

**Hanson Aggregates
Pacific Southwest**

**9229 Harris Plant Road
San Diego, CA 92145**

**SDAPCD
Emission ID 77**

October 2022

Prepared by:



Office Locations:
Los Angeles, Orange County,
Riverside, Ventura, San Diego, Fresno, Merced,
Bakersfield, Berkeley, San Francisco

Tel: (949) 248-8490
Fax: (949) 248-8499

Copyright ©2022, Yorke Engineering, LLC

**Risk Reduction Audit and Plan
for Reporting Year 2017**

Hanson Aggregates Pacific Southwest Risk Reduction Audit and Plan for Facility Reporting Year 2017

Prepared for:

**Hanson Aggregates Pacific Southwest
9229 Harris Plant Road
San Diego, CA 92145**

SDAPCD Emission ID 77

October 2022

Table of Contents

1.0	INTRODUCTION	1
1.1	Facility Information.....	1
1.2	Permit Action.....	2
2.0	RISK REDUCTION	3
2.1	Risk Reduction Evaluation.....	3
2.1.1	<i>SDAPCD HRA Results – Chronic Worker Health Hazard Index</i>	<i>3</i>
2.2	Risk Reduction Measures.....	7
2.3	Emissions with Selected Risk Reduction Measures	7
2.4	HRA Results with Risk Reduction Measures	10
2.4.1	<i>Risk Reduction HRA Results – Chronic Worker Health Hazard Index.....</i>	<i>10</i>
2.5	Risk Reduction Schedule	13

List of Figures

Figure 2-1: SDAPCD HRA Road Source Locations	6
Figure 2-2: RRP HRA Road Source Locations	9
Figure 2-3: Risk Reduction Chronic Worker HHI Isopleth and Locations of PMI and MEIW ...	11

List of Tables

Table 1-1: Plan Contacts	2
Table 2-1: SDAPCD Chronic HHI Results Per Source from All Pollutants Targeting the Respiratory System at MEIW	4
Table 2-2: SDAPCD Chronic HHI Results Per Pollutant from All Sources at MEIW	5
Table 2-3: Road Source Groups in AERMOD	8
Table 2-4: Risk Reduction Chronic HHI Results Per Source from All Pollutants Targeting the Respiratory System at MEIW	12
Table 2-5: Risk Reduction Chronic HHI Results Per Pollutant from All Sources at MEIW	13

Table of Appendices

APPENDIX A – GENERAL PERMIT APPLICATION

APPENDIX B – HAUL ROAD EMISSIONS

APPENDIX C – HEALTH RISK ASSESSMENT RESULTS

List of Acronyms and Abbreviations

AB	Assembly Bill
HARP2	Hotspots Analysis and Reporting Program, Version 2
HHI	Health Hazard Index
HRA	Health Risk Assessment
MEIW	Maximally Exposed Individual Worker
PMI	Point of Maximum Impact
OEHHA	Office of Environmental Health Hazard Assessment
SDAPCD	San Diego County Air Pollution Control District
TAC	Toxic Air Contaminant
UTM	Universal Transverse Mercator

Hanson Aggregates Pacific Southwest Risk Reduction Audit and Plan for Reporting Year 2017

1.0 INTRODUCTION

Hanson Aggregates Pacific Southwest LLC (Hanson) operated the Miramar Hanson Aggregates Ready Mix (Ready Mix) facility located at 9229 Harris Plant Road in San Diego, CA during 2017. The facility is regulated by the California Air Toxics “Hot Spots” Program under Assembly Bill 2588 (AB 2588), which is administered by the San Diego County Air Pollution Control District (SDAPCD). As part of this program, a Health Risk Assessment (HRA) based on 2017 facility emissions was conducted by Yorke Engineering, LLC (Yorke) and subsequently revised by the SDAPCD. The HRA modeling predicted that the non-cancer chronic worker Health Hazard Index (HHI) exceeded the SDAPCD Rule 1210 risk reduction level of 1.0.

In accordance with SDAPCD Rule 1210 (effective November 4, 2021), Yorke has prepared this risk reduction audit and plan on behalf of Hanson. The plan outlines the procedures Hanson will use to reduce facility risks below the risk reduction levels applicable to the 2017 HRA.

1.1 Facility Information

The production of ready-mix concrete at the Miramar Hanson facility contributes to the economy of San Diego by providing an essential construction material to the area.

The SDAPCD permitting site ID for Hanson is APCD1981-SITE-00105, and the emissions inventory facility ID is 77. The facility address is:

9229 Harris Plant Road
San Diego, CA 92145

The facility’s equipment includes:

- Concrete Batch Plant, Fly Ash and Cement Silos, and Baghouse (Permit ID 004081);
- Diesel Engine(s) (Permit ID 002336);
- Four Screeners (Permit IDs 002462, 978623, and 002337);
- Two Crushers (Permit ID 002337)
- Aggregate Storage Pile (Permit ID 002337); and
- Paved and Unpaved Haul Roads (Permit IDs 002337 and 004081).

All sources at the facility typically operate 10 hours per day, 6 days per week.

The team responsible for preparation and implementation of the risk reduction audit and plan are listed in Table 1-1.

Table 1-1: Plan Contacts

Erika Guerra		Julie Mitchell
Hanson Aggregates Pacific Southwest LLC		Yorke Engineering, LLC
Address:	9229 Harris Plant Road San Diego, CA 92145	2356 Moore Street, Suite 206 San Diego, CA, 92110
Phone:	(925) 365-0004	(619) 375-9142
E-mail:	Erika.Guerra@martinmarietta.com	JMitchell@YorkeEngr.com

1.2 Permit Action

The permit application accompanying this plan is only for risk reduction actions as required per Rule 1210. The General Permit or Registration Application Form is provided in Appendix A, along with the SDAPCD application fee estimate.

2.0 RISK REDUCTION

2.1 Risk Reduction Evaluation

The HRA conducted by the SDAPCD predicted that the non-cancer chronic worker HHI exceeded the Rule 1210 risk reduction threshold of 1.0 at four off-site worker facilities.

This risk evaluation examines the sources and pollutants that cause a significant portion of the chronic worker risk at the Maximally Exposed Individual Worker (MEIW) and other off-site worker locations and assesses potential reduction measures.

2.1.1 SDAPCD HRA Results – Chronic Worker Health Hazard Index

The chronic worker HHI was calculated based on period (annual) concentrations using the annual emission rates from all sources. Figure 2-1 shows the locations of the roads modeled in the SDAPCD HRA.

The chronic HHI at the Maximally Exposed Individual Worker (MEIW), receptor 2, was mainly due to arsenic (50%) and silica (48%) targeting the respiratory system. The primary sources were the unpaved haul roads accounting for 84% of the risk, as shown in Tables 2-1 and 2-2. The source/pollutant profile is very similar for the other receptors above the risk reduction threshold.

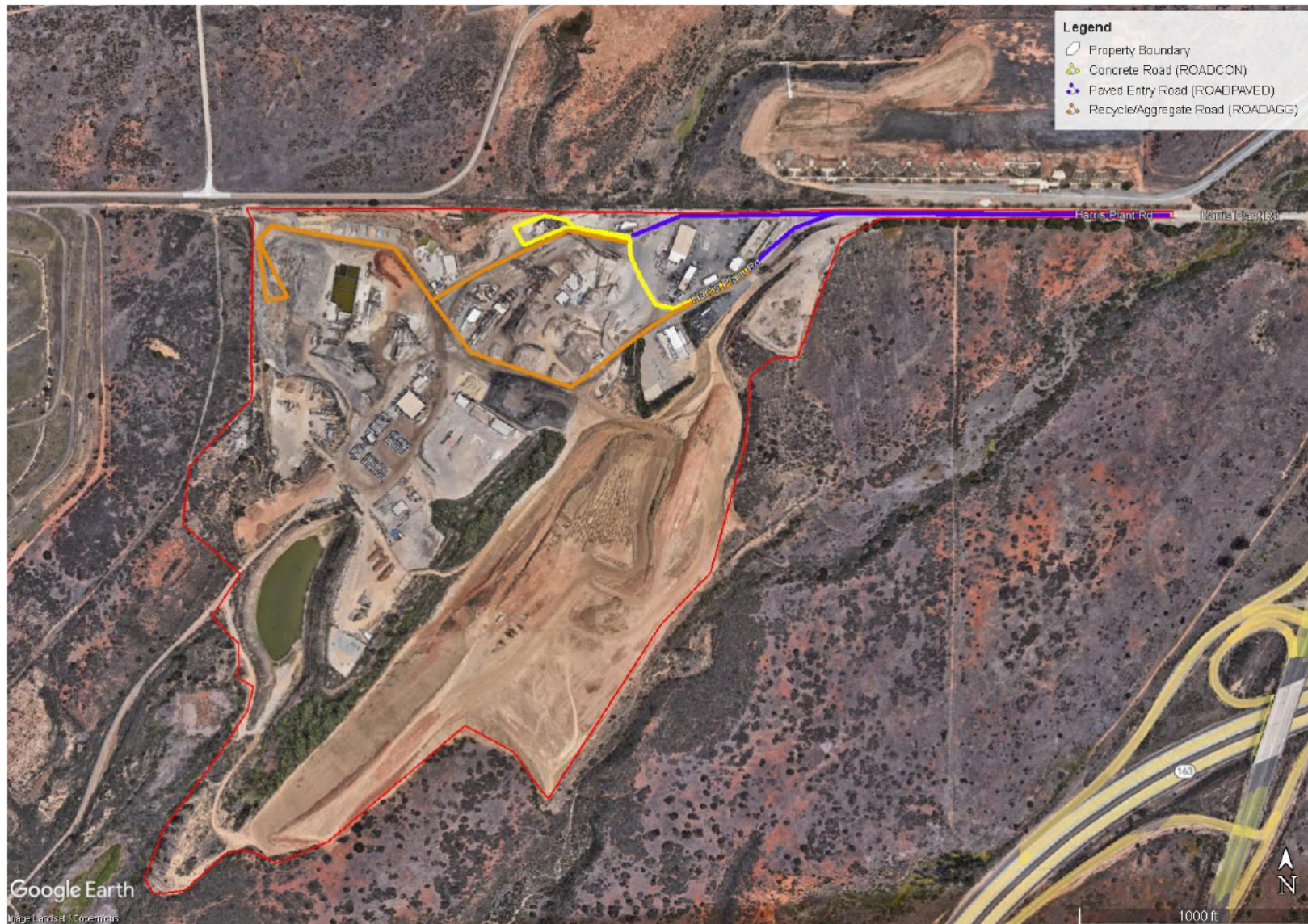
Table 2-1: SDAPCD Chronic HHI Results Per Source from All Pollutants Targeting the Respiratory System at MEIW

HARP Sources	Description	Source Group	Maximally Exposed Individual Worker (MEIW)	
			Chronic Hazard Index	Contribution (%)
ALL	-	-	2.58E+00	100%
2337-9	Unpaved Export	Recycle/Aggregate Unpaved Road	7.27E-01	28.17%
2337-8	Unpaved Import Recycle Material		9.00E-01	34.88%
4081-2c	Unpaved Import Sand and Aggregate		5.54E-02	2.15%
4081-2a	Unpaved Import Cement	Concrete Plant Unpaved Road	6.59E-02	2.56%
4081-2b	Unpaved Import Fly Ash		9.31E-03	0.36%
4081-4	Unpaved Export Concrete		4.08E-01	15.81%
2337-4	Jaw Crusher	Recycle/Aggregate Plant	1.65E-02	0.64%
2337-5	Impact Crusher		1.65E-02	0.64%
2337-6	Screen		6.85E-02	2.66%
2337-7	Magnetic Separator		1.22E-01	4.72%
2462-2462	Double Deck Screen		3.19E-03	0.12%
978623-978623	Portable Screen		1.94E-03	0.08%
2337-3	Aggregate Plant Open Storage	Recycle/Aggregate Storage Pile	1.31E-01	5.06%
4081-6a	Paved Import Cement	Paved Entry Road	4.54E-03	0.18%
4081-6b	Paved Import Fly Ash		6.41E-04	0.02%
4081-6c	Paved Import Sand and Aggregate		7.98E-04	0.03%
4081-7	Paved Export Concrete		3.18E-02	1.23%
2337-10	Paved Import Recycle		1.71E-02	0.66%
4081-1	3 Cement Silos	Concrete Batch Plant	8.80E-06	0.00%
4081-4081	Concrete Production		0.00E+00	0.00%
4081-5	Fly Ash Silo		0.00E+00	0.00%
2336-2336	Diesel Engines	Engines	8.27E-04	0.03%

Table 2-2: SDAPCD Chronic HHI Results Per Pollutant from All Sources at MEIW

Pollutant	CAS No.	Target Organs											
		Alimentary	Bone	Cardiovascular	Central Nervous	Endocrine	Eye	Hematologic	Immune	Kidney	Reproductive/ Development	Respiratory	Skin
Arsenic	7440382	0	0	1.2787	1.2787	0	0	0	0	0	1.2787	1.2787	1.279
Silica, Crystalline	1175	0	0	0	0	0	0	0	0	0	0	1.2427	0
Nickel	7440020	0	0	0	0	0	0	0.050	0	0	0.0003	0.0501	0
Beryllium	7440417	0.0001	0	0	0	0	0	0	0.005	0	0	0.0053	0
Cadmium	7440439	0	0	0	0	0	0	0	0	0.002	0	0.0019	0
Diesel Particulate Matter	9901	0	0	0	0	0	0	0	0	0	0	0.0008	0
Chromium, Hexavalent	18540299	0	0	0	0	0	0	2E-10	0	0	0	4E-09	0
Manganese	7439965	0	0	0	0.1846	0	0	0	0	0	0	0	0
Selenium	7782492	6E-05	0	6E-05	6E-05	0	0	0	0	0	0	0	0
Total Chronic Worker HHI		2E-04	0	1.279	1.463	0	0	0.05	0.005	0.002	1.279	2.579	1.279

Figure 2-1: SDAPCD HRA Road Source Locations



2.2 Risk Reduction Measures

This risk reduction evaluation focuses on reductions associated with the road dust toxic air contaminant (TAC) emissions. The risk reduction measures that have been applied include road paving and increasing the frequency of the unpaved road watering to every 2-hours.

Since 2017, the year this HRA examined, the roads surrounding the concrete batch plant, the road across the middle of the site that services the concrete batch plant, and an extension to the exit road have been paved. The change from unpaved to paved roads will cause a 10-fold decrease in emissions.

In 2020 the Recycle/Aggregate plant permit (APCD2015-PTO-002337) was updated to include a condition requiring unpaved road watering every 2-hours. This increased watering frequency will reduce the Recycle/Aggregate plant unpaved road emissions by approximately 4 times.

Figure 2-2 shows the current paved and unpaved road configuration of the facility that was analyzed in the RRP HRA. Note that the segment of road identified as unpaved concrete plant road is part of the Recycle/Aggregate plant unpaved road, thus the same watering efficiency is applied to this segment, even though the concrete batch plant does not contain a permit condition requiring watering every 2-hours.

Since the Recycle/Aggregate plant permit already includes Condition 12, that requires “Unpaved haul roads shall be watered at 2 hour intervals”, no additional permit modifications are needed to ensure compliance.

These reductions are real, permanent, quantifiable, and enforceable through the SDAPCD permit for the Recycle/Aggregate plant (Permit APCD2015-PTO-002337).

2.3 Emissions with Selected Risk Reduction Measures

The risk reduction plan is only required for chronic worker risks, thus only the annual emission rates were examined. The RRP modeling used the 2017 annual emissions with the risk reduction measures incorporated. The emissions inventory was updated to incorporate the risk reduction measures by

- lengthening the paved road segments;
- shortening the unpaved or road segments; and
- applying an unpaved road dust control efficiency of 95%.

The previous AERMOD road sources were updated so as to minimize the changes to these sources, in doing so a number of small road segments were used to represent the larger Concrete Batch Plant and Recycle/Aggregate Plant paved and unpaved road source groups.

Each plant road was modeled with multiple line-volume sources and then grouped as a single source in AERMOD. The unit emission rate was divided by the total length of the source group road then proportioned for the length of each road segment source, so that the total source group emission rate summed to a unit emission rate of 1 gram per second (g/s).

Figure 2-2 shows the locations of the individual road segments used in AERMOD. Table 2-3 Lists how these sources were combined into source groups.

Emissions from the remaining sources were unchanged from the SDAPCD emission inventory dated April 12, 2022.

Detailed paved and unpaved road emission calculations are presented in Appendix B and will be provided to SDAