160	-25
Stockton Lodi P-C Region	436	409	-6
Tehama County	62	49	-21
Temescal Valley-Orange County*	1,077	1,079	0
Tulare County **	N/A**	130	N/A**
Ventura County (combined Western Ventura County and Simi Valley P-C Regions)*	298	241	-19
Western San Diego County P-C Region	1,014	763	-25
Yuba City-Marysville P-C Region	403	344	-15
Total	12,047	11,045	-8

* Two P-C Regions have been combined into one study area.
** In Map Sheet 52 (2012) separate values for east and west Merced County and north and south Tulare County were presented. In this update, information is given only for the counties as a whole and not the parts.

No additional study areas have been combined in this update. It is likely that in some future update the San Fernando Valley-Saugus Newhall aggregate study area and the Palmdale study area may be combined as permitted reserves in the San Fernando Valley-Saugus Newhall aggregate study area are depleted. In addition, a study of the Greater Sacramento Area currently nearing completion will likely result in the combination of several previously existing study areas.

Changes in Permitted Aggregate Reserves

Fifteen of the study areas shown on the updated map experienced a decrease in permitted aggregate reserves since the 2012 map was completed (See Table 2). Most of these decreases likely represent aggregate production within those study areas since the last update of Map Sheet 52.

A large part of the reduction in the San Fernando Valley-Saugus Newhall study area is due to the subtraction of the 56 million tons of permitted aggregate reserves previously associated with the CEMEX Soledad Canyon Sand and Gravel Mining Project. In 2015, the Bureau of Land Management withdrew the contracts that would have allowed mining. The issue is currently under appeal with the Interior Board of Land Appeals. If, at a future date, the contracts are restored then the permitted reserves will be restored.

Twelve of the study areas shown on the updated map had increases in permitted aggregate reserves. Most of these increases are because of newly permitted or expanded mining operations within the various study areas. An expansion may increase the footprint of the mine or increase permitted mining depth. Some of these increases may be the result of recalculation of the permitted aggregate reserves in a study area.

Total permitted reserves for all the included study areas increased to 7,628 million tons from 4,067 million tons – an apparent increase of 3,561 million tons. The actual increase was likely slightly more because of production since 2010. Approximately two-thirds of the increase is due to permitting activities in the Bakersfield, Fresno, and Sacramento study areas.

Changes in Fifty-Year Demand

Of the study areas shown on the updated Map Sheet 52, five had increases in 50-year demand, two had less than a one percent change, and 20 showed decreases in projected 50-year demand (See Table 3). The large number of study areas with decreasing 50-year demand is likely due in part to incorporation of lower per capita consumption rates caused by the slow recovery of the construction industry in California in the years following the economic recession of 2007-2009.

Comparison of Areas with Less than 10-Years of Permitted Aggregate Reserves

The 2018 Map Sheet 52 shows only one aggregate study area with less than a 10-year supply of permitted aggregate reserves – San Fernando Valley-Saugus Newhall.

Compared to the 2012 version of the map, which showed four aggregate study areas with less than a 10-year supply of aggregate – Sacramento County and the Fresno, San Fernando Valley-Saugus Newhall, and Western San Diego P-C regions.

PART III: OVERVIEW OF CONSTRUCTION AGGREGATE

Construction aggregate was the leading non-fuel mineral commodity produced in California in 2016. Valued at $1.42 billion, aggregate made up about 42 percent of California's $3.4 billion non-fuel mineral production in 2016.

Aggregate Quality and Use

Aggregate normally makes up 80 to 100 percent of the material volume in PCC and AC and provides the bulk and strength to these materials. Rarely, even from the highest-grade deposits, is in-place aggregate physically or chemically suited for every type of aggregate use. Every potential deposit must be tested to determine how much of the material can meet specifications for a particular use, and what processing is required. Specifications for PCC, AC, and various other uses of aggregate have been established by several agencies, such as the U.S. Bureau of Reclamation, the U.S. Army Corps of Engineers, and the California Department of Transportation to ensure that aggregate is satisfactory for specific uses. These agencies and other major consumers test aggregate using standard procedures of the American Society for Testing Materials (ASTM), the American Association of State Highway Officials, and other organizations.

Most PCC and AC aggregate specifications have been established to ensure the manufacture of strong, durable structures capable of withstanding the physical and chemical effects of weathering and use. For example, specifications for PCC and concrete products prohibit or limit the use of rock materials containing mineral substances such as gypsum, pyrite, zeolite, opal, chalcedony, chert, siliceous shale, volcanic glass, and some high-silica volcanic rocks. Gypsum retards the setting time of portland cement; pyrite dissociates to yield sulfuric acid and an iron oxide stain; and other substances contain silica in a form that reacts with alkali substances in the cement, resulting in cracks and "pop-outs."

Specifications also call for precise particle-size distribution for the various uses of aggregate that is commonly classified into two general sizes: coarse and fine. Coarse aggregate is rock retained on a 3/8-inch or a #4 U.S. sieve. Fine aggregate passes a 3/8-inch sieve and is retained on a #200 U.S. sieve (a sieve with 200 weaves per inch). For some uses, such as asphalt paving, particle shape is specified. Aggregate material used with bituminous binder (asphalt) to form sealing coats on road surfaces shall consist of at least 90 percent by weight of crushed particles. Crushed stone is preferable to natural gravel in AC because asphalt adheres better to broken surfaces than to rounded surfaces and the interlocking of angular particles strengthens the AC and road base.

The material specifications for PCC and AC aggregate are more restrictive than specifications for other applications such as Class II base, subbase, and fill. These restrictive specifications make deposits acceptable for use as PCC or AC aggregate the scarcest and most valuable aggregate resources. Aggregate produced from such deposits can be, and commonly is, used in applications other than concrete. PCC- and AC-grade aggregate deposits are of major importance when planning for future availability of aggregate commodities because of their versatility, value, and relative scarcity.

Factors Affecting Aggregate Deposit Quality

The major factors that affect the quality of construction aggregate are the rock type and the degree of weathering of the deposit. Rock type determines the hardness, durability, and potential chemical reactivity of the rock when mixed with cement to make concrete. In alluvial sand and gravel deposits, rock type is variable and reflects the rocks present in the drainage basin of the stream or river. In crushed stone deposits, rock type is typically less variable, although in some types of deposits, such as sandstones or volcanic rocks, there may be significant variability of rock type. Rock type may also influence aggregate shape. For example, some metamorphic rocks such as slates tend to break into thin platy fragments that are unsuitable for many aggregate uses, while many volcanic and granitic rocks break into blocky fragments more suited to a wide variety of aggregate uses. Deposit type also affects aggregate shape. For example, in alluvial sand and gravel deposits, the natural abrasive action of the stream rounds the edges of rock particles, in contrast to the sharp edges of particles from crushed stone deposits.

Weathering is the in-place physical or chemical decay of rock materials at or near the Earth's surface. Weathering commonly decreases the physical strength of the rock and may make the material unsuitable for high strength and durability uses. Weathering may also alter the chemical composition of the aggregate, making it less suitable for some aggregate uses. If weathering is severe enough, the material may not be suitable for use as PCC or AC aggregate. Typically, the older a deposit is, the more likely it has been subjected to weathering. The severity of weathering commonly increases with increasing age of the deposit.

Comparison of Alluvial Sand and Gravel to Crushed Stone Aggregate

The preferred use of one aggregate material over another in construction practices depends not only on specification standards, but also on economic considerations. Alluvial gravel is typically preferred to crushed stone for PCC aggregate because the rounded particles of alluvial sand and gravel result in a wet mix that is easier to work than a mix made of angular fragments. Also, crushed stone is less desirable in applications where the concrete is placed by pumping because sharp edges will increase wear and damage to the pumping equipment. The workability of a mix consisting of portland cement with crushed stone aggregate can be improved by adding more sand and water, but more cement must then be added to the mix to meet concrete durability standards. This results in a more expensive concrete mix and a higher cost to the consumer.

In addition, aggregate from a crushed stone deposit is typically more expensive than that from an alluvial deposit due to the additional costs associated with the ripping, drilling and blasting necessary to remove material from most quarries and the additional crushing required to produce the various sizes of aggregate. Manufacturing sand by crushing is costlier than mining and processing naturally occurring sand. Although more care is required in pouring and placing a wet mix containing crushed stone, PCC made with this aggregate is as satisfactory as that made with alluvial sand and gravel of comparable rock quality. Owing to environmental concerns and regulatory constraints in many areas of the state, it is likely that extraction of sand and gravel resources from instream and floodplain areas will become less common in the future. If this trend continues, crushed stone may become increasingly important to the California market.

Aggregate Price

The price of aggregate throughout California varies considerably depending on location, quality, and supply and demand. The highest quality aggregate, and typically most costly, is that which meets the specifications for use in PCC or AC. All prices discussed in this section are for PCC/AC-grade aggregate at the plant site or FOB (freight on board). Transportation cost, which adds to the final cost of aggregate, is discussed in the next section.

Regional variations make it difficult to estimate the average price of PCC-grade aggregate for the state. Over the last decade, prices have varied from more than $20 per ton in areas with depleting or depleted aggregate supplies and high demands such as San Diego and parts of the Bay Area, to $9 to $12 per ton in areas such as Yuba City-Marysville with abundant aggregate supplies and low to moderate demands. In many areas of the state it is likely that prices fall between these two endmembers.

Transportation and Increasing Haul Distances

Transportation plays a major role in the cost of aggregate to the consumer. Aggregate is a low-unit-value, high-bulk-weight commodity, and it must be obtained from nearby sources to minimize both the dollar cost to the aggregate consumer and other environmental and economic costs associated with transportation. If nearby sources do not exist, then transportation costs may significantly increase the cost of the aggregate by the time it reaches the consumer.

This makes the mining of aggregate much more competitive than most other mined commodities. The location, distance to market, and access to major transportation routes greatly influence the economic feasibility of an aggregate mine.

Most aggregate in California moves to its final point of use by truck. Trucking is typically charged at an hourly rate and rates may vary in different regions of the state. The typical distance traveled per hour may also vary, being greater in less congested or more rural areas, and less in densely populated urban areas. Other factors that affect hauling rates include fuel costs, toll bridges and toll roads, road conditions, and terrain. Transportation cost is the principal constraint defining the market area for an aggregate mining operation and the cost of transporting aggregate over long distances can equal or exceed the base cost of the aggregate.

Throughout California, aggregate haul distances have gradually increased as more local sources of aggregate diminish. Consequently, older P-C regions, most of which were established in the late 1970s, have changed considerably since their boundaries were drawn. This is especially evident in Los Angeles, Orange, and Ventura counties where aggregate shortages have led to the merging of six P-C regions shown on the original

(2002) map into three regions for the updated maps. In some parts of the state, one-way haul distances that were 20-30 miles decades ago are now sometimes 100 miles or more. Increased aggregate haul distances not only increase the cost of aggregate to the consumer, but also increase environmental and societal impacts such as increased fuel consumption, carbon dioxide (CO_2) emissions, air pollution, traffic congestion, and road maintenance.

Imported Aggregate

In some regions, local aggregate production is sufficient to meet the local demand, but in others, there is more demand than can be met by local production leading to a shortfall that is typically met by importing construction aggregate from neighboring aggregate producing regions.

There are both advantages and disadvantages to importing construction aggregate. Imports can provide needed aggregate in areas with depleted reserves/resources and can supply specific types of aggregate that are in short supply in the region. However, imported aggregate is often more expensive because of additional transportation costs. Increased costs for aggregate leads to more expensive construction projects in both the public and private sectors. Importing aggregate from neighboring regions also leads to more rapid depletion of reserves/resources in those regions, potentially contributing to price increases or aggregate shortages in those regions.

In addition to the greater economic costs, there are often increased environmental and societal costs associated with the import of aggregate when compared to local production. The environmental impacts include higher emissions of greenhouse gases, such as CO_2, and air pollution. The societal impacts include increased traffic congestion and road wear and maintenance due to increased truck traffic. In the case of imports, these environmental and societal impacts occur both within the importing region and in the neighboring regions that supply the material and through which the material is transported.

Currently almost all aggregate produced or imported into California is transported to its final point of use by truck. In discussions of aggregate import, other modes of transportation such as rail, barge, or ship are often mentioned as alternative methods of moving aggregate. In 2011, the San Diego Association of Governments (SANDAG) Service Bureau published the San Diego Region Aggregate Supply Study (SANDAG Service Bureau, 2011). This study included an evaluation of fuel use and CO_2 emissions for several scenarios involving different transport options for importing aggregate into the San Diego area. While the published study is specific to the San Diego region, it provides an interesting analysis of the impacts of importing construction aggregate. The following discussion is adapted from Special Report 240 (Gius, Busch, and Miller, 2017).

The SANDAG study looked at the impacts based on various combinations of transport options for the following five scenarios:

- In region production
- Import by truck from neighboring regions
- Import by rail/truck from San Bernardino County
- Import by barge/truck from Baja California, Mexico
- Import by ship/truck from British Columbia, Canada.

Fuel consumption, CO_2 emissions, and some other pollutant emissions (nitrogen oxides (NO_x) and particulate matter (PM)) were estimated based on round-trip travel, with aggregate transported to the point of use and the vehicle returning empty. For scenarios involving non-truck transport (rail, barge, and ship), delivery to the final point of use by truck was included. The transport scenarios and transport type and mileage considerations are presented in Table 4. More detail can be found in the SANDAG study (SANDAG Service Bureau, 2011).

Table 4. Summary of SANDAG Aggregate Transport Scenarios

SANDAG AGGREGATE TRANSPORT SCENARIOS	
TRANSPORT OPTION	**MILEAGE BY MODE**
Local: Truck	26 miles one way / 52 miles round trip
Import: Truck	100 miles one way / 200 miles round trip
Import: Rail + Truck	Rail: 200 miles one way / 400 miles round trip Truck: 20 miles one way / 40 miles round trip
Import: Barge + Truck	Barge: 70 miles one way / 140 miles round trip Truck: 20 miles one way / 40 miles round trip
Import: Ship + Truck	Ship: 1,540 miles one way / 3,080 miles round trip Truck: 20 miles one way / 40 miles round trip

Adapted from SANDAG Service Bureau, 2011

Transportation methods that move larger amounts of aggregate per load can be more efficient in terms of fuel consumption (gallons of fuel consumed per net ton-mile traveled) and CO_2, NO_x, and PM emissions (grams of CO_2, NO_x, and PM emitted per net ton-mile traveled). However, even though these transport options may be more efficient on a net ton-mile basis, the total fuel consumption and emissions are dependent on the distance traveled. If those distances are large, total fuel consumption and emissions may exceed those of less efficient transportation methods over shorter distances. This is demonstrated by SANDAG's findings. Even though transport by rail, barge, and ship have lower fuel consumption and CO_2 emissions per net ton-mile than transport by truck (Table 5), the total fuel usage and CO_2 emissions for those transport scenarios are greater than in-region production with truck delivery because of the distances involved (Table 6).

Table 5. Fuel Consumption and CO_2 Emissions from Aggregate Transport with Payload

Mode	Payload	Fuel Consumption (gallons/net ton per mile)	CO_2 Emissions (grams/net ton per mile)
Truck	25 tons	0.0086	86.9
Rail	100 tons per hopper car	0.0021	21.4
Barge	1,500 tons	0.0068	69.6
Ship	72,786 tons	0.0004	5.3

Adapted from Tables 4-2 and 4-4, SANDAG Service Bureau, 2011

Table 6. Fuel Consumption and Emissions for Aggregate Transport Scenarios – Estimates per Million Tons of Aggregate Transported

Transport Option	Total Fuel Consumption (gallons)	Total CO_2 Emissions (metric tons)	Total NO_x Emissions (metric tons)	Total PM Emissions (metric tons)
Local: Truck	296,000	3,000	26.5	1.1
Import: Truck	1,138,000	11,537	102	4.4
Import: Rail + Truck	788,000	7,985	120.4	3.3
Import: Barge + Truck	804,000	8,210	147.1	5.1
Import: Ship + Truck	1,406,000	16,703	282.2	16.3

Adapted from SANDAG Service Bureau, 2011

Table 6 shows that, per million tons of aggregate transported, local production with transport by truck consumes less fuel and produces less CO_2, NOx, and PM than the other transport options investigated by SANDAG. Transport Option 2, import of one million tons of aggregate by truck from neighboring regions, consumes almost four times as much fuel and produces almost four times the emissions as the local production and delivery of a similar amount of aggregate. In addition, the impacts occur not only in the Western San Diego County P-C Region, but in neighboring regions through which the materials are transported.

While this analysis pertains to San Diego County, similar analyses, with appropriate parameters, could be done for other regions. What it does point out is that, even though some methods of transportation may be more efficient on a per ton-mile basis, if the transport distances are great enough, the overall impacts may be greater than those of local production.

Factors Affecting Aggregate Demand

Several factors may influence aggregate demand. In periods of high economic growth, demand may increase, depleting permitted reserves more rapidly than expected. Large projects, such as the construction or maintenance of major infrastructure, or rebuilding after a disaster such as an earthquake could also deplete permitted reserves more rapidly. Increased demand from neighboring regions with dwindling or depleted permitted reserves may also accelerate the depletion of permitted reserves in a study area. Conversely, a period of declining economy or of low economic growth, such as that during the recession of 2007 to 2009 and the subsequent slow economic recovery, can reduce demand for a period of time, extending the life of permitted reserves. In some cases, importation of aggregate from other areas may extend the life of a region’s permitted reserves.

SUMMARY AND CONCLUSIONS

Aggregate is essential to the needs of modern society, providing material for the construction and maintenance of roadways, dams, canals, buildings, and other parts of California's infrastructure. Aggregate is also found in homes, schools, hospitals, and shopping centers.

In the 30-year period from 1987 to 2016, Californians consumed an average of about 180 million tons of construction aggregate (all grades) per year or about 5.3 tons per person per year. Demand for aggregate is expected to increase as the state's population continues to grow and infrastructure is maintained, improved, and expanded. For example, the Road Repair and Accountability Act of 2017 (SB1) will provide approximately 5 billion dollars annually for a variety of maintenance, rehabilitation, and other transportation related projects over the next decade. Because aggregate is a low unit-value, high-bulk-weight commodity, it must be obtained from nearby sources to minimize the dollar cost to the aggregate consumer and other environmental and economic costs associated with transportation.

Comparing regional needs to available reserves and resources demonstrates the important aggregate resource issues facing lead agencies in California. These issues include the need to plan carefully for the use of lands containing these resources and the need to consider the permitting of additional aggregate resources before currently permitted deposits are depleted.

Increasingly, as existing permitted aggregate supplies are depleted, local land-use decisions regarding aggregate resources are having regional impacts that go beyond local jurisdictional boundaries. Planning for future construction aggregate needs in our communities should take into consideration not only the needs of the community, but also the needs of the region and neighboring regions. Importing aggregate from neighboring regions leads to more rapid depletion of reserves/resources in those regions, potentially contributing to price increases or aggregate shortages in those regions.

In addition to the greater economic costs, there are often increased environmental and societal costs associated with the import of aggregate when compared to local production. The environmental impacts include higher emissions of greenhouse gases, such as CO_2, and air pollution. The societal impacts include increased traffic congestion and road maintenance due to increased truck traffic. In the case of imports, these environmental and societal impacts occur both within the importing region and in the neighboring regions that supply the material and through which the material is transported. Finally, reliance on imports places responsibility and authority for permitting related to the local aggregate supply in the hands of decision makers in other jurisdictions.

For more than 40 years, under SMARA, CGS has conducted on-going studies that identify and evaluate aggregate resources throughout the state. Map Sheet 52 (2018) is an updated summary of supply and demand data from these studies. The map presents a statewide overview of projected future aggregate needs and currently permitted reserves.

The following conclusions can be drawn from Map Sheet 52 (2018) and this accompanying report:

- In the next 50 years, the study areas identified on Map Sheet 52 (2018) will need approximately 11 billion tons of aggregate.
- The study areas shown on Map Sheet 52 currently have about 7.6 billion tons of permitted reserves, which is about 69 percent of the total projected 50-year aggregate demand identified for these study areas. This is about 10 percent of the total aggregate resources located within the study areas.
- One aggregate study area is projected to have 10 or fewer years of permitted aggregate reserves remaining as of January 2017 (San Fernando Valley / Saugus Newhall area).
- Seven aggregate study areas have between 11 and 20 years of aggregate reserves remaining.
- Ten aggregate study areas have between 21 and 30 years of aggregate reserves remaining.
- Four aggregate study areas have between 31 and 40 years of aggregate reserves remaining.
- Two aggregate study areas have between 41 and 50 years of aggregate reserves remaining.
- Five aggregate study areas (Bakersfield, Fresno, and Yuba City-Marysville P-C regions, and Nevada and Placer counties) have more than 50 years of aggregate reserves remaining.

The information presented on Map Sheet 52 (2018) and in the referenced reports is provided to assist land use planners and decision makers in identifying those areas containing construction aggregate resources, and to estimate potential future demand for these resources in different regions of the state. This information is intended to help planners and decision makers balance the need for construction aggregate with the many other competing land use issues in their jurisdictions, and to provide for adequate supplies of construction aggregate to meet future needs.

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Gius, F.W., Busch, L.L., and Miller, R.V., 2017, Update of Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Western San Diego County Production-Consumption Region, California. California Geological Survey, Special Report 240, 50p.

Kohler, S.L., 2002, Aggregate Availability in California, California Geological Survey, Map Sheet 52, scale 1:1,100,000, 26p.

Kohler, S.L., 2006, Aggregate Availability in California, California Geological Survey, Map Sheet 52 (Updated 2006), scale 1:1,100,000, 26p.

San Diego Association of Governments Service Bureau, January 2011, San Diego Region Aggregate Supply Study: 118 p., http://www.sandag.org/uploads/publicationid/publicationid_1558_12638.pdf.

California Department of Finance, Demographic Research Unit, *Total Estimated and Projected Population for California and Counties: July 1, 2010 to July 1, 2060 in 1-year increments.* January 2018.

APPENDIX: MINERAL LAND CLASSIFICATION REPORTS BY THE CALIFORNIA GEOLOGICAL SURVEY (Special Reports and Open-File Reports, with information on aggregate resources)

SPECIAL REPORTS

SR 132: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Yuba City-Marysville Production-Consumption Region. By Habel, R.S., and Campion, L.F., 1986.

*SR 143: Part I: Mineral Land Classification of the Greater Los Angeles Area: Description of the Mineral Land Classification Project of the Greater Los Angeles Area._By Anderson T. P., Loyd, R.C., Clark, W.B., Miller, R.M., Corbaley, R., Kohler, S.L., and Bushnell, M.M., 1979.

*SR 143: Part II: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, San Fernando Valley Production-Consumption Region. By Anderson T.P., Loyd, R.C., Clark, W.B., Miller, R.M., Corbaley, R., Kohler, S.L., and Bushnell, M.M., 1979.

*SR 143: Part III: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, Orange County-Temescal Valley Production-Consumption Region. By Miller, R.V., and Corbaley, R., 1981.

*SR 143: Part IV: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, San Gabriel Valley Production-Consumption Region. By Kohler, S.L., 1982.

*SR 143: Part V: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, Saugus-Newhall Production-Consumption Region and Palmdale Production-Consumption Region. By Joseph, S.E, Miller, R.V., Tan, S.S., and Goodman, R.W., 1987.

*SR 143: Part VI: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, Claremont-Upland Production-Consumption Region. By Cole, J.W., 1987.

*SR 143: Part VII: Mineral Land Classification of the Greater Los Angeles Area: Classification of Sand and Gravel Resource Areas, San Bernardino Production-Consumption Region. By Miller, R.V., 1987.

*SR 145: Part I: Mineral Land Classification of Ventura County: Description of the Mineral Land Classification Project of Ventura County. By Anderson, T.P., Loyd, R.C., Kiessling, E.W., Kohler, S.L., and Miller, R.V., 1981.

*SR 145: Part II: Mineral Land Classification of Ventura County: Classification of the Sand, Gravel, and Crushed Rock Resource Areas, Simi Production-Consumption Region. By Anderson, T.P., Loyd, R.C., Kiessling, E.W., Kohler, S.L., and Miller, R.V., 1981.

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*SR 146: Part I: Mineral Land Classification: Project Description: Mineral Land Classification for Construction Aggregate in the San Francisco-Monterey Bay Area. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 146: Part II: Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Region. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 146: Part III: Mineral Land Classification: Aggregate Materials in the North San Francisco Bay Production-Consumption Region. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 146: Part IV: Mineral Land Classification: Aggregate Materials in the Monterey Bay Production-Consumption Region. By Stinson, M.C., Manson, M.W., and Plappert, J.J., 1987.

*SR 147: Mineral Land Classification: Aggregate Materials in the Bakersfield Production-Consumption Region. By Cole, J.W., 1988.

*SR 153: Mineral Land Classification: Aggregate Materials in the Western San Diego County Production-Consumption Region. By Kohler, S.L., and Miller, R.V., 1982.

SR 156: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Sacramento-Fairfield Production-Consumption Region. By Dupras, D.L., 1988.

*SR 158: Mineral Land Classification: Aggregate Materials in the Fresno Production-Consumption Region. By Cole, J.W., and Fuller, D.R., 1986.

*SR 159: Mineral Land Classification: Aggregate Materials in the Palm Springs Production-Consumption Region. By Miller, R.V., 1987.

*SR 160: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Stockton-Lodi Production-Consumption Region. By Jensen, L.S., and Silva, M.A., 1989.

*SR 162: Mineral Land Classification: Portland Cement Concrete Aggregate and Active Mines of All Other Mineral Commodities in the San Luis Obispo-Santa Barbara Production-Consumption Region. By Miller, R.V., Cole, J.W., and Clinkenbeard, J.P., 1989.

SR 164: Mineral Land Classification of Nevada County, California. By Loyd, R.C., and Clinkenbeard, J.P., 1990.

*SR 165: Mineral Land Classification of the Temescal Valley Area, Riverside County, California. By Miller, R.V., Shumway, D.O., and Hill, R.L., 1991.

SR 173: Mineral Land Classification of Stanislaus County, California. By Higgins, C.T., and Dupras, D.L., 1993.

SR 198: Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Palm Springs Production-Consumption Region, Riverside County, California. Busch, L.L., 2007.

SR 199: Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Stockton-Lodi Production-Consumption Region, San Joaquin and Stanislaus Counties, California. Smith, J.D. and Clinkenbeard J.P., 2012.

SR202 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Claremont-Upland Production-Consumption Region, Los Angeles and San Bernardino Counties, California. Miller, R.V. and Busch, L.L., 2007.

SR 205 Update of Mineral Land Classification of Aggregate Resources in the North San Francisco Bay P-C Region: Sonoma, Napa, and Marin Counties and Southwestern Solano County, California. Miller, R.V. and Busch, L.L., 2013

SR 206 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the San Bernardino Production-Consumption Region, San Bernardino and Riverside Counties, California. Miller, R.V. and Busch, L.L., 2008.

SR 209 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the San Gabriel Valley Production-Consumption Region, Los Angeles County, California. Kohler, S.L., 2010.

SR 210 Update of Mineral Land Classification: Aggregate Materials in the Bakersfield Production-Consumption Region, Kern County, California. Busch, L.L., 2009.

SR 215 Update of Mineral Land Classification: Aggregate Materials in the San Luis Obispo-Santa Barbara Production-Consumption Region, California. Busch, L.L. and Miller, R.V., 2011.

SR 231 Update of Mineral Land Classification for Portland Cement Concrete-Grade Aggregate in the Temescal Valley Production Area, Riverside County, California. Miller, R.V. and Busch, L.L., 2014.

SR 240 Update of Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Western San Diego County Production-Consumption Region, California. Gius, F.W., Busch, L.L., and Miller, R.V. 2017.

* These Mineral Land Classification reports have been updated and are not shown on the index map (lower left-hand corner of Map Sheet 52).

OPEN-FILE REPORTS

OFR 92-06: Mineral Land Classification of Concrete Aggregate Resources in the Barstow-Victorville Area. By Miller, R.V., 1993.

OFR 93-10: Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California: Part I - Ventura County. By Miller, R.V., 1993.

OFR 94-14: Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California: Part II - Los Angeles County. By Miller, R.V., 1994.

OFR 94-15: Update of Mineral Land Classification of Portland Cement Concrete Aggregate in Ventura, Los Angeles, and Orange Counties, California: Part III - Orange County. By Miller, R.V., 1995.

OFR 95-10: Mineral Land Classification of Placer County, California. By Loyd, R.C., 1995.

OFR 96-03: Update of Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Region. By Kohler-Antablin, S.L., 1996.

*OFR 96-04: Update of Mineral Land Classification: Aggregate Materials in the Western San Diego County Production-Consumption Region. By Miller, R.V., 1996.

OFR 97-01: Mineral Land Classification of Concrete Aggregate Resources in the Tulare County Production-Consumption Region, California. By Taylor, G.C., 1997.

OFR 97-02: Mineral Land Classification of Concrete-Grade Aggregate Resources in Glenn County, California. By Shumway, D.O., 1997.

OFR 97-03: Mineral Land Classification of Alluvial Sand and Gravel, Crushed Stone, Volcanic Cinders, Limestone, and Diatomite within Shasta County, California. By Dupras, D.L, 1997.

OFR 99-01: Update of Mineral Land Classification: Aggregate Materials in the Monterey Bay Production-Consumption Region, California. By Kohler-Antablin, S.L., 1999.

OFR 99-02: Update of Mineral Land Classification: Aggregate Materials in the Fresno Production-Consumption Region, California. By Youngs, L.G. and Miller, R.V., 1999.

OFR 99-08: Mineral Land Classification of Merced County, California. By Clinkenbeard, J.P., 1999.

OFR 99-09: Mineral Land Classification: Portland Cement Concrete-Grade Aggregate and Clay Resources in Sacramento County, California. By Dupras, D.L., 1999.

OFR 2000-03: Mineral Land Classification of El Dorado County, California. By Busch, L. L., 2001

OFR 2000-18: Mineral Land Classification of Concrete-Grade Aggregate Resources in Tehama County, California. By Foster, B.D., 2001

* These Mineral Land Classification reports have been updated and are not shown on the index map (lower left-hand corner of Map Sheet 52).

CALIFORNIA GEOLOGICAL SURVEY

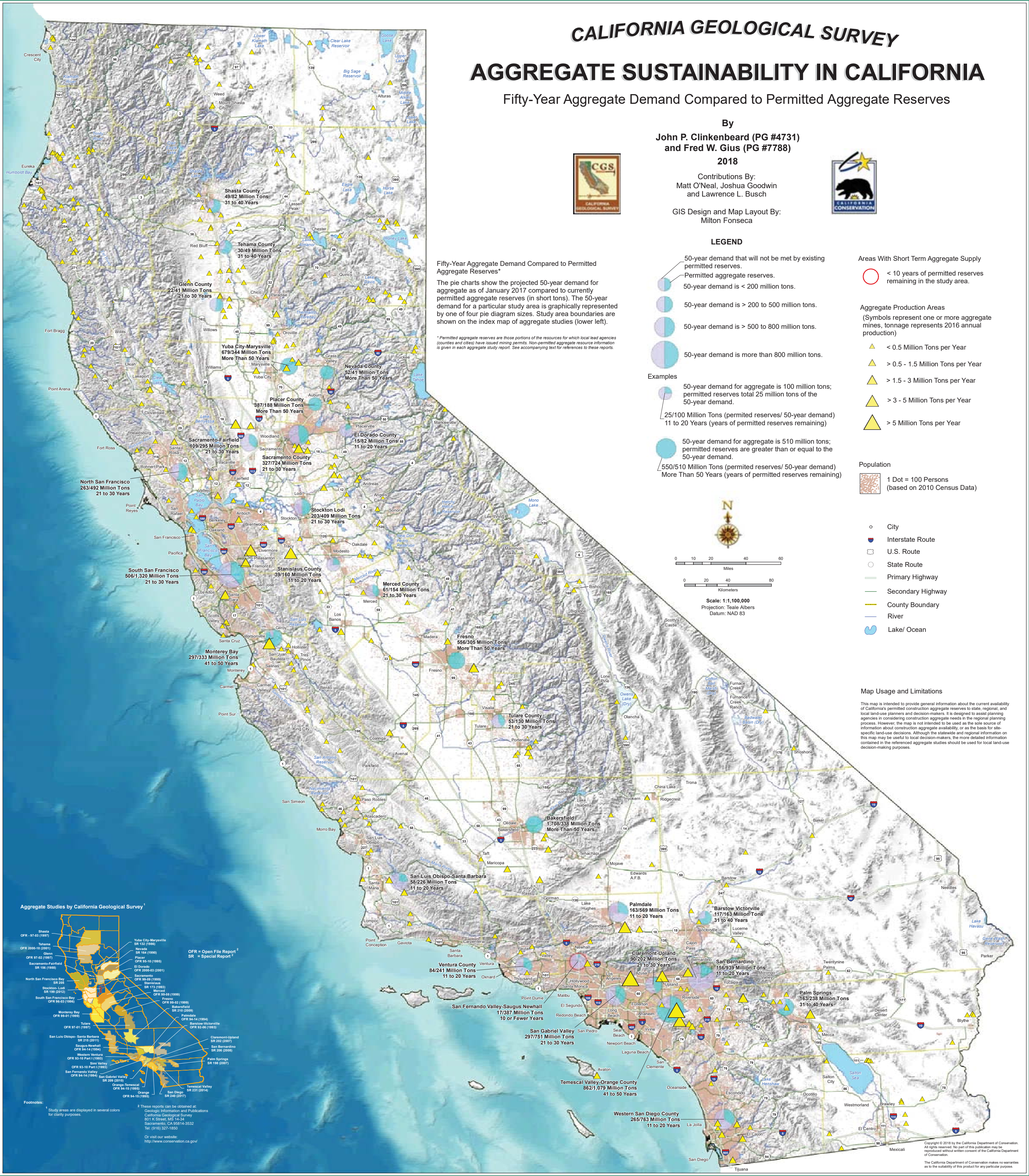
AGGREGATE SUSTAINABILITY IN CALIFORNIA

Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves

By
John P. Clinkenbeard (PG #4731)
and Fred W. Gius (PG #7788)
2018

Contributions By:
Matt O'Neal, Joshua Goodwin
and Lawrence L. Busch

GIS Design and Map Layout By:
Milton Fonseca



Fifty-Year Aggregate Demand Compared to Permitted Aggregate Reserves*

The pie charts show the projected 50-year demand for aggregate as of January 2017 compared to currently permitted aggregate reserves (in short tons). The 50-year demand for a particular study area is graphically represented by one of four pie diagram sizes. Study area boundaries are shown on the index map of aggregate studies (lower left).

** Permitted aggregate reserves are those portions of the resources for which local lead agencies (counties and cities) have issued mining permits. Non-permitted aggregate resource information is given in each aggregate study report. See accompanying text for references to these reports.*

LEGEND

50-year demand that will not be met by existing permitted reserves.
Permitted aggregate reserves.
50-year demand is < 200 million tons.
50-year demand is > 200 to 500 million tons.
50-year demand is > 500 to 800 million tons.
50-year demand is more than 800 million tons.

Examples

50-year demand for aggregate is 100 million tons; permitted reserves total 25 million tons of the 50-year demand.
25/100 Million Tons (permitted reserves/ 50-year demand)
11 to 20 Years (years of permitted reserves remaining)

50-year demand for aggregate is 510 million tons; permitted reserves are greater than or equal to the 50-year demand.
550/510 Million Tons (permited reserves/ 50-year demand)
More Than 50 Years (years of permitted reserves remaining)

Areas With Short Term Aggregate Supply

< 10 years of permitted reserves remaining in the study area.

Aggregate Production Areas

(Symbols represent one or more aggregate mines, tonnage represents 2016 annual production)

< 0.5 Million Tons per Year
> 0.5 - 1.5 Million Tons per Year
> 1.5 - 3 Million Tons per Year
> 3 - 5 Million Tons per Year
> 5 Million Tons per Year

Population

1 Dot = 100 Persons
(based on 2010 Census Data)

City
Interstate Route
U.S. Route
State Route
Primary Highway
Secondary Highway
County Boundary
River
Lake/ Ocean

Map Usage and Limitations

This map is intended to provide general information about the current availability of California's permitted construction aggregate reserves to state, regional, and local land-use planners and decision-makers. It is designed to assist planning agencies in considering construction aggregate needs in the regional planning process. However, the map is not intended to be used as the sole source of information about construction aggregate availability, or as the basis for site-specific land-use decisions. Although the statewide and regional information on this map may be useful to local decision-makers, the more detailed information contained in the referenced aggregate studies should be used for local land-use decision-making purposes.

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SPECIAL REPORT 206

UPDATE OF MINERAL LAND CLASSIFICATION FOR PORTLAND CEMENT CONCRETE-GRADE AGGREGATE IN THE SAN BERNARDINO PRODUCTION-CONSUMPTION REGION, SAN BERNARDINO AND RIVERSIDE COUNTIES, CALIFORNIA

2008

CALIFORNIA GEOLOGICAL SURVEY
Department of Conservation

STATE OF CALIFORNIA
ARNOLD SCHWARZENEGGER
GOVERNOR

THE RESOURCES AGENCY
MIKE CHRISMAN
SECRETARY FOR RESOURCES

DEPARTMENT OF CONSERVATION
BRIDGETT LUTHER
DIRECTOR

CALIFORNIA GEOLOGICAL SURVEY
JOHN G. PARRISH, PH.D., *STATE GEOLOGIST*

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SPECIAL REPORT 206

UPDATE OF MINERAL LAND CLASSIFICATION FOR PORTLAND CEMENT CONCRETE-GRADE AGGREGATE IN THE SAN BERNARDINO PRODUCTION-CONSUMPTION REGION, SAN BERNARDINO AND RIVERSIDE COUNTIES, CALIFORNIA

By

Russell V. Miller, PG #3331

and

Lawrence L. Busch, PG #6440

2008

CALIFORNIA GEOLOGICAL SURVEY'S PUBLIC INFORMATION OFFICES:

Southern California Regional Office
888 Figueroa Street, Suite 475
Los Angeles, CA 90017
(213) 239-0878

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EXECUTIVE SUMMARY

This report updates information presented in a classification report on portland cement concrete-grade (PCC) aggregate in the San Bernardino Production-Consumption (P-C) Region first published in 1984. That report was published by the California Department of Conservation's Division of Mines and Geology (now California Geological Survey) as Special Report 143, Part VII (SR 143, Part VII) – *Mineral Land Classification of the Greater Los Angeles Area, Part VII, Classification of Sand and Gravel Resource Areas, San Bernardino Production-Consumption Region* (Miller, 1984).

Sand and gravel deposits having material suitable for use as PCC aggregate are classified in this update report. Deposits suitable for lower grades of aggregate use, such as asphaltic aggregate, base, subbase, and fill were not considered in this classification process because of their general abundance in the San Bernardino P-C Region. However, all of the mines that produce PCC aggregate in the region also produce lower grades of aggregate.

SR 143, Part VII assisted the State Mining and Geology Board (Board) in a subsequent process called *designation*. Designation is the formal recognition by the Board of lands containing mineral resources of regional or statewide significance that are needed to meet the demands of the future. The Board's designation of lands in the San Bernardino P-C Region was published in 1987 as SMARA Designation Report No. 5 (California Department of Conservation, 1987). This update classification report does not change that designation.

In this update report, the following conclusions are reached:

- The permitted reserves are projected to last until the year 2024, 16 years from the present (2008).
- Two new areas, Sectors J and K, are identified. Sector J contains a total of 334 million tons of additional aggregate resources. The resource figure for Sector K is proprietary.
- About 18 percent, or 4,427 acres, of the 24,656 acres of lands designated by the Board in 1987 has been lost to land uses incompatible with mining. This equates to 959 million tons of PCC-grade aggregate resources lost.
- The anticipated consumption of aggregate in the San Bernardino P-C Region for the next 50 years (through the year 2057) is estimated to be 1,131 million tons, of which 735 million tons must be PCC quality. This is more than twice the previous 50-year projection.
- There remain an estimated 5,986 million tons of unpermitted PCC-grade aggregate resources in the San Bernardino P-C Region.
- From 1987 to 2007, about 109 million tons of new PCC-grade aggregate reserves have been permitted.

PART I - INTRODUCTION

In 1984, a report titled "Mineral Land Classification of the Greater Los Angeles Area, Part VII, Classification of Sand and Gravel Resource Areas, San Bernardino Production-Consumption Region" (Miller, 1984 – second printing in 1987) was published by the California Division of Mines and Geology (predecessor to the California Geological Survey or "CGS"). It is referred to in this update report as SR 143, Part VII. In SR 143, Part VII, a part of southwestern San Bernardino County and a part of eastern Riverside County were classified for portland cement concrete-grade (PCC) aggregate (see Figure 1). The region is covered by all or part of 26 U.S. Geological Survey 7-1/2 minute quadrangle maps as shown on Figure 2.

Subsequent to the publication of SR 143, Part VII, and completion of an Environmental Impact Report (California Department of Conservation, 1985) the State Mining and Geology Board (Board) designated approximately 40 square miles of land within the San Bernardino Production-Consumption (P-C) Region as having mineral resources of statewide or regional significance (California Department of Conservation, 1987).

This report presents a reevaluation and update of SR 143, Part VII, and a review of the areas designated by the Board, for the benefit of local lead agencies in the San Bernardino P-C Region (see Table 1 for a list of lead agencies). This report is intended as an update to and not a replacement for SR 143, Part VII. In addition, this report does not alter the previous designation of lands in the San Bernardino P-C Region.

BACKGROUND

SR 143, Part VII and this update were produced by the State Geologist as specified by the Surface Mining and Reclamation Act (SMARA) of 1975. SMARA was passed by the California State Legislature in response to the loss of significant mineral resources due to urban expansion, the need for current information concerning the location and quantity of essential mineral deposits, and to ensure adequate mined-land reclamation. To address mineral resource conservation, SMARA mandated a two-phase process called *classification-designation*.

The objective of the classification-designation process is to ensure, through appropriate local lead agency policies and procedures, that mineral materials will be available when needed and do not become inaccessible as a result of inadequate information during the land-use decision-making process.

SMARA mandates that the Board develop guidelines for mineral land classification. The Board adopted SMARA guidelines on June 30, 1978 and revised them in 2000. The guidelines are available on the California Department of Conservation website at http:/www.consrv.ca.gov/SMGB/Guidelines/ClassDesig.pdf.

The guidelines require the State Geologist to classify specified areas into Mineral Resource Zones (MRZs). The guidelines also require that classification reports for construction aggregate resources include the following additional information: (1) the location and estimated total

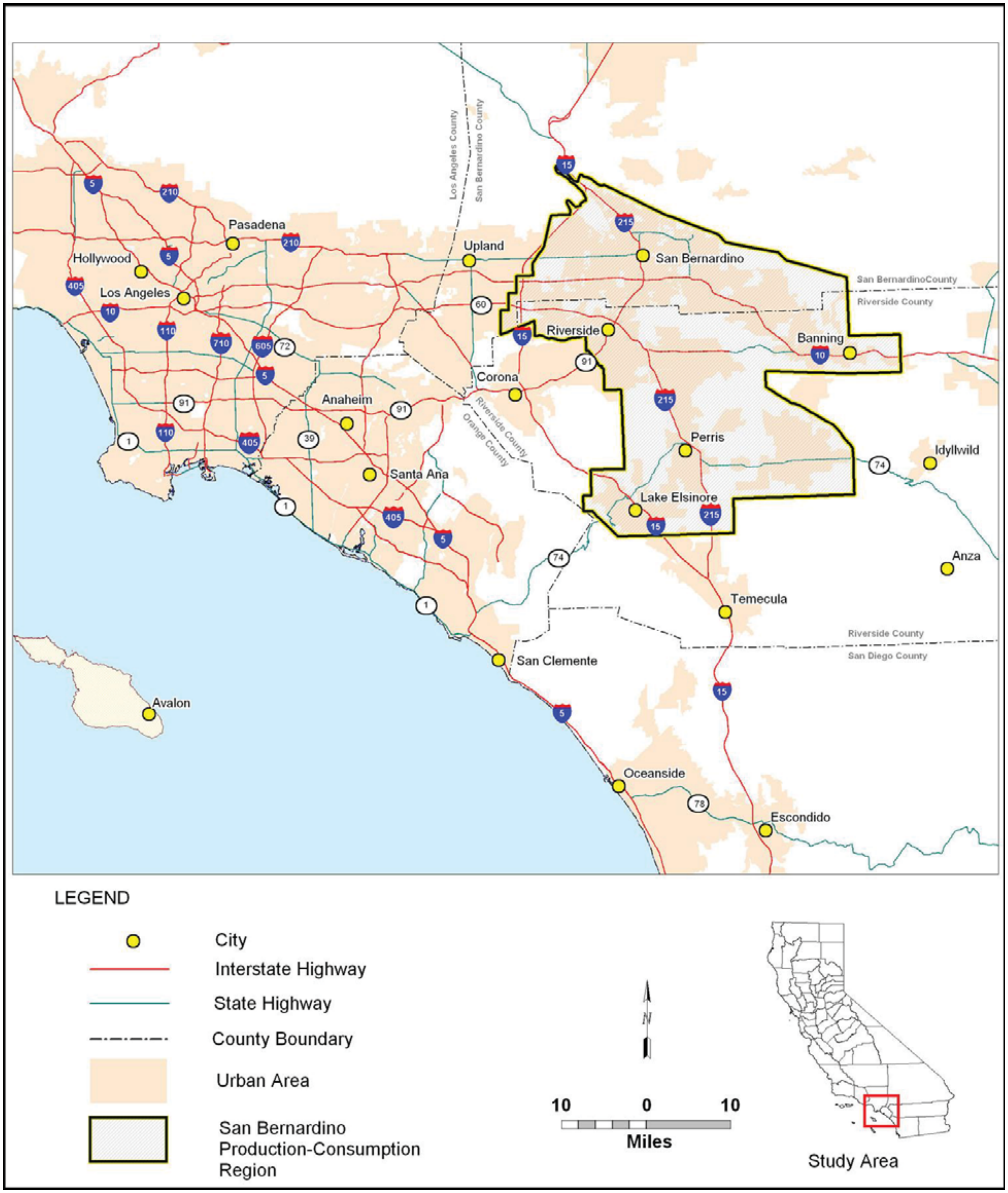


Figure 1. General location map of the San Bernardino P-C Region.

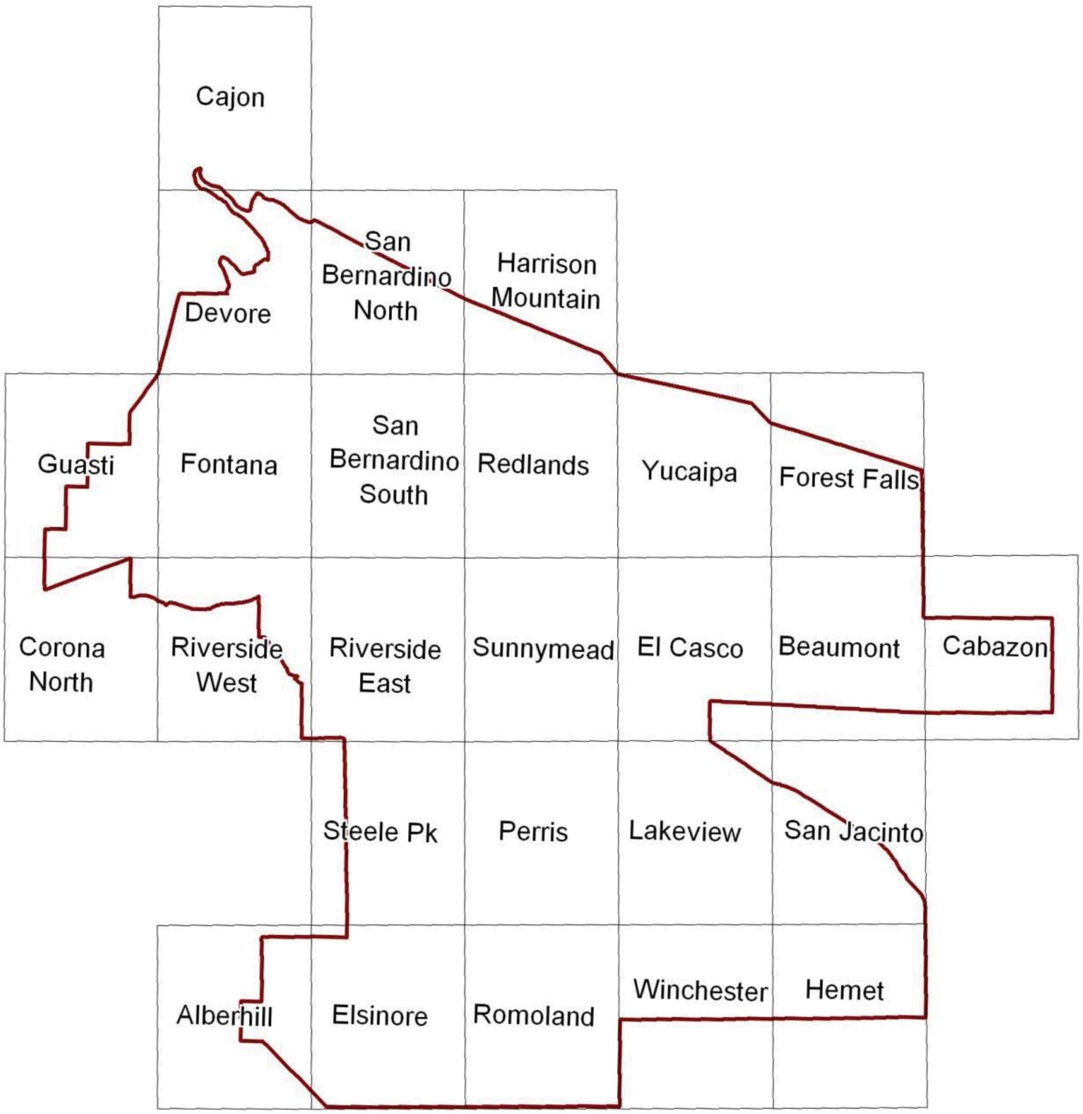


Figure 2. Index map of U.S. Geological Survey 7-1/2 minute quadrangles covering the San Bernardino P-C Region

quantity of construction aggregate in areas with land-uses compatible with potential mining; (2) limits of the market area that these potential resources would supply; and (3) an estimate of the total quantity of aggregate material that will be needed to supply the area for the next 50 years.

Table 1. Lead agencies in the San Bernardino P-C Region (county and incorporated city governments).

LEAD AGENCY	Lead agencies with active aggregate operations within their jurisdiction	Lead agencies with land designated for PCC-grade aggregate within their jurisdiction
County of San Bernardino	*	*
City of Colton		*
City of Fontana		*
City of Grand Terrace		
City of Highland	*	*
City of Loma Linda		
City of Ontario		*
City of Rancho Cucamonga		*
City of Redlands	*	*
City of Rialto	*	*
City of San Bernardino	*	*
City of Yucaipa		
County of Riverside	*	*
City of Banning	*	*
City of Beaumont		
City of Calimesa		
City of Canyon Lake		
City of Hemet		
City of Lake Elsinore		*
City of Moreno Valley		
City of Perris		
City of Riverside		*
City of San Jacinto		

OVERVIEW OF CLASSIFICATION

The classification of construction aggregate resources involves the six distinct but interrelated steps that are listed below.

1. Determination of Study Boundary: Study areas may be a county, a portion of a county, or a P-C region that may contain parts of one or more counties. P-C regions were selected such that the majority (95 percent) of the construction aggregate produced in the region is consumed in the region. (See explanation following this list).

2. Establishment of Mineral Resource Zones (MRZs): Based on geologic appraisals, lands within the study area were classified in SR 143, Part VII as MRZ-1, MRZ-2, or MRZ-3. In this update report, this MRZ classification has been retained and is shown on Plate 1. This classification system is discussed in Part II of this report. The geologic appraisals include a study of pertinent geologic reports and maps, and field investigations of geologic units exposed in outcrops and at active and inactive mines and quarries.

3. Identification of Sectors: Lands known to contain significant aggregate resources (areas classified as MRZ-2 in Step 2 above) are evaluated to determine if current uses of these lands preclude mining. Areas currently permitted for mining and areas found to have land uses compatible with possible mining are identified as *Sectors* (Plates 2 and 3).

4. Calculation of Resource Tonnages within Sectors: Investigation and analysis of on-site conditions, measurement of the areal extent of deposits, drill-hole information, waste-material percentages, and deposit densities are used to calculate total tonnages of aggregate reserves (deposits in land owned or controlled by an aggregate producer and permitted for mining) and resources (all deposits of aggregate, including the permitted reserves) within each Sector.

5. Forecast of 50-Year Needs and the Life Expectancy of Current Reserves: The total tonnage of aggregate needed to satisfy the estimated demand in the study area over the next 50 years is based on multiplying the projected population over that period with the average annual per-capita rate of total aggregate consumption from 1981 to the time of the study. Results of this forecast are used to determine the life expectancy of the study area's current reserves.

6. Identification of Alternative Resources: Alternative sources of aggregate are identified and briefly discussed.

When the determination of the study boundary for the San Bernardino P-C Region originally was made in the early 1980s, the region consumed at least 95 percent of the aggregate produced within the region. Since then, marketing patterns have changed so that this is no longer true. Based on discussions with aggregate operators, it is estimated that approximately 70 percent of the region's aggregate production in 2007 was exported beyond the P-C Region boundary. A small part of this may have been offset by imports from the neighboring Claremont-Upland P-C Region. There are two factors that have led to this increase in inter-regional aggregate commerce. The depletion of aggregate reserves in large areas such as Orange County and northern San Diego County have increased exports to those regions, and consolidation of ownership may have led to longer hauls to company-owned concrete batch plants outside of the P-C region. Also, aggregate is being transported by rail from the San Bernardino P-C Region to the San Gabriel P-C Region.

Classification of the San Bernardino P-C Region was done with regard to the suitability of the material for use in PCC aggregate. Materials suitable only for asphaltic aggregate, base, subbase, and fill were not classified because of their abundance in the region.

OVERVIEW OF DESIGNATION

This update report contains the classification step of the two-phase process provided by SMARA. The designation phase follows the receipt and acceptance of this classification report by the Board. Designation is the formal recognition by the Board, after consultation with lead agencies and other interested parties, of areas containing mineral deposits of regional or statewide economic significance. Procedures for the designation of lands containing significant mineral deposits are specified in Section II.2 of the Board's Guidelines for Classification and Designation of Mineral Lands (http:/www.consrv.ca.gov/SMGB/Guidelines/ClassDesig.pdf).

The Board previously designated lands in the San Bernardino P-C Region in a report titled "Designation of Regionally Significant Construction Aggregate Resource Areas in the Claremont-Upland and San Bernardino Production-Consumption Regions: SMARA Designation Report No. 5" (California Department of Conservation, 1987). This update report reviews the current land uses of the previously designated areas, but does not alter that designation.

LEAD AGENCY RESPONSE TO CLASSIFICATION

The Board, upon receipt of the classification information from the State Geologist, transmits the classification report to the appropriate lead agencies and makes it available to other interested parties. Within 12 months of receipt of the report, each lead agency must develop and adopt mineral resource management policies to be incorporated in its general plan. These policies will:

1. Recognize the mineral land classification information, including the classification maps transmitted to the lead agency by the Board.

2. Emphasize the conservation and development of the identified mineral deposits.

Lead agencies that have jurisdiction within the San Bernardino P-C Region are shown in Table 1. The information in this update and the revised projection of aggregate needs in the region should be used by the lead agencies in evaluating the effectiveness of their current mineral resource management policies and in planning for future construction aggregate demands in their jurisdictions. These plans should be updated if necessary.

PART II - MINERAL LAND CLASSIFICATION OF AGGREGATE IN THE SAN BERNARDINO P-C REGION

This section of the report contains information concerning the location, quality, and quantity of aggregate resources in the San Bernardino P-C region.

MINERAL RESOURCE ZONES

As set forth in Section 2761 (b) of SMARA, the State Geologist shall classify land solely on the basis of geologic factors and without regard to existing land use. Areas subject to mineral land classification studies are divided by the State Geologist into various Mineral Resource Zone (MRZ) categories that reflect varying degrees of mineral resource potential. When SR 143, Part VII was written, the nomenclature for mineral land classification consisted of four categories—MRZ-1, MRZ-2, MRZ-3, and MRZ-4. Since then, the nomenclature has been expanded to include subdivisions of the MRZ-2 and MRZ-3 categories into “a” and “b” subcategories, as explained in the Board’s Guidelines for Classification and Designation of Mineral Lands under Section I, part 3. The original categories for mineral land classification were retained for this update report. Following is a brief description of the three MRZ categories used in this update report (MRZ-4 is not used):

MRZ-1: Areas where available geologic information indicates that little likelihood exists for the presence of significant mineral resources.

MRZ-2: Areas where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood for their presence exists. This zone shall be applied to known mineral deposits or where well-developed lines of reasoning, based upon economic-geologic principles and adequate data, demonstrate that the likelihood for occurrence of significant mineral deposits is high.

MRZ-3: Areas containing known or inferred mineral occurrences of undetermined mineral resource significance.

CLASSIFICATION CRITERIA

To be considered **significant** for the purpose of mineral land classification, a mineral deposit, or a group of mineral deposits that can be mined as a unit, must meet marketability and threshold value criteria adopted by the Board (California State Mining and Geology Board website). Threshold values are intended to indicate in a general way the approximate minimum size of a mineral deposit that will be considered significant for classification and designation. The threshold value criteria vary for different minerals depending on their uniqueness and commodity-type category. The Board determined threshold value of the first marketable product in 1998 dollars to be $1,250,000 for a metallic ore or rare mineral deposit, $2,500,000 for an industrial mineral deposit other than construction aggregate, and $12,500,000 for a construction aggregate deposit. In order to adjust these threshold values to reflect 2008 dollars, each value was multiplied by an inflation factor of 1.34. This factor was determined by dividing the U.S. Department of Labor's (California Department of Finance website, 2008) estimated Consumer Price Index (CPI) for December, 2007 (219.6) by the CPI for 1998 (163.7). Threshold values in 2007 dollars (rounded to the nearest thousand) are as follows:

Metallic or rare mineral deposits	$ 1,675,000
Industrial minerals other than construction aggregate	$ 3,350,000
Construction aggregate	$ 16,750,000

Construction aggregate sells for about $13 per ton in the San Bernardino P-C Region; therefore, $16,750,000 equates to about 1.3 million tons of aggregate material.

REEVALUATION OF MINERAL LAND CLASSIFICATION FOR PCC-GRADE AGGREGATE IN THE SAN BERNARDINO P-C REGION

Analysis of new data obtained since the publication of SR 143, Part VII has resulted in two areas being reclassified from MRZ-3 to MRZ-2 for PCC-grade aggregate.

Areas Reclassified to MRZ-2 from MRZ-3 for PCC-Grade Aggregate

In this update report, 1,657 acres previously classified MRZ-3 for PCC-grade aggregate in SR 143, Part VII are reclassified as MRZ-2 for PCC. These areas are in the City of Fontana (Lytle Creek Fan) and in the north edge of the City of Lake Elsinore (Gavilan Hills) as shown on Plate 1.

Lytle Creek Fan (MRZ-2 PCC-1)

This area contains sand and gravel deposits that are part of the Lytle Creek alluvial fan, southwest of the mouth of Lytle Creek Canyon (Plate 1) and covers an area of 1,567 acres. Excavation for the Mid-Valley Sanitary Landfill has yielded new information on the quality of aggregate material in this area. Robertson's Ready Mix Concrete, Inc., has been selling material from this deposit for use as PCC-grade aggregate since 1999. Other parts of the Lytle Creek Fan were classified MRZ-2 in SR 143, Part VII and subsequently designated by the Board.

Gavilan Hills (MRZ-2 PCC-2)

The second area reclassified to MRZ-2 from MRZ-3 is a 90-acre crushed-stone deposit in the Gavilan Hills north of the City of Lake Elsinore. The rock material here is a granitic rock of the Peninsular Ranges Batholith known as tonalite. Pacific Aggregates, Inc., has been mining and selling this material as PCC-grade aggregate since 2006.

REEVALUATION OF PCC-GRADE AGGREGATE IN THE SAN BERNARDINO P-C REGION

A reevaluation of PCC-grade aggregate resources in the San Bernardino P-C Region is presented in this section of the report. The reevaluation was conducted on the basis of a quantitative evaluation of suitable PCC-grade aggregate resources classified as MRZ-2.

Concepts Used in Identifying Aggregate Resource Sectors

The State Geologist is responsible for identifying and calculating the amount of aggregate resources contained in areas classified as MRZ-2. Recognizing that there are lands within these areas that have already been urbanized, and therefore the mineral resources within them have a limited opportunity for conservation, development, and utilization, the State Geologist further limits the aggregate resource calculations to areas within “Sectors.”

Sectors are areas that have been classified as MRZ-2 by the State Geologist, and that have current land uses deemed compatible with potential mining based on criteria provided by the Board. Compatible land uses are defined as those that are non-urbanized or that have very low-density residential developments (one dwelling unit per ten acres or less), land without high-cost improvements, and land used for agriculture, grazing, or open space. Urbanization and/or incompatible land uses are defined as improvements of high cost, such as high-density residential developments, intensive industrial developments, commercial developments, and major public facilities.

Mineral land classification, which is done without regard for current land use, results in a delineation of the resource areas on maps; but this by itself does very little to put into perspective the resource base that is available to meet the future needs of a region. Sectors are used to focus the attention of land-use planners and local governments on the areas that remain accessible for mineral extraction. The State Geologist calculates the available resources of each Sector and identifies the amount of remaining resources that have been permitted for mining. Resources that have been permitted for mining are termed “reserves.” The calculated reserves and resources of all the Sectors within a P-C Region are compared with the State Geologist’s forecast of the 50-year needs of that P-C Region for the particular mineral resource.

Each Sector, or group of Sectors, meets or exceeds the Board’s threshold value, and each Sector may be considered for designation as an area of regional or statewide significance by the Board pursuant to SMARA. The Board only considers areas in Sectors for designation.

For this update, the determination of land use as non-urbanized was based on conditions of the lands as of December 2007. The land use was determined by reference to satellite imagery, field reconnaissance, and consultation with local planners.

The Board’s criteria for creating Sectors focuses on the apparent suitability of the land for mining and does not take into consideration land commitments (other than approved tracts or Specific Plans) that may have been made that restrict the accessibility of some of the Sectors for mining. It is possible, therefore, that the available resource base as calculated by the State Geologist may be overestimated.

Calculation of Available Resources

The resource estimates presented in this section are limited to those remaining aggregate resources identified in the Sectors designated by the Board (California Department of Conservation, 1987) and two newly identified resource Sectors. Some Sectors are subdivided into numbered subsectors to recognize the location of existing highways, canals, bridges, power lines, pipelines, etc., to allow for more realistic resource tonnage calculations.

Resource tonnage calculations for this report were made by assuming that the tonnage of resources lost was proportional to the area lost to urban development in each sector. The factors used in this report to determine the areal extent and tonnage of PCC-grade aggregate resources remaining within the designated Sectors are the same as those used in SP 143, Part VII and listed in that report under the descriptions for individual Sectors.

Resource tonnage calculations for this update report used area calculations from Geographic Information System (GIS) software. The calculations are current as of January 2008. Neither SR 143, Part VII or the designation report (California Department of Conservation, 1987) included the area calculations for individual subsectors.

Previously Designated Resource Sectors

In SR 143, Part VII, all lands in the San Bernardino P-C Region classified as containing significant aggregate resources (MRZ-2) and not precluded from mining by incompatible land uses, were divided into nine Sectors—A, B, C, D, E, F, G, H, and I, with Sectors A through G further subdivided into 111 subsectors. In 1987, the Board designated parts of Sectors A through G and all of Sectors H and I (California Department of Conservation, 1987). The areas of the designated Sectors were recalculated for this update using a GIS. The recalculated total is 24,656 acres. Only the Sectors designated in 1987 were retained in this report. Following is a brief summary of the designated Sectors, which are shown on Plates 2 and 3:

> Sector A – Deposits of the Lytle Creek alluvial fan in and around the City of Fontana. Eighteen of the original 30 subsectors are currently designated to be of regional significance. These are Sectors A-4, A-6 through A-9, A-13 through A-19, A-23, A-24, and A-27 through A-30. The area and resources remaining in each Subsector are listed in the Appendix.

> Sector B – Deposits of the Lytle Creek alluvial wash, northwest of and partly within the City of San Bernardino. Thirteen of the original 18 subsectors are currently designated to be of regional significance. These are Sectors B-1, B-2, B-5 through B-10, B-12, and B-14 through B17. The area and resources remaining in each Subsector are listed in the Appendix.

> Sector C – Deposits of the Cajon Creek alluvial wash, immediately north of the confluence with Lytle Creek alluvial wash. Seven of the original 14 subsectors are currently designated to be of regional significance. These are Sectors C-1, C-3 through C-6, C-8, and C-10. The area and resources remaining in each Subsector are listed in the Appendix.

> Sector D – Alluvial fan deposits in the central part of the San Bernardino Valley near the community of Mira Loma. Five of the original seven subsectors are currently designated to be of regional significance. These are Sectors D-2 through D-6. The area and resources remaining in each Subsector are listed in the Appendix.

Sector E – Deposits of alluvium in and near the Santa Ana River channel, downstream of the Interstate Highway 215 crossing to the upstream part of the Santa Ana River Wildlife Area. Fourteen of the original 24 subsectors are currently designated to be of regional significance. These are Sectors E-1, E-2, E-4, E-5, E-9, E-10, E-13, E-14, E-17, E-19, E-20, and E-22 through E-24. The area and resources remaining in each Subsector are listed in the Appendix.

Sector F – Deposits of alluvium of the Santa Ana River and its major tributaries upstream of Interstate Highway 215. Seventeen of the original 33 subsectors are currently designated to be of regional significance. These are Sectors F-1 through F-6, F-9, F-12, F-14 through F-18, F-20, F-23, F-32, and F-33. The area and resources remaining in each Subsector are listed in the Appendix.

Sector G – Deposits of alluvium in the San Gorgonio River channel and floodplain, east of the City of Banning. Both subsectors G-1 and G-2 are currently designated to be of regional significance. The area and resources remaining in these two subsectors are listed in the Appendix.

Sector H – Deposits of alluvium in the channel of Rice Canyon Creek and part of its fan, near the community of Alberhill in Riverside County. This Sector is currently designated to be of regional significance. The resources in this Sector have been depleted.

Sector I – Deposits of alluvium in the channel of McVickers Canyon Creek and part of its fan, northwest of the City of Lake Elsinore. This Sector is currently designated to be of regional significance. The resources in this Sector have been depleted or precluded from mining by urbanization.

Newly Identified Resource Sectors

This report describes two newly identified aggregate resource sectors covering an area of approximately 1,657 acres. The new areas are identified as Sector J (Plate 2), which contains 13 subsectors, and Sector K (Plate 3). These areas are described below and summarized in Table 2. These newly identified sectors are not currently designated, but may be considered for designation by the Board in the future.

<u>Lytle Creek Fan - Sector J (1,567 acres)</u>

Sector J is a newly identified area of significant PCC-grade aggregate resources on the Lytle Creek alluvial fan. Sector J includes the area of the Lytle Creek alluvial fan nearest the mouth of Lytle Creek, north of Highland Avenue and west of Riverside Avenue and is divided into 13 subsectors (J-1 through J13) by roads, a freeway, and power lines. The new information on aggregate quality in this area is derived from the excavation associated with the Mid-Valley Sanitary Landfill. The aggregate resources in Sector J are estimated to be 100 feet thick, have a density of .065 tons per cubic foot, and have a waste factor of 10 percent. It is estimated that Sector J contains approximately 334 million tons of PCC-grade aggregate resources. Robertson's Ready Mix Concrete, Inc. operates in subsectors J-12 and J-13.

Sector J-1 is between Lytle Creek Road and the Ontario Freeway (Interstate 15).

Sector J-2 is northwest of Lytle Creek Road in Section 13, T1N, R6W, SBBM.

Sector J-3 is a triangular area between Citrus Avenue, Duncan Canyon Road, and the Ontario Freeway (Interstate 15).

Sector J-4 is southeast of the Ontario Freeway (Interstate 15), in the west half of Section 18, T1N, R5W, SBBM.

Sector J-5 is southeast of the Ontario Freeway (Interstate 15), in the northeast 1/4 of Section 18, T1N, R5W, SBBM.

Sector J-6 is the largest of the subsectors in Sector J. It is north of Summit Avenue, between Citrus Avenue and Sierra Avenue.

Sector J-7 is east of the Ontario Freeway (Interstate 15), south of Duncan Canyon Road, west of Citrus Avenue, and north of a power line. It is in the northeast ¼ of Section 24, T1N, R6W, SBBM.

Sector J-8 is south of a power line that separates it from Sector J-7, in the northeast ¼ of Section 24, T1N, R6W, SBBM.

Sector J-9 is a rectangular area between Citrus Avenue and Catawba Avenue, north of Curtis Avenue and south of Summit Avenue, in the east ½ of the northeast ¼ of Section 25, T1N, R6W, SBBM.

Sector J-10 is a strip along the eastern side of Sierra Avenue, north of Windflower Avenue, in Sections 17, 20, and 29, T1N, R5W, SBBM.

Sector J-11 is in the northeast ¼ of Section 29, T1N, R5W, SBBM.

Sector J-12 is in the southeast ¼ of Section 19, T1N, R5W, SBBM.

Sector J-13 is south of State Route 210 Freeway, just east of the Rialto Municipal Airport in the east ½ of Section 34, T1N, R5W, SBBM.

Gavilan Hills – Sector K (90 acres)

Sector K is a newly identified 90-acre area within the granitic rocks of the Peninsular Ranges Batholith. It is north of Elsinore Lake, on the northeast corner of the Corona Freeway and Nichols Road. The area is the site of an active crushed-stone quarry operated by the Pacific Aggregates, Inc. The aggregate resources in this Sector are proprietary.

Aggregate Resources in the San Bernardino P-C Region

There are several factors that have changed the amount of PCC-grade aggregate resources in the San Bernardino P-C Region identified in SR 143, Part VII. There also have been changes since the designation in 1987. These factors include the newly identified aggregate resources summarized in Table 2, the designated lands lost to urbanization since 1987 listed in Table 3, and the commercial aggregate production since 1981. There was also significant non-commercial production of PCC-grade aggregate from Sector F-15 in the Santa Ana River Wash for use in the Seven Oaks Dam construction.

Newly identified unpermitted aggregate resources, in the areas reclassified from MRZ-3 to MRZ-2 (Sectors J described above), total 334 million tons. The permitted aggregate reserves in Sector J cannot be included due to confidentiality. The aggregate resource in Sector K is all under permit, and cannot be given.

Urban development has covered 4,427acres within designated Sectors, containing about 959 million tons of PCC-grade aggregate resources (see Table 3 and Plates 2 and 3). This has reduced the designated PCC-grade aggregate resources about 14 percent.

PCC-grade aggregate resources have also been reduced by production from commercial aggregate mines by 252 million tons.

Table 2. Sectors J and K acreages and aggregate resources.

Sector	Acres	Aggregate Resources (million tons)
J-1	65.0	13.9
J-2	32.9	6.7
J-3	37.6	7.9
J-4	91.1	20.4
J-5	29.6	6.1
J-6	755.3	185.5
J-7	48.3	10.3
J-8	44.3	9.5
J-9	63.2	14.9
J-10	196.7	49.4
J-11	76.6	P
J-12	89.5	P
J-13	36.4	9.3
K	89.9	P
Totals	1,656.4	333.9

P - Sector contains reserves that are proprietary and are not added to total.

The construction of the Seven Oaks Dam used 23.6 million tons of aggregate from Sector F-15. This resource figure listed in Table 4 and the Appendix for Sector F-15 has been reduced by this amount.

As shown in Table 4, there are now 5,986 million tons of PCC-grade aggregate resources identified in the San Bernardino P-C Region.

The PCC-grade aggregate reserves (permitted resources) have decreased to 287 million tons from 430 million tons—as given in SR 143, Part VII (see Table 4). The 287 million tons of present reserves includes 109 million tons of reserves permitted since 1987.

Table 3. PCC-grade aggregate resources lost to incompatible land uses, 1987 to 2008. Only those Sectors or subsectors with areas lost to incompatible land uses are listed in this table. A complete listing of subsectors is in the Appendix.

Sector	Acres Designated in Sector in 1987	Acres Lost to Incompatible Uses	Resources Lost (million tons)
A-4	808.5	447.2	92.5
A-6	92.1	92.1	21.5
A-7	813.7	504.1	130.6
A-8	513.2	441.8	126.0
A-9	350.4	251.0	74.9
A-13	291.8	231.7	74.9
A-15	57.9	57.9	14.9
A-16	28.3	12.3	3.0
A-17	24.3	9.5	2.2
A-18	39.5	39.5	9.2
A-19	93.6	7.8	1.4
A-23	74.8	74.8	17.0
A-24	46.3	46.3	4.3
A-27	44.6	44.6	4.0
A-28	214.8	214.8	13.6
B-6	97.0	37.7	2.1
B-7	189.3	40.9	10.2
B-12	12.5	12.5	0.9
B-16	8.2	8.2	0.6
B-17	8.4	8.4	0.3
C-4	58.8	28.4	5.2
C-10	50.0	36.5	3.7
D-2	120.6	120.6	9.0
D-3	269.7	269.7	19.5
D-4	69.5	69.5	7.8
D-5	91.2	91.2	7.0
D-6	72.2	72.2	5.3
E-4	50.9	50.9	8.9
E-10	641.3	45.2	4.7
E-13	281.2	12.3	1.3
E-24	207.5	93.8	13.7

Table 3. (Continued)

Sector	Acres Designated in Sector in 1987	Acres Lost to Incompatible Uses	Resources Lost (million tons)
F-1	48.1	48.1	4.7
F-2	125.4	45.6	2.9
F-3	34.8	16.4	8.3
F-4	134.5	134.5	50.0
F-5	13.4	13.4	1.8
F-6	150.4	19.7	8.3
F-12	54.0	54.0	3.2
F-14	1,140.0	68.9	48.7
F-15	5,493.0	272.2	121.2
F-16	87.2	1.8	0.4
F-17	38.5	2.3	0.4
F-23	151.8	20.4	3.0
I	318.8	255.9	16.1
Totals	**13,512.0**	**4,426.6**	**959.2**

Table 4. Summary of PCC-grade aggregate resources and reserves in the San Bernardino P-C Region in 2008.

Sector	**Resources In 2008** (million tons)	**Reserves (Permitted Resources) In 2008** (million tons)
A	269.5	0
B	897.6	P
C	615.4	P
D	0	0
E	281.2	0
F	3,476.4	P
G	355.0	P
H	†	0
I	†	0
J††	334	P
K††	P	P
Subtotal*	**6,238**	
Production since 1981	**-252**	
Totals	**5,986**	**287**

P Sector contains reserves that are proprietary.
† Remainder of resources mined out.
†† Newly identified Sector (not designated).
*This subtotal is different than the column total to conceal more than one proprietary figure as provided by PRC 2207(g).

PART III – AGGREGATE PRODUCTION IN THE SAN BERNARDINO P-C REGION

As of January 2008, the following four companies operated nine mines producing PCC-grade aggregate in the San Bernardino P-C Region:

- Cemex (two mines)
- Pacific Aggregates, Inc.
- Robertson's Ready Mix Concrete, Inc. (five mines)
- Vulcan Materials Company

Following are brief descriptions of the above company operations:

Cemex operates the Lytle Creek Quarry in Lytle Creek Wash, south of Interstate Highway 15, and the Redlands Pit in the Santa Ana River Wash, mostly in the City of Redlands and partly in the City of Highland.

Pacific Aggregates, Inc. is quarrying granitic rock from a hillside north of Lake Elsinore. This quarry is known as the Nichols Canyon Mine.

Robertson's Ready Mix Concrete, Inc. owns the 4th Street Rock Crusher operation in the Lytle Creek flood control channel and the Old Webster Quarry in the upper Santa Ana River wash in the City of Highland. The company also has two mines along the San Gorgonio River; one in the City of Banning (Banning Pit) and the other near the community of Cabazon (Cabazon Pit). The company's newest mine involves the removal of material in conjunction with the Mid-Valley Landfill on the Lytle Creek alluvial fan in the City of Rialto.

Vulcan Materials Company, Western Division's Cajon Creek Pit began operation in 1998. The mine is in the Cajon Creek Wash, south of Interstate Highway 15. The project covers 1,392 acres, of which 606 acres will be mined.

AGGREGATE PRODUCTION DATA

PCC-grade aggregate production data for the San Bernardino P-C Region from 1981 to 1990 were collected from records of the U.S. Department of the Interior's Bureau of Mines (now part of the U.S. Geological Survey) and from the aggregate producers. The U.S. Bureau of Mines' records were compiled from responses to voluntary questionnaires sent annually, or biennially, to all known mine operators. Each producer was requested to divulge the production from each of their producing properties for the preceding year. The accuracy of these figures depends on the accuracy of the producers' responses. For the years 1991 through 2006, annual mine production data from the California Department of Conservation's Office of Mine Reclamation were used. As shown in Table 5 and Figure 3, PCC-grade aggregate production in the San Bernardino P-C Region has increased from 3.9 million tons in 1981 to 19.5 million tons in 2006—the last year production figures are available.

Table 5. Population, aggregate production, and per capita consumption in the San Bernardino P-C Region during the years 1981 through 2006.

YEAR	POPULATION	AGGREGATE PRODUCTION (tons*)	PER CAPITA CONSUMPTION (tons)
1981	748,832	3,876,000	5.2
1982	775,693	3,333,000	4.3
1983	801,491	3,154,000	3.9
1984	829,321	5,071,000	6.1
1985	863,843	3,774,000	4.4
1986	907,707	8,361,000	9.2
1987	960,915	5,650,000	5.9
1988	1,023,302	12,172,000	11.9
1989	1,093,438	12,065,000	11.0
1990	1,171,271	12,297,000	10.5
1991	1,260,165	7,403,000	5.9
1992	1,298,262	7,700,000	5.9
1993	1,319,372	7,666,000	5.8
1994	1,333,405	6,933,000	5.2
1995	1,352,146	6,307,000	4.7
1996	1,366,154	7,562,000	5.5
1997	1,389,652	8,152,000	5.9
1998	1,425,498	8,932,000	6.3
1999	1,463,152	9,765,000	6.7
2000	1,497,294	11,784,000	7.9
2001	1,534,859	13,149,000	8.6
2002	1,585,046	14,696,000	9.3
2003	1,640,385	17,240,000	10.5
2004	1,701,269	16,396,000	9.6
2005	1,761,551	18,785,000	10.7
2006	1,819,037	19,656,000	10.8
		Total: 251,879,000	**Average: 7.4**

***Aggregate production figures are rounded to nearest 1000 tons.**

PART IV – UPDATED ESTIMATE OF 50-YEAR CONSUMPTION OF AGGREGATE IN THE SAN BERNARDINO P-C REGION

The Board, as specified in its guidelines for classification and designation of mineral land (California State Mining and Geology Board), requires that mineral land classification reports for regions containing construction materials classified as MRZ-2 include "An estimate of the total quantity of each such construction material that will be needed to supply the requirements of both the county and the marketing region in which it occurs for the next 50 years. The marketing region is defined as the area within which such material is usually mined and marketed. The amount of each construction material mineral resource needed for the next 50 years shall be projected using past consumption rates adjusted for anticipated changes in market conditions and mining technology." This section contains the revised estimate of aggregate needs for the San Bernardino P-C Region, forecasted to the year 2057.

CORRELATION BETWEEN AGGREGATE PRODUCTION AND POPULATION

Past studies of production-consumption regions in California have shown a correlation between the amount of aggregate consumed and the population of the market area (Anderson and others, 1979). An aggregate report for Los Angeles County (Miller, 1994) contains a statistical analysis of aggregate consumption versus population suggesting that roughly two-thirds of the variation in aggregate consumption could be attributed to population variation. The fact that large market regions such as Los Angeles County show a correlation between aggregate production and population indicate that population is a major factor in determining aggregate consumption in many areas. Other factors, such as major public construction projects can randomly add large amounts of aggregate to consumption figures. The economy also has a strong influence on aggregate demand, but the simple factor of population was selected because it most influences aggregate demand over long periods of time.

A comparison of the projected aggregate demand for the San Bernardino P-C Region from SR 143, Part VII and actual production data for the period of 1981 to 2006 is shown in Figure 3. SR 143, Part VII projected that the demand for aggregate in the San Bernardino P-C region for 1981-2006 would be 207 million tons. Actual PCC-grade aggregate production in the San Bernardino P-C Region for 1981-2006 was 252 million tons. The difference between projected demand and actual production, 45 million tons, was about 22 percent more. This difference is because of a greater increase in population than was projected—the projected 2006 population was 1.14 million compared to an actual 2006 population of 1.82 million—and a recent increase in exports to other regions. Information provided by the aggregate producers in the region, indicate that exports reached nearly 70 percent of total production in 2007. If this continues, the demand on the regions aggregate resources may be much higher than is projected.

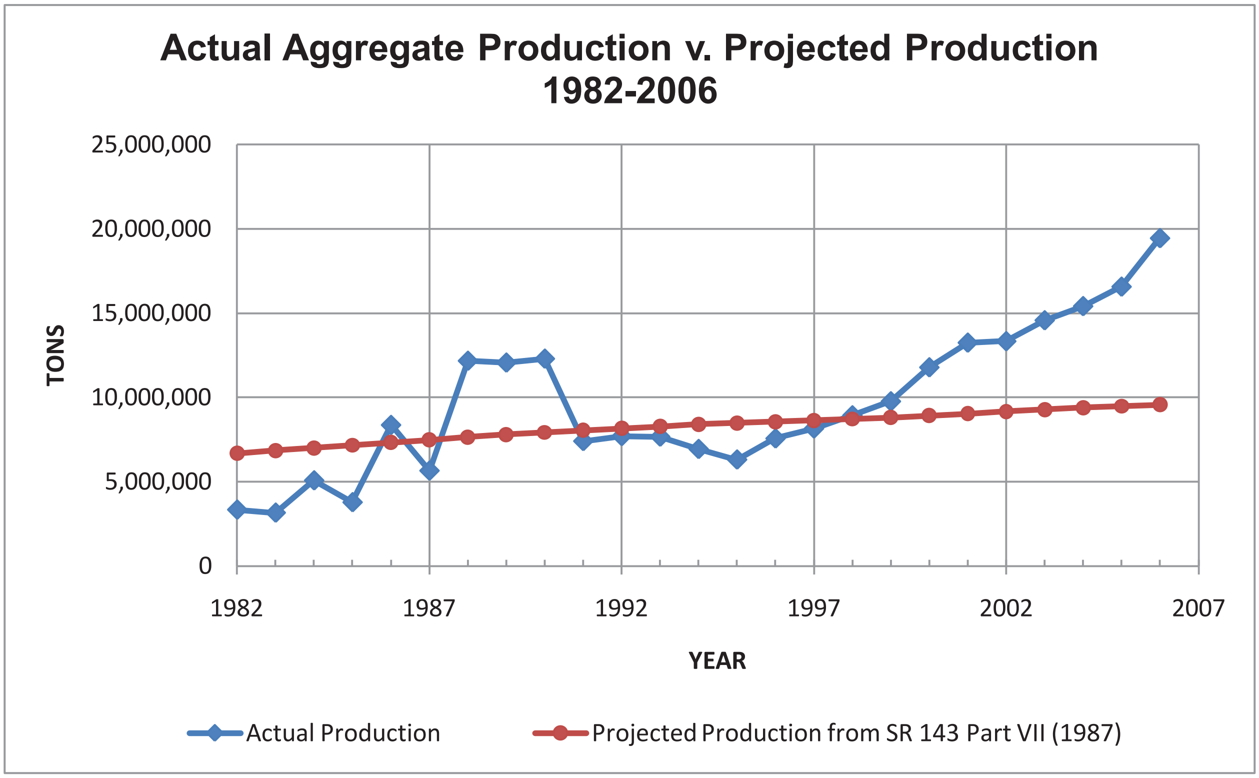


Figure 3. Comparison of projected demand in the San Bernardino P-C Region with actual PCC-grade aggregate production, 1982-2006.

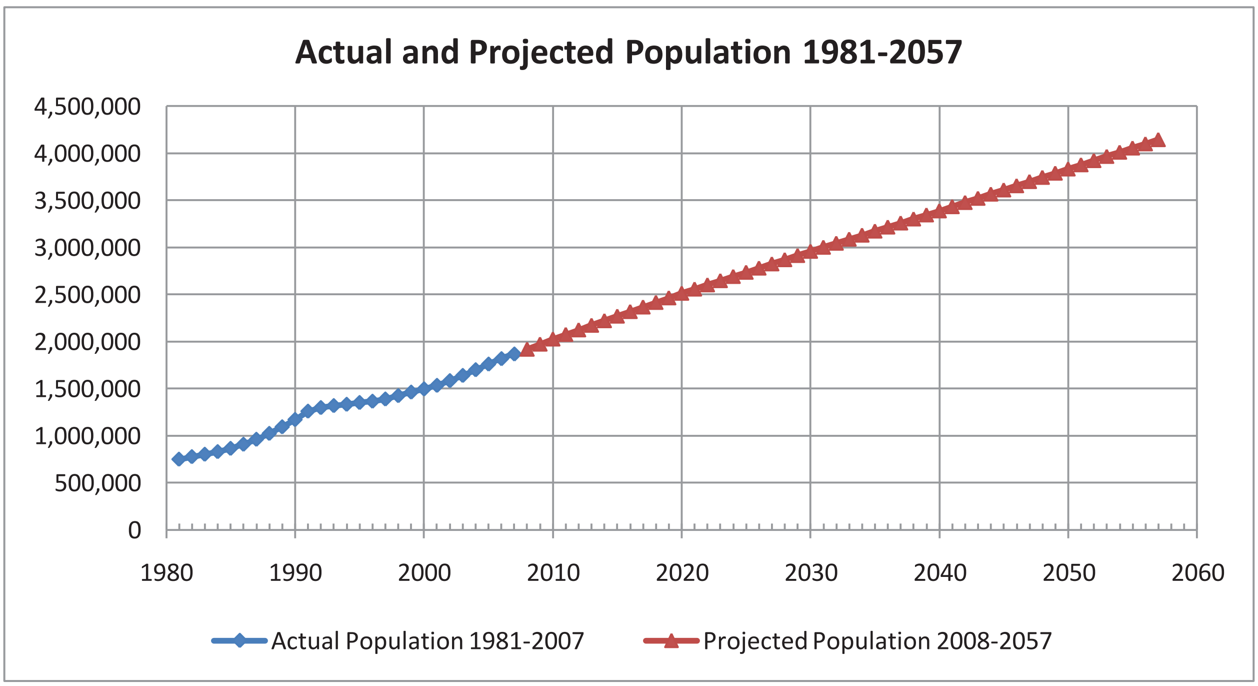
Population data for the San Bernardino P-C Region for the years 1981 to 2007 were obtained from census tract data provided by the San Bernardino County and Riverside County planning departments for the 1980 census and from census tract population data from the U.S. Census Bureau (2007) for the 1990 and 2000 censuses. Complete census tracts within the Region were summed with the population of partial tracts. The population of partial tracts was equated to be the same percentage as the included area. The population statistics between census years are interpolated. The average per capita aggregate consumption rate for the years 1981 through 2006 was 7.4 tons per person per year (Table 5). This rate was used for projecting future aggregate demands.

POPULATION PROJECTION FOR THE SAN BERNARDINO P-C REGION THROUGH THE YEAR 2057

The year-2000 population for the census tracts within San Bernardino and Riverside counties was divided by the total year-2000 population of each county, respectively, resulting in a ratio. This percentage (44.2 percent of Riverside County's total population and 47.6 percent of San Bernardino County's total population) was used to estimate the San Bernardino P-C Region's population for the years 2010, 2020, 2030, 2040 and 2050.

The population projection for the San Bernardino P-C Region (Figure 4) was estimated from official projections published by the California Department of Finance's Demographic Research Unit (California Department of Finance, 2007) and the above percentages for each county. Report 06 P-1(on the California Department of Finance's website) provides population projections for counties in California for the years 2010, 2020, 2030, 2040 and 2050. Yearly population estimates were interpolated from the bracketing 10-year projected population numbers and extrapolated for the years 2051 through 2057. The population of the San Bernardino P-C Region is projected to increase from 1,918,400 in 2007 to 4,147,600 in 2057.

Figure 4. Population of the San Bernardino P-C Region—1981-2007—and population projection to 2057.



PROJECTED AGGREGATE DEMAND FOR THE SAN BERNARDINO P-C REGION THROUGH THE YEAR 2057

A simple analysis using projected population and annual per capita consumption rate, derived by methods described in preceding sections, was used to forecast the aggregate demand of the San Bernardino P-C Region through the year 2057 (Table 6). The calculated annual per capita consumption rate of 7.4 tons (from Table 5) was multiplied by the projected annual population for each year through the year 2057.

The result of this projection shows that an estimated 1,131 million tons of aggregate will be needed to satisfy future demand in the San Bernardino P-C Region through the year 2057. Of this total, it is estimated by producers in the region that approximately 65 percent, or 735 million

Table 6. Projected population and aggregate demand in the San Bernardino P-C Region (2008-2057).

YEAR	PROJECTED POPULATION	PROJECTED AGGREGATE DEMAND (in tons)*	ESTIMATED PCC AGGREGATE DEMAND (in tons)*	YEAR	PROJECTED POPULATION*	PROJECTED AGGREGATE DEMAND (in tons)*	ESTIMATED PCC AGGREGATE DEMAND (in tons)*
2008	1,918,350	14,196,000	9,227,000	2034	3,131,999	23,177,000	15,065,000
2009	1,972,620	14,597,000	9,488,000	2035	3,175,011	23,495,000	15,272,000
2010	2,026,935	14,999,000	9,750,000	2036	3,218,023	23,813,000	15,479,000
2011	2,075,601	15,359,000	9,984,000	2037	3,261,035	24,132,000	15,686,000
2012	2,124,267	15,720,000	10,218,000	2038	3,304,047	24,450,000	15,892,000
2013	2,172,932	16,080,000	10,452,000	2039	3,347,059	24,768,000	16,099,000
2014	2,221,598	16,440,000	10,686,000	2040	3,390,071	25,087,000	16,306,000
2015	2,270,264	16,800,000	10,920,000	2041	3,434,632	25,416,000	16,521,000
2016	2,318,930	17,160,000	11,154,000	2042	3,479,192	25,746,000	16,735,000
2017	2,367,596	17,520,000	11,388,000	2043	3,523,753	26,076,000	16,949,000
2018	2,416,261	17,880,000	11,622,000	2044	3,568,314	26,406,000	17,164,000
2019	2,464,927	18,240,000	11,856,000	2045	3,612,875	26,735,000	17,378,000
2020	2,513,593	18,601,000	12,090,000	2046	3,657,435	27,065,000	17,592,000
2021	2,558,319	18,932,000	12,306,000	2047	3,701,996	27,395,000	17,807,000
2022	2,602,945	19,262,000	12,520,000	2048	3,746,557	27,725,000	18,021,000
2023	2,647,570	19,592,000	12,735,000	2049	3,791,117	28,054,000	18,235,000
2024	2,692,196	19,922,000	12,949,000	2050	3,835,678	28,384,000	18,450,000
2025	2,736,822	20,252,000	13,164,000	2051	3,880,239	28,714,000	18,664,000
2026	2,781,448	20,583,000	13,379,000	2052	3,924,799	29,044,000	18,878,000
2027	2,826,074	20,913,000	13,593,000	2053	3,969,360	29,373,000	19,093,000
2028	2,870,699	21,243,000	13,808,000	2054	4,013,921	29,703,000	19,307,000
2029	2,915,325	21,573,000	14,023,000	2055	4,058,482	30,033,000	19,521,000
2030	2,959,951	21,904,000	14,237,000	2056	4,103,042	30,363,000	19,736,000
2031	3,002,963	22,222,000	14,444,000	2057	4,147,603	30,692,000	19,950,000
2032	3,045,975	22,540,000	14,651,000	**Total 50-Year Demand:**		**1,131,233,000**	**735,302,000**
2033	3,088,987	22,859,000	14,858,000				

* Aggregate figures are rounded to the nearest 1,000 tons

tons, will be used in PCC, with the remainder being used in other construction aggregates. This updated 50-year demand is over two times the previous projected 50-year demand. This is because of the greater increase in population than was predicted by the previous projection.

COMPARISON OF THE 50-YEAR AGGREGATE DEMAND WITH CURRENT PCC-GRADE AGGREGATE RESERVES

The total PCC-grade aggregate reserves of 287 million tons in the San Bernardino P-C Region are projected to last 17 years (to the year 2024). If all of the PCC-grade aggregate reserves were used exclusively for PCC aggregate, the supply would theoretically last 31 years. In reality, 35 percent of the PCC-grade aggregate reserves likely will be used for lower grade aggregate products, and a depletion date of 2024 is more realistic. However, even this date may be optimistic. An important consideration is that not all of the aggregate reserves may be minable under the present permits because of operating restrictions or because of expiration dates that may not allow reserves to be completely mined. This last point is important because of the difficulty in obtaining permit extensions.

Comparing regional needs to available reserves and resources demonstrates the construction aggregate resource issues confronting the region. This includes the need to plan carefully for the use of lands containing these resources and the need to consider the permitting of additional aggregate resources in the region before currently permitted deposits are depleted.

Table 7 is a summary of present aggregate resources and estimated future aggregate demands for the San Bernardino P-C Region. The projected lifespan of the aggregate reserves assumes that mining of these reserves will continue to be permitted until the reserves are depleted. In addition, should unforeseen events occur, such as massive urban renewal, reconstruction in the wake of a disaster, or major economic recession, the demand for construction aggregate in the San Bernardino P-C Region could change considerably, which could alter the lifespan of aggregate reserves in the region.

ALTERNATIVE SOURCES OF AGGREGATE FOR THE SAN BERNARDINO P-C REGION

Potential sources of portland cement concrete aggregate, in addition to the deposits classified MRZ-2, exist within and near the San Bernardino P-C Region. The potential sources within the region are in areas that are classified as MRZ-3 and include areas underlain by Holocene alluvial deposits, Tertiary sedimentary deposits, and crystalline rocks. Too little is known about these alternative sources to allow more than a general description. SR 143, Part VII contains a description of these deposits in the section titled “Alternative Sources of Aggregate.”

Table 7. Summary of PCC-grade aggregate resources, PCC-grade aggregate reserves, projected 50-year demand, and depletion date for the San Bernardino P-C Region.

Estimated PCC-Grade Aggregate Resources	**5,986 Million Tons**
PCC-Grade Aggregate Reserves	**287 Million Tons**
Projected 50-Year Construction Aggregate Demand (all aggregate grades)	**1,131 Million Tons**
Projected 50-Year Demand for PCC Aggregate	**735 Million Tons**
Estimated Years Until Depletion of Current PCC-Grade Aggregate Reserves	**17 Years**
Estimated Depletion Date of PCC-Grade Aggregate Reserves	**2024**

Sources outside of the San Bernardino P-C Region are the production areas in the neighboring Claremont-Upland P-C Region to the west, about three miles away, and the Temescal Valley area, about five miles to the south and east. The additional transportation costs incurred by bringing in aggregate from these other areas could increase the price of construction aggregate in the San Bernardino P-C Region, and, these neighboring regions do not have a 50-year supply of aggregate reserves to meet their own demand (Miller and Busch, 2007; Miller, Shumway, and Hill, 1991).

RECYCLED AGGREGATE

During the past two decades, the use of recycled inert demolition debris such as concrete rubble and slab asphalt rubble has steadily increased in California. The most recycled materials in California, by tonnage, are asphalt and concrete. Recycling programs that recover demolition rubble, such as concrete and asphalt, significantly help reduce the waste-stream going into landfills and also extend the life of existing aggregate mines. However, recycled aggregate generally is not suitable for use as PCC aggregate. The bulk of recycled aggregate is used as base materials.

In the San Bernardino P-C Region, as in all of the greater Los Angeles area, the rate of recycling of demolition waste is high. A roughly estimated 700,000 tons of recycled aggregate is produced from demolished construction materials annually in the P-C Region. This figure is based on producer estimates only. Unless there is a large change in the use of recycled material for aggregate, there will not be a significant effect on the mining of new aggregate deposits and the projection of future demand for raw aggregate materials will not change significantly.

PART V – CONCLUSIONS

Within the San Bernardino P-C Region, two areas previously classified as MRZ-3 have been reclassified as MRZ-2. Newly classified areas contain about 334 million tons of unpermitted PCC-grade aggregate resources. A reevaluation of the previously designated areas within the region indicates that that about 4,427 acres, containing 959 million tons of resources, have been lost to urbanization or depleted between 1987 and 2007. After adjusting for past production, both commercial and non-commercial, the remaining designated resources and the newly identified resources total 5,986 million tons of PCC-grade aggregate resources.

Based on available historic population and production data, and population projections, the San Bernardino P-C Region will need to produce 1,131 million tons of aggregate during the next 50 years. Of this projected demand, it is estimated that 65 percent, or 735 million tons, must be suitable for use in PCC. The presently permitted aggregate reserves of 287 million tons represent approximately 25 percent of the projected construction aggregate demand of the next 50 years. These permitted reserves are projected to last until the year 2024, 17 years from the present. If a major earthquake or similar unforeseen catastrophic event strikes the region and necessitates reconstruction, existing reserves may be depleted sooner. A comparison of the results of the current study with those of the 1987 study is presented in Table 8.

Table 8. Results of this update report compared with Special Report 143, Part VII and the designation report for the San Bernardino P-C Region.

	Previous Reports†	This Update Report
Identified PCC-Grade Aggregate Resources*	6,887 Million Tons	5,986 Million Tons
PCC-Grade Aggregate Reserves*	430 Million Tons	287 Million Tons
Projected 50-year Aggregate Demand	480 Million Tons	1,131 Million Tons
Estimated Number of Years Until Reserves* are Depleted	41 Years	17 Years
Estimated Depletion Date of Reserves*	2022	2024
Calculated Per Capita Aggregate Consumption	8.4 Tons	7.4 Tons

† SR 143, Part VII and the designation report (California Department of Conservation, 1987).
* Reserves are aggregate deposits that have been determined to be acceptable for commercial use, that exist within properties owned or leased by aggregate producing companies, and for which permits have been granted to allow mining and processing of the material. Resources include reserves as well as all potentially usable aggregate materials that may be mined in the future, but for which no permit allowing mining has been granted.

ACKNOWLEDGMENTS

CGS gratefully acknowledges the cooperation of all the local government agencies, organizations, and especially the aggregate producers, all of whom provided information during the course of this study. Special thanks are extended to Doug Sprague of Vulcan Materials Company, Christine Jones and Dave Samaro of Cemex, Christine Goeyvaersts of Robertson's Ready Mix, Chad Warren and Dan Lincoln of Pacific Aggregates, Pete Pouwels of Holliday Rock Products, David Jones of the County of Riverside Planning Department, Chuck Wideen of the County of Riverside Department of Building and Safety, and George Kenline of the County of San Bernardino Land Use Services Department.

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APPENDIX – SECTOR SUMMARIES

Summary of Designated Sector acreages, PCC-grade aggregate resources, and reserves in the San Bernardino P-C Region in 2008. (Note: Newly identified Sectors J and K are not designated)

Sector	**Acres Remaining in Sector**	**Resources in 2008*** (million tons)	**Reserves (Permitted Resources) in 2008** (million tons)
A-4	434.6	74.8	0
A-6	†	0	0
A-7	309.6	80.2	0
A-8	71.4	20.4	0
A-9	99.4	29.7	0
A-13	60.1	19.4	0
A-14	24.4	8.3	0
A-15	†	0	0
A-16	16	3.8	0
A-17	14.8	3.5	0
A-18	†	0	0
A-19	85.8	15.8	0
A-23	†	0	0
A-24	†	0	0
A-27	†	0	0
A-28	†	0	0
A-29	232.0	11.6	0
A-30	19.7	2.0	0
B-1	118.9	45.4	0
B-2	10.9	1.8	0
B-5	3,708.0	709.2	P
B-6	59.3	3.2	0
B-7	148.4	36.8	0
B-8	267.3	59.1	0
B-9	169.6	28.5	P
B-10	85.1	12.0	P
B-12	†	0	0
B-14	18.4	1.3	0
B-15	8.8	0.3	0
B-16	†	0	0
B-17	†	0	0
C-1	510.0	101.5	0
C-3	165.0	39.1	P

Sector	Acres Remaining in Sector	Resources in 2008* (million tons)	Reserves (Permitted Resources) in 2008 (million tons)
C-4	30.4	5.6	0
C-5	413.0	118.2	P
C-6	1,260.9	344.0	P
C-8	26.7	5.6	0
C-10	13.5	1.4	0
D-2	†	0	0
D-3	†	0	0
D-4	†	0	0
D-5	†	0	0
D-6	†	0	0
E-1	49.2	3.0	0
E-2	15.2	0.8	0
E-4	†	0	0
E-5	294.0	62.8	0
E-9	23.0	4.0	0
E-10	596.1	62.1	0
E-13	268.9	29.1	0
E-14	313.8	58.3	0
E-17	19.9	2.9	0
E-19	102.0	18.0	0
E-20	37.6	5.3	0
E-22	41.3	6.1	0
E-23	77.2	12.1	0
E-24	113.7	16.7	0
F-1	†	0	0
F-2	79.8	5.1	0
F-3	18.4	9.3	0
F-4	†	0	0
F-5	†	0	0
F-6	130.7	55.4	0
F-9	51.6	6.3	0
F-12	†	0	0
F-14	1,071.1	756.5	P
F-15	5,220.8	2,301.2	P
F-16	85.4	16.7	0
F-17	36.2	6.5	0
F-18	433.6	117.2	0
F-20	581.6	164.6	0
F-23	131.4	19.6	0
F-32	62.9	7.6	0
F-33	76.5	10.4	0

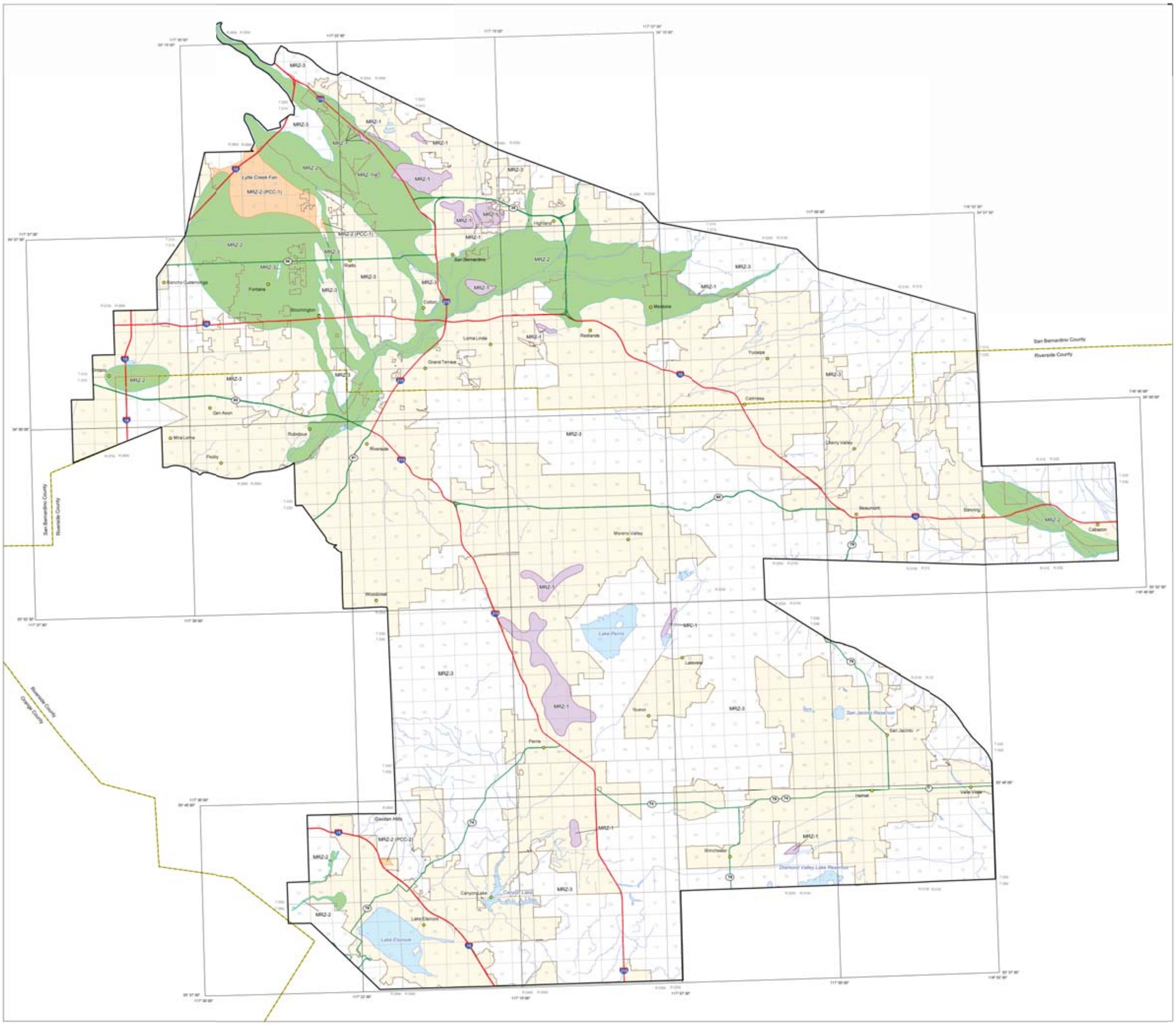
Sector	Acres Remaining in Sector	Resources in 2008* (million tons)	Reserves (Permitted Resources) in 2008 (million tons)
G-1	470.6	75.0	P
G-2	1,677.0	280.0	P
H	0	€	0
I	0	€	0
J-1††	65.0	13.9	0
J-2††	32.9	6.7	0
J-3††	37.6	7.9	0
J-4††	91.1	20.4	0
J-5††	29.6	6.1	0
J-6††	755.3	185.5	0
J-7††	48.3	10.3	0
J-8††	44.3	9.5	0
J-9††	63.2	14.9	0
J-10††	196.7	49.4	0
J-11††	76.6	P	P
J-12††	89.5	P	P
J-13††	36.4	9.3	0
K††	89.9	P	P
Totals	**22,293.4**	**5,986.0****	**287**

* Reserves mined since 1980 are not subtracted due to confidentiality.
P Sector contains reserves that are proprietary
† Completely lost to urbanization
€ Remainder of resources mined out.
†† Newly identified Sector (not designated)
** Due to confidentiality, commercial production since 1981 has not been subtracted from individual Sectors. However, all past production has been subtracted from the resource total (6,238 million tons minus 252 million tons = 5,986 million tons).

Updated Mineral Land Classification Map for Portland Cement Concrete-Grade Aggregate in the San Bernardino Production-Consumption (P-C) Region, San Bernardino and Riverside Counties, California

By
Russell V. Miller (PG #3331) and Lawrence L. Busch (PG #6440)

2008



LEGEND

- San Bernardino P-C Region.
- MRZ-1: Areas where available geologic information indicates that little likelihood exists for the presence of significant mineral resources.
- MRZ-2: Areas where geologic data indicate that significant PCC-Grade aggregate resources are present
- New MRZ-2 areas (this study). MRZ-2 (PCC-1) Notation in parenthesis identifies specific areas - see text for descrition.
- MRZ- 3: Areas containing known or inferred mineral occurrences of undetermined mineral resource significace.
- Urban Area.
- City, Town or Community
- Public Land Survey System
- County Boundary
- Interstate Highway
- State Highway
- Lake
- River

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Location of San Bernardino Production-Consumption Region and Index of USGS 7.5 -Minute Topo quads

Miles

Scale: 1:100,000

Map Sources (Digital GIS Layers):

Hydrography ,Roads, and Urban Areas - GDT April 2004.
Public Land Survey System - Department of Conservation, Division of Oil, Gas, and Geothermal Resources.

California Geological Survey Web Site:
http://www.consrv.ca.gov/cgs/

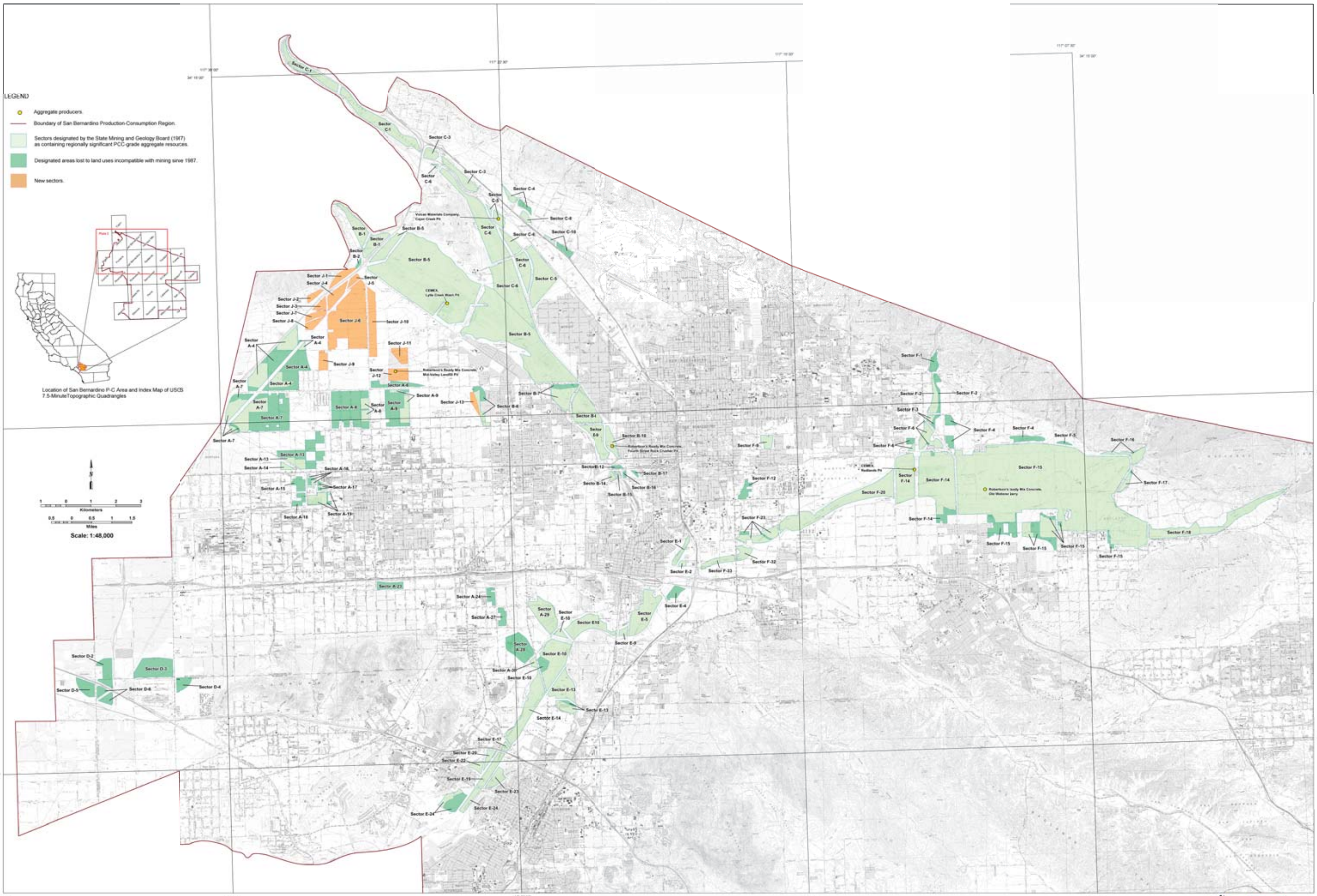
Prepared in Compliance with the Surface Mining and Reclamation Act of 1975, Article 4, Section 2761

State Geologist

GIS Development and Map Layout by Milton Fonseca

Updated Aggregate Resource Sector Map for Portland Cement Concrete-Grade Aggregate in the Northern San Bernardino Production-Consumption (P-C) Region, San Bernardino and Riverside Counties, California

By
Russell V. Miller (PG #3331) and Lawrence L. Busch (PG #6440)
2008



California Geological Survey Web Site:
http://www.consrv.ca.gov/cgs/

Base Sources (Digital GIS Layers):
7.5-Minute Topographic Quadrangles: U.S. Geological Survey

GIS Development and Map Layout by Milton Fonseca

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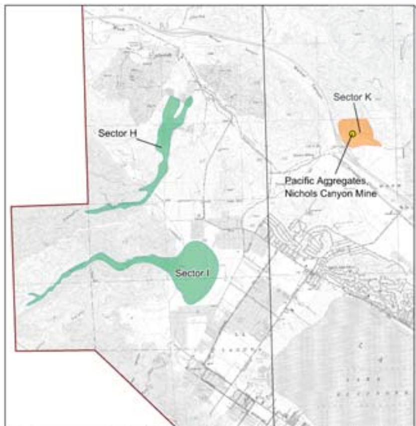
Updated Aggregate Resource Sector Map for Portland Cement Concrete-Grade Aggregate in the Southern San Bernardino Production-Consumption (P-C) Region, San Bernardino and Riverside Counties, California

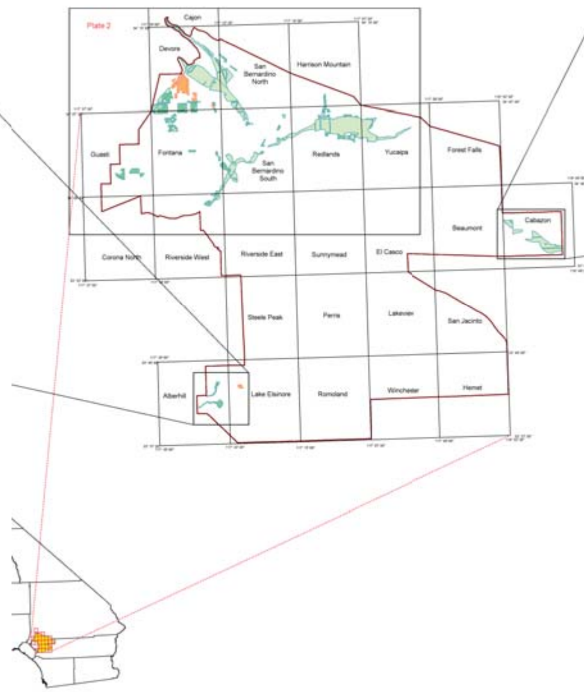
By

Russell V. Miller (PG #3331) and Lawrence L. Busch (PG #6440)

2008



Location of San Bernardino Production-Consumption Region Southwestern Sectors
(Scale 1:48,000)



Location of San Bernardino Production-Consumption Region and Index of USGS 7.5-Minute Topographic Quadrangles

Location of San Bernardino Production-Consumption Region Eastern Sectors
(Scale 1:48,000)

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Kilometers 1 0 1 2

Miles 1 0 1 2

Scale: 1:48,000

LEGEND

- Aggregate producers.
- Boundary of San Bernardino Production-Consumption Region
- Sectors designated by the State Mining and Geology Board (1987) as containing regionally significant PCC-grade aggregate resources
- Designated areas lost to land uses incompatible with mining since 1987
- New sectors.

Map Sources (Digital GIS Layers):
7.5-Minute Topographic Quadrangles: U.S. Geological Survey

California Geological Survey Web Site: http://www.conservation.ca.gov/cgs/

GIS Development and Map Layout by Milton Fonseca

State of California
DEPARTMENT OF TRANSPORTATION

Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: DISTRICT DIRECTORS

Date: November 18, 2011

From: MALCOLM DOUGHERTY
Acting Director

Subject: **Aggregate Resource Policy Statement and Tools**

This memo is in response to multiple requests from resource developers, planning departments, and California Department of Transportation (Caltrans) staff about our policy toward mining projects. It clarifies the policy and provides tools for districts to encourage an increased supply of aggregate materials statewide.

Our policy is that Caltrans will continue to work with local and State agencies to help gain approval of new aggregate mining sites throughout the state, acknowledging the need for an increased aggregate supply. As a responsible agency under the California Environmental Quality Act, however, we do not endorse specific mining projects. In light of this, Caltrans will provide the technical assessment and information pertaining to availability locally as well as infrastructure needs of aggregate projects in your region, including education of local stakeholders and early public engagement regarding long-term aggregate issues.

The following tools are attached to aid you in this regard:

- A sample letter that can be addressed to our local and regional transportation planning partners. This letter outlines our policy toward mineral resource development in general.
- The 2011 update of the Construction Aggregate Supply Limitations Fact Sheet.
- The 2006 Department of Conservation Map Sheet 52, which shows the permitted aggregate materials supply in relation to projected demand over 50 years.

The above tools were developed in support of an ongoing consortium known as the Aggregate Availability Group. This group, as per its 2009 charter, includes management and staff-level representatives from the Caltrans Divisions of Planning, Design, and Construction, the California Business, Transportation and Housing Agency, the California Department of Conservation, the California Construction and Industrial Materials Association, and the Governor's Office of Planning and Research. One of the main goals of this effort has been to produce maps and other tools to engage the public, legislators, and local jurisdictions. These staff will apprise you of new materials as they become available.

Please take the time to review the attached tools. This issue is as important as ever, and it is my hope that ongoing collaboration will help us secure the resources that we need to provide world-class transportation options for years to come.

Attachments:
(1) Sample Policy Statement Letter
(2) Construction Aggregate Supply Limitations Fact Sheet
(3) Department of Conservation Map Sheet 52, Aggregate Availability in California

Attachment 1

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY

DEPARTMENT OF TRANSPORTATION
<DISTRICT>
<ADDRESS>
<CITY, STATE, ZIP>
<PHONE>
<FAX >
<WEB URL>

Flex your power!
Be energy efficient!

<DATE>

<Name>
<Title>
<Organization>
<Street Address>
<City, State, Zip Code>

Dear<RECIPIENT>:

As you are aware, aggregate resources play a vital role in our efforts to build and improve our State's infrastructure. Indeed, our State's mineral resource development is essential to our economic well-being, as well as our intentions to grow more responsibly and provide the safest, fastest, and most efficient transportation options possible. While it is important that we find ways to meet our current needs for construction materials, we must also anticipate future demand and expand our aggregate supply in an environmentally appropriate and culturally circumspect manner. In doing so, we prepare our future generations to navigate the challenges that our State will face as population increases and accessible resources grow scarce.

Throughout the State, attention is being given to what is increasingly seen as an urgent resource issue. The recently enrolled Assembly Bill 566 (Galgiani, 2011) codified several legislative findings, among them that mineral extraction is essential to the needs of society, and that the development of local mineral resources is vital in reducing truck emissions in our State.

The California Department of Transportation (Caltrans) continues to coordinate with public decision-makers, the construction industry, and government officials in exploring opportunities to improve the reclamation and permitting processes and increase California's aggregate supply. While the pressure for resources has eased for the last three years due to a sharp decline in residential construction, the transportation sector continues to build projects and the housing market is showing signs of regaining strength. This is not a time to relax our efforts, but to redouble them in anticipation of full economic recovery.

In the last five years, Caltrans has delivered approximately 1,700 highway projects worth $19 billion that were moved into construction. There are currently 825 construction contracts underway with a contract value that exceeds $10 billion. Highway projects are only one part of the story, however, as local and regional agencies continue to maintain and improve the roads in their jurisdictions.

In addition to the outlay of the traditional transportation agencies, the California High Speed Rail Authority expects to break ground on the first 179 mile stretch of its high-speed railway in fall 2012. This section, from Merced to Bakersfield, will require over five million tons of sand, gravel, and crushed stone, which is about four percent of the total production that the State saw in 2009.

With the passage of SB 391 (Liu, 2009) and SB 375 (Steinberg, 2008), Caltrans and local transportation agencies were challenged to conceive of new ways to reduce greenhouse gas (GHG) emissions while providing world class transportation facilities for our constituents. The statewide modal plans and Regional Transportation Plans, which shape California's transportation future, outline extensive improvements to the current system. Yet, between long truck hauls averaging 50 miles and international importing of materials, the GHG impact of aggregate delivery continues to mount. An increased aggregate reserve that is closer to construction sites is key to addressing our dire air quality and climate change concerns.

While we are continuing to work with local and State agencies to help gain approval of new aggregate mining sites throughout the state, there is still much to be done to ensure that these essential resources will be available for development in the far reaches of our long-range plans. I would like to encourage you to explore new strategies to increase aggregate reserves in your region, including education of local stakeholders, early public engagement, and willingness to collaborate in the mitigation of environmental and transportation system impacts from aggregate production and distribution.

The attached Fact Sheet provides information on the potential economic, social, air quality, and environmental factors that are affected by local aggregate supply. This is a good starting point for collaborative discussions that aim to find solutions to issues regarding aggregate availability. Also attached is a map that shows statewide aggregate supply and demand.

Finally, I would like to invite you to contact <CALTRANS DISTRICT REPRESENTATIVES> (http://www.dot.ca.gov/localoffice.htm), who are available upon request to speak at public meetings in your area regarding the importance of increasing California's aggregate supply in an environmentally sustainable manner. While the permitting of new mining facilities must be done with attention to all of the possible impacts to surrounding areas, Caltrans encourages the development of new sources for construction aggregate. Our economy and our environment depend on it.

Please share this information with your planning commissions, city councils, and county boards of supervisors.

Thank you in advance for helping to improve mobility across California.

Sincerely,

<Signature Block Name>
District Director

Attachments:
(1) 2011 Construction Aggregate Supply Limitations Fact Sheet
(2) Department of Conservation Map Sheet 52, *Aggregate Availability in California*

Construction Aggregate Supply Limitations
Some Estimates of Economic Impact–November 2011

- Aggregates are low-value, heavy-weight building materials used in construction, including sand, gravel, crushed stone, and recycled concrete. Aggregates are mined and either used as raw material (for example, as foundations) or serve as composite materials in the production of concrete and asphalt. The main end markets for aggregates include private residential construction (34 percent), commercial construction (17 percent), and public infrastructure projects (43 percent, including 26 percent for public highways, streets and transit).

- Aggregates are usually shipped from quarries or production sites close to their end market because transportation is a major element in the cost of delivered aggregates and the cost depends on the distance of the delivery. According to the industry, shipping costs for aggregates can outweigh production costs if the material is trucked more than 20 miles.[1] Permitting new aggregate sites would lead to shorter haul distance to minimize transport/shipping cost.

- According to the California Geological Survey (CGS), California has an estimated 74 billion tons of aggregate resources underlying mineral lands classified by the State Geologist. However, only about six to seven percent have actually been permitted by local agencies for mining activities. Permitting of mining sites is difficult and time consuming due to environmental, land development, and zoning laws, and could take between five and ten years. At the current rate of production, available aggregate supply in some areas in the State could be depleted in a decade.

- According to the California Department of Finance, housing construction activity in California more than doubled between 1996-2005, the longest sustained growth period in recent history; but experienced more than 80 percent decline during 2006-2009 (from 209 to 36 thousand units). Despite a 23 percent rebound in housing construction spending in 2010, overall construction industry in California remains depressed. This has contributed to a significant reduction in both production and value of construction aggregate in recent years.

- According to the CGS, California produced 133.5 million tons (valued at $1.4 billion) of construction sand, gravel, and crushed stone in 2009, compared to 237.3 million tons (valued at $1.9 billion) in 2006, an almost 44 percent drop since 2006. The transportation of 133.5 million tons of construction aggregates generates about 5.3 million truckloads (@ 25 tons per truck), or a total of 10.7 million truck trips a year (including empty trucks returning to the aggregate sites) related to the transportation of construction aggregates in the State.

- According to the Teichert Construction and West Coast Aggregates, Inc. the average hauling distance for aggregates in California may be as high as 50 miles. Truck transportation accounts for about 99 percent of shipping aggregates for 40 miles or less.[2] At an average 50-mile distance, the total aggregate-truck VMT would be 535 million miles per year (10.7 million trucks x 50 miles).

- Let us assume that permitting additional mining facilities would reduce the average hauling distance from 50 to 35 miles statewide. Using an average hauling distance of 35 miles, the total annual aggregate-truck miles of travel would be 375 million miles (10.7 million trucks x 35 miles). The 15-mile shorter hauling distance would reduce aggregate-truck miles of travel by 160 million miles per year (535-375), and annual diesel fuel consumption by 20 million gallons [using California Air Resources Board (CARB) diesel fuel consumption rate of 0.13 gallons per vehicle-mile at 55-60 mph speed].

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[1] Therese Dunphy, "Evening the Playing Field," *Aggregates Manager*, August 2006.

[2] Tina Grady Barbaccia, "Off-highway Transportation," *Aggregates Manager*, July 2006.

- A recent University of California, Berkeley study[3] confirms that the most likely, and dominant, effect of the opening of new sites for the production of construction aggregates would be a reduction in truck miles of travel for hauling aggregates (i.e., new quarry will be located closer to the users to minimize transportation costs), thus a reduction in emissions from trucks.

- Based on the CARB emission factors estimates, and assuming an average 55-60 miles per hour speed, a reduction of 160 million miles of truck travel (or 20 million gallons of diesel fuel consumption) would reduce truck emissions (CO, NOx, PM10, SOx, VOC, and CO2) by about 22,436 tons a year.

- The total transportation cost of aggregates (at \$0.10 per ton per mile) shipped 35-miles average distance throughout California would be \$936 million (10.7 million trucks x 25 tons x 35 miles x \$0.1), and over \$1.3 billion if shipped an average distance of 50 miles. The statewide transportation cost savings of reduced hauling distance would amount to \$376 million a year (or a 30 percent cost savings).

- The California Department of Transportation (Caltrans) estimates that on average, about \$2.5 billion is spent on State and local capital outlay projects each year, and on average, aggregates account for 8-10 percent of total project costs, or about \$250 million annually. A 30 percent increase/decrease in shipping cost of aggregates would increase/decrease the total annual project costs by \$75 million per year.

- The reduction in aggregate-related truck miles of travel would also reduce traffic congestion and traffic accidents on roads, but these impacts would be difficult to estimate. An additional benefit from truck trip reduction would be reduced pavement deterioration. Caltrans expects to spend about \$700 million annually on pavement rehabilitation projects. Assuming trucks account for 60 percent of the pavement damage on the State highways, and aggregate-trucks on average account for 5 percent of all heavy truck travel on the State highways, the trucks shipping aggregates would account for about \$20 million of cost savings in the pavement rehabilitation each year.

- Project delays due to lack of aggregate supply in the area, would also result in project cost escalation and reduced user benefits (reduced travel time and accidents) that would have otherwise been generated. A delay of 10 percent of the projects (or \$250 million in capital outlay expenditures) for one year would increase the cost of the State and local capital outlay program by \$13 million a year (at 5 percent average cost escalation factor).

- Generalizing, and pro rating, the user benefits estimated for the 2008 Interregional Transportation Improvement Program projects, a delay of ten percent of the capital outlay program for one year could also cost California about \$97 million in increased roadway congestion and traffic accidents.

In conclusion, the overall picture may indicate that the concerns over the limited supply of construction aggregates may have eased for now due to the severe housing decline and economic slowdown. However, over the long run, with the eventual housing and economic rebound, the supply-demand imbalance will continue for many areas. Meanwhile, for some specific localities and construction projects, the challenge of adequate and cost-effective supply of construction aggregates persists.

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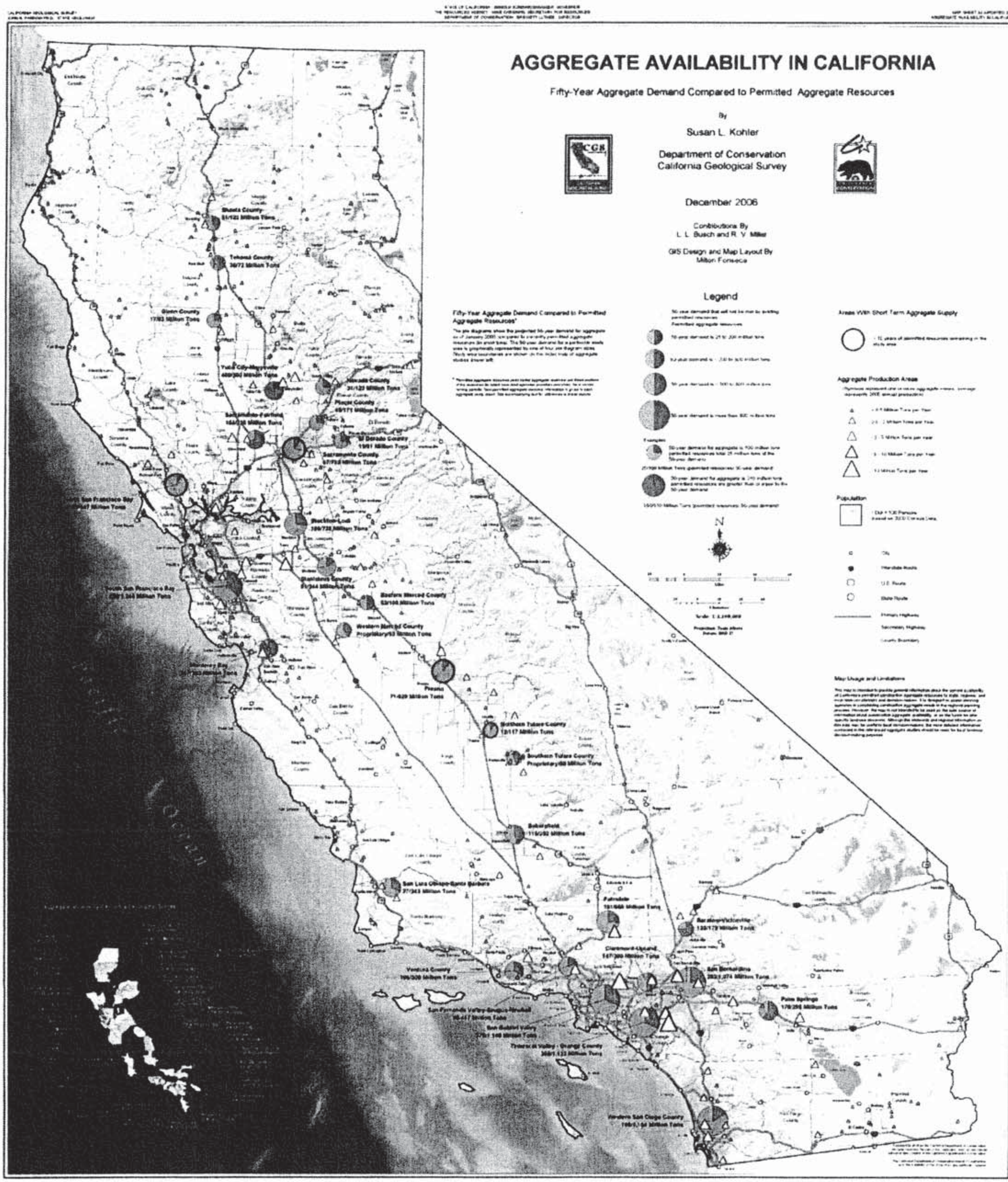
[3] Peter Berck, "A Note on the Environmental Costs of Aggregates," *Working Paper No. 994*, Dept. of Agricultural and Resource Economics and Policy, University of California, Berkeley, January 2005.

Attachment 3



INORGANIC CHEMICALS IN GROUND WATER AND SOIL: BACKGROUND CONCENTRATIONS AT CALIFORNIA AIR FORCE BASES.

Philip M. Hunter[1], Brian K. Davis[2], and Frank Roach[3].

[1]Air Force Center for Environmental Excellence, Brooks City-Base, Texas, [2]Department of Toxic Substances Control, CalEPA, Sacramento, California, and [3]San Antonio, Texas.

Presented at:

44th Annual Meeting of the Society of Toxicology

New Orleans, Louisiana

10 March 2005

Professional affiliations are listed for contact purposes only. Analysis and conclusions contained herein are solely those of the authors, and do not represent official policy of the Department of Toxic Substances Control.

ABSTRACT

Inorganic chemicals have widespread industrial use and are significant contaminants at many hazardous waste sites and industrial locations. Risk assessment and risk management must differentiate between background (naturally occurring) and anthropogenic inorganic chemicals. This distinction is important for site characterization, determining chemicals of concern, establishing cleanup levels, and long-term monitoring programs. This paper is an update of our 2001 report on background at Air Force bases in California.

The Air Force's Environmental Resources Program Information Management System (ERPIMS) database was searched for uncontaminated sample locations for soil and groundwater at 14 Air Force installations in 10 California counties. Background data for 27 inorganic constituents from 1,307 monitoring well locations yielded as many as 5,071 groundwater samples for individual chemicals, while 3,883 boreholes yielded as many as 10,415 soil samples. Medians, 95th, and 99th percentiles are reported for each chemical. Since statistical analysis of soil data indicated that background levels differed significantly with depth, separate background calculations for soil are presented for three depths (less than 3 feet, between 3 and 15 feet, and greater than 15 feet).

For groundwater, background statistics for each constituent are given without regard to sampling depth. Some inorganic constituents were detected frequently and at levels that exceed important environmental thresholds such as Maximum Contaminant Levels (MCLs) or Action Levels for drinking water. Background 95th percentile levels equal or exceed federal and/or California MCLs for aluminum, antimony, cadmium, chromium, nickel, and thallium. The 95th percentile level for lead exceeds the Action Level of 0.015 mg/L for drinking water measured at the tap. This analysis provides background levels that are representative of California Air Force Bases as a group. The background data in this presentation should not be used to replace local background data, but rather provide important benchmarks by which the adequacy of local data can be judged.

INTRODUCTION

Risk assessment of inorganic chemicals for human and ecological receptors requires the parsing of concentrations and associated risk, into portions attributable to anthropogenic activities and portions that are naturally occurring. Background data can be used in the initial site investigation, for identification of chemicals of potential concern, in remedy selection, and for risk communication to the public. (Current USEPA guidance [2002] recommends including all inorganic chemicals in risk assessment and considering the relative contributions of naturally occurring versus anthropogenic chemicals during risk characterization and risk management.)

Computer algorithms were applied to identify background locations at Air Force Bases (AFBs) in California, based on the absence of organic contaminants. This paper presents an update, with substantial increases in data, compared to the summaries of background data in groundwater and soil in Hunter and Davis, 2001. Sample sizes increased by over 40% for soil and by almost 200% for groundwater. These results should not be used in lieu of site-specific background concentrations. They can, however, provide a useful perspective for site-specific results.

METHODS

A computer algorithm was constructed to identify background locations at 14 California Air Force bases, using data from 1984 - 2004. The algorithm, using Structured Query Language, searches out all locations that have been sampled for both inorganic and organic chemicals. Sampling locations with organic contamination (at levels greater than twice the method detection limit) are eliminated. The most common 25 organic contaminants in groundwater were used for groundwater and the most common 25 organic chemicals in soil were similarly applied. Upper-range outliers were eliminated for each inorganic constituent based on concentrations that exceeded "far-outside" values in "box and whisker" plots. Upgradient, downgradient, and sidegradient locations were all potential background sampling locations. Substantially more background locations were identified in soil than in groundwater. On average, 50 background well locations and 100 background borehole locations have been identified per AFB.

This analysis is complicated by different analytical laboratories, various sampling strategies, multiple detection limits, diverse hydrogeologic terrains, variability over 3-dimensional space, a variety of types of hazardous waste sites, multiple Air Force bases, and different waste handling practices. These result in the discrimination of background levels across more than one hydrostratigraphic unit or more than one soil horizon. Given the large sample sizes, percentiles are reported without confidence limits. SAS® and Systat® software generated the statistics shown in the tables. The groundwater data represent dissolved, field-filtered, and total recoverable results.

BACKGROUND ANALYSIS FOR GROUNDWATER

- 1,307 background wells were identified and analyzed from a universe of 6,290 available monitoring wells
- Range of number of Air Force Bases: 5 for boron to 13 for many constituents
- Data are biased, with Vandenberg, Travis and March AFBs representing 75% of the total data
- Range of background wells: 148 for Cr-6 to 1307 for Pb
- Range of sample sizes: 243 for Cr-6 to 5071 for Pb
- Range of detection rates: 2% for Ag to 99.8% for Mg
- Distributions did not fit either a normal or lognormal distribution
- The 95^{th} percentiles for Al, Sb, Cd, Cr, Ni, and Tl exceed the respective MCLs (Maximum Contaminant Levels for drinking water), both California and USEPA; the 95^{th} percentile for Pb exceeds its USEPA Action Level for drinking water

GROUNDWATER DATA FROM AIR FORCE BASES IN CALIFORNIA								
Analyte	n	Percentile in ug/L			Detection	Median Method Detection	Number Wells	Number AF Bases
		50th	95th	99th				
Aluminum	3560	100	32,500	118,000	51%	70	968	12
Antimony	4084	*ND*	146	190	6%	26	1084	12
Arsenic	3983	*ND*	35	140	23%	3	1043	13
Barium	3680	90	630	2,100	94%	6	1011	13
Beryllium	4160	*ND*	*ND*	5	5%	2	1104	12
Boron	560	83	1,800	16,000	84%	30	286	5
Cadmium	4396	*ND*	6	42	11%	4	1176	13
Chloride	2184	142,000	1,000,000	3,120,000	99%	500	855	11
Chromium	4335	*ND*	810	5,390	37%	5	1157	13
Chromium-6	243	*ND*	25	60	36%	4	148	9
Cobalt	3686	*ND*	25	95	13%	10	993	12
Copper	4786	*ND*	50	220	19%	12	1094	13
Cyanide	580	*ND*	12	30	6%	10	269	9
Fluoride	1005	400	1,300	1,850	90%	100	557	9
Iron	4508	225	41,000	193,000	74%	20	1054	12
Lead	5071	*ND*	50	220	16%	4	1307	13
Magnesium	4731	23,200	153,000	390,000	100%	36	1075	13
Manganese	4523	46	2,150	5,800	79%	3	1043	12
Mercury	3599	*ND*	0.5	3	7%	0.2	965	13
Molybdenum	3594	*ND*	79	122	23%	6	958	11
Nickel	4200	*ND*	455	1,470	38%	22	1090	13
Selenium	3861	*ND*	31	200	12%	5	1027	13
Silver	4314	*ND*	15	20	2%	3	1163	13
Sodium	4719	85,800	588,000	2,080,000	100%	240	1083	13
Thallium	3965	*ND*	200	300	4%	100	1003	12
Vanadium	3497	16	110	464	62%	7	935	12
Zinc	4835	20	220	990	68%	10	1113	13

BACKGROUND ANALYSIS FOR SOIL

- 4230 background boreholes were identified and analyzed from a universe of 10,030 available boreholes
- Range of number of Air Force Bases: 2 for Cl to 13 for As
- Data are biased, with Vandenberg, March, and Edwards AFBs representing 50% of the total data
- Range of background boreholes: 126 for Fl to 3,883 for Pb
- Range of sample sizes: 354 for Fl to 10,415 for Pb
- Range of detection rates: 2% for Cn to > 99% for Fe, Mn, Ba, and V
- None of the distributions fit either a normal or lognormal distribution
- The 95^{th} percentiles for As, Fe, Tl, and V exceed their respective USEPA Region 9 Preliminary Remediation Goals (residential, health-based concentrations)

SOIL DATA FROM AIR FORCE BASES IN CALIFORNIA								
Analyte	n	Percentile (mg/kg)			Detection	Median Method Detection Limit	Number Boreholes	Number AF Bases
		50th	95th	99th				
Aluminum	7473	7,560.0	23,000.0	31,300.0	97%	10.4	3027	12
Antimony	9065	*ND*	12.5	25.0	7%	6.3	3522	12
Arsenic	8665	2.2	12.7	23.2	61%	0.6	3193	13
Barium	8340	67.3	320.0	584.0	100%	1.0	3218	12
Beryllium	8242	0.3	1.1	5.6	54%	0.2	3211	12
Boron	435	44.9	140.0	201.0	93%	3.2	146	3
Cadmium	9367	*ND*	2.3	7.7	18%	0.5	3691	12
Chloride	572	10.2	629.0	1,730.0	94%	0.2	257	2
Chromium	10051	11.6	49.4	100.0	94%	1.0	3821	12
Chromium-6	2060	*ND*	2.0	5.0	10%	0.2	650	9
Cobalt	7163	5.8	22.0	35.9	85%	1.0	2908	12
Copper	9441	9.9	53.3	157.0	95%	1.3	3671	12
Cyanide	1198	*ND*	0.7	3.0	2%	0.5	525	10
Fluoride	354	1.1	8.9	23.0	82%	0.5	126	3
Iron	8003	12,500.0	36,100.0	49,400.0	100%	5.4	3141	12
Lead	10415	3.1	25.0	148.0	66%	2.0	3883	12
Magnesium	6985	3,280.0	9,520.0	16,200.0	97%	20.0	2814	11
Manganese	7964	208.0	823.0	1,600.0	100%	1.0	3122	12
Mercury	7702	*ND*	0.3	0.6	10%	0.1	2719	12
Molybdenum	6967	*ND*	20.0	44.0	16%	2.0	2752	12
Nickel	9390	7.1	41.5	85.4	72%	2.2	3633	12
Selenium	8656	*ND*	11.0	25.0	7%	0.6	3182	12
Silver	9669	*ND*	2.1	6.1	6%	1.0	3727	12
Sodium	5907	222.0	1,660.0	3,980.0	83%	60.8	3503	11
Thallium	8639	*ND*	25.0	173.5	8%	5.0	3352	12
Vanadium	7971	27.4	88.3	126.0	99%	1.0	3168	12
Zinc	9981	31.2	104.0	307.0	99%	1.1	3870	12

VARIABILITY OF SOIL BACKGROUND LEVELS WITH DEPTH

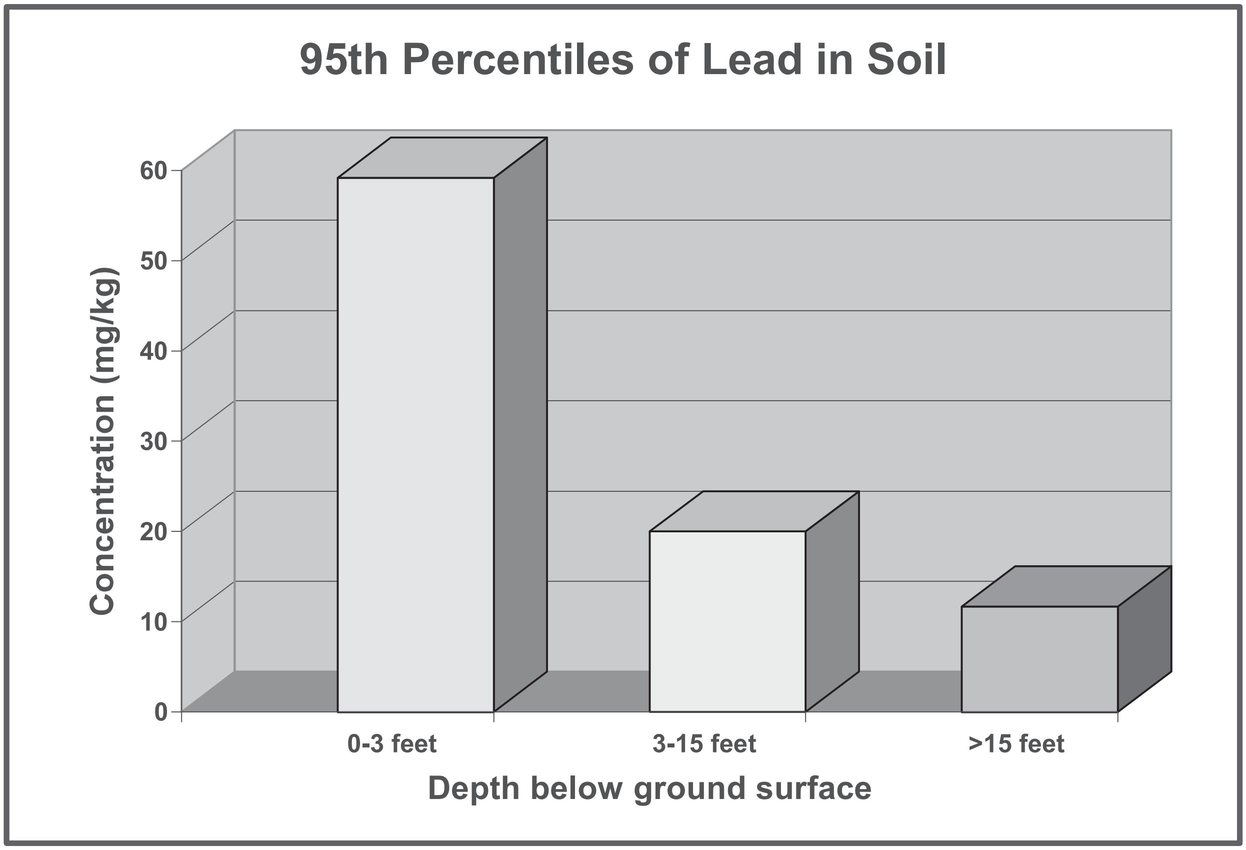
A frequency distribution analysis of sampling depths indicated that the soil sample data could be divided into three horizons of approximately equal sample sizes. These horizons are: 1) surface to 3 feet, 2) 3 feet to 15 feet, and 3) greater than 15 feet. Separate background concentrations by depth were derived for all analytes. No consistent pattern relates concentration and depth. Lead concentrations decrease markedly with depth (95^{th} percentiles are 59.2 mg/kg, 20.0 mg/kg, and 11.7 mg/kg), iron concentrations increase with depth (95^{th} percentiles are 33,000 mg/kg, 36,100 mg/kg, and 40,000 mg/kg), and chromium concentrations are about constant (95^{th} percentiles are 48.9 mg/kg, 49.9 mg/kg, and 49.6 mg/kg).

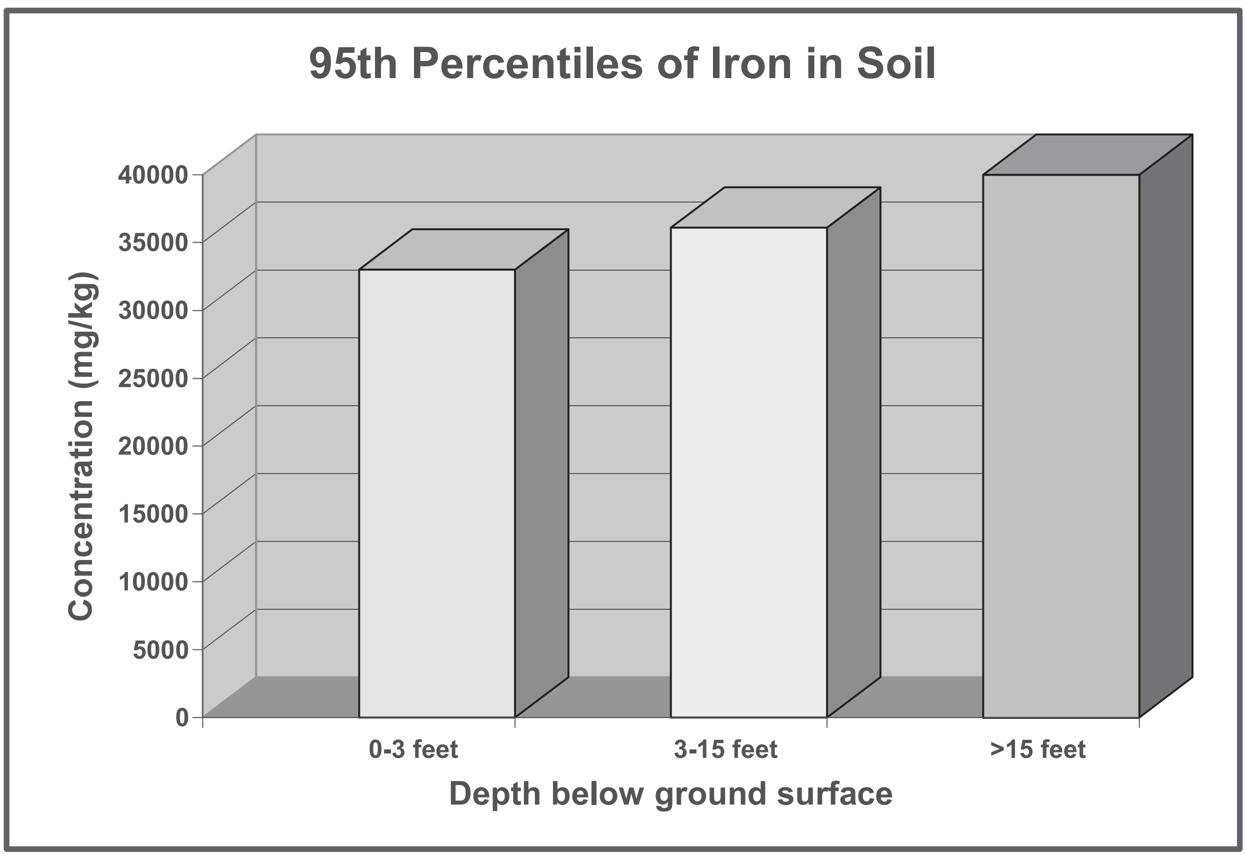
SOIL DATA FROM SURFACE TO 3 FEET								
Analyte	n	Percentile (mg/kg)			Detection	Median Method Detection Limit	Number Boreholes	Number AF Bases
		50th	95th	99th				
Aluminum	2718	7,615.0	22,100.0	28,400.0	98%	10.1	2042	11
Antimony	3003	*ND*	12.0	25.0	9%	6.1	2311	11
Arsenic	2807	2.4	12.6	23.2	69%	0.5	2051	12
Barium	2895	74.0	316.0	596.0	100%	1.0	2141	11
Beryllium	2748	0.3	1.1	2.1	57%	0.2	2112	11
Boron	105	6.1	116.0	136.0	82%	3.2	93	3
Cadmium	3101	*ND*	2.7	10.6	23%	0.5	2362	11
Chloride	224	7.6	419.0	1,100.0	94%	0.2	169	2
Chromium	3297	13.3	48.9	144.0	97%	1.0	2482	11
Chromium-6	560	*ND*	3.3	5.9	13%	0.2	431	9
Cobalt	2444	6.0	21.0	34.1	87%	1.0	1847	11
Copper	3163	11.9	52.7	221.0	97%	1.0	2390	11
Cyanide	422	*ND*	0.6	25.5	3%	0.5	354	9
Fluoride	125	1.0	8.9	18.0	79%	0.5	103	3
Iron	2797	12,600.0	33,000.0	45,600.0	100%	5.2	2094	10
Lead	3312	5.2	59.2	348.0	72%	2.0	2414	11
Magnesium	2436	3,130.0	8,730.0	19,900.0	98%	20.0	1856	10
Manganese	2790	224.0	810.0	1,400.0	100%	1.0	2082	11
Mercury	2471	*ND*	0.2	0.7	13%	0.1	1798	11
Molybdenum	2373	*ND*	20.3	44.0	19%	2.0	1785	11
Nickel	3078	8.3	38.8	127.0	76%	1.5	2345	11
Selenium	2806	*ND*	10.5	25.0	9%	0.6	2056	11
Silver	3251	*ND*	2.0	10.0	7%	0.6	2452	11
Sodium	2053	181.0	1,510.0	4,520.0	82%	51.7	1584	10
Thallium	2886	*ND*	25.0	169.5	8%	5.0	2210	11
Vanadium	2802	28.0	88.0	133.0	99%	1.0	2096	11
Zinc	3341	34.0	125.0	518.0	99%	1.1	2542	11

SOIL DATA FROM 3 FEET TO 15 FEET

Analyte	n	Percentile (mg/kg)			Detection	Median Method Detection Limit	Number Boreholes	Number AF Bases
		50th	95th	99th				
Aluminum	2961	7,870.0	23,400.0	32,100.0	96%	10.0	1685	11
Antimony	3306	*ND*	13.0	30.0	8%	6.1	1940	11
Arsenic	3145	2.3	15.0	33.9	66%	0.5	1752	11
Barium	3149	70.4	357.0	624.0	100%	0.5	1765	11
Beryllium	2897	0.3	1.1	5.9	54%	0.2	1710	11
Boron	196	50.0	116.0	136.0	99%	3.7	99	3
Cadmium	3360	*ND*	2.5	7.7	15%	0.5	1976	11
Chloride	187	8.9	638.0	2,600.0	96%	0.2	2	2
Chromium	3637	13.8	49.9	94.0	96%	1.0	2078	11
Chromium-6	670	*ND*	2.5	4.4	13%	0.2	397	9
Cobalt	2647	6.4	20.7	35.0	83%	1.0	1537	11
Copper	3395	10.4	56.0	167.0	96%	1.0	1948	11
Cyanide	462	*ND*	0.6	1.3	1%	0.6	235	8
Fluoride	130	1.2	9.3	25.0	82%	0.5	77	1
Iron	3024	13,400.0	36,100.0	47,200.0	100%	5.3	1733	10
Lead	3862	3.2	20.0	89.0	66%	1.8	2081	12
Magnesium	2553	3,550.0	9,770.0	15,400.0	93%	20.0	1477	10
Manganese	3032	207.0	787.0	1,500.0	100%	1.0	1477	11
Mercury	2863	*ND*	0.3	0.6	11%	0.1	1635	11
Molybdenum	2547	*ND*	21.0	42.0	20%	2.0	1485	11
Nickel	3425	8.2	41.8	89.3	75%	1.2	1964	11
Selenium	3228	*ND*	11.0	48.0	10%	0.5	1803	11
Silver	3539	*ND*	2.0	5.0	5%	0.6	2042	11
Sodium	2305	250.0	1,980.0	4,010.0	88%	40.0	1338	10
Thallium	3049	*ND*	25.0	171.5	7%	2.2	1795	11
Vanadium	3027	28.6	86.0	127.0	100%	1.0	1727	11
Zinc	3707	31.6	93.2	250.0	99%	1.0	2109	11

SOIL DATA DEEPER THAN 15 FEET								
Analyte	n	Percentile (mg/kg)			Detection	Median Method Detection Limit	Number Boreholes	Number AF Bases
		50th	95th	99th				
Aluminum	1794	7,010.0	23,600.0	34,400.0	96%	11.0	836	12
Antimony	2756	*ND*	12.5	18.0	8%	6.6	1096	12
Arsenic	2713	1.5	10.0	20.0	66%	0.6	1025	12
Barium	2296	56.5	257.0	493.0	100%	1.1	901	12
Beryllium	2597	0.3	1.2	5.8	54%	0.2	1034	11
Boron	134	47.0	147.0	160.0	99%	3.0	62	3
Cadmium	2906	*ND*	1.8	4.7	15%	0.5	1170	12
Chloride	161	17.0	802.0	6,510.0	96%	0.2	95	2
Chromium	3117	8.0	49.6	88.3	96%	1.1	1205	12
Chromium-6	830	*ND*	1.0	4.0	13%	0.1	183	8
Cobalt	2072	5.0	24.3	38.7	83%	1.1	838	12
Copper	2883	6.4	51.5	109.0	96%	2.0	1117	12
Cyanide	314	*ND*	0.7	1.7	1%	0.5	109	7
Fluoride	99	1.4	7.3	29.0	82%	0.5	43	1
Iron	2182	11,100.0	40,000.0	52,800.0	100%	5.6	895	12
Lead	3241	2.7	11.7	22.5	66%	2.0	1274	12
Magnesium	1996	3,040.0	9,690.0	13,600.0	93%	21.7	821	11
Manganese	2142	182.5	930.0	2,010.0	100%	1.1	883	12
Mercury	2368	*ND*	0.3	0.4	11%	0.1	877	11
Molybdenum	2047	*ND*	20.0	44.0	20%	2.2	833	12
Nickel	2887	5.0	43.8	68.5	75%	4.1	1146	12
Selenium	2622	*ND*	11.5	14.0	10%	0.6	1000	12
Silver	2879	*ND*	2.4	5.4	5%	1.0	1127	12
Sodium	1549	216.0	1,180.0	2,700.0	88%	108.0	718	11
Thallium	2704	*ND*	25.0	176.0	7%	5.0	1074	12
Vanadium	2142	24.4	90.7	120.0	100%	1.1	871	12
Zinc	2933	27.1	99.6	180.0	99%	2.1	1181	12


95th Percentiles of Lead in Soil
Concentration (mg/kg)
60
50
40
30
20
10
0
0-3 feet
3-15 feet
>15 feet
Depth below ground surface


95th Percentiles of Iron in Soil
Concentration (mg/kg)
40000
35000
30000
25000
20000
15000
10000
5000
0
0-3 feet
3-15 feet
>15 feet
Depth below ground surface

SUMMARY AND CONCLUSIONS

- Computer algorithms identified background locations, based on the absence of organic contamination, for 27 inorganic chemicals in groundwater and soil at California Air Force Bases.
- The 95th percentile is a good representation of background concentration, given the inherent complexities of these large and diverse samples.
- Concentrations of some inorganic chemicals vary considerably by soil depth.
- For some inorganic chemicals the 95th percentile exceeds health-based criteria of concern.
- Concentrations and statistics for the inorganic chemicals have not changed significantly since our previous report (Hunter and Davis, 2001).
- These data provide insight on background variability across a range of environments, but do not necessarily represent all areas of California.
- These results can provide a useful context, but they cannot substitute for site-specific background concentrations.

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DISCLAIMER

The opinions and findings in this paper are those of the authors. They do not represent guidance or policy of the California Department of Toxic Substances Control, California Environmental Protection Agency, or the U.S. Air Force.

Determination of a Southern California Regional Background Arsenic Concentration in Soil

G. Chernoff, W. Bosan and D. Oudiz

California Department of Toxic Substances Control

Professional affiliations are listed for contact purposes only. Analysis and conclusions contained herein are solely those of the authors, and do not represent official policy of the Department of Toxic Substances Control.

Abstract

Background metals in soil can prove problematic for risk assessment purposes because metals detected at a site may be comprised of naturally occurring metals, regional anthropogenic contributions or a site-specific release. Arsenic is especially problematic since the risk-based soil concentration is 100-times below typical ambient concentrations.

The Department of Toxic Substances Control (DTSC) established a regional background arsenic concentration in soil that can be used as a screening tool for sites throughout southern California. The term "background" collectively refers to both naturally occurring and anthropogenic concentrations in shallow soil. Data were derived from completed Preliminary Environmental Assessment (PEA) reports for proposed school sites. Site data were combined for each county in southern California, including Los Angeles, Orange, Riverside, San Bernardino and San Diego counties. Los Angeles County had the largest number of sites (19 school sites) and arsenic data points (1097 samples) and will serve as the model for the statistical derivation of background arsenic.

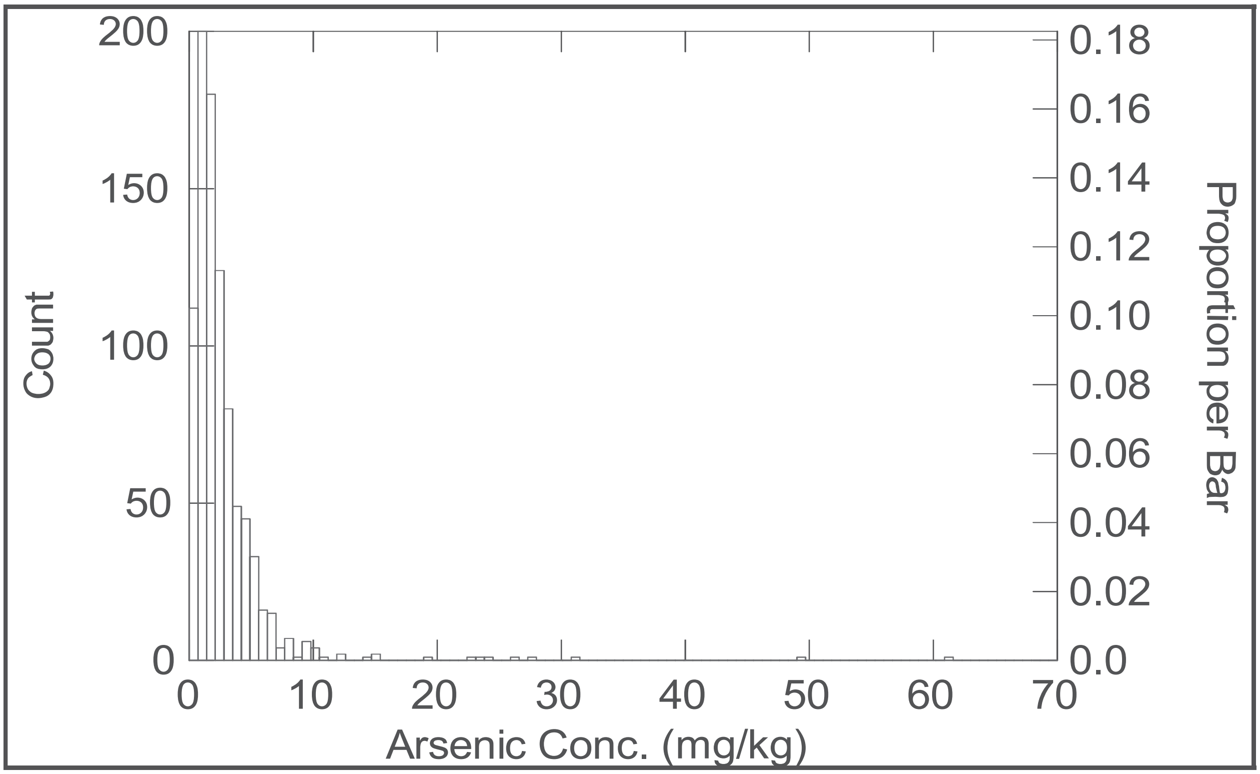
A probability plot of the arsenic data clearly demonstrated a classical, lognormal distribution from which outliers were determined using the box plot. The summary statistics for the arsenic data set, excluding the outliers, were calculated and the upper-bound arsenic concentration estimated using both the 95% confidence limit of the 99th quantile of the arsenic data set and a distribution-free, nonparametric analysis.

Both statistical methods resulted in an upper-bound arsenic concentration of approximately 12 mg/kg for Los Angeles County. Using the same approach, the upper-bound arsenic concentrations were similar for each of the other southern California counties, resulting in an upper-bound estimate of 12 mg/kg for arsenic in southern California. A similar evaluation is being conducted by DTSC for northern California sites in order to derive arsenic screening levels State-wide.

Introduction

The Department of Toxic Substances Control (DTSC) oversees the environmental assessments of proposed and existing school sites. Arsenic has proven problematic at these sites since the risk-based soil concentration of approximately 0.03 mg/kg is nearly always below the concentrations detected on site thereby necessitating the need to establish the arsenic background concentration at each site.

To determine if a regional arsenic background level could be established for the Los Angeles Unified School District (LAUSD), 1097 data points collected from 19 school sites distributed throughout the LAUSD were evaluated using both graphical data plots and statistical calculations.



A histogram of the data demonstrated a classical lognormal distribution with a wide range of arsenic concentrations. A box plot, also known as the fourth spread was used to identify 11 outliers, the two lowest values and the nine largest values, which were eliminated from further analysis. The descriptive statistics for the log-transformed arsenic data set, excluding the outliers previously established are summarized below.

DESCRIPTIVE STATISTIC	VALUE
Sample Size (n)	1086
Mean (μ)	0.1788 (1.51 mg/kg)
Median	0.1761 (1.50 mg/kg)
Standard Deviation	0.3646
Standard Error of the Mean[1]	0.0111
Minimum Concentration	-0.8125 (0.15 mg/kg)
Maximum Concentration	1.2930 (19.63 mg/kg)
Lower Quartile (Q_1)	-0.1249
Upper Quartile (Q_3)	0.4472

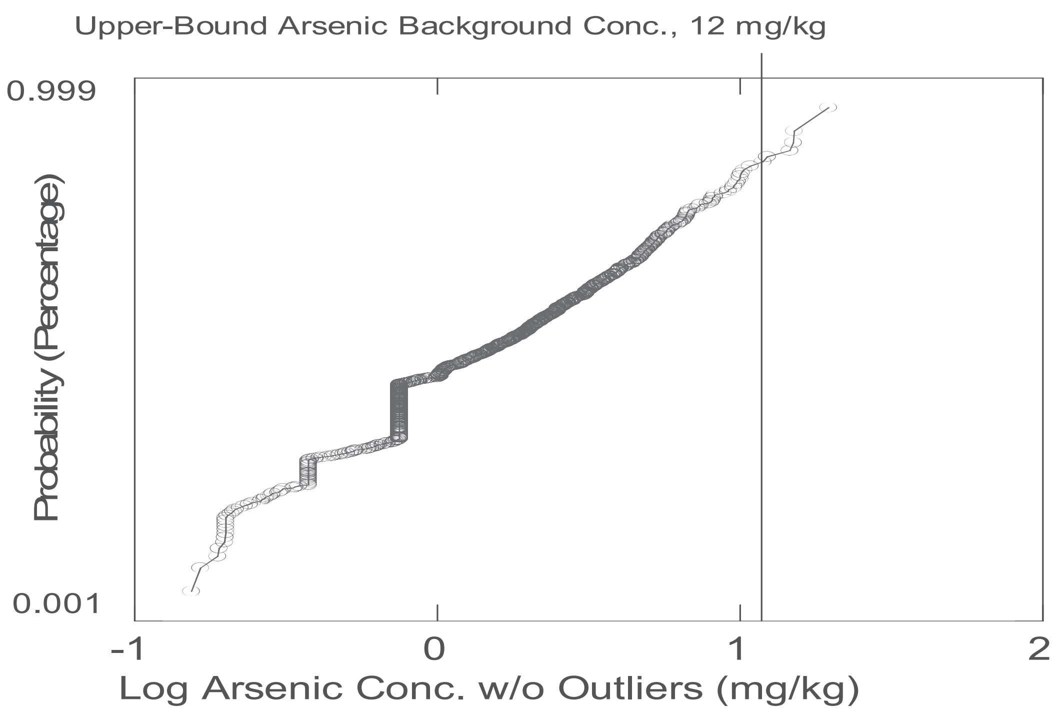
The upper limit of the data set was estimated according to the following equation:

$$UL_{1-\alpha}\left(X_p\right) = \bar{x} + sK_{1-\alpha,p}$$

Calculating the 95% confidence limit of the 99th quantile of the arsenic data set excluding the outliers, the $UL_{0.95}(X_{0.99})$ was found to be 1.054 in log units, or 11.32 mg/kg arsenic. A distribution-free non-parametric analysis to calculate the $UL_{0.95}(X_{0.99})$ as described by Gilbert (1987) used the following equation:

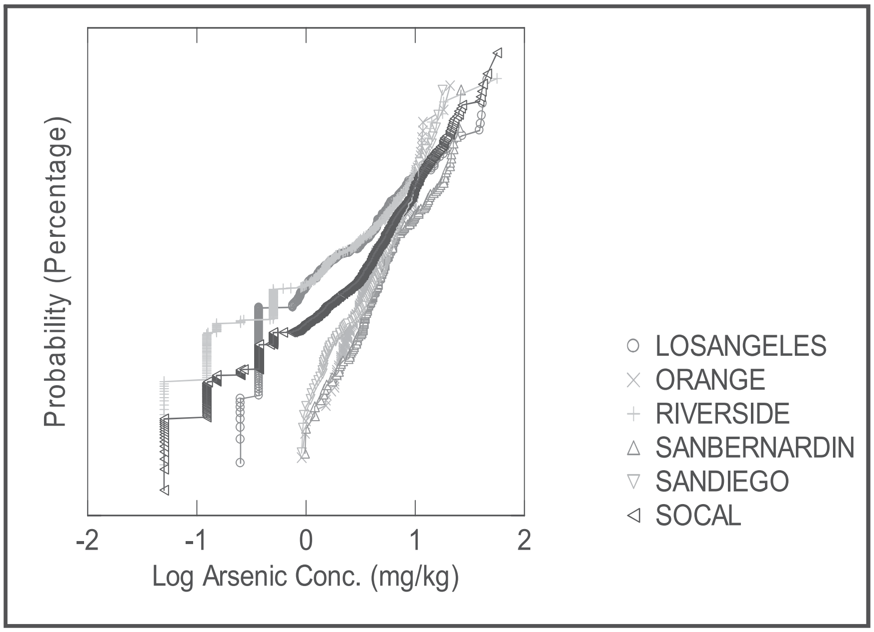
$$Rank\ of\ UL_{0.95}(X_{0.99}) = p(n+1) + Z_{1-\alpha}[np(1-p)]^{1/2}$$

The solution of this equation indicated that the $UL_{0.95}(X_{0.99})$ is 52.4% of the way between the 1081st and 1082nd highest arsenic concentrations which is 12.3 mg/kg. The Probability Plot of the arsenic data set excluding the outliers is shown below:



The plot demonstrates that the log-transformed data is normally distributed with an inflection point at approximately 1.0 which is equivalent to approximately 10 mg/kg. Taken together, the data from the statistical and graphical evaluation of the data from LAUSD has an upper bound between 10 and 12 mg/kg.

The same analysis was conducted on school sites from San Diego County (3 school sites), Orange County (7 school sites), Riverside County (15 school sites), San Bernardino County (6 school sites) and Los Angeles County (21 school sites).



As shown in the Probability Plot of the data from the 5 Southern California Counties, and the combined Southern California data, the individual plots share a common inflection point at approximately 1.1 on the logarithmic scale, or approximately 12 mg/kg.

Conclusion

A Probability Plot and statistical analysis of a large data set from school sites in Los Angeles County gave an upper-bound background arsenic concentration of 12/mg/kg. A Probability Plot for school sites from 5 counties in Southern California also gave an upper-bound background arsenic concentration of 12 mg/kg.

In some of the counties, there was another inflection point at approximately 1.5 mg/kg arsenic. This is interpreted as representing the upper-bound of the naturally occurring arsenic, while the inflection at 12 mg/kg represents the upper-bound of the naturally occurring plus anthropogenic arsenic.

This finding suggests that in Southern California, 12 mg/kg maybe a useful screening number for evaluating arsenic as a chemical of potential concern. A similar evaluation is being conducted by DTSC for school sites in Northern California in order to derive arsenic screening levels State-wide.

APPENDEIX C WHAT CONSTITUTES AN ADVERSE HEALTH EFFECT OF AIR POLLUTION?

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What Constitutes an Adverse Health Effect of Air Pollution?

This Official Statement of the American Thoracic Society Was Adopted by the ATS Board of Directors, July 1999

PURPOSE OF THE STATEMENT

As the twentieth century ends, the health effects of outdoor air pollution remain a public health concern in developing and developed countries alike. In the United States, the principal pollutants monitored for regulatory purposes (carbon monoxide, nitrogen dioxide, sulfur dioxide, particles, ozone, and lead; see Table 1) show general trends of declining concentrations, although ozone pollution now affects many regions of the country besides southern California (1). Yet, even at levels of air pollution now measured in many cities of the United States, associations between air pollution levels and health indicators are being demonstrated at concentrations around those set by standards of the U.S. Environmental Protection Agency (2, 3). In many countries of the developing world, concentrations of air pollutants are rising with industrialization and the increasing numbers of motor vehicles (4, 5). Extremely large and densely populated urban areas, often referred to as "megacities," have the potential to generate unprecedented air quality problems.

There are common principles to air quality management throughout the world. Public health protection unifies all approaches, whether based on voluntary guidelines, mandated standards for concentrations, or source control. The intent is to limit or to avoid any impact of air pollution on the public's health. Air quality management is thus based on a scientific foundation built from the epidemiologic, toxicologic, and clinical evidence on health effects of air pollution. In interpreting this evidence for public health protection, there is a need to identify those effects that are considered "adverse" and to separate them from those effects not considered adverse.

The American Thoracic Society has previously provided guidance on the distinction between adverse and nonadverse health effects of air pollution in its 1985 statement, "Guidelines as to What Constitutes an Adverse Respiratory Health Effect" (6). Definitions of adverse effects have also been offered by the World Health Organization (7–10), but the guidance of the American Thoracic Society has received particular emphasis in the United States. Preparation of the original statement was intended to coincide with consideration of the passage of an amended Clean Air Act and to provide a framework for interpreting scientific evidence relevant to the mandate of the act. In particular, the Clean Air Act requires that the Administrator of the Environmental Protection Agency promulgate, for certain pollutants, standards that will be sufficient to protect against adverse effects of the air pollutants on health. The act is silent on the definition of "adverse effect" and, at the time of the 1985 statement, there was considerable controversy around the interpretation of this language as revision of the act was being considered. Recognizing the need of policy makers for expert guidance, the American Thoracic Society released the 1985 statement, which to date constitutes the sole set of recommendations on this issue from an expert panel convened by a health organization.

The American Thoracic Society has revised the 1985 statement because new scientific findings, published since the original statement, have again raised questions as to the boundary between adverse and nonadverse in considering health effects of air pollution. These new findings reflect improved sensitivity of research approaches and the application of biomarkers that can detect even subtle perturbations of biologic systems by air pollutants. Epidemiologic research designs have been refined and large sample sizes and increasingly accurate methods for exposure assessment have increased the sensitivity of epidemiologic data for detecting evidence of effects. New statistical approaches and advances in software and hardware have facilitated analyses of large databases of mortality and morbidity information. The design of clinical studies-including controlled exposures of volunteers-has also advanced and biologic specimens may be obtained after exposure, for example, by fiberoptic bronchoscopy, to identify changes in levels of markers of injury. Toxicologic studies have also gained in sophistication through incorporation of more sensitive indicators of effect and the careful tracing of the relationship between exposure and biologically relevant doses to target sites, which may now be considered at a molecular level.

New dimensions have been added to the array of outcome measures. Medical outcomes research now recognizes that patient well-being should be broadly conceptualized and measured rigorously, in addition to considering the biological process of the disease itself. As a result, health-related quality of life, the perception of well-being, is now considered a necessary component of outcomes research. Validated instruments have been developed to assess the impact of health-related symptoms and impairment on functional status and quality of life (11-14). The formalization of the concept of environmental justice acknowledges that the effects of specific pollutants cannot be evaluated in isolation without giving consideration to the overlapping exposures of populations, often minority group members of low socioeconomic status, who live in neighborhoods that are heavily exposed to multiple environmental contaminants (15).

This new statement, like the 1985 statement, is intended to provide guidance to policy makers and others who interpret the scientific evidence on the health effects of air pollution for the purpose of risk management. The statement does not offer strict rules or numerical criteria, but rather proposes principles to be used in weighing the evidence and setting boundaries between adverse and nonadverse health effects. Even if the technical tools were available for scaling the consequences of air pollution on the multiple relevant axes, the placement of dividing lines should be a societal judgment and consequently

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TABLE 1

U.S. NATIONAL AMBIENT AIR QUALITY STANDARDS*

Pollutant	NAAQS Concentration (ppm)	($\mu g/m^3$)	Standard Type
Particulate matter ≥ 10 Pm (PM,,)			
24-h average		150	Primary and secondary
Annual arithmetic mean		50	Primary and secondary
Particulate matter ≥ 2.5 μm ($PM_{2.5}$)			
24-h average		65	Primary and secondary
Annual arithmetic mean		15	Primary and secondary
Ozone (0,)			
24-h average	0.12	235	Primary and secondary
Annual arithmetic mean	0.08	157	Primary and secondary
Sulfur dioxide (SO,)			
24-h average	0.14	365	Primary
Annual arithmetic mean	0.03	80	Primary
3-h average	0.50	1,300	Secondary
Nitrogen dioxide (NO,)			
Annual arithmetic mean	0.053	100	Primary and secondary
Carbon monoxide (CO)			
1-h average	35	40	Primary
8-h average	9	10	Primary
Lead (Pb)			
Quarterly average		1.5	Primary and secondary

* For detailed information on scientific bases and policy considerations underlying decisions establishing the NAAQS listed here, see the AQCDs, staff papers, and NAAQS Promulgation notices cited in text. Such information can also be obtained from several internet websites (e.g., http://www.epa.giv/airs/criteria.html; http://www.epa.gov/oar/oaqps/publicat.html; and http://www.epa.gov/ncea/biblio.htm).

this committee does not propose specific boundaries for separating adverse from nonadverse effects.

OVERVIEW OF THE 1985 STATEMENT

The 1985 statement of the American Thoracic Society was directed at respiratory health effects of air pollution and emphasized the interpretation of the epidemiologic evidence. The statement recognized the spectrum of responses to air pollution, which begins with exposure and evidence of exposure and ends at death. This spectrum has been characterized as a pyramid, based in the most common consequence-exposure-and having mortality, the least common and most severe consequence, at its tip. The statement included a table that lists adverse respiratory health effects, seemingly in order of declining severity (Table 2). The 1985 statement hinged the distinction between adverse and nonadverse effects on medical considerations. The committee recognized that the boundary is further influenced by societal considerations: "Where one draws the line to categorize it as an adverse health effect or an action level between pathophysiologic or physiologic change is probably best left to the individual or the community."

The committee's definition of adverse respiratory health effects was ". medically significant physiologic or pathologic changes generally evidenced by one or more of the following: (*1*) interference with the normal activity of the affected person or persons, (2) episodic respiratory illness, (3) incapacitating illness, (4) permanent respiratory injury, and/or (5) progressive respiratory dysfunction." The committee noted that all changes are not adverse, citing the example of carboxyhemoglobin. The level of carboxyhemoglobin, beyond that from endogenous production, is indicative of exposure but it is not predictive of adverse effects until reaching threshold levels, depending on the effect and the susceptibility of the exposed person. The statement recognized that a distinction should be

TABLE 2

ADVERSE RESPIRATORY HEALTH EFFECTS

A. Increased mortality (*Increased* as used here and subsequently means significantly [$p < 0.05$] increased above that recorded in some standard, comparable population. In selected situation, $p < 0.1$ may be appropriate)

B. Increased incidence of cancer

C. Increased frequency of symptomatic asthmatic attacks

D. Increased incidence of lower respiratory tract infections

E. Increased exacerbations of disease in persons with chronic cardiopulmonary or other disease that could be reflected in a variety of ways
   1. Less able to cope with daily activities (i.e., shortness of breath or increased anginal episodes)
   2. Increased hospitalization, both frequency and duration
   3. Increased emergency ward or physician visits
   4. Increased pulmonary medication
   5. Decreased pulmonary function

F. Reduction in FEV_1 or FVC associated with clinical symptoms
   1. Chronic reduction in FEV, or FVC associated with clinical symptoms
   2. A significant increase in number of persons with FEV below normal limits: chronically reduced FEV, is a 'predictor of increased risk of mortality. Transient or reversible reductions that are not associated with an asthmatic attack appear to be less important. It should be emphasized that a small but significant reduction in a population mean FEV, or FEV_{75} is probably medically significant, as such a difference may indicate an increase in the number of persons witn respiratory impairment in the population. In other words, a small part of the population may manifest a marked change that is medically significant to them, but when diluted with the rest of the population the change appears to be small
   3. An increased rate of decline in pulmonary function (FEV,) relative to the predicted value in adults with increasing age or failure of children to maintain their predicted FEV, growth curve. Such data must be standardized for sex, race, height, and other demographic and anthropometric factors

G. Increased prevalence of wheezing in the chest apart from colds, or of wheezing most days or nights. (The significance of wheezing with colds needs more study and evaluation.)

H. Increased prevalence or incidence of chest tightness

I. Increased prevalence or incidence of cough/phlegm production requiring medical attention

I. Increased incidence of acute upper respiratory infections that interfere with normal activity

K. Acute upper respiratory tract infections that do not interfere with normal activity

L. Eye, nose, and throat irritation that may interfere with normal activity (i.e., driving a car) if severe

M. Odors

drawn between effects to individuals and effects to populations and that populations are heterogeneous in their susceptibility. The comment was offered that a change in a population could be "medically significant" for that group. The statement also provides guidance on interpretation of'reversible effects and on interpreting irreversible effects. In acknowledging that research would continue to address uncertainties, the committee recommended that the guidelines should be periodically reviewed and updated.

METHODOLOGY FOR DEVELOPING THIS STATEMENT

Following the recommendation of the committee that authored the 1985 statement, the Environmental and Occupational Health Assembly of the American Thoracic Society recognized a need to reconvene a group to review and revise the prior statement. The statement had been used for more than a decade and new investigative approaches were being used to identify effects of air pollution that were not considered by the first committee. In addition, societal perspectives had shifted since the early 1980s and a forma1 concern for the impact of air pollution on specific groups had been expressed through the environmental justice movement.

To revise the statement, a multidisciplinary committee was convened in 1997 that included expertise in pulmonary medicine, public health, epidemiology, both clinical and animal toxicology, biochemistry, and cellular and molecular biology. This committee conducted several planning meetings and consulted experts in environmental economics and in ethics. In addition, a multidisciplinary workshop was convened to gain input from the range of groups potentially interested in the statement and its application. The committee's approach was discussed at a symposium held at the 1999 Annual Meeting of the American Thoracic Society. After further revisions, the statement was reviewed and submitted to the Board of the American Thoracic Society.

BACKGROUND ON THE CLEAN AIR ACT

The preparation of the original statement was largely motivated by potential ambiguity in interpreting the language of the Clean Air Act, which addresses adverse effects of air pollution without providing clear guidance as to the distinction between adverse and nonadverse effects. In addition, questions regarding this distinction arise repeatedly in interpreting the findings of research studies, whether observational or experimental. Consequently, the 1985 statement has had broader application than just the interpretation of evidence on air pollution and health for the purpose of promulgating air quality regulations. Nonetheless, the committee found the legislative history of the Clean Air Act to be relevant to its charge.

The first national legislation on air pollution, the Air Pollution Control Act, was passed in the mid-1950s; the original Clean Air Act was passed in 1963 and last revised in 1990. The act is lengthy and complex in its provisions; most relevant to considerations in defining an adverse health effect are Sections 108 (Air Quality Criteria and Control Techniques), 109 (National Ambient Air Quality Standards), and 112 (Hazardous Air Pollutants). National Ambient Air Quality Standards (NAAQS) are set individually for six prevalent pollutants (Table 1), often referred to as "criteria pollutants." They are so designated because of the requirement for comprehensively reviewing relevant information in a criteria document. The primary NAAQS are to be set at a level that protects the public health with an adequate margin of safety, regardless of economic or technical feasibility of attainment. The secondary standards are concerned with welfare and environmental consequences.

The hazardous air pollutants, as defined in Section 112, are not covered under Sections 108 and 109 as criteria pollutants. In 1990, the Congress offered a list of 189 such pollutants and a process for listing and delisting substances. The 1990 Clean Air Act states: "The Administrator shall periodically review [and revise] the list [of 189 hazardous air pollutants] by. adding pollutants which present, or may present, through inhalation or other routes of exposure, a threat of adverse human health effects (including, but not limited to substances which are known to be, or may reasonably be anticipated to be, carcinogenic, mutagenic, teratogenic, neurotoxic, which cause reproductive dysfunction, or which are acutely or chronically toxic). ." Section 112(f)(2) further directs the Environmental Protection Agency to assess whether the emissions standards for the listed hazardous air pollutants required under other subsections "provide an ample margin of safety to protect public health" and if not, then the agency is to develop standards that will address the "remaining risk."

The historical record provides an indication of the intent of the Congress in framing the language of the Clean Air Act with regard to protection of the public's health. Research now shows that the most highly susceptible individuals may respond to common exposures that are often at or close to natural background pollutant levels.

With regard to sensitivity, the 1970 Clean Air Act recognized that some persons were so ill as to need controlled environments, e.g., persons in intensive care units or newborn infants in nurseries; the act stated that the standards might not necessarily protect such individuals. It further stated, however, that the standards should protect "particularly sensitive citizens such as bronchial asthmatics and emphysematics who in the normal course of daily activity are exposed to the ambient environment." The act further suggested that the adequacy of any standard could be tested in a statistically representative sample of sensitive individuals. The hearing record on the 1970 act is informative. Dr. Hon T. Middleton (Commissioner, National Air Pollution Control Administration, Department of Health, Education, and Welfare) addressed the Senate Subcommittee on Air and Water Pollution of the Committee on Public Works on May 27, 1970. He testified that the intent of any national air quality standard is to be "protective of health in all places" and set at a level below which effects have not been observed. Dr. Middleton recognized the difficulty of finding a demarcation point of exposure below which there is no effect and he noted that there may be subtle effects and evolving scientific understanding.

Further difficulties in the language of the Clean Air Act were later noted in ***A Legislative History of the Clean Air Act Amendments of 1977: A Continuation of the Clean Air Act Amendments of 1970.*** This document noted the difficulty of applying the margin of safety and the erosion of margins of safety by advancing scientific knowledge. The document also commented on the implicit assumption of a safe threshold in the language of the act and the implausibility of this assumption. The report questioned whether the NAAQS (I) protect against genetic mutations, birth defects, and cancer, (2) take sufficient account of the consequences of long-term low-level exposures or short-term peaks, and (3) sufficiently consider synergism among pollutants and the formation of secondary pollutants, e.g., sulfates, with their own toxicity. These considerations remain relevant more than 20 years later.

This selective review of the historical record indicates that Congress intended that the NAAQS would afford health protection not only to the general population but to subgroups with enhanced susceptibility to air pollution, including people with asthma and people with chronic obstructive lung disease. Nevertheless, it is also clear that some exquisitely susceptible individuals might remain outside the ambit of protection of the NAAQS. A margin of safety was to be provided but quantitative specification was not offered. The evolutionary nature of the supporting scientific evidence was repetitively acknowledged and the need to distinguish adverse from nonadverse effects was at least implicitly recognized. The current language of Section 112 explicitly acknowledges the possibility of shifting understanding of risks of specific hazardous air pollutants.

GENERAL CONSIDERATIONS

In preparing the statement, the committee identified several general considerations that are relevant to interpreting evidence on the health effects of air pollution. Each of these considerations and the committee's judgment as to their proper weighting are detailed below.

Population Health versus Individual Risk

The effects of air pollution can be viewed in the complementary contexts of the increment of an individual's risk for disease—the clinician's measure of impact-and of the additional risk incurred by a population, which is the public health perspective (16). Both perspectives are relevant to interpreting research findings on air pollution and to regulations that are protective of the public's health. Any risk incurred by an exposed individual beyond some boundary, determined by the individual or on a societal basis, could be deemed unacceptable. For example. prolonged exposure to a respiratory carcinogen could result in an individual-level incremental risk of exposure of 10^{-4}, more than two orders of magnitude lower than the baseline lifetime individual risk in the United States. Nevertheless, among an exposed population of IO', the estimated number of cancer cases that might result from such an exposure would number 10^3, illustrating that minute individual risks may be significant from the standpoint of population exposures.

Exposure could also enhance risk for a population to an unacceptable degree, perhaps without shifting the risks of any particular individuals to an unacceptable level. Figure 1 illustrates the distinction. In Figure 1 A, the population's distribution of exposure shifts toward a higher level and some members of the population cross the boundary to an unacceptable risk. In Figure 1B. the shift affects the position of the population distribution, but no individuals move to an unacceptable level of risk. Effects on persons with asthma are illustrative. A population of children with asthma could have a distribution of lung function such that no individual child has a level associated with significant impairment. Exposure to air pollution could shift the distribution toward lower levels without bringing any individual child to a level that is associated with clinically relevant consequences. Individuals within the population would, however, have diminished reserve function and are at potentially increased risk if affected by another agent, e.g., a viral infection. Assuming that the relationship between the risk factor and the disease is causal, the committee considered that such a shift in the risk factor distribution, and hence the risk profile of the exposed population. should be considered adverse, even in the absence of the immediate occurrence of frank illness.

Ethics and Equity

The past decade has brought increasing concern over the ethics of heterogeneous, inequitable distributions of environmental and occupational exposures (IS). Within the United States, some groups receive disproportionate exposures to environmental agents that are injurious to health; the environmental justice movement seeks to redress these inequities. The exposures of concern originate in breathing polluted outdoor air, living in substandard housing with indoor air pollution problems, including exposures to certain bioacrosols and combustion products, and working in jobs with occupational respiratory risks. Groups encompassed by this movement in the United States include various racial and ethnic minority populations. particularly those living within urban areas, and the socioeconomically disadvantaged. In the developing world, such exposures can occur at substantially higher levels and may, in some instances. extend to a majority of a given nation's population. Limited access to care and medications may enhance susceptibility to pollution.

The concept of environmental equity had not been formally voiced when the 1985 statement was written. The present committee viewed inequities of exposure as potentially representing a form of susceptibility to air pollution. In other words, individuals within the target groups may be at increased risk of experiencing adverse effects from a given level of ambient air pollution because their baseline risk level may have been raised by other exposures. Moreover, in some instances there may be genetic and nutritional factors enhancing susceptibility as well. It should be noted, however, that there are other exposure scenarios and other subpopulations with increased baseline risks that are not formally included within the environmental justice movement. The heterogeneity of populations needs full acknowledgment, whether it reflects disproportionate noxious exposures or other factors. Observing that there have been few investigations of the effects of other exposures, genetics, or nutrition on susceptibility to air pollution-related effects, either in the United States or internationally, the committee issued a call for additional research in these areas.

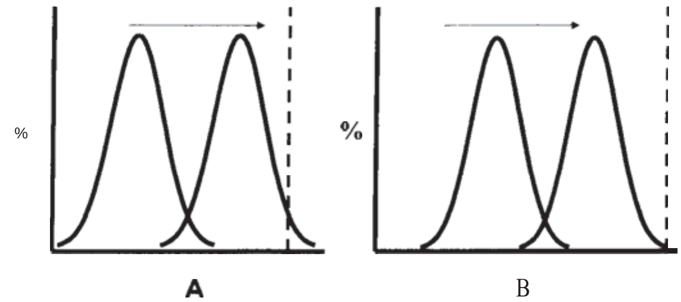

Figure 7. Hypothetical distributions **of exposure for two populations, *A* and *B*. (See text for explanation.)**

Economic Costs

Adverse health effects of air pollution incur costs, including direct costs of providing treatment for illness and indirect costs of lost work time and productivity. Cost-benefit analysis provides an estimate of the balancing of the costs of controls against the benefits; cost effectiveness analysis provides an indication of the level of control accomplished in relation to costs. Cost-benefit and cost-effectiveness analysis are assumption-laden tools now being used for policy-making purposes. Cost estimates depend on the valuation given to illness, lost work time and productivity, and even to lost life. It has been proposed that cost-benefit analysis may facilitate the process of deciding whether a given air pollution-related health impact should be considered adverse. The legislative history of the Clean Air Act explicitly excludes consideration of economic factors in setting ambient air quality standards or in developing emissions standards for hazardous air pollutants. In the context of air quality regulation, cost-benefit analysis is a multistep process involving the articulation of value judgments regarding potential costs (expenditures of public and private resources to reduce pollutant emissions and exposures) versus benefits (avoidance of specified adverse health impacts in a designated population). Benefits, in theory, should be quantified as the willingness of beneficiaries to pay to avoid the adverse impact. In practice, quantification of such health impacts from exposure to air pollution is often based on direct costs related to medical treatment and indirect costs such as school absenteeism, lost work time, decreased productivity, and, at the extreme, person-years of life lost. Valuations of a given effect may vary internationally, as differences in population age distributions, comorbidity, nutritional status, and other circumstances can affect this process. Ideally, cost-benefit analysis should make explicit the value judgments underlying these assessments, highlighting distinctions among alternative pollution control strategies to achieve specific air quality standards. Willingness of individuals to pay to avoid adverse health effects is also estimated from responses to contingent valuation surveys and from market data concerning choices about employment that carries health risks.

Nevertheless, the committee concurred that the specification of which health effects should be considered adverse must precede the application of cost-benefit analysis for evaluation of air pollution control strategies. That is, once a given outcome is designated as adverse, this information can be used as input to cost-benefit analysis. Estimates of costs associated with a given health outcome. while useful from a public policy perspective, cannot be translated into any clinical or biological framework to distinguish adverse from nonadverse effects. Therefore, the committee concluded that however valuable this economists' tool may be for regulatory decision-making, cost-benefit analysis lay outside the scope of this position paper and, indeed, the expertise of the American Thoracic Society.

Susceptibility

The issue of susceptibility has been recognized throughout the history of our initiatives to regulate outdoor air pollution. Susceptibility, broadly defined, may include extrinsic factors, including the profile of exposures to other pollutants, for example, in the workplace or at home, and intrinsic factors, for example, genotype. The size of the population of individuals susceptible to indoor air pollution is large, potentially including infants and the elderly, persons with chronic heart and lung diseases, and the immunocompromised. Persons with multiple deleterious exposures may also be considered as having heightened susceptibility, particularly if the combined effects of the agents are synergistic. Even with the populations considered as susceptible there is a distribution of the degree of susceptibility. For example, levels of nonspecific airway responsiveness in persons with asthma span several orders of magnitude.

The current explosive growth in knowledge of the genetic basis of lung disease, including responses to environmental agents, will provide increasing insights into the mechanistic basis of susceptibility and provide markers of risk status. We already have evidence of between-person variation in the pulmonary function response to ozone and interstrain variation in the pulmonary effects of environmental exposures, including criteria pollutants, in rodent species. As we develop the capacity to more precisely identify those at risk, we may find it increasingly challenging to assure protection for all individuals against adverse health effects.

The present committee agreed with the principle espoused in the Clean Air Act: that regulations should extend protection to include those with enhanced susceptibility to air pollution, recognizing that some highly susceptible individuals may still respond to low-level exposures. Research now shows that some highly susceptible individuals may respond to common exposures that are often unavoidable. Furthermore, by definition, susceptible individuals cannot have the same margin of safety as the nonsusceptible groups within the population.

Heterogeneity of Perspectives

In society there is an extraordinary range of views on environmental issues and tolerance of risk. Looking more globally to other developed countries and to the developing countries, the range of perspectives is even broader. The committee acknowledges that any defined boundaries for distinguishing adverse health effects may not be embraced by all groups. This heterogeneity and the possibility that some may reject the committee's proposal challenged the committee to recommend in principle that control measures should maximize public health benefits while assuring equity.

DIMENSIONS OF ADVERSE EFFECTS

Biomarkers

Biomarkers are indicators of exposure, effect, or susceptibility that are measured in biologic materials, such as blood or bronchoalveolar lavage fluid. The concept of biomarkers has been formalized since the 1985 statement (17) and since then. a continuously increasing number of candidate indicators of exposure, effect, and susceptibility have been developed and applied in laboratory studies of humans and animals and in both occupational and environmental population studies. The progressive refinement of techniques in the field of cellular and molecular biology, and the burgeoning understanding of the complex chemical intracellular and cell-to-cell signaling pathways collectively termed "cytokines" (18), have rapidly expanded the spectrum of candidate markers of effects. It is now possible to detect very early, or initiating phases of responses at the molecular level, such as the production of mRNA for cytokines. Similarly, the progressive development of genetic assays and understanding of the human genome have provided numerous candidate markers of both effects and susceptibility (19).

Biomarkers relevant to air pollution have been measured in blood, exhaled air, urine, sputum, and in bronchoalveolar lavage fluids and tissue specimens collected by bronchoscopy. Bronchoalveolar lavage fluids, for example, are now frequently analyzed for cell numbers and types, cytokines (e.g., several interleukins and tumor necrosis factor α), enzymes (e.g., lactate dehydrogenasc and β-glucoronidase), fibronectin, protein, arachidonic acid metabolites, and reactive oxygen species. Because many of the epithelial cell types of the nasopharyngeal region are similar to epithelia and responses in the trachea, bronchi, and bronchioles, responses of nasal cells have been examined as potential biomarkers for their ability to predict parallel responses in lung airways, which are more difficult to sample.

Biomarkers have been extensively applied in toxicologic studies of air pollution, both in animals and in clinical studies involving exposures of human volunteers. The biomarkcrs are examined for their ability to provide evidence of "biologically effective" doses, including the earliest phases of homeostatic responses, the occurrence of injury, outcomes that are intermediate between injury and disease, and the presence of established disease processes. Genetic markers of susceptibility have begun to be applied to the respiratory system, and this application will undoubtedly expand rapidly. A frequent goal of biomarker development is the ability to readily measure changes that precede and predict continued or progressive events leading to clinical effects and disease (Figure 2).

To date, although biomarkers have proved informative about homeostatic adjustments to exposure and the mechanisms of injury and disease, lack of validation against previously established measures of effect. such as clinical status or even physiologic impairment, remains an important weakness. We do not know if elevations of biomarkers during short-term experimental exposures signal risk for ongoing injury and clinical effects or simply indicate transient responses that can provide insights into mechanisms of injury. The utility of some older biomarkers is well established, such as the relationships among carboxyhemoglobin. exposure to carbon monoxide,

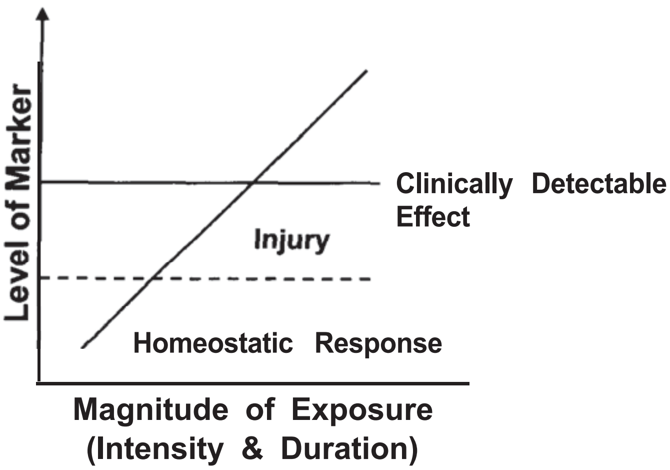

figure 2. Schema for considering biomarkers of response.

impairment of oxygen-carrying capacity, and the risk for angina in the presence of ischemic heart disease. However, the interpretative value for the majority of the many promising new cytokine and genetic biomarkers remains to be established. Not only is it difficult to assess the value of many biomarkers for distinguishing between physiological, homeostatic responses and injury, but it is also difficult to judge the value of changes during short-term exposures for predicting ongoing injury or risk for longer-term clinical effects.

The committee concluded that the continued development of biomarkers is an important need because of their considerable potential not only for detecting the adverse effects of air pollution exposure, but also for aiding the determination of the types and levels of response that should be considered adverse. We often do not know in a parallel, iterative manner, whether the exploration and validation of biomarkers will unquestionably advance our understanding of the mechanisms of homeostatic and injury responses. At this time, however, few of the rapidly growing list of candidate biomarkers have been validated to such an extent that their responses can be used with confidence to define the point at which a response should be equated to an adverse effect warranting preventive measures. Thus, we presently have only a very modest ability to translate evidence from biomarkers directly into a taxonomy of adverse health effects. Consequently, the committee cautions that not all changes in biomarkers related to air pollution should be considered as indicative of injury that represents an adverse effect.

Quality of Life

Health, in its broadest definition, includes not only the absence of disease but the attainment of well-being. Since the preparation of the 198.5 statement, the National Institutes of Health, the Centers of Disease Control, the Food and Drug Administration, and the World Health Organization have broadened their perspective of health to incorporate the concept of health-related quality of life as a valid and important health outcome. Health-related quality of life (HRQL) refers to the individual's perception of well-being, and includes such factors as self-care functioning, mental health, pain, and sense of overall well-being. Decreased health-related quality of life is widely accepted to be an adverse health effect. For this reason, measurable negative effects of air pollution on quality of life, whether for persons with chronic respiratory conditions or the population in general, were consequently considered by this committee to be adverse health effects. Air pollution exposure can adversely affect several domains of quality of life including physical functioning (particularly for persons with respiratory or cardiovascular conditions) and general well-being. Stinging, watery eyes resulting from air pollution not only reflect a chronic physical symptom but may decrease overall quality of life. Outdoor air pollution and odors have been associated with psychiatric symptoms, including anxiety and depression. Increased levels of some air pollutants have been reported to be associated with an increase in psychiatric admissions. The potential effects of air pollution and respiratory symptoms on different domains of quality of life are illustrated in Figure 3.

Measurement of the impact of air pollution on health-related quality of life can be accomplished either by measuring specific domains that may be influenced by air quality (e.g., anxiety, functional status), or by using specific quality of life instruments designed to measure multiple health-related domains (e.g., MOS-SF-36, St. George's Respiratory Questionnaire). The cost-benefits of improved air quality on health-related quality of life could also be measured by the use of quality of life measures that employ utility rating scales. The effects of air pollution of a magnitude considered to be clinically significant with these instruments should be regarded as adverse in interpreting evidence on the health effects of air pollution, regardless of the affected dimension. Additional research is needed to develop an information base for interpreting data from new and more sensitive instruments directed specifically at air pollution.

Physiological impact

The 198.5 statement acknowledged a distinction between reversible and irreversible effects. Healthy persons may sustain transient reductions in pulmonary function associated with air pollution exposure, e.g., reduction of the forced vital capacity (FVC) with exercise at times of higher levels of ozone pollution. However, the committee recommends that a small, transient loss of lung function, by itself, should not automatically be designated as adverse. In drawing the distinction between adverse and nonadverse reversible effects, this committee recommended that reversible loss of lung function in combination with the presence of symptoms should be considered as adverse. This recommendation is consistent with the 1985 statement. The Environmental Protection Agency has also needed to address the interpretation of such data. The Envi-

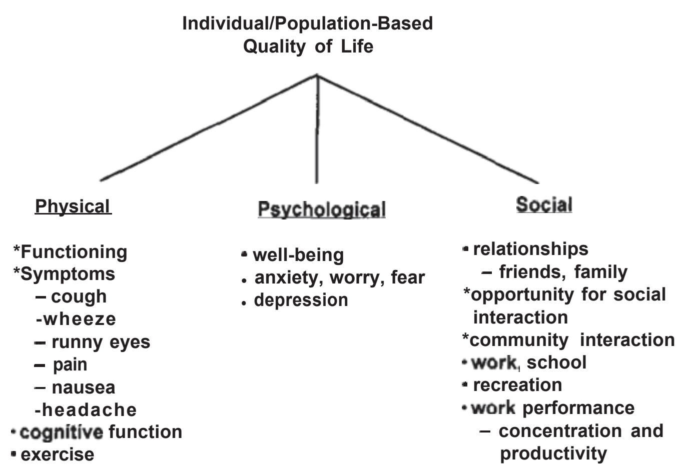

Figure 3. Quality of life domains vulnerable to the adverse health/respiratory effects of air pollution.

ronmental Protection Agency, in its 1989 review of ozone (20), offered a graded classification of lung function changes in persons with asthma. Reduction of the forced expiratory volume in 1 s (FEV_1) was graded as mild, moderate, or severe for reductions of less than 10%, 10–20%, and more than 20%, respectively. This classification has not been validated for acceptability or against other measures.

There is also epidemiologic evidence that air pollution may adversely affect lung growth or accelerate the age-related decline of lung function. Epidemiologic studies are limited in their power to detect such permanent effects and any evidence of association between air pollution exposure and permanent loss of function is indicative of an adverse effect at the population level. Some individuals may sustain clinically relevant, permanent losses of lung function. This committee considered that any detectable level of permanent lung function loss attributable to air pollution exposure should be considered as adverse.

Symptoms

Air pollution exposure can evoke symptoms in persons without underlying chronic heart or lung conditions and also provoke or increase symptom rates in persons with asthma and chronic obstructive lung disease. The Environmental Protection Agency also offered a scale for cough and pain on taking a deep breath in its 1989 ozone review (20). “Infrequent cough” was classified as “None/Normal.”

Do all levels of increased symptom occurrence constitute an adverse health effect? The committee judged that air pollution-related symptoms associated with diminished quality of life or with a change in clinical status should be considered as adverse at the individual level. Characterizing the degree of symptomatology associated with diminished quality of life is an appropriate focus for research and a topic that could be investigated using new approaches for assessing quality of life. A change in clinical status can be appropriately set in a medical framework as one requiring medical care or a change in medication. At the population level, any detectable increment in symptom frequency should be considered as constituting an adverse health effect.

Clinical Outcomes

A wide range of clinical outcome measures has been considered in relation to air pollution, including population-level effects, such as increases in numbers of emergency room visits for asthma or hospitalizations for pneumonia, and individual-level effects, such as increased need for bronchodilator therapy. The present committee shared the view of the previous group: detectable effects of air pollution on clinical measures should be considered adverse.

At the population level, the magnitude of the detectable air pollution effect will depend on the extent of the data available for evaluation and methodological aspects of the data, including the degree of error affecting exposure and outcome variables. With large databases, seemingly modest effects may be detectable. However, the committee recommends that no level of effect of air pollution on population-level clinical indicators can be considered acceptable.

Mortality

Following the development of new approaches for the analysis of time-series data, extensive analyses have now been reported on the relationship between daily mortality counts and levels of air pollution on the same or prior days. Several prospective cohort studies have also addressed the effect of longer-term indicators of air pollution exposure on mortality, controlling for relevant individual factors, including age, sex, cigarette smoking, and occupational exposures, among others. Cross-sectional studies-comparing mortality across locations having different levels of air pollution while controlling for a variety of potential confounding factors-have also been conducted. The air pollution-associated mortality findings figured prominently in the recent revision of the U.S. NAAQS for particulate matter.

Associations between air pollution levels and daily mortality counts have been interpreted by some as reflecting the impact of air pollution on a pool of frail individuals with severe underlying heart or lung disease. One explanation for the day-to-day associations attributes them to a brief advancement of the time of death for extremely frail individuals who would have been expected to die soon even in the absence of an air pollution-related insult (21). Work has shown, however, that while this phenomenon of advancement, referred to as mortality displacement, may occur, it cannot provide a full explanation of the associations repeatedly found between daily fluctuations of air pollution and mortality (22, J. Schwartz, “Harvesting and long term exposure effects in the relationship between air pollution and mortality” [1999, unpublished manuscript]). In addition, some mortality time-series studies have found effects across all age strata, not just among the elderly or the very young, suggesting potentially substantial effects on person-years of life lost. Finally, studies of long-term exposures have shown a gradient of mortality risk from cardiopulmonary disease as well as differences in life expectancy across cities with different long-term pollution levels. Thus, although we still have little insight into the extent to which mortality displacement occurs, the evidentiary ensemble from several types of study designs consistently shows that air pollution can shorten the life span to an unacceptable degree.

Risk Assessment

Since the publication of the 1985 statement, quantitative risk assessment has emerged as a key tool for summarizing information on risks to health from environmental agents. Quantitative risk assessment offers a framework for organizing information on risks within its four elements: hazard identification, exposure assessment, dose-response assessment, and risk characterization. The findings of a risk assessment, encompassed in the risk characterization component, may include an overall assessment of impact, a description of the distribution of risk in the population, and an evaluation of risk for susceptible persons within the population. Quantitative risk assessment has been a cornerstone in evaluating risks of environmental carcinogens and we anticipate increasing application to noncarcinogenic health effects of environmental agents, including air pollution.

In interpreting the findings of risk assessments, guidance can be found in precedents offered by key interpretations of regulatory requirements, including the Supreme Court’s decision on the benzene standard proposed by the Occupational Safety and Health Administration, and in pollutant-specific regulatory actions. Risks may be couched as the numbers of attributable events in the population and also as the level of risk incurred by individual members of the population.

The committee recognized the rising use and potential utility of quantitative risk assessment in characterizing the health effects of air pollution. However, the committee noted that the results of quantitative risk assessment can often be sensitive to assumptions regarding the distribution and magnitude of exposure, the choice of an appropriate dose-response relationship, and other input decisions. Judgments on acceptability of risk are societal and made through complex regulatory processes involving extensive public input. The committee did not consider that its mandate extended to offering specific guidance on acceptable risk levels for populations or individuals, nor is risk assessment an appropriate basis for determining what constitutes an adverse effect.

CONCLUSIONS

Since the preparation of the 1985 statement of the American Thoracic Society, there have been tremendous advances in the scientific methods used to investigate the health effects of air pollution. These advances range from the molecular to the behavioral levels of inquiry. As a result, this statement covers topics that are new since the 1985 statement. Yet, this committee, like the 1985 group, was confronted by a lack of formal research or investigation on the very topic of this statement: the boundary between adverse and nonadverse effects. Consequently, the committee needed to exercise its collective judgment on matters that should be based in some broader, societal decision-making process. Its recommendations are summarized below.

- *Biomarkers.* Few of the rapidly growing list of candidate biomarkers have been validated sufficiently that their responses can be used with confidence to define the point at which a response should be equated to an adverse effect warranting preventive measures. The committee cautions that not all changes in biomarkers related to air pollution should be considered as indicative of injury that represents an adverse effect.
- *Quality of life.* Decreased health-related quality of life is widely accepted as an adverse health effect. For this reason, measurable negative effects of air pollution on quality of life, whether for persons with chronic respiratory conditions or for the population in general, were consequently considered to be adverse by this committee.
- *Physiological impact.* The committee recommends that a small, transient loss of lung function, by itself. should not automatically be designated as adverse. In drawing the distinction between adverse and nonadverse reversible effects, this committee recommended that reversible loss of lung function in combination with the presence of symptoms should be considered adverse. This committee considered that any detectable level of permanent lung function loss attributable to air pollution exposure should be considered adverse.
- *Symptoms.* The committee judged that air pollution-related symptoms associated with diminished quality of life or with a change in clinical status should be considered adverse at the individual level.
- *Clinical outcomes.* The present committee shared the view of the previous group: detectable effects of air pollution on clinical measures should be considered as adverse.
- *Mortality.* This committee agreed with the conclusion articulated by the 1985 group that any effect on mortality should be judged as adverse. In addition, we are now faced with the challenge of interpreting the findings of time-series studies of effects on short time frames. In interpreting this type of evidence, consideration needs to be given to the extent of life-shortening underlying the association.
- *Population health versus individual risk.* Assuming that the relationship between the risk factor and the disease is causal, the committee considered that such a shift in the risk factor distribution, and hence the risk profile of the exposed population, should be considered adverse, even in the absence of the immediate occurrence of frank illness.

This statement was prepared by an ad-hoc committee of the Assembly on Environmental and Occupational Health. Members of the committee are:

Jon Samet, M.D., *Co-chair*
Sonia Buist, M.D., *Co-chair*
Rebecca Bascom, M.D.
Joe Garcia, M.D.
Michael Lipsett, M.D.
Joe Mauderly, D.V.M.
David Mannino, M.D.
Cynthia Rand, Ph.D.
Isabelle Romieu, M.D.
Mark Utell, M.D.
Gregory Wagner, M.D.

Workshop Participants
David V. Bates, M.D.
Melvin L. Billingsley, Ph.D.
Michael Gelobter, M.D.
Benjami F. Hobbs, Ph.D.
Stephen Kleenberger, Ph.D.
Nancy Kline Leidy, Ph.D., R.N.
Stephanie London, M.D., Dr.P.H.
William F. McDonnell, M.D., Ph.D.
Dieter Schwela, M.D.
James C. Wiley, M.D.

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APPENDEIX D OPERATION PHASE EMISSIONS

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	Project Year 1-2 (lbs/hr)					
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX
Quarrying Fugitive Emissions				5.25	1.533	
Quarrying Engine Emissions	0.174	1.203	2.051	0.075	0.069	0.004
Off-Road Haul - Mine to Processing Area (Fugitive)				8.39	1.78	
Off-Road Haul - Mine to Processing Area (Engine)	0.176	0.990	1.782	0.065	0.059	0.003
Processing Area Drop/Storage	0.165	1.072	1.771	0.461	0.182	
Plant/Aggregate Processing				3.092	0.903	
Loadout Processing Area Drop/Storage				0.386	0.113	
Onroad Onsite Haul Engine Emissions	0.005	0.023	0.137	0.005	0.003	0.0003
Onroad Onsite Haul Fugitive Emissions				15.384	3.261	

	Project Year 3-16 (lbs/hr)					
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX
Quarrying Fugitive Emissions				5.25	1.533	
Quarrying Engine Emissions	0.154	1.127	1.645	0.062	0.057	0.004
Off-Road Haul - Mine to Processing Area (Fugitive)				8.39	1.78	
Off-Road Haul - Mine to Processing Area (Engine)	0.150	0.893	1.304	0.048	0.044	0.003
Processing Area Drop/Storage	0.141	0.984	1.411	0.444	0.166	0.003
Plant/Aggregate Processing				3.092	0.903	
Loadout Processing Area Drop/Storage				0.386	0.113	
Onroad Onsite Haul Engine Emissions	0.003	0.017	0.104	0.004	0.002	0.0003
Onroad Onsite Haul Fugitive Emissions				15.384	3.261	

	Project Year 17-30 (lbs/hr)					
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX
Quarrying Fugitive Emissions				5.25	1.533	
Quarrying Engine Emissions	0.157	0.836	0.359	0.014	0.014	0.004
Off-Road Haul - Mine to Processing Area (Fugitive)				8.39	1.78	
Off-Road Haul - Mine to Processing Area (Engine)	0.139	0.738	0.232	0.009	0.009	0.003
Processing Area Drop/Storage	0.109	0.808	0.315	0.395	0.121	0.003
Plant/Aggregate Processing				3.092	0.903	
Loadout Processing Area Drop/Storage				0.386	0.113	
Onroad Onsite Haul Engine Emissions	0.001	0.010	0.058	0.003	0.001	0.0002
Onroad Onsite Haul Fugitive Emissions				15.384	3.261	

	Project Year 1-2 (tons/yr)						
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX	CO2e
Quarrying Fugitive Emissions	0	0	0	2.457	0.717444	0	0
Quarrying Engine Emissions	0.027371	0.189532	0.323167	0.011828	0.01087	0.000591	57.61856
Off-Road Haul - Mine to Processing Area (Fugitive)	0	0	0	3.925195	0.832141	0	0
Off-Road Haul - Mine to Processing Area (Engine)	0.082175	0.463512	0.833785	0.030308	0.027808	0.001562	152.8626
Plant Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Aggregate Processing	0.075741	0.558725	0.798898	1.485079	0.457471	0.001175	1419.409
Loadout Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Onroad Onsite Haul Engine Emissions	0.002526	0.010618	0.064091	0.002289	0.001531	0.000159	17.60097
Onroad Onsite Haul Fugitive Emissions	0	0	0	7.19949	1.526292	0	0
Onroad Offsite Haul Engine Emissions	0.091838	0.386091	2.330578	0.083242	0.055683	0.005775	640.0354
Total	**0.279652**	**1.608479**	**4.35052**	**15.55608**	**3.734843**	**0.009263**	**2287.526**

	Project Year 3-16 (tons/yr)						
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX	CO2e
Quarrying Fugitive Emissions	0	0	0	2.457	0.717444	0	0
Quarrying Engine Emissions	0.024235	0.177637	0.259198	0.009715	0.008928	0.000591	56.25525
Off-Road Haul - Mine to Processing Area (Fugitive)	0	0	0	3.925195	0.832141	0	0
Off-Road Haul - Mine to Processing Area (Engine)	0.070302	0.418003	0.6104	0.022497	0.020622	0.001562	149.4674
Plant Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Aggregate Processing	0.064098	0.52682	0.641567	1.475709	0.44893	0.001175	1417.096
Loadout Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Onroad Onsite Haul Engine Emissions	0.00163	0.007831	0.048726	0.001894	0.001153	0.000153	16.90301
Onroad Onsite Haul Fugitive Emissions	0	0	0	7.19949	1.526292	0	0
Onroad Offsite Haul Engine Emissions	0.059267	0.284765	1.771866	0.068876	0.041938	0.005546	614.6551
Total	**0.219532**	**1.415057**	**3.331757**	**15.52203**	**3.70305**	**0.009028**	**2254.376**

	Project Year 17-30 (tons/yr)						
Source	ROG	CO	NOX	PM10 (total)	PM2.5 (total)	SOX	CO2e
Quarrying Fugitive Emissions	0	0	0	2.457	0.717444	0	0
Quarrying Engine Emissions	0.024739	0.131744	0.056594	0.002165	0.002165	0.000591	67.27716
Off-Road Haul - Mine to Processing Area (Fugitive)	0	0	0	3.925195	0.832141	0	0
Off-Road Haul - Mine to Processing Area (Engine)	0.06499	0.345261	0.108734	0.004062	0.004062	0.001562	177.7076
Plant Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Aggregate Processing	0.052021	0.47578	0.189702	1.451076	0.42656	0.001257	1439.34
Loadout Processing Area Drop/Storage	0	0	0	0.180826	0.052801	0	0
Onroad Onsite Haul Engine Emissions	0.000369	0.004575	0.027163	0.00134	0.000623	0.000112	12.36151
Onroad Onsite Haul Fugitive Emissions	0	0	0	7.19949	1.526292	0	0
Onroad Offsite Haul Engine Emissions	0.013401	0.166381	0.987763	0.048736	0.022669	0.004057	449.5096
Total	**0.15552**	**1.123741**	**1.369956**	**15.45071**	**3.637559**	**0.007579**	**2146.196**

Aggregates Plant - Future

	lb/hr	lb/yr	ton/yr
PM10 Emissions	3.092	2894.112	1.447
PM2.5 Emissions	0.903	845.081	0.423

Device Identifier	Device Type	Max. (ton/hr)	Max. (ton/yr)	Code	Description	PM10 (lb/ton)	PM10 Max. (lb/hr)	PM10 Max. (lb/yr)	Estimated Power (Kw)
A	Grizzly Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
B	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
C	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
D	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
E	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
F	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
G	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
H	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
I	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
J	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
K	Screen	500	468000	1	*Screening*	0.000740	0.3700	346.3200	100.0000
L	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
M	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
N	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
O	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
P	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
Q	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
R	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
S	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
T	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
U	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
V	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
W	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
Z	Belt Scale	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
AA	Surge Bin	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
BB	Jaw Crusher	500	468000	2	*Primary Crushing*	0.002400	1.2000	1123.2000	225.0000
CC	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
DD	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	25.0000
Portable - Exctec	Vibrating Grizzly	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Exctec	Screen	500	468000	1	*Screening*	0.000740	0.3700	346.3200	*0.0000*
Portable - Exctec	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Exctec	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Exctec	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Exctec	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Exctec	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Powerscreen	Receiving Hopper	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*
Portable - Powerscreen	Vibrating Grizzly	500	468000	0	*Pass Through*	0.000000	*0.0000*	*0.0000*	*0.0000*
Portable - Powerscreen	Screen	500	468000	1	*Screening*	0.000740	0.3700	346.3200	*0.0000*
Portable - Powerscreen	Conveyor	500	468000	7	*Conv. Transfer Pt.*	0.000046	0.0230	21.5280	*0.0000*

Plant equipment based on VCAPCD Permit Number 00489.

Emission Factors (lb/ton)
AP 42 Table 11.19.2-2, 8/04

Operation Type	Description	PM 10		
		No Control	**Control**	**% Reduction**
0	Mis. Ops	0.000000	0	
1	Screening	0.008700	0.000740	0.91
2	Primary Crushing	0.002400	0.000540	0.78
3	Secondary Crushing	0.002400	0.000540	0.78
4	Tertiary Crushing	0.002400	0.000540	0.78
5	Fines Crushing	0.015000	0.001200	0.92
6	Fines Screening	0.072000	0.002200	0.97
7	Conv. Transfer Pt.	0.001100	0.000046	0.96
8	Wet Drilling	0.000080		
9	Truck Unloading Stone	0.000016		

Emission Factors from AP-42 Table 11.19.2-2

PM2.5 emission factor assumed to be 29.2% of PM10 based on SCAQMD's Updated CEIDARS

Electricity Use

Total Kw Draw:	950.0000
Estimated Annual Opp Hours:	2920
Estimated Annual Kw-hr Use:	2774000
Annual CO2e Emissions (grams):	1184498000
Annual CO2e Emissions (lbs):	2611371.086
Annual CO2e Emissions (tons):	1305.685543

CO2e Emissions based on ARB documentation https://bit.ly/2SE6XKF

Material Drop, Storage, and Mining Emissions Factors		
Storage Cycle* Emission Factor from AP42 13.2.4:		
PM10 E.F. (lb/ton) = k(0.0032)(U/5)1.3/(M/2)1.4		
	Value	**Units**
k = particle size multiplier =	0.35	dimensionless
U = mean wind speed =	5.82	mph
M = material moisture content =	3	percent
PM10 EF =	**0.00077**	**lb/ton**
PM2.5 EF =	**0.00023**	**lb/ton**

*****Includes loading into piles, equiptment traffic, windblown dust, and loadout

wind speed taken from CalEEMod Appendix D Table 1.1: Weather Data

Material Drop, Storage, and Mining Emissions Factors		
Aggregate Mining Emission Factor (SDAPCD Documentation)		
	Value	**Units**
Uncontrolled PM10 Ems Factor =	0.021	lbs/ton quarried
PM2.5 Component of PM10 =	0.292	weight fraction
Control Factor (Water Spray) =	0.5	weight fraction
EF PM10 =	**0.0105**	**lbs/ton quarried**
EF PM2.5 =	**0.003066**	**lbs/ton quarried**

*See https://bit.ly/2FuS1pq

Basline Unpaved Road Emission Factors

Unpaved Road emissions factor from AP42 Section 13.2.2

EF (lb/VMT)= $4.9 * (S/12)^{0.7} * (W/3)^{0.45}$

	Mining Haul Trucks		On-road Trucks	
	PM10	**PM2.5**	**PM10**	**PM2.5**
S = silt content (%) =	4.8		4.8	
W_l = loaded truck wt (tons) =	75		40	
W_u = unloaded truck wt (tons) =	35		15	
W = avg truck weight	55		27.5	
EF (lb/VMT) =	9.55	2.03	6.99	1.48
Baseline C.E. =	80%	80%	80%	80%
Baseline EF (lb/VMT) =	**1.91**	**0.41**	**1.40**	**0.30**

Silt content based on mean Sand and Gravel Processing from AP-42 Table 13.2.2-1.
Control efficiency for unpaved roads in baseline is 80% for watering.
PM2.5 emissions are 21.2% of PM10 for unpaved roads (SCAQMD *Updated CEIDARS Table).*

Future Unpaved Road Emission Factors

Unpaved Road emissions factor from AP42 Section 13.2.2

EF (lb/VMT)= $4.9 * (S/12)^{0.7} * (W/3)^{0.45}$

	Mining Haul Trucks		On-road Trucks	
	PM10	**PM2.5**	**PM10**	**PM2.5**
S = silt content (%) =	4.8		4.8	
W_l = loaded truck wt (tons) =	75		40	
W_u = unloaded truck wt (tons) =	35		15	
W = avg truck weight	55		27.5	
EF (lb/VMT) =	9.55	2.03	6.99	1.48
Future C.E. =	80%	80%	80%	80%
Future EF (lb/VMT) =	**1.91**	**0.41**	**1.40**	**0.30**

Silt content based on mean Sand and Gravel Processing from AP-42 Table 13.2.2-1.
Control efficiency for unpaved roads in baseline is 80% for watering.
PM2.5 emissions are 21.2% of PM10 for unpaved roads (SCAQMD *Updated CEIDARS Table).*

Basline Paved Road Emission Factors

Paved Road emissions factor from AP42 Section 13.2.1

EF (lb/VMT)= k * $(sL)^{0.91}$ * $(W)^{1.02}$

	Mining Haul Trucks		On-road Trucks	
	PM10	**PM2.5**	**PM10**	**PM2.5**
k= particle size multiplier (lb/vmt) =	0.0022	0.00054	0.0022	0.00054
sL = road surface silt loading (g/m^2) =	0.2	0.2	0.2	0.2
W_l = loaded truck wt (tons) =	75	120	40	40
W_u = unloaded truck wt (tons) =	35	50	15	15
W = avge truck weight	55.00	85.00	27.50	27.50
EF (lb/VMT) =	0.03	0.01	0.01	0.00
Baseline C.E. =	80%	80%	80%	80%
Baseline EF (lb/VMT) =	**0.0061**	**0.0023**	**0.0030**	**0.0007**

Particle size multiplier based on AP-42 Table 13.2.1-1
Silt Loading based on ADT of 500 - 5000 from AP-42 Table 13.1-2
Control efficiency for unpaved roads in baseline is 80% for watering.

Future Paved Road Emission Factors

Paved Road emissions factor from AP42 Section 13.2.1

EF (lb/VMT)= k * $(sL)^{0.91}$ * $(W)^{1.02}$

	Mining Haul Trucks		On-road Trucks	
	PM10	**PM2.5**	**PM10**	**PM2.5**
k= particle size multiplier (lb/vmt) =	0.0022	0.00054	0.0022	0.00054
sL = road surface silt loading (g/m^2) =	0.2	0.2	0.2	0.2
W_l = loaded truck wt (tons) =	75	120	40	40
W_u = unloaded truck wt (tons) =	35	50	15	15
W = avge truck weight	55.00	85.00	27.50	27.50
EF (lb/VMT) =	0.03	0.01	0.01	0.00
Future C.E. =	80%	80%	80%	80%
Future EF (lb/VMT) =	**0.0061**	**0.0023**	**0.0030**	**0.0007**

Particle size multiplier based on AP-42 Table 13.2.1-1
Silt Loading based on ADT of 500 - 5000 from AP-42 Table 13.1-2
Control efficiency for unpaved roads in baseline is 80% for watering.

Future Years 1 - 2							CalEEMod Emission Factor (2019) g/hp-hr								Max Hour Emissions (lbs)								Max Annual Emissions (lbs)							
Equipment	**Make**	**Model**	**Estimated HP**	**Max Annual Op-Hrs**	**Max Hour Op-Hrs**	**Load Factor (a)**	ROG	CO	NOX	SO_2	PM10	PM2.5	CO_2	CH_4	ROG	CO	NOX	SO_2	PM10	PM2.5	CO_2	CH_4	ROG	CO	NOX	SO_2	PM10	PM2.5	CO_2	CH_4
Excavator	John Deere	870 Ex	500	315.15	1	0.38	0.16	1.11	1.78	0.005	0.06	0.05	481.24	0.15	0.07	0.47	0.75	0.0021	0.024	0.022	201.58	0.06	21.39	146.99	234.96	0.66	7.66	7.00	63528.04	20.07
Dozer	John Deere	1050 K	350	315.15	1	0.43	0.32	2.22	3.93	0.005	0.15	0.14	485.86	0.15	0.11	0.74	1.31	0.0017	0.051	0.047	161.21	0.05	33.36	232.07	411.37	0.52	16.00	14.74	50804.87	16.10
Loader	John Deere	844 K	400	630	1	0.4	0.31	1.72	3.29	0.005	0.12	0.11	477.04	0.15	0.11	0.61	1.16	0.0018	0.043	0.040	168.27	0.05	68.03	383.48	730.93	1.11	27.35	25.12	106062.00	33.57
Haul Truck	John Deere	410 E	450	1658	1.8	0.38	0.26	1.48	2.67	0.005	0.10	0.09	485.38	0.15	0.18	0.99	1.78	0.0033	0.065	0.059	324.06	0.10	164.35	927.02	1667.57	3.12	60.62	55.62	303319.35	96.24
Screening Plant Engine	Extect	S5	100	936	1	0.4	0.29	1.62	3.37	0.005	0.13	0.12	480.75	0.15	0.03	0.14	0.30	0.0004	0.011	0.010	42.39	0.01	24.02	133.68	278.23	0.41	10.57	9.74	39681.48	12.55
Screening Plant Engine	PowerScreen	800-PS	100	1872	1	0.4	0.36	3.64	3.57	0.005	0.23	0.21	484.11	0.15	0.03	0.32	0.31	0.0004	0.020	0.019	42.69	0.01	59.43	600.29	588.64	0.83	38.13	35.00	79918.34	25.26

a - Load Factor based on CalEEMod Appendix D OFFROAD Default Horsepower and Load Factors

Screen Plant Egnine Op-Hrs based on maximum throughput listed on Permit 00489

Future Years 3 - 16							CalEEMod Emission Factor (2021) g/hp-hr								Max Hour Emissions (lbs)								Max Annual Emissions (lbs)							
Equipment	**Make**	**Model**	**Estimated HP**	**Max Annual Op-Hrs**	**Max Hour Op-Hrs**	**Load Factor (a)**	ROG	CO	NOX	SO_2	PM10	PM2.5	CO_2	CH_4	ROG	CO	NOX	SO_2	PM10	PM2.5	CO_2	CH_4	ROG	CO	NOX	SO_2	PM10	PM2.5	CO_2	CH_4
Excavator	John Deere	870 Ex	500	315.15	1	0.38	0.14	1.09	1.33	0.005	0.05	0.04	469.62	0.15	0.06	0.46	0.56	0.0021	0.019	0.017	196.71	0.06	18.88	143.60	175.80	0.66	5.94	5.41	61994.02	20.07
Dozer	John Deere	1050 K	350	315.15	1	0.43	0.28	2.02	3.28	0.005	0.13	0.12	474.48	0.15	0.09	0.67	1.09	0.0017	0.043	0.039	157.43	0.05	29.59	211.68	342.59	0.52	13.49	12.44	49614.89	16.00
Loader	John Deere	844 K	400	630	1	0.4	0.26	1.53	2.61	0.005	0.10	0.09	467.93	0.15	0.09	0.54	0.92	0.0018	0.034	0.032	165.06	0.05	58.70	340.00	580.37	1.11	21.57	20.01	104035.70	33.57
Haul Truck	John Deere	410 E	450	1658	1.8	0.38	0.23	1.34	1.95	0.005	0.07	0.07	474.54	0.15	0.15	0.89	1.30	0.0033	0.048	0.044	316.82	0.10	140.60	836.01	1220.80	3.12	44.99	41.24	296544.61	95.61
Screening Plant Engine	Extect	S5	100	936	1	0.4	0.25	1.44	2.60	0.005	0.10	0.09	470.30	0.15	0.02	0.13	0.23	0.0004	0.009	0.008	41.47	0.01	20.97	119.01	214.74	0.41	8.34	7.68	38818.83	12.55
Screening Plant Engine	PowerScreen	800-PS	100	1872	1	0.4	0.29	3.60	2.96	0.005	0.17	0.15	473.59	0.15	0.03	0.32	0.26	0.0004	0.015	0.013	41.76	0.01	48.53	594.63	488.02	0.83	27.40	25.09	78180.99	25.26

a - Load Factor based on CalEEMod Appendix D OFFROAD Default Horsepower and Load Factors

Screen Plant Egnine Op-Hrs based on maximum throughput listed on Permit 00489

Future Years 17 - 30							CalEEMod Emission Factor (2035) g/hp-hr								Max Hour Emissions (lbs)								Max Annual Emissions (lbs)							
Equipment	**Make**	**Model**	**Estimated HP**	**Max Annual Op-Hrs**	**Max Hour Op-Hrs**	**Load Factor (a)**	ROG	CO	NOX	SO_2	PM10	PM2.5	CO_2	CH_4	ROG	CO	NOX	SO_2	PM10	PM2.5	CO_2	CH_4	ROG	CO	NOX	SO_2	PM10	PM2.5	CO_2	CH_4
Excavator	John Deere	870 Ex	500	315.15	1	0.38	0.20	1.09	0.34	0.005	0.01	0.01	568.30	0.02	0.08	0.46	0.14	0.0021	0.005	0.005	238.05	0.01	25.74	143.76	44.49	0.66	1.72	1.72	75021.23	2.24
Dozer	John Deere	1050 K	350	315.15	1	0.43	0.23	1.15	0.66	0.005	0.03	0.03	568.30	0.02	0.08	0.38	0.22	0.0017	0.008	0.008	188.56	0.01	23.74	119.73	68.70	0.52	2.61	2.61	59424.71	2.09
Loader	John Deere	844 K	400	630	1	0.4	0.19	1.08	0.42	0.005	0.02	0.02	568.30	0.02	0.07	0.38	0.15	0.0018	0.005	0.005	200.46	0.01	42.47	239.23	92.49	1.11	3.33	3.33	126351.54	3.78
Haul Truck	John Deere	410 E	450	1658	1.8	0.38	0.21	1.11	0.35	0.005	0.01	0.01	568.30	0.02	0.14	0.74	0.23	0.0033	0.009	0.009	379.42	0.01	129.98	690.52	217.47	3.12	8.12	8.12	355134.01	11.25
Screening Plant Engine	Extect	S5	100	936	1	0.4	0.19	1.08	0.35	0.005	0.01	0.01	568.30	0.02	0.02	0.10	0.03	0.0004	0.001	0.001	50.12	0.00	15.85	89.31	28.89	0.41	1.07	1.07	46908.01	1.40
Screening Plant Engine	PowerScreen	800-PS	100	1872	1	0.4	0.28	3.77	1.56	0.006	0.02	0.02	568.30	0.03	0.02	0.33	0.14	0.0005	0.002	0.002	50.12	0.00	45.73	623.02	258.02	0.99	3.63	3.63	93816.02	4.13

a - Load Factor based on CalEEMod Appendix D OFFROAD Default Horsepower and Load Factors

Screen Plant Egnine Op-Hrs based on maximum throughput listed on Permit 00489

Loader Cycle Time Analysis

Loader Comparison	John Deere 844K	Caterpillar 980G
Net Horse Power	377	373
Avg. Bucket Size Range (yd^3)	6.3 - 8.1	5 - 8
WheelBase (feet)	12.2	12.5

*On-site loader was assumed to be functionally similar to Caterpillar 980 Model based on manufacturer specifications including but not limited to those demonstrated in this table.

Parameters	Assumption/Calculation
Loader Model	980
Travel Distance (avg) (meters)	25
Bucket Payload[1] (yd^3)	5.5
Bucket Payload in Tons	8.25
Material Type[2]	1/8" to 3/4"
Bucket Fill Factor[2]	90%
Job Efficiency[3] (work 50 min/hr)	83%
Grade Resistance[4]	0%
Rolling Resistance[4]	2%
Total Resistance[4]	2%

Hydraulic Cycle Time (mins) [5]	Assumption/Calculation	
Average Cycle Time [6]		0.55
Material Handler?	Yes	-0.05
Materials:	Mixed	0.02
Pile:	Conveyor piled > 10'	0.00
Truck Ownership:	Independent	0.04
Operation Cycle:	Constant	-0.04
Target Type:	N/A	0.00
Total Hydraulic Cycle Time		**0.52**

Total Cycle Time	Assumption/Calculation
Hydraulic Cycle Time (min/cycle)	0.52
Travel with load[7] (min/cycle)	0.10
Travel empty[7] (min/cycle)	0.10
Total Cycle Time (min/cycle)	**0.72**

Production Rate Calculations	Material Handling	
	Baseline	**Future**
Cycles per Hour	100.0	100.0
One Machine Production Rate (tph)	743	743
Max Hour Production Rate (tph)	0	500
Max Annual Throughput (tpy)	0	468,000
Opperating Hours Max Hour	0.00	0.67
Operating Hours per Year	0	630

[1] Average of Caterpillar Performance Handbook (CPH) indicated range of 5 to 8 yd^3 for 980G loaders
[2] Material type and bucket fill factor from Caterpillar Performance Handbook Edition 37, February 2007 (CPH) page 27-1
[3] Job efficiency accounts for operator skill, minor repairs and adjustments, personnel delays, and delays caused by job layout. CPH suggested 50 minutes (83%) (CPH page 12-80)

[4] Resisitance from CPH pg 22-5 and 22-6 and "Typical Rolling Resistance Factors" table on page 27-1
[5] Guidelines for "Selecting a Machine" on page 12-79 and 12-80 of CPH Edition 38 were used to determine the hydraulic cycle time.
[6] Average cycle time for this type of equipment is tabulated on page 12-80 of CPH.
[7] Figures on pages 12-104,105 in CPH were used to estimate the travel times for 908G loaders.
*See John Deere Manufacterer Specifications https://www.deere.com/en/loaders/wheel-loaders/844k-ii-wheel-loader/ and Caterpillar Manufacturer Specifications https://www.deere.com/en/loaders/wheel-loaders/844k-ii-wheel-loader/ for modern versions of specified Loader Models.

Off-Road Haul Truck (Cat 773C or equivalent) Cycle Time Analysis

Haul Truck Comparison	John Deere 410E	Caterpillar 740
Net Horse Power	443	436
Load Capacity (tons)	41	42

*On-site loader was assumed to be functionally similar to Caterpillar 980 Model based on manufacturer specifications including but not limited to those demonstrated in this table.

Truck Loading Details	Amount	Units	Source
Max Rate Transferred	743	tons/hour	Project Specification
Truck payload	41	tons	John Deere: https://bit.ly/2YpqIFR
Baseline Haul Distance	0.36	Miles	Google Earth
Future Haul Distance	0.36	Miles	Google Earth
Average Loaded Speed	10	mph	Assumption
Average Unloaded Speed	15	mph	Assumption
Time to load a truck	3.3	minutes	Loader Cycle Time Analysis
Truck maneuver in loading area	0.7	minutes	Page 1-25, CPH ed. 48
Total loading and maneuver time	4.0	minutes	Calculation

	Baseline Time (min.)	Future Time (min.)	Assumptions
Load Total	4.0	4.0	See Loader CT
Travel to Plant Feed	2.2	2.2	Calculation
Dump	1.1	1.1	Estimated
Travel to Quarry	1.4	1.4	Calculation
Total Cycle Time	**8.7**	**8.7**	
Tons/Hour Hauled per Truck	**282**	**282**	
Loads in Max Hour	**0**	**12**	
Loads in Max Year	**0**	**11415**	
VMT in Max hour	**0**	**4**	
VMT in Max Year	**0**	**4109**	
Truck Hrs Required Max Hour	**0.00**	**1.77**	
Truck Hrs Required Max Year	**0**	**1658**	

On-Road Haul Truck Specifications

	Baseline	Future
On-site Loop Distance (Miles):	0.55	0.55
Off-Site Round Trip (Miles):	20	20
Capacity (tons/load):	25	25
On-Site Max Hour VMT:	0	11
On-Site Max Annual VMT:	0	10296
Off-Site Max Annual VMT:	0	374400

Ventura County EMFAC2017 On-Road T7-Tractor Emission Factors

	lbs/VMT								VMT/Gallon
calendar_year	HC_EF	ROG_EF	CO_EF	NOx_EF	PM10_EF	PM2_5_EF	SOx_EF	CO2e_EF	MPG
2000	0.002746	0.003478058	0.014118	0.046897	0.002534	0.002296	0.000320308	4.109612	5.736428792
2001	0.002637	0.003339197	0.01321	0.047484	0.002322	0.002094	0.000318878	4.091065	5.762155581
2002	0.002623	0.003321202	0.013061	0.047473	0.002269	0.002043	0.000317221	4.069658	5.792246831
2003	0.002596	0.003287186	0.012587	0.047533	0.002138	0.001917	0.000317423	4.07253	5.788570025
2004	0.002617	0.003314451	0.012694	0.046522	0.002151	0.00193	0.000316452	4.060075	5.806326008
2005	0.00231	0.002924929	0.011448	0.042522	0.001979	0.001766	0.000311415	3.994949	5.90024847
2006	0.002269	0.002873853	0.01135	0.041036	0.001952	0.00174	0.000311089	3.98911	5.906431075
2007	0.002182	0.002763366	0.010879	0.039312	0.001824	0.001617	3.58559E-05	3.984906	5.912847565
2008	0.002136	0.002705265	0.010616	0.038249	0.001767	0.001563	3.57945E-05	3.978454	5.922981535
2009	0.00196	0.002482708	0.009768	0.035323	0.001638	0.00144	3.59801E-05	3.999212	5.892440108
2010	0.002185	0.002767359	0.010757	0.037704	0.001738	0.001535	3.59459E-05	3.995919	5.898037087
2011	0.002059	0.002606942	0.01012	0.035488	0.001634	0.001435	3.58037E-05	3.978574	5.92145834
2012	0.001868	0.002365583	0.009212	0.033267	0.001508	0.001315	3.56998E-05	3.966496	5.938696438
2013	0.001318	0.001668617	0.006434	0.026527	0.001098	0.000923	3.44634E-05	3.825699	6.15175657
2014	0.00103	0.001304954	0.005075	0.022844	0.000895	0.000728	3.3784E-05	3.749202	6.275464335
2015	0.000874	0.001107111	0.004309	0.019987	0.000773	0.000611	3.31928E-05	3.679249	6.387245291
2016	0.000715	0.000904971	0.00356	0.017348	0.000665	0.000509	3.25522E-05	3.608037	6.512931056
2017	0.000559	0.000707978	0.002821	0.015236	0.000556	0.000404	3.18708E-05	3.532299	6.652188754
2018	0.000459	0.00058094	0.002374	0.013705	0.000491	0.000342	3.13429E-05	3.473659	6.764225728
2019	0.000387	0.000490589	0.002062	0.01245	0.000445	0.000297	3.08505E-05	3.418992	6.87219076
2020	0.000315	0.000399518	0.001769	0.010947	0.000403	0.000258	3.02521E-05	3.35258	7.008126573
2021	0.00025	0.000316598	0.001521	0.009465	0.000368	0.000224	2.96287E-05	3.283414	7.155565696
2022	0.000135	0.000171509	0.00105	0.007556	0.000289	0.000149	2.86036E-05	3.16965	7.412024963
2023	5.33E-05	6.75589E-05	0.000822	0.005431	0.000262	0.000123	2.69133E-05	2.98224	7.877524187
2024	5.48E-05	6.93627E-05	0.000849	0.00553	0.000263	0.000123	2.66104E-05	2.948674	7.967207285
2025	5.59E-05	7.07832E-05	0.000869	0.005574	0.000263	0.000124	2.62207E-05	2.905496	8.085612283
2026	5.68E-05	7.18904E-05	0.000885	0.005593	0.000264	0.000124	2.58044E-05	2.859374	8.216043321
2027	5.73E-05	7.25803E-05	0.000895	0.005582	0.000264	0.000124	2.53206E-05	2.805766	8.37302904
2028	5.77E-05	7.3026E-05	0.000902	0.005555	0.000264	0.000124	2.48229E-05	2.75061	8.540934605
2029	5.78E-05	7.31964E-05	0.000905	0.00551	0.000263	0.000124	2.43291E-05	2.695903	8.714258879
2030	5.79E-05	7.32959E-05	0.000908	0.00547	0.000263	0.000123	2.38416E-05	2.641882	8.892452988
2031	5.79E-05	7.33018E-05	0.000911	0.005471	0.000262	0.000122	2.34012E-05	2.593079	9.059816442
2032	5.77E-05	7.30161E-05	0.000908	0.005424	0.000261	0.000122	2.2929E-05	2.540756	9.246397791
2033	5.73E-05	7.25186E-05	0.000901	0.005375	0.000261	0.000122	2.24855E-05	2.491614	9.428765614
2034	5.69E-05	7.20158E-05	0.000894	0.005323	0.000261	0.000121	2.20596E-05	2.444419	9.610814985
2035	5.65E-05	7.15879E-05	0.000889	0.005277	0.00026	0.000121	2.16698E-05	2.401226	9.783695231
2036	5.62E-05	7.11794E-05	0.000883	0.005236	0.00026	0.000121	2.13305E-05	2.363635	9.939298736
2037	5.59E-05	7.07764E-05	0.000878	0.0052	0.00026	0.000121	2.09954E-05	2.326497	10.09796486
2038	5.56E-05	7.04302E-05	0.000873	0.005169	0.00026	0.00012	2.06931E-05	2.293009	10.24544164
2039	5.54E-05	7.01365E-05	0.000869	0.005145	0.000259	0.00012	2.04241E-05	2.263198	10.38039686
2040	5.52E-05	6.99584E-05	0.000867	0.005128	0.000259	0.00012	2.01954E-05	2.237851	10.49797762
2041	5.52E-05	6.98527E-05	0.000865	0.005115	0.000259	0.00012	1.99995E-05	2.216151	10.60077009
2042	5.51E-05	6.98034E-05	0.000865	0.005107	0.000259	0.00012	1.98328E-05	2.197682	10.68986491
2043	5.51E-05	6.97941E-05	0.000865	0.005101	0.000259	0.00012	1.96914E-05	2.182014	10.7666219
2044	5.51E-05	6.98247E-05	0.000865	0.005099	0.000259	0.00012	1.95745E-05	2.169052	10.83096873
2045	5.52E-05	6.98643E-05	0.000866	0.005097	0.000259	0.00012	1.94738E-05	2.157894	10.88697475
2046	5.52E-05	6.99125E-05	0.000866	0.005097	0.000259	0.00012	1.93884E-05	2.148439	10.93488808
2047	5.52E-05	6.99659E-05	0.000867	0.005096	0.000259	0.00012	1.93161E-05	2.140422	10.97584798
2048	5.53E-05	7.00236E-05	0.000868	0.005096	0.000259	0.00012	1.92549E-05	2.133643	11.01072129
2049	5.53E-05	7.00856E-05	0.000869	0.005097	0.000259	0.00012	1.92046E-05	2.128071	11.03955297

					Yr 1 - 2		Yr 3 - 16		Yr 17 - 30	
	Model Object	TAC	TAC CAS	Speciation	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
Future Mine Max Hour	FMHE	diesel PM10	9901	N/A	0.075059684	0	0.061651169	0	0.01374031	0
		Arsenic	7440382	0.00001	0.0000525	0	0.0000525	0	0.0000525	0
		Beryllium	7440417	0.000001	0.00000525	0	0.00000525	0	0.00000525	0
		Cadmium	7440439	0.000001	0.00000525	0	0.00000525	0	0.00000525	0
		Chromium	7440473	0.00005	0.0002625	0	0.0002625	0	0.0002625	0
		Copper	7440508	0.0001	0.000525	0	0.000525	0	0.000525	0
		Lead	7439921	0.00005	0.0002625	0	0.0002625	0	0.0002625	0
		Manganese	7439965	0.0005	0.002625	0	0.002625	0	0.002625	0
		Nickel	7440020	0.000008	0.000042	0	0.000042	0	0.000042	0
		Selenium	7782492	0.000005	0.00002625	0	0.00002625	0	0.00002625	0
		Silica, Crystalline	1175	0.1	0.525	0	0.525	0	0.525	0
		Zinc	7440666	0.0002	0.00105	0	0.00105	0	0.00105	0
Baseline Mining	BM	diesel PM10	9901	N/A	0	0	0	0	0	0
		Arsenic	7440382	0.00001	0	0	0	0	0	0
		Beryllium	7440417	0.000001	0	0	0	0	0	0
		Cadmium	7440439	0.000001	0	0	0	0	0	0
		Chromium	7440473	0.00005	0	0	0	0	0	0
		Copper	7440508	0.0001	0	0	0	0	0	0
		Lead	7439921	0.00005	0	0	0	0	0	0
		Manganese	7439965	0.0005	0	0	0	0	0	0
		Nickel	7440020	0.000008	0	0	0	0	0	0
		Selenium	7782492	0.000005	0	0	0	0	0	0
		Silica, Crystalline	1175	0.1	0	0	0	0	0	0
		Zinc	7440666	0.0002	0	0	0	0	0	0

	Model Object	TAC	TAC CAS	Speciation	Yr 1 - 2		Yr 3 - 16		Yr 17 - 30	
					lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
On-Road Vehicle Emissions	ONRD	diesel PM10	9901	N/A	0	4.578317	0	3.788168	0	2.680456
		Aluminum	7429905	0.015	0	215.9847	0	215.9847	0	215.9847
		Arsenic	7440382	0.00001	0	0.14399	0	0.14399	0	0.14399
		Barium	7440393	0.000145	0	2.087852	0	2.087852	0	2.087852
		Beryllium	7440417	0.000001	0	0.014399	0	0.014399	0	0.014399
		Cadmium	7440439	0.000001	0	0.014399	0	0.014399	0	0.014399
		Chromium	7440473	0.000025	0	0.359975	0	0.359975	0	0.359975
		Copper	7440508	0.00004	0	0.575959	0	0.575959	0	0.575959
		Lead	7439921	0.00003	0	0.431969	0	0.431969	0	0.431969
		Manganese	7439965	0.00049	0	7.055501	0	7.055501	0	7.055501
		Nickel	7440020	0.000008	0	0.115192	0	0.115192	0	0.115192
		Selenium	7782492	0.000001	0	0.014399	0	0.014399	0	0.014399
		Silica, Crystalline	1175	0.1	0	1439.898	0	1439.898	0	1439.898
		Zinc	7440666	0.000112	0	1.612686	0	1.612686	0	1.612686
Off-Road Vehicle Emissions	OFRD	diesel PM10	9901	N/A	0	60.61598	0	44.9933	0	8.123791
		Aluminum	7429905	0.015	0	117.7558	0	117.7558	0	117.7558
		Arsenic	7440382	0.00001	0	0.078504	0	0.078504	0	0.078504
		Barium	7440393	0.000145	0	1.138306	0	1.138306	0	1.138306
		Beryllium	7440417	0.000001	0	0.00785	0	0.00785	0	0.00785
		Cadmium	7440439	0.000001	0	0.00785	0	0.00785	0	0.00785
		Chromium	7440473	0.000025	0	0.19626	0	0.19626	0	0.19626
		Copper	7440508	0.00004	0	0.314016	0	0.314016	0	0.314016
		Lead	7439921	0.00003	0	0.235512	0	0.235512	0	0.235512
		Manganese	7439965	0.00049	0	3.846691	0	3.846691	0	3.846691
		Nickel	7440020	0.000008	0	0.062803	0	0.062803	0	0.062803
		Selenium	7782492	0.000001	0	0.00785	0	0.00785	0	0.00785
		Silica, Crystalline	1175	0.1	0	785.039	0	785.039	0	785.039
		Zinc	7440666	0.000112	0	0.879244	0	0.879244	0	0.879244

	Model Object	TAC	TAC CAS	Speciation	Yr 1 - 2		Yr 3 - 16		Yr 17 - 30	
					lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
Rock Plant / Associated Off-Road Equiptment	PLNT	diesel PM10	9901	N/A	0	76.04617	0	57.30657	0	8.039834
		Aluminum	7429905	0.015	0	43.41168	0	43.41168	0	43.41168
		Arsenic	7440382	0.00001	0	0.028941	0	0.028941	0	0.028941
		Barium	7440393	0.000225	0	0.651175	0	0.651175	0	0.651175
		Beryllium	7440417	0.000001	0	0.002894	0	0.002894	0	0.002894
		Cadmium	7440439	0.000001	0	0.002894	0	0.002894	0	0.002894
		Chromium	7440473	0.000028	0	0.081035	0	0.081035	0	0.081035
		Cobalt	7440484	0.000011	0	0.031835	0	0.031835	0	0.031835
		Copper	7440508	0.000037	0	0.107082	0	0.107082	0	0.107082
		Lead	7439921	0.00005	0	0.144706	0	0.144706	0	0.144706
		Manganese	7439965	0.00053	0	1.533879	0	1.533879	0	1.533879
		Nickel	7440020	0.000008	0	0.023153	0	0.023153	0	0.023153
		Selenium	7782492	0.000001	0	0.002894	0	0.002894	0	0.002894
		Silica, Crystalline	1175	0.1	0	289.4112	0	289.4112	0	289.4112
		Zinc	7440666	0.000099	0	0.286517	0	0.286517	0	0.286517
Loadout and Material Handling	LDOT	diesel PM10	9901	N/A	0		0		0	
		Aluminum	7429905	0.015	0	5.424766	0	5.424766	0	5.424766
		Arsenic	7440382	0.00001	0	0.003617	0	0.003617	0	0.003617
		Barium	7440393	0.000225	0	0.081371	0	0.081371	0	0.081371
		Beryllium	7440417	0.000001	0	0.000362	0	0.000362	0	0.000362
		Cadmium	7440439	0.000001	0	0.000362	0	0.000362	0	0.000362
		Chromium	7440473	0.000028	0	0.010126	0	0.010126	0	0.010126
		Cobalt	7440484	0.000011	0	0.003978	0	0.003978	0	0.003978
		Copper	7440508	0.000037	0	0.013381	0	0.013381	0	0.013381
		Lead	7439921	0.00005	0	0.018083	0	0.018083	0	0.018083
		Manganese	7439965	0.00053	0	0.191675	0	0.191675	0	0.191675
		Nickel	7440020	0.000008	0	0.002893	0	0.002893	0	0.002893
		Selenium	7782492	0.000001	0	0.000362	0	0.000362	0	0.000362
		Silica, Crystalline	1175	0.1	0	36.16511	0	36.16511	0	36.16511
		Zinc	7440666	0.000099	0	0.035803	0	0.035803	0	0.035803

					Yr 1 - 2		Yr 3 - 16		Yr 17 - 30	
	Model Object	TAC	TAC CAS	Speciation	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr
Future Mining Max Year	FMY2	diesel PM10	9901	N/A	0	23.65517	0	19.42946	0	4.33028
		Arsenic	7440382	0.00001	0	0.04914	0	0.04914	0	0.04914
		Beryllium	7440417	0.000001	0	0.004914	0	0.004914	0	0.004914
		Cadmium	7440439	0.000001	0	0.004914	0	0.004914	0	0.004914
		Chromium	7440473	0.00005	0	0.2457	0	0.2457	0	0.2457
		Copper	7440508	0.0001	0	0.4914	0	0.4914	0	0.4914
		Lead	7439921	0.00005	0	0.2457	0	0.2457	0	0.2457
		Manganese	7439965	0.0005	0	2.457	0	2.457	0	2.457
		Nickel	7440020	0.000008	0	0.039312	0	0.039312	0	0.039312
		Selenium	7782492	0.000005	0	0.02457	0	0.02457	0	0.02457
		Silica, Crystalline	1175	0.1	0	491.4	0	491.4	0	491.4
		Zinc	7440666	0.0002	0	0.9828	0	0.9828	0	0.9828

APPENDEIX E MODELING RESULTS

Modeling files, alongside a copy of this report, can be found at:

https://bit.ly/2uzLMf6

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REC	Receptor Type	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
1	GRID	309050	3777650	N/A	N/A	0.00072906
2	GRID	310550	3777650	N/A	N/A	0.00094145
3	GRID	312050	3777650	N/A	N/A	0.0004067
4	GRID	313550	3777650	N/A	N/A	0.0010513
5	GRID	315050	3777650	N/A	N/A	0.0013432
6	GRID	316550	3777650	N/A	N/A	0.0011444
7	GRID	318050	3777650	N/A	N/A	0.00045729
8	GRID	319550	3777650	N/A	N/A	0.000061222
9	GRID	321050	3777650	N/A	N/A	0.000040637
10	GRID	322550	3777650	N/A	N/A	0.000038382
11	GRID	309050	3779150	N/A	N/A	0.00094631
12	GRID	310550	3779150	N/A	N/A	0.0010871
13	GRID	312050	3779150	N/A	N/A	0.0012704
14	GRID	313550	3779150	N/A	N/A	0.0019786
15	GRID	315050	3779150	N/A	N/A	0.00039558
16	GRID	316550	3779150	N/A	N/A	0.0018022
17	GRID	318050	3779150	N/A	N/A	0.0017901
18	GRID	319550	3779150	N/A	N/A	0.000082532
19	GRID	321050	3779150	N/A	N/A	0.000071411
20	GRID	322550	3779150	N/A	N/A	0.000069613
21	GRID	309050	3780650	N/A	N/A	0.0010112
22	GRID	310550	3780650	N/A	N/A	0.0013374
23	GRID	312050	3780650	N/A	N/A	0.0018144
24	GRID	313550	3780650	N/A	N/A	0.0022653
25	GRID	315050	3780650	N/A	N/A	0.0029517
26	GRID	316550	3780650	N/A	N/A	0.00043444
27	GRID	318050	3780650	N/A	N/A	0.0005212
28	GRID	319550	3780650	N/A	N/A	0.00060308
29	GRID	321050	3780650	N/A	N/A	0.00017743
30	GRID	322550	3780650	N/A	N/A	0.00015616
31	GRID	309050	3782150	N/A	N/A	0.0011361
32	GRID	310550	3782150	N/A	N/A	0.0016507
33	GRID	312050	3782150	N/A	N/A	0.0023067
34	GRID	313550	3782150	N/A	N/A	0.001299
35	GRID	315050	3782150	N/A	N/A	0.0069448
36	GRID	316550	3782150	N/A	N/A	0.0004835
37	GRID	318050	3782150	N/A	N/A	0.00094924
38	GRID	319550	3782150	N/A	N/A	0.003941
39	GRID	321050	3782150	N/A	N/A	0.0013415
40	GRID	322550	3782150	N/A	N/A	0.00014153
41	GRID	309050	3783650	N/A	N/A	0.0010691
42	GRID	310550	3783650	N/A	N/A	0.0017211
43	GRID	312050	3783650	N/A	N/A	0.0025639
44	GRID	313550	3783650	N/A	N/A	0.0045971

REC	Receptor Type	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
45	GRID	315050	3783650	N/A	N/A	0.011176
46	GRID	316550	3783650	N/A	N/A	0.0048967
47	GRID	318050	3783650	N/A	N/A	0.0026907
48	GRID	319550	3783650	N/A	N/A	0.0043694
49	GRID	321050	3783650	N/A	N/A	0.0023032
50	GRID	322550	3783650	N/A	N/A	0.0017579
51	GRID	309050	3785150	N/A	N/A	0.0010164
52	GRID	310550	3785150	N/A	N/A	0.0012132
53	GRID	312050	3785150	N/A	N/A	0.0020761
54	GRID	313550	3785150	N/A	N/A	0.0028929
55	GRID	315050	3785150	N/A	N/A	0.0064056
56	GRID	316550	3785150	N/A	N/A	0.0010307
57	GRID	318050	3785150	N/A	N/A	0.0023968
58	GRID	319550	3785150	N/A	N/A	0.0034222
59	GRID	321050	3785150	N/A	N/A	0.0023895
60	GRID	322550	3785150	N/A	N/A	0.0011857
61	GRID	309050	3786650	N/A	N/A	0.0007016
62	GRID	310550	3786650	N/A	N/A	0.0011775
63	GRID	312050	3786650	N/A	N/A	0.001514
64	GRID	313550	3786650	N/A	N/A	0.0017403
65	GRID	315050	3786650	N/A	N/A	0.0035428
66	GRID	316550	3786650	N/A	N/A	0.003436
67	GRID	318050	3786650	N/A	N/A	0.0025452
68	GRID	319550	3786650	N/A	N/A	0.0018172
69	GRID	321050	3786650	N/A	N/A	0.0015234
70	GRID	322550	3786650	N/A	N/A	0.0012504
71	GRID	309050	3788150	N/A	N/A	0.00076275
72	GRID	310550	3788150	N/A	N/A	0.00085324
73	GRID	312050	3788150	N/A	N/A	0.0012079
74	GRID	313550	3788150	N/A	N/A	0.0014293
75	GRID	315050	3788150	N/A	N/A	0.001979
76	GRID	316550	3788150	N/A	N/A	0.0017481
77	GRID	318050	3788150	N/A	N/A	0.0015324
78	GRID	319550	3788150	N/A	N/A	0.0010577
79	GRID	321050	3788150	N/A	N/A	0.00022945
80	GRID	322550	3788150	N/A	N/A	0.00062596
81	GRID	309050	3789650	N/A	N/A	0.00057599
82	GRID	310550	3789650	N/A	N/A	0.00070901
83	GRID	312050	3789650	N/A	N/A	0.00088117
84	GRID	313550	3789650	N/A	N/A	0.00093089
85	GRID	315050	3789650	N/A	N/A	0.0012538
86	GRID	316550	3789650	N/A	N/A	0.0011006
87	GRID	318050	3789650	N/A	N/A	0.0010501
88	GRID	319550	3789650	N/A	N/A	0.00092608

REC	Receptor Type	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
89	GRID	321050	3789650	N/A	N/A	0.00084778
90	GRID	322550	3789650	N/A	N/A	0.00059527
91	GRID	309050	3791150	N/A	N/A	0.00049712
92	GRID	310550	3791150	N/A	N/A	0.00056978
93	GRID	312050	3791150	N/A	N/A	0.00068492
94	GRID	313550	3791150	N/A	N/A	0.00073289
95	GRID	315050	3791150	N/A	N/A	0.0007768
96	GRID	316550	3791150	N/A	N/A	0.00075722
97	GRID	318050	3791150	N/A	N/A	0.00074709
98	GRID	319550	3791150	N/A	N/A	0.00070407
99	GRID	321050	3791150	N/A	N/A	0.00051044
100	GRID	322550	3791150	N/A	N/A	0.00049639
101	Worker	315425.4	3784412	5.463E-07	0.22185	0.015385
102	Worker	315309.5	3784203	7.6453E-07	0.19859	0.01577
103	Worker	315524.3	3784201	1.4291E-06	0.25745	0.020604
104	Worker	314819	3784501	1.4385E-07	0.033961	0.0087981
105	Worker	314870.9	3785536	6.3013E-08	0.011589	0.0044142
106	Worker	315545.9	3785545	1.078E-07	0.017025	0.006917
107	Worker	317023.7	3786515	5.0826E-08	0.0079883	0.0036147
108	Worker	317277	3783438	1.0447E-08	0.0013181	0.0040758
109	Residence	316741.8	3783884	3.31097E-07	0.005788	0.0078163
110	Residence	316658	3783803	2.16946E-07	0.0038015	0.0068743
111	Residence	316454.7	3783619	8.45121E-08	0.0015628	0.0037284
112	Residence	316525.3	3783638	1.00887E-07	0.0018792	0.0045408
113	Residence	316723.8	3783843	2.62466E-07	0.0045682	0.0065075
114	Residence	316481.8	3783625	8.71812E-08	0.0016134	0.0033112
115	Residence	316435.2	3783583	8.2968E-08	0.0015298	0.0037141
116	Residence	316934.9	3783882	3.0296E-07	0.0053638	0.0047633
117	Residence	316935.2	3783867	2.87217E-07	0.005089	0.0046156
118	Residence	316942	3783914	3.3197E-07	0.0058725	0.0044587
119	Residence	316968.4	3783923	3.52095E-07	0.0062235	0.0044286
120	Residence	316997.1	3783921	3.48348E-07	0.0061619	0.0041486
121	Residence	316357.6	3783158	3.86869E-08	0.00070622	0.0021653
122	Residence	316401.1	3783150	3.90621E-08	0.00072304	0.0019904
123	Residence	316145.9	3782940	2.73365E-08	0.00050486	0.0016038
124	Residence	316295.7	3782904	2.87551E-08	0.00050576	0.0011189
125	Residence	315901	3782418	1.57457E-08	0.00029161	0.00059094
126	Residence	315792.1	3782244	1.42023E-08	0.00026039	0.00048797
127	Residence	317133.1	3783906	2.93021E-07	0.0052061	0.0028313
128	Residence	317142.4	3783933	3.1477E-07	0.0055782	0.0029673
129	Residence	317147.3	3783979	3.77899E-07	0.0066676	0.0034045
130	Residence	317154.4	3784013	4.42292E-07	0.0077763	0.003174
131	Residence	317170.8	3784043	5.04318E-07	0.0088443	0.003075
132	Residence	316319.2	3786097	8.05584E-07	0.020123	0.0056451

REC	Receptor Type	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
133	Residence	316417.7	3786056	8.46795E-07	0.02069	0.004761
134	Residence	316473.7	3786012	9.07744E-07	0.021801	0.0053121
135	Residence	316507.9	3785967	9.74153E-07	0.023056	0.0052975
136	Residence	316534.3	3785931	1.02992E-06	0.024131	0.0061164
137	Residence	316594.8	3785967	1.00612E-06	0.023006	0.0061065
138	Residence	316647	3785969	1.00463E-06	0.022904	0.0057489
139	Residence	316687.9	3785960	1.00977E-06	0.023061	0.0057726
140	Residence	316764.7	3785995	9.68256E-07	0.021818	0.0054626
141	Residence	316798.7	3785975	9.9047E-07	0.022269	0.005266
142	Residence	316851.5	3785959	1.01265E-06	0.022826	0.0052861
143	Residence	316903.9	3785951	1.02058E-06	0.023028	0.005561
144	Residence	316952.3	3785955	1.00962E-06	0.022797	0.0054377
145	Residence	317008	3785953	9.92743E-07	0.022389	0.0056408
146	Residence	317065.4	3785943	9.80313E-07	0.022028	0.0057993
147	Residence	317116.8	3785927	9.87603E-07	0.022162	0.0044515
148	Residence	317246.8	3785925	9.7837E-07	0.021535	0.0052036
149	Residence	317371.8	3785893	9.52283E-07	0.02104	0.004304
150	Residence	317471.9	3785853	9.34448E-07	0.021077	0.0046649
151	Residence	317579.5	3785808	9.40662E-07	0.021519	0.0043222
152	Residence	317778.8	3785802	8.71483E-07	0.020231	0.0047208
153	Residence	319270	3783854	2.38651E-07	0.0043559	0.0050856
154	Residence	319338.6	3784029	2.01554E-07	0.0037023	0.0053459
155	Residence	319303.1	3784178	1.68104E-07	0.003145	0.0046558
156	Residence	319513.5	3784378	2.04885E-07	0.0038061	0.0040569
157	Residence	319364.6	3784639	1.74736E-07	0.0032422	0.0040775
158	Residence	319336.2	3784837	1.82205E-07	0.0034465	0.0055983
159	Residence	319383.5	3785055	1.7427E-07	0.0033006	0.0038093
160	Residence	319303.1	3785095	1.50725E-07	0.0028778	0.0045188
161	Residence	319128.1	3785440	1.3781E-07	0.0027396	0.00564
162	Residence	319140.9	3785661	1.40517E-07	0.0026345	0.0046921
163	Residence	318366.3	3783901	1.7915E-07	0.0032459	0.0014023
164	Fenceline	315657.4	3784403	N/A	N/A	0.022206
165	Fenceline	315647.7	3784485	N/A	N/A	0.020851
166	Fenceline	315641.3	3784513	N/A	N/A	0.01971
167	Fenceline	315706.7	3784724	N/A	N/A	0.015315
168	Fenceline	315714.2	3784755	N/A	N/A	0.01523
169	Fenceline	315895.5	3784784	N/A	N/A	0.016515
170	Fenceline	316013.1	3784802	N/A	N/A	0.020493
171	Fenceline	316101.5	3784768	N/A	N/A	0.02303
172	Fenceline	316533.8	3784488	N/A	N/A	0.01072
173	Fenceline	316545.7	3784328	N/A	N/A	0.036307
174	Fenceline	316606	3784210	N/A	N/A	0.013183
175	Fenceline	316430.9	3783981	N/A	N/A	0.079244
176	Fenceline	315605	3783689	N/A	N/A	0.019256

REC	Receptor Type	X	Y	Total Cancer Risk Sum	Overall Max Chronic Hazard Index	Overall Max Acute Hazard Index
177	Fenceline	315548.1	3783937	N/A	N/A	0.020351
178	Fenceline	315617.9	3784014	N/A	N/A	0.021411
179	Fenceline	315631	3784149	N/A	N/A	0.021279
180	Fenceline	315653.7	3784408	N/A	N/A	0.022435
181	Fenceline	315663.1	3784583	N/A	N/A	0.018561
182	Fenceline	315684.9	3784653	N/A	N/A	0.015335
183	Fenceline	315804.8	3784769	N/A	N/A	0.017161
184	Fenceline	315954.3	3784793	N/A	N/A	0.019463
185	Fenceline	316173.5	3784722	N/A	N/A	0.025068
186	Fenceline	316245.6	3784675	N/A	N/A	0.033779
187	Fenceline	316317.7	3784628	N/A	N/A	0.0089638
188	Fenceline	316389.7	3784581	N/A	N/A	0.0039864
189	Fenceline	316461.8	3784535	N/A	N/A	0.0054843
190	Fenceline	316539.8	3784408	N/A	N/A	0.011547
191	Fenceline	316575.9	3784269	N/A	N/A	0.016412
192	Fenceline	316547.7	3784134	N/A	N/A	0.020883
193	Fenceline	316489.3	3784058	N/A	N/A	0.063473
194	Fenceline	316339.2	3783949	N/A	N/A	0.079753
195	Fenceline	316247.4	3783916	N/A	N/A	0.060172
196	Fenceline	316155.6	3783884	N/A	N/A	0.04808
197	Fenceline	316063.8	3783851	N/A	N/A	0.040679
198	Fenceline	315972.1	3783819	N/A	N/A	0.033206
199	Fenceline	315880.3	3783786	N/A	N/A	0.028853
200	Fenceline	315788.5	3783754	N/A	N/A	0.023937
201	Fenceline	315696.8	3783721	N/A	N/A	0.021217
202	Fenceline	315586	3783772	N/A	N/A	0.020248
203	Fenceline	315567.1	3783855	N/A	N/A	0.020617
204	Fenceline	315583	3783976	N/A	N/A	0.021789
205	Fenceline	315624.4	3784081	N/A	N/A	0.023381
206	Fenceline	315638.6	3784236	N/A	N/A	0.022855
207	Fenceline	315646.1	3784322	N/A	N/A	0.021243

APPENDIX B-2

SUPPLEMENTAL AIR QUALITY AND GREENHOUSE GAS EMISSIONS EVALUATION AND HEALTH RISK SCREENING FOR THE PACIFIC ROCK QUARRY CONDITIONAL USE PERMIT MODIFICATION APPLICATION

ESA

626 Wilshire Boulevard
Suite 1100
Los Angeles, CA 90017
213.599.4300 phone
213.599.4301 fax

esassoc.com

technical memorandum

date	October 16, 2020
to	Bob Delp, Benchmark Resources
from	Alan Sako, ESA Alison Campestre, ESA
subject	Supplemental Air Quality and Greenhouse Gas Emissions Evaluation and Health Risk Screening for the Pacific Rock Quarry Conditional Use Permit Modification Application

1.0 Introduction

1.1 Project Background

Pacific Rock, Inc. ("Applicant" or "Operator") has requested a modification to the existing conditional use permit (CUP) and an amendment to the reclamation plan for the Pacific Rock Quarry ("Project"), which is located in unincorporated Ventura County between the cities of Camarillo and Thousand Oaks on portions of the Tax Assessor's Parcel Numbers 234-0-060-220 and 234-0-060-190. The term "Project site" is used herein to reference the proposed CUP area, which includes the existing mining operation and areas proposed for mine expansion and reclamation under the Project. The physical address for the Project site is 1000 South Howard Road, Camarillo, California 93012. The Project site is approximately 1.5 miles east of Lewis Road and approximately two miles south of Highway 101.

The Applicant prepared an "Air Quality, Health Risk, and Climate Change Impact Assessment" (Sespe, 2019a)[1] ("Applicant's air quality study"), which provides estimates of criteria air pollutant and greenhouse gas (GHG) emissions that would result from implementation of the Project. Environmental Science Associates (ESA), as a subconsultant to Benchmark Resources, is assisting with the preparation of the Air Quality and GHG analyses to support the Environmental Impact Report (EIR) for the County's compliance with the California Environmental Quality Act (CEQA). In this role, ESA peer reviewed the Applicant's air quality study and determined that certain Project-related emissions sources were not included in the Applicant's air quality study. To provide a complete evaluation of Project emissions, the County requested that ESA prepare supplemental criteria air pollutant and GHG emissions calculations to support the EIR's air

1 Sespe Consulting, Inc., Air Quality, Health Risk, and Climate Change Impact Assessment, Pacific Rock Quarry Expansion Project, Ventura County, California, March 29, 2019.

quality and GHG impact analyses. The County also requested that this supplemental analysis use emission factors for baseline emissions that reflect emission factors associated with the representative years (2008 to 2017) used for establishing baseline annual production for the existing operation, as discussed further in subsection 2.1, Emission Factors, below. Results from this supplemental analysis are presented here for use by the County in preparing the Draft EIR air quality and GHG impact analysis.

1.2 Purpose of this Technical Memorandum

Based on County direction as discussed above, ESA has prepared this technical memorandum to supplement the criteria air pollutant and GHG emissions calculations in the Applicant's air quality study with emissions calculations for additional Project-related sources that were not included in the Applicant's air quality study. Specifically, this supplemental assessment accounts for the following additional emission sources:

- Respirable and fine particulate matter (PM10 and PM2.5) emissions from fugitive dust resulting from increased drilling for placement of blasting materials;
- Criteria pollutant and GHG emissions resulting from the increased use of drilling equipment for placement of blasting materials;
- Criteria pollutant and GHG emissions resulting from off-site haul truck travel;
- Criteria pollutant and GHG emissions resulting from off-site worker travel;
- PM10 and PM2.5 emissions from fugitive dust for the crushing of recycle asphalt and concrete at the proposed recycle plant;
- Criteria pollutant and GHG emissions resulting from the increased use of diesel-fueled equipment for the handling of recycle asphalt and concrete at the proposed recycle plant; and
- PM10 and PM2.5 emissions from proposed fill import and placement for reclamation.

The result of ESA's analysis for the above activities shows an increase to both baseline and Project emission estimates as compared to the emissions reported in the Applicant's air quality study. A description of the calculation methodologies is provided in the next section, and a summary of the annual and daily emissions results from ESA's analysis are provided in **Tables 1** through **4**, provided following the Emissions Calculation Methodology section of this technical memorandum.

2.0 Emissions Calculation Methodology

The calculation methodologies for criteria pollutants and GHG emissions are described below for each aforementioned activity where supplementary data collection and studies were conducted by ESA. Additionally, the methodology used for establishing emission factors for calculating the baseline and Project criteria pollutants and GHG emissions from the quarrying engine, off-road haul engine and the on-road onsite haul trucks are also described below.

Methodologies and emission factors for emissions estimates are drawn from the United States Environmental Protection Agency (USEPA) Compilation of Air Pollutant Emission Factors (AP-42), the California Air Resources Board's (CARB) EMissions FACtor 2017 (EMFAC2017) model and the CARB California Emissions Estimator Model (CalEEMod) software (version 2016.3.2), and appropriate scaling of emissions estimated in the Applicant's air quality study. AP-42 was used for fugitive dust-related emissions calculations, scaled emissions based on updated vehicle miles traveled were used for off-site haul truck and worker vehicle travel-related emissions calculations, and CalEEMod was used for on-site heavy-duty diesel equipment emissions calculations. CalEEMod and EMFAC2017 were also relied upon for obtaining emission factors used in calculating emissions from the quarrying engine, off-road haul engine, and the on-road onsite haul trucks.

The supplemental emissions estimates for both the baseline conditions (i.e., emissions associated with existing operations at the site) and Project conditions were calculated for each source. The results of the supplemental emissions estimates are then combined with the emissions estimates from the Applicant's air quality study. The resulting emissions are considered appropriate for use by the County in the Draft EIR for evaluation of the Project's air quality and GHG impacts.

2.1 Emission Factors

For this analysis and based on the County's request, a weighted average emission factor was developed for the baseline sources listed below utilizing the annual tonnage mined from data reported from 2008 to 2017.[2] The CalEEMod emission factors from the year 2008 to 2017 for each equipment type were weighted by dividing a given year's reported tonnage mined by the total tonnage mined during the years 2008 and 2017. This methodology was implemented to calculate baseline emissions for the following equipment:

- Drill rig,
- Quarrying engines,
- Off-road haul from mine to processing,
- On-road onsite haul engine, and
- On-road offsite haul trucks and worker vehicles.

The emission factors used to calculate Project emissions from the above-named equipment are based on the Project operational year 2021. This approach for Project emissions is considered conservative since equipment emission factors will continue to decrease over time after 2021. Consistent with the Applicant's air quality study, the emissions from aggregate plant processing

2 The tonnage for the 2014 reporting year represents an outlier year and may be underreported. Thus, was adjusted based on the average annual tonnage of the other years, 2008 to 2013 and 2015 to 2017.

equipment are based on 2019 operational year emission factors. The emission factors used for calculating criteria pollutant and GHG emissions from the aggregate plant processing equipment are the same for both the baseline and Project years. As discussed above, emissions from the proposed recycling plant are conservatively assumed to be the same as the quarrying engines, off-road haul from mine to processing, and the aggregate plant processing. Thus, the calculated emissions for the proposed recycling plant utilize 2021 emissions factors for the quarrying engines and off-road haul from mine to processing and 2019 emission factors for calculating emissions from the aggregate plant processing equipment.

2.2 Emissions Sources

Drilling Fugitive Dust

Mining at the Project site utilizes blasting to loosen rock, which requires drilling to create borings where blasting agents are placed. Drilling into bedrock results in fugitive dust emissions, of which PM10 and PM2.5 emissions are a component. The Applicant's air quality study does not account for drilling fugitive dust emissions; therefore, an estimate of both baseline and Project fugitive dust emissions associated with drilling is provided here.

For drilling emissions estimates under baseline conditions, approximately 415 tons per day and 20,900 tons per year of material is assumed to be mined.[3] For drilling emissions estimates with the Project, an average 1,500 tons per day and 468,000 tons per year of material is assumed to be mined. The average 1,500 tons per day for the Project is based on 312 working days per year, i.e. 468,000 tons per year ÷ 312 working days per year.

The PM10 emissions are estimated for this analysis by multiplying the amount of mined material (measured in tons) by the drilling fugitive dust emission factor from USEPA AP-42, Table 11.19.2-2[4].

The emissions calculation methodology is detailed below.

$$\text{Emissions}_{\text{drilling,fugitivedust}}[\text{lbs/day or lbs/year}] = EF_{PM10} \times TQ$$

Where:

$\text{Emissions}_{\text{drilling,fugitivedust}}$	=	Fugitive dust emissions caused by drilling [lbs/day or lbs/year]
EF_{PM10}	=	Emission factor for PM10 [lbs/TQ]
TQ	=	Tons quarried [tons]

Drilling Equipment Exhaust

As discussed in the previous section, **Drilling Fugitive Dust**, drilling is required to place the blast material used in extracting the raw resource for processing. It is assumed under baseline and

3 Annual production under baseline conditions is based on the 10-year annual average reported by the Operator between 2008 and 2017.

4 USEPA AP-42, Chapter 11.9, Table 11.19.2-2, wet drilling – unfragmented stone. https://www3.epa.gov/ttn/chief/ap42/ch11/final/c11s09.pdf.

Project conditions that a diesel-powered drill rig is used, generating criteria pollutant, toxic air contaminants (TAC) (i.e., diesel particulate matter), and GHG emissions.[5] The Applicant's air quality study does not account for drilling equipment criteria pollutant and GHG emissions; therefore, an estimate of both baseline and Project emissions associated with drilling equipment is provided here.

Emissions from the drill rig are calculated based on emission factors in CalEEMod based on a weighted average of the historical annual tons quarried per year between the years of 2008 and 2017 (refer to section 2.1, Emission Factors, above for additional explanation). Under the Project, maximum daily emissions are based on equipment operating for an 8-hour workday. Baseline emissions are estimated using a scaling coefficient based on the baseline and Project tons quarried. The coefficient is a ratio of the estimated tons quarried per day in the baseline or Project divided by the tons quarried per day in the Project (i.e., 415 tons divided by 1,500 tons; refer to detailed calculations provided in Exhibit A). The coefficient is 1 for the Project and 0.277 for the baseline. Annual emissions are also based on the number of drilling days in a year, which is estimated at two days per year for primary blasts and two days per week for smaller blasts, for a total of 106 days per year. The emissions calculation methodology is detailed below.

$Emissions_{pollutant,drillrig}$[lbs/day or lbs/year] = $EF_{pollutant} \times BD \times C_{TQ}$

Where:

$Emissions_{pollutant,drillrig}$	=	Emissions caused by drill rig [lbs/year]
$EF_{pollutant}$	=	Emission factor for pollutant [lbs/day]
BD	=	Drilling days [days/year]C_{TQ}
=	Tons quarried coefficient [dimensionless, %]	

GHG emissions associated with diesel-powered drill rig operation consist of CO_2 and lesser amounts of CH_4. Like the criteria pollutant analysis, the GHG emissions were calculated based on the estimated number of blast days, the CalEEMod generated emission factors, the scaling factor as described above, and the applicable GWP factors as shown below.

Emissions [$MTCO_2e$] = $\sum_i (EF_{pollutant,drilling} \times BD \times C_{TQ} \times GWP_i)$

Where:

$MTCO_2e$	=	Metric tons of carbon dioxide equivalents from drill rig
$EF_{pollutant,drillrig}$	=	Emissions factor for pollutant [lbs/year]
BD	=	Drilling days [days/year]
C_{TQ}	=	Tons quarried coefficient [dimensionless, %]
GWP_i	=	Global warming potential [where i is $GWP_{CO2} = 1$ and $GWP_{CH4} = 25$]

5 Diesel emissions also include toxic air contaminants that relate to health risk, as discussed in the Adjusted Health Risk Assessment section of this memorandum.

On-site and Off-site Haul Truck Travel

Although the emissions analysis from off-site, on-road haul trucks was included in the Applicant's air quality study, the technical peer review of that study conducted by ESA determined that estimated travel distances on paved roads, expected number of truckloads per day and, therefore, total vehicle miles traveled (VMT) were underestimated. Furthermore, the County requested that ESA use weighted average baseline emission factors to calculate emissions from the on-site, on-road haul truck travel to more appropriately reflect the baseline operational years from 2008 through 2017 (refer to section 2.1, Emission Factors, above for additional explanation).

Haul Distance

The Applicant's air quality study assumed an average roundtrip distance of 20 miles on paved roads (10 miles inbound, 10 miles outbound) for off-site haul truck travel. ESA's review of the Applicant's air quality study recommended a longer average trip distance using the CalEEMod default 40-mile roundtrip (20 miles inbound, 20 miles outbound) as more conservative and appropriate for the County's EIR analysis of off-site haul truck trip emissions. County staff concurred with this recommendation. ESA's technical review of the Applicant's air quality study concurred with that study's use of an on-site roundtrip travel distance on unpaved roads of 0.55 miles per roundtrip. Thus, the total roundtrip travel distance used in this analysis is 40.55 miles, including 40 miles of travel on off-site paved roads and 0.55 miles of travel on on-site unpaved roads. Although the haul truck emissions from the 0.55 miles of travel on on-site unpaved roads were accounted for in the Applicant's air quality study, they have been recalculated for this supplemental analysis using a weighted emission factor (refer to section 2.1, Emission Factors, above for additional explanation). Therefore, this supplemental analysis estimates haul truck emissions associated with the 40 miles of travel on off-site paved roads and recalculates the estimated haul truck emissions associated with the 0.55 miles of travel on on-site unpaved roads.

Haul Truck Trips

The number of haul truck trips associated with baseline conditions and Project operation were considered in determining the methodology for the air quality and GHG analysis. The following sections discuss estimated daily and annual haul truck trips under baseline conditions and with Project operation.

Baseline Daily Haul Truck Trips

The existing operation is permitted to generate up to 60 loads (120 one-way truck trips) per day. Information regarding existing operations is not available to provide a detailed accounting of baseline daily trips and vehicle miles traveled for the existing operation. However, estimates of daily and annual VMT under baseline conditions can be made using information from operational records that are available.

According to Operator reporting submitted to the VCAPCD, during the period August 1, 2015 through July 31, 2016, total annual production during the period was 37,345 tons. Records indicate that the aggregate was produced over a total of 90 days during this period. Although on-site production does not necessarily directly equate to off-site transport, an assumed correlation between on-site production and off-site transport is considered sufficient for the purposes of this analysis. Based on an assumed typical average haul truck load capacity of 25 tons, the transport of 37,345 tons of aggregate requires 1,494 haul truck loads, resulting in an average of 16.6 daily haul truck loads from the site. To determine the number of trips, the number of haul truck loads is multiplied by two to account for the trip associated with the unloaded truck traveling to the site. Thus, approximately 33 daily one-way haul truck trips are assumed under baseline conditions for a typical day of operations.

Baseline Annual Haul Truck Trips

The Operator submits "Mining Operation Annual Reports" to the County and the California Department of Conservation, Division of Mine Reclamation (DMR). Based on these records, average annual production for the 10-year period between 2008 and 2017 is approximately 20,900 tons. The County has directed that the 10-year average of 20,900 tons be used as the annual production baseline for the purposes of environmental review. Applying the 25-ton haul load capacity factor, the 20,900 tons of material requires approximately 836 haul truck loads per year.

Project Daily and Annual Trips

Operations under the Project would be limited to 60 loads per day, regardless of the load type. These loads could consist of a combination of aggregate exports from the site, incoming concrete and asphalt for recycle processing, outgoing concrete and asphalt after recycle processing, and imported material for reclamation fill. The Project would allow for hauling to and from the site seven days a week, and this analysis conservatively assumes that hauling could occur at the maximum daily rate of 365 days per year, resulting in a maximum potential of 21,900 haul truck loads per year (60 truck loads per day × 365 days per year = 21,900 truck loads per year). The Applicant's air quality study estimated Project annual truckloads at 18,720, based on a maximum aggregate production of 468,000 tons per year divided by 25 tons per truck load. However, in consultation with the County, it was determined that ESA should use the higher annual truck load factor of 21,900 loads per year to sufficiently account for the Project's potential 60 loads per day 365 day per year. .

Vehicle Miles Traveled and Emission Factors

VMT is calculated both daily and annually as follows:

$VMT_{haultrucks}$ [miles/day or miles/year] = Truckloads × Distance

Where:

$VMT_{haultrucks}$	=	Heavy-duty truck miles traveled [miles/day or miles/year]
Truckloads	=	Number of roundtrip truckloads [truckloads/day or truckloads/year]
Distance	=	Roundtrip distance per truckload [miles/truckload]

Haul trucks associated with baseline conditions and Project operations generate off-site, on-road heavy-duty truck exhaust emissions of VOCs, NO_X, CO, SO_X, PM10 and PM2.5, evaporative emissions of VOCs, and fugitive dust emissions of PM10 and PM2.5 from haul trucks transporting product to and from the Project site. Heavy-duty truck emissions, with the exception of fugitive dust, were calculated by taking the total miles traveled per vehicle per day and per year and multiplying that mileage by emission factors for heavy-heavy-duty trucks (HHDT category) taken from the EMFAC2017 model. Baseline emissions were calculated using a weighted average emission factor developed based on the tonnage mined per year during the years of 2008 to 2017 ((refer to section 2.1, Emission Factors, above for additional explanation)).[6] Project emissions were calculated assuming a project operational year 2021. Total emissions per truck per trip were then summed to reach the total daily and annual criteria pollutant emissions for heavy-duty vehicles under baseline conditions and Project operations.

$Emissions_{pollutant}$ [lbs/day or lbs/year] = $VMT_{haultrucks} \times EF_{running,pollutant}$

Where:

$Emissions_{pollutant}$	=	Emissions from truck running for each pollutant [lbs/day or lbs/year]
$VMT_{haultrucks}$	=	Truck miles traveled [miles/day or miles/year]
$EF_{running,pollutant}$	=	Emission factor for running emissions [lb/mile]

The fugitive dust emissions calculations utilize emission factors derived from the information contained in USEPA AP-42, Chapter 13.2.1 for paved roads and Chapter 13.2.2 for unpaved roads. Additional details and associated assumptions of these emission factor calculations can be found in Exhibit A.

Furthermore, on-site and off-site, on-road heavy-duty trucks would generate GHG emissions of CO_2 and lesser amounts of CH_4 and N_2O from haul trucks transporting product to and from the Project site. Like the criteria pollutant analysis, the emissions from mobile sources were calculated based on the trip rates, trip lengths, the running emission factors generated from the EMFAC2017 model, and the applicable GWP factors as shown below.

Emissions [$MTCO_2e$] = $\sum_i (VMT_{haultrucks} \times EF_{running,pollutant} \times GWP_i)$

Where:

$MTCO_2e$	=	Metric tons of carbon dioxide equivalents
$VMT_{haultrucks}$	=	Truck miles traveled [miles/day or miles/year]
$EF_{running,pollutant}$	=	Emission factor for running emissions [MT/mile]
GWP_i	=	Global warming potential [where i is $GWP_{CO2} = 1$, $GWP_{CH4} = 25$, and $GWP_{N2O} = 298$]

Off-site Worker Travel

Off-site worker travel emissions were not accounted for in the Applicant's air quality study. Thus, this supplemental analysis includes emissions from off-site worker travel. The number of workers at the site under existing operations varies depending on activities occurring on any given day.

6 Since the average speed on the on-site unpaved road is unknown, ESA assumed an average speed of 15 miles per hour for an unloaded haul truck and 10 miles per hour for a loaded haul truck. Emission factors from EMFAC2017 are based on these speeds. An aggregate speed was assumed for the emission factors from EMFAC2017 for the off-site on-road haul trucks.

The Operator advised the County that on November 27, 2018 (the day traffic counts were taken associated with other studies prepared for the EIR) there were three worker trips to the site and three worker trips from the site, for a total of six one-way worker trips or three worker roundtrips on that day (the same day involved nine aggregate truck loads from the site, indicating that site operations and shipments were occurring on that day). Based on this data and coordination with the County, three workers and three worker roundtrips is considered a reasonable estimate of worker trips on a typical day of operations under baseline conditions. Assuming 90 days per year of operations under baseline conditions as discussed previously, baseline annual worker roundtrips are estimated to be 270 per year.

The Applicant advises that the Project would require up to 12 workers per day, each resulting in an assumed two one-way worker trips or one roundtrip, resulting in a total of 12 worker roundtrips per day and 4,380 worker roundtrips per year. Additional trips would periodically be required for equipment, fuel, and other supply deliveries, and maintenance. These trips are considered to represent a very small portion of the total Project-related trips. Due to the conservative approach in estimating haul truck and worker trips and trip distances in this memorandum, supply delivery trips are not separately estimated and emissions are considered to be reasonably accounted for in the Project haul truck trip emissions presented here.

For this analysis, it is assumed that the average work trip distance would be 20 miles, resulting in an average worker roundtrip distance of 40 miles.

$VMT_{workers}$ [miles/day or miles/year] = $RoundTrips_{workers} \times Distance_{roundtrip}$

Where:

VMT_{worker}	=	Light-duty worker miles traveled [miles/day or miles/year]
$RoundTrips_{workers}$	=	Number of worker round trips [trips/day or trips/year]
$Distance_{roundtrip}$	=	Roundtrip distance per worker [miles/trip]

Work trips associated with baseline conditions and Project operations generate off-site, on-road light-duty vehicle exhaust emissions of VOCs, NO_X, CO, SO_X, PM10 and PM2.5, evaporative emissions of VOCs, and fugitive dust emissions of PM10 and PM2.5 from workers traveling to and from the site. All miles are assumed to be traveled on paved roads. Light-duty worker vehicle emissions were calculated by taking the total miles traveled per vehicle per day and per year and multiplying that mileage by emission factors for light-duty vehicles (LDA, LDT1, and LDT2 categories) taken from CARB EMFAC2017 model. Baseline emissions were calculated using a weighted average emission factor developed based on the tonnage mined per year during the years of 2008 to 2017 ((refer to section 2.1, Emission Factors, above for additional explanation)). Project emissions were calculated assuming a project operational year 2021. Total emissions per vehicle per trip were then summed to reach the total daily and annual criteria pollutant emissions for light-duty vehicles.

$Emissions_{pollutant}$ [lb/day or lbs/year] = $VMT_{workers} \times EF_{running,pollutant}$

Where:

$Emissions_{pollutant}$	=	Emissions from worker vehicle running for each pollutant [lbs/day or lbs/year]
$VMT_{workers}$	=	Light-duty worker miles traveled [miles/day or miles/year]
$EF_{running,pollutant}$	=	Emission factor for running emissions [lb/mile]

Furthermore, off-site, on-road light-duty vehicles generate GHG emissions of CO_2 and lesser amounts of CH_4 and N_2O from workers traveling to and from the location. Like the criteria pollutant analysis, the emissions from mobile sources were calculated based on the trip rates, trip lengths, the running emission factors generated from the EMFAC2017 model, and the applicable GWP factors as follows.

$$\text{Emissions } [MTCO_2e] = \textstyle\sum_i (VMT_{workers} \times EF_{running,pollutant} \times GWP_i)$$

Where:

$MTCO_2e$	=	Metric tons of carbon dioxide equivalents
$VMT_{workers}$	=	Light-duty worker miles traveled [miles/day or miles/year]
$EF_{running,pollutant}$	=	Emission factor for running emissions [MT/mile]
GWP_i	=	Global warming potential [where *i* is $GWP_{CO2} = 1$, $GWP_{CH4} = 25$, and $GWP_{N2O} = 298$]

Proposed Recycle Plant Fugitive Dust

Operation of the proposed recycle plant would generate fugitive dust emissions, including PM10 and PM2.5, from aggregate crushing. The Applicant's air quality study did not include emissions associated with the proposed recycle plant; therefore, emissions for this Project component are included in this supplemental analysis. As noted previously, all other emissions from equipment at the proposed recycle plant would be permitted by VCAPCD, and thus, pursuant to VCAPCD direction, these factors do not need to be accounted for in the daily emissions towards the significance thresholds. The PM10 and PM2.5 emissions were based on the tons of aggregate processed and the USEPA AP-42, Table 11.19.2-4[7] emission factors for pulverized mineral processing operations.

$$Emissions_{pollutant}[\text{lbs/day or lbs/year}] = EF_{pollutant} \times TP$$

Where:

$Emissions_{pollutant}$	=	Fugitive dust emissions from processing aggregate [lbs/day or lbs/year]
$EF_{pollutant}$	=	Emission factor pulverized mineral processing operations [lb/ton]
TP	=	Tons of aggregate processed [tons/day or tons/year]

7 USEPA AP-42, Chapter 11.19.2, Table 11.19.2-4, Product Storage with Fabric Filter Control. https://www3.epa.gov/ttnchie1/ap42/ch11/final/c11s1902.pdf.

Proposed Recycle Plant Equipment Exhaust

Detailed information regarding the engine size of the proposed Recycle Plant Aggregate Crushing Equipment is not known. According to the technical memorandum, "Response to Comments – Air Quality, Health Risk and Climate Change Impact Assessment" (Sespe 2019b),[8] which was prepared to address County comments on the Applicant's air quality study, recycle plants are generally smaller and process at a slower rate than aggregates plants. Under the proposed Project, up to 30,000 cubic yards per year of concrete and asphalt debris would be received, crushed, and sold as base material, which would be substantially less volume than the Project's permitted annual production of 468,000 tons per year. Therefore, the assumption of a generally smaller recycling plant with a reduced processing rate as compared to the aggregates plant is reasonable. For the purposes of this supplement assessment, and as a conservative assumption, the proposed Recycle Plant Aggregate Crushing Equipment is assumed to be the same as those of the aggregate plant, quarrying engines, loading equipment, and off-road haul from mine to processing area, as documented in the Applicant's air quality study.

Reclamation Fill Import and Placement Fugitive Dust

The proposed Project would allow approximately 150,000 tons per year of fill to be imported for reclamation purposes. PM10 and PM2.5 emissions from fill import and placement were not estimated or included in the Applicant's air quality study; therefore, emissions for this Project component are included in this supplemental analysis.

For the purposes of this analysis, imported fill material is assumed to be handled twice once brought on site (allowing for initial placement to stockpile material when brought on site with subsequent relocation for final placement), which results in a total of 300,000 tons of material managed annually. Tons of fill material managed daily was based on the 60 truckload per day limit in the existing CUP and an assumed 25 tons per truckload, thus up to 1,500 tons of imported fill is assumed as a daily maximum. Emissions from fill import and placement were calculated based on tons of material managed and calculated emission factors utilizing methodology from USEPA AP-42, Chapter 13.2.4[9].

$\text{Emissions}_{\text{pollutant}}$[lbs/day or lbs/year] = $\text{EF}_{\text{pollutant}} \times \text{FM} \times \text{H}$

Where:

$\text{Emissions}_{\text{pollutant}}$	=	Fugitive dust emissions from placing fill [lbs/day or lbs/year]
$\text{EF}_{\text{pollutant}}$	=	Soil handling emission factor [lbs/ton soil]
FM	=	Fill material managed [tons/day or tons/year]
H	=	Number of times material handled [dimensionless]

And, $\text{EF}_{\text{pollutant}} = [\ k_{\text{pollutant}}\ (0.0032)\ [\ (U/5)^{1.3} / (M/2)^{1.4}]]$

Where:

8 Sespe Consulting, Inc., Response to Comments – Air Quality, Health Risk and Climate Change Impact Assessment CUP Modification Application for the Pacific Rock Quarry in Ventura County, CA, August 15, 2019.

9 USEPA AP-42, Chapter 13.2.4, Section 3 (2006). https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0204.pdf.

$k_{pollutant}$	=	Particle size multiplier [dimensionless factor]
U	=	mean wind speed [mph][10]
M	=	Moisture content [%][11]

3.0 Supplemental Emissions Results

Annual and daily criteria pollutant emissions associated with the supplemental analysis for the operational components discussed above are shown in **Table 1**, *Supplemental Annual Criteria Pollutant and Greenhouse Gas Emissions by Source*, and **Table 2**, *Supplemental Daily Criteria Pollutant Emissions by Source*, below. Detailed emissions calculations are provided in **Exhibit A** of this technical memorandum.

[10] Based on atmospheric dispersion modeling system, AERMOD, meteorological data, converted from 5.06 knots.

[11] Based on USEPA AP-42, Table 13.2.4-1, cover moisture content. https://www3.epa.gov/ttn/chief/ap42/ch13/final/c13s0204.pdf.

TABLE 1
SUPPLEMENTAL ANNUAL CRITERIA POLLUTANT AND GREENHOUSE GAS EMISSIONS BY SOURCE

Pollutant	ROG (tons/year)	NO_X (tons/year)	CO (tons/year)	SO_2 (tons/year)	PM10 (tons/year)	PM2.5 (tons/year)	$MTCO_2e$ (MT/year)
Baseline							
Drilling Fugitive Dust	--	--	--	--	0.001	<0.001	--
Drill Rig	0.007	0.034	0.108	<0.001	0.003	0.003	13.44
Off-site Haul Truck Travel	0.025	0.419	0.115	0.001	0.037	0.019	63.60
Off-site Worker Travel	0.003	0.004	0.032	<0.001	0.007	0.002	4.18
Recycle Plant Fugitive Dust	--	--	--	--	--	--	--
Recycle Plant Equipment	--	--	--	--	--	--	--
Reclamation Fill Handling	--	--	--	--	--	--	--
Project							
Drilling Fugitive Dust	--	--	--	--	0.019	0.002	--
Drill Rig	0.014	0.161	0.110	0.001	0.005	0.004	44.43
Off-site Haul Truck Travel	0.140	4.423	1.146	0.014	0.691	0.220	1,445.41
Off-site Worker Travel	0.026	0.020	0.233	0.001	0.118	0.030	55.39
Recycle Plant Fugitive Dust	--	--	--	--	0.040	0.005	--
Recycle Plant Equipment	0.220	2.209	1.446	0.005	0.086	0.079	394.26
Reclamation Fill Handling	--	--	--	--	0.017	0.003	--

Source: ESA, 2020.

TABLE 2
SUPPLEMENTAL DAILY CRITERIA POLLUTANT EMISSIONS BY SOURCE

Pollutant	ROG (lbs/day)	NO_X (lbs/day)	CO (lbs/day)	SO_2 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Baseline						
Drilling Fugitive Dust	--	--	--	--	0.03	<0.01
Drill Rig	0.45	2.31	7.38	0.01	0.22	0.20
Off-site Haul Truck Travel	0.99	16.65	4.55	0.02	1.48	0.75
Off-site Worker Travel	0.08	0.08	0.71	<0.01	0.16	0.04
Recycle Plant Fugitive Dust	--	--	--	--	--	--
Recycle Plant Equipment	--	--	--	--	--	--
Reclamation Fill Handling	--	--	--	--	--	--
Project						
Drilling Fugitive Dust	--	--	--	--	0.12	0.02
Drill Rig	0.26	3.04	2.08	0.01	0.09	0.08
Off-site Haul Truck Travel	0.77	24.24	6.28	0.08	3.79	1.20
Off-site Worker Travel	0.14	0.11	1.27	<0.01	0.65	0.17
Recycle Plant Fugitive Dust	--	--	--	--	2.38	0.31
Recycle Plant Equipment	1.41	14.16	9.27	0.03	0.55	0.51
Reclamation Fill Handling	--	--	--	--	0.33	0.05

Source: ESA, 2020.

4.0 Total Baseline and Project Emissions

The total baseline and Project emissions include the annual and daily criteria pollutant emissions from ESA's supplemental analysis discussed above, as well as baseline and Project emissions from all other sources estimated in the Applicant's air quality study, which include criteria pollutant, toxic air contaminants, and GHG emissions from: Quarrying Fugitive Dust; On-Site Off-Road Haul – Mine to Processing Area (Fugitive Dust); Processing Area Drop/Storage;

Plant/Aggregate Processing; Loadout Processing Area Drop/Storage; and On-Site On-road Haul (Fugitive Dust).

Baseline annual emissions for those sources listed above are derived by multiplying the baseline maximum hour emissions, which are based on a production of 500 tons, by a factor of 41.8 to reflect baseline annual production of 20,900 tons (500 tons per hour x 41.8 hours per year = 20,900 tons per year) and converting from pounds to tons (pounds / 2,000 = tons).

Baseline daily emissions for those sources listed above are derived by multiplying the baseline maximum hour emissions, which are based on a production of 500 tons, by a factor of 0.83 to reflect baseline daily production of 415 tons (500 tons per hour x 0.83 hours per day = 415 tons per day). Daily emissions are reported in units of pounds per day; therefore, no unit conversion is necessary.

Project annual emissions for the aggregate plant processing equipment and fugitive dust emissions from quarrying, off-road hauling from mine to processing, processing area drop and storage, load out processing area drop and storage are derived by multiplying the baseline maximum hour production of 500 tons by a factor of 936 to reflect Project annual production of 468,000 tons (500 tons per hour x 936 hours per year = 468,000 tons per year) and converting from pounds to tons (pounds / 2,000 = tons).

Project daily emissions for the aggregate plant processing equipment and fugitive dust emissions from quarrying, off-road hauling from mine to processing, processing area drop and storage, load out processing area drop and storage are derived by multiplying the baseline maximum hour production of 500 tons by a factor of 3 to reflect Project daily production of 1,500 tons (500 tons per hour x 3 hours per day = 1,500 tons per day). Daily emissions are reported in units of pounds per day; therefore, no unit conversion is necessary.

Total annual and daily criteria pollutant emissions associated with baseline operations and the Project are shown in **Table 3**, *Total Annual Criteria Pollutant and Greenhouse Gas Emissions by Source*, and **Table 4**, *Total Daily Criteria Pollutant and Greenhouse Gas Emissions by Source*, below. These tables utilize the emissions estimates from the Applicant's air quality study, as adjusted to match the appropriate baseline and Project production levels, and incorporate the supplemental emissions estimates provided in this memorandum (as summarized in Tables 1 and 2, above).

TABLE 3
TOTAL ANNUAL CRITERIA POLLUTANT AND GREENHOUSE GAS EMISSIONS BY SOURCE

Pollutant	ROG (tons/year)	NO_X (tons/year)	CO (tons/year)	SO_2 (tons/year)	PM10 (tons/year)	PM2.5 (tons/year)	$MTCO_2e$ (MT/year)
Baseline							
Quarrying Fugitive Emissions	--	--	--	--	0.110	0.032	--
Quarrying Engine Emissions	0.005	0.071	0.032	<0.001	0.003	0.002	7.42
Off-Road Haul - Mine to Processing Area (Fugitive)	--	--	--	--	0.175	0.037	--
Off-Road Haul - Mine to Processing Area (Engine)	0.006	0.068	0.030	<0.001	0.003	0.002	6.64
Plant/Aggregate Processing	0.003	0.037	0.022	<0.001	0.002	0.001	4.84
Processing Area Drop/Storage	--	--	--	--	0.065	0.019	--
Loadout Processing Area Drop/Storage	--	--	--	--	0.008	0.002	--
On-road On-site Haul Engine Emissions	0.001	0.012	0.003	<0.001	<0.001	<0.001	2.27
On-road On-site Haul Fugitive Emissions	--	--	--	--	0.322	0.068	--
Drilling Fugitive Dust	--	--	--	--	0.001	<0.001	--
Drill Rig	0.007	0.034	0.108	<0.001	0.003	0.003	13.44
Off-site Haul Truck Travel	0.025	0.419	0.115	0.001	0.037	0.019	63.60
Off-site Worker Travel	0.003	0.004	0.032	<0.001	0.007	0.002	4.18
Recycle Plant Fugitive Dust	--	--	--	--	--	--	--
Recycle Plant Equipment	--	--	--	--	--	--	--
Reclamation Fill Handling	--	--	--	--	--	--	--
Baseline Total Emissions	***0.050***	***0.645***	***0.342***	***0.001***	***0.736***	***0.187***	***102.39***
Project							
Quarrying Fugitive Emissions	--	--	--	--	2.457	0.716	--
Quarrying Engine Emissions	0.072	0.770	0.528	0.002	0.029	0.027	51.03
Off-Road Haul - Mine to Processing Area (Fugitive)	--	--	--	--	3.927	0.833	--
Off-Road Haul - Mine to Processing Area (Engine)	0.124	1.081	0.740	0.003	0.040	0.037	135.63
Plant/Aggregate Processing	0.078	0.830	0.501	0.001	0.035	0.032	108.41
Processing Area Drop/Storage	--	--	--	--	1.446	0.421	‘--
Loadout Processing Area Drop/Storage	--	--	--	--	0.183	0.051	‘--
On-road On-site Haul Engine Emissions	0.007	0.157	0.097	<0.001	0.001	0.001	47.57
On-road On-site Haul Fugitive Emissions	--	--	--	--	8.422	1.786	‘--
Drilling Fugitive Dust	--	--	--	--	0.019	0.002	--
Drill Rig	0.014	0.161	0.110	0.001	0.005	0.004	44.43
Off-site Haul Truck Travel	0.140	4.423	1.146	0.014	0.691	0.220	1,445.41
Off-site Worker Travel	0.026	0.020	0.233	0.001	0.118	0.030	55.39
Recycle Plant Fugitive Dust	--	--	--	--	0.040	0.005	--
Recycle Plant Equipment	0.220	2.209	1.446	0.005	0.086	0.079	394.26
Reclamation Fill Handling	--	--	--	--	0.017	0.003	--
Project Total Emissions	***0.681***	***9.651***	***4.801***	***0.027***	***17.516***	***4.247***	***2,282.13***
Net Emissions Increase	**0.631**	**9.006**	**4.459**	**0.026**	**16.780**	**4.060**	**2,179.74**

Source: Sespe, 2019a; ESA, 2020.

TABLE 4
TOTAL DAILY CRITERIA POLLUTANT EMISSIONS BY SOURCE

Pollutant	ROG (lbs/day)	NO_X (lbs/day)	CO (lbs/day)	SO_2 (lbs/day)	PM10 (lbs/day)	PM2.5 (lbs/day)
Baseline						
Quarrying Fugitive Emissions	--	--	--	--	4.36	1.27
Quarrying Engine Emissions	0.20	2.84	1.29	<0.01	0.10	0.09
Off-Road Haul - Mine to Processing Area (Fugitive)	-	--	--	--	6.96	1.48
Off-Road Haul - Mine to Processing Area (Engine)	0.23	2.70	1.17	<0.01	0.10	0.10
Plant/Aggregate Processing	0.14	1.47	0.89	<0.01	0.06	0.06
Processing Area Drop/Storage	--	--	--	--	2.56	0.75
Loadout Processing Area Drop/Storage	--	--	--	--	0.32	0.09
On-road On-site Haul Engine Emissions	0.05	0.47	0.13	<0.01	0.01	0.01
On-road On-site Haul Fugitive Emissions	--	--	--	--	12.77	2.71
Drilling Fugitive Dust	--	--	--	--	0.03	<0.01
Drill Rig	0.45	2.31	7.38	0.01	0.22	0.20
Off-site Haul Truck Travel	0.99	16.65	4.55	0.02	1.48	0.75
Off-site Worker Travel	0.08	0.08	0.71	<0.01	0.16	0.04
Recycle Plant Fugitive Dust	--	--	--	--	--	--
Recycle Plant Equipment	--	--	--	--	--	--
Reclamation Fill Handling	--	--	--	--	--	--
Total Emissions	***2.14***	***26.52***	***16.12***	***0.03***	***29.13***	***7.55***
Project						
Quarrying Fugitive Emissions	--	--	--	--	15.75	4.59
Quarrying Engine Emissions	0.46	4.93	3.38	0.01	0.18	0.17
Off-Road Haul - Mine to Processing Area (Fugitive)	-	-	-	-	25.17	5.34
Off-Road Haul - Mine to Processing Area (Engine)	0.45	3.91	2.68	0.01	0.14	0.13
Plant/Aggregate Processing	0.50	5.32	3.21	0.01	0.22	0.20
Processing Area Drop/Storage	--	--	--	--	9.27	2.70
Loadout Processing Area Drop/Storage	--	--	--	--	1.17	0.33
On-road On-site Haul Engine Emissions	0.04	0.86	0.53	<0.01	<0.01	<0.01
On-road On-site Haul Fugitive Emissions	--	--	--	--	46.15	9.78
Drilling Fugitive Dust	--	--	--	--	0.32	0.04
Drill Rig	0.26	3.04	2.08	0.01	0.09	0.08
Off-site Haul Truck Travel	0.77	24.24	6.28	0.08	3.79	1.20
Off-site Worker Travel	0.14	0.11	1.27	<0.01	0.65	0.17
Recycle Plant Fugitive Dust	--	--	--	--	2.38	0.31
Recycle Plant Equipment	1.41	14.16	9.27	0.03	0.55	0.51
Reclamation Fill Handling	--	--	--	--	0.33	0.05
Total Emissions	***4.03***	***56.57***	***28.70***	***0.15***	***106.16***	***25.60***
Net Emissions Increase	**1.89**	**30.05**	**12.58**	**0.12**	**77.03**	**18.05**

Source: Sespe, 2019a; ESA, 2020.

5.0 Adjusted Health Risk Assessment

The Applicant's air quality study includes a health risk assessment (HRA) that evaluates the anticipated health risk associated with air pollutant emissions as estimated in that study. As discussed above, this memorandum provides supplemental emissions estimates which concludes that the Project would result in a greater difference between baseline emissions and Project emissions than that reported in the Applicant's air quality study. Therefore, it is necessary to consider whether the adjusted emissions would be expected to substantially change the health risk conclusions in the Applicant's air quality study and its HRA.

The Applicant's HRA was performed in accordance with the revised OEHHA "Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments" (OEHHA, 2015). The analysis incorporated the Project's estimated TAC emissions and dispersion modeling using the USEPA AERMOD model with meteorological data from the Camarillo Airport (Meteorological Station ID 23136). The Applicant's HRA assumed all Project toxic air contaminant emissions would be net new emissions and did not subtract the baseline toxic air contaminant emissions in the HRA. Therefore, the Applicant's HRA is conservative and overestimates the incremental increase in health risks from the Project. **Table 5**, *Applicant's Air Quality Study HRA Results* presents that study's conclusions that the Project would not exceed the significance thresholds at the nearest sensitive uses.

TABLE 5
APPLICANT'S AIR QUALITY STUDY HRA RESULTS

Model Receptor No. – Type – Location	Excess Cancer Cases per One Million People Exposed	Maximum Chronic Hazard Index	Maximum Acute Hazard Index
136 – MEIR (Cancer, Chronic) – North of Project	1.0	0.024	< 0.010
109 – MEIR (Acute) – East of Project	0.33	0.006	< 0.010
103 – MEIW (Cancer, Chronic, Acute) – Funeral Home	1.4	0.260	0.021
194 – PMI – Project Boundary (UTM 316339, 3783949)	N/A	N/A	0.079
Significance Threshold	**10**	**1.0**	**1.0**
Exceeds Significance Threshold?	**No**	**No**	**No**

Source: Sespe, 2019a

Diesel particulate matter (DPM) emissions are a primary influence on health risk and DPM emissions highly correlate with exhaust PM2.5 emissions.[12] Therefore, for the purposes of this supplemental analysis, an initial screening assessment was performed to consider whether emission estimates as updated by this supplemental analysis would have the potential to substantially affect the conclusions of the Applicant's HRA. This screening assessment considers the difference between the annual PM2.5 emissions of the Applicant's air quality study and the updated annual PM2.5 emissions and correlates that change to a similar change in health risk.

The Applicant's air quality study estimated the Project's maximum annual emissions of PM2.5 at 3.73 tons per year (Sespe, 2019a: Table 7). Based on the supplemental calculations provided herein, the Project's adjusted maximum annual emissions of PM2.5 is 4.247 tons per year, as shown in Table 3 above. However, a portion of the Project's adjusted maximum annual emissions of PM2.5 are attributable to off-site haul truck and off-site worker vehicle travel, which contributes approximately 0.250 tons per year to the Project's adjusted maximum annual emissions of PM2.5. The overwhelming majority of the off-site haul truck and worker vehicle travel emissions would occur on regional roadways away from the Project site. As discussed above, off-site haul trucks and worker vehicles are assumed to travel an average of 40 miles per roundtrip (20 miles inbound, 20 miles outbound). Emissions beyond approximately 0.25 mile

[12] South Coast Air Quality Management District, Updated CEIDARS Table with PM2.5 Fractions.

from the Project site would not substantially influence concentrations of toxic air contaminants in the area near the Project site or at sensitive receptor locations in the vicinity of the Project site. As a conservative assumption, it is assumed 5% (equivalent to 2 miles of travel, or 1 mile for an inbound trip and 1 mile for an outbound trip) of the off-site haul truck and worker vehicle emissions are considered in the adjusted health risk assessment. Therefore, the Project's adjusted maximum annual emissions of PM2.5 considered for the adjusted health risk assessment screening is 4.010 tons per year, which represents an increase of 0.280 tons per year, or an increase of approximately 7.5%, as compared to PM2.5 emissions estimates in the Applicant's air quality study.

Table 6, *Adjusted Health Risk Assessment*, presents the results of applying a 7.5% increase to the health risk assessment results from the Applicant's HRA. As shown in the table, the 7.5% increase continues to result in increased health risk levels well below the significance thresholds. It is noted that HRA modeling based on the updated emissions would be expected to result in projected risk levels that vary slightly from those estimated through the screening approach used here. However, it is reasonably expected that updated modeling would result in the same impact determination as shown in Table 6 and would not indicate an increased health risk that would exceed the significance thresholds. Thus, the conclusions presented here are considered sufficient for the County's CEQA review of the Project.

TABLE 6
ADJUSTED HEALTH RISK ASSESSMENT

Model Receptor No. – Type – Location	Excess Cancer Cases per One Million People Exposed	Maximum Chronic Hazard Index	Maximum Acute Hazard Index
136 – MEIR (Cancer, Chronic) – North of Project	1.08	0.026	0.011
109 – MEIR (Acute) – East of Project	0.35	0.006	0.011
103 – MEIW (Cancer, Chronic, Acute) – Funeral Home	1.51	0.280	0.023
194 – PMI – Project Boundary (UTM 316339, 3783949)	N/A	N/A	0.085
Significance Threshold	**10**	**1.0**	**1.0**
Exceeds Significance Threshold?	**No**	**No**	**No**

Source: Derived by multiplying the health risk assessment results provided in the "Air Quality, Health Risk, and Climate Change Impact Assessment" (Sespe, 2019a) and scaled to account for the Project's adjusted total annual emissions estimates as presented in Table 3. Scaling is based on PM2.5 emissions, which are highly correlated to diesel particulate matter emissions, the primary driver of health risk impacts.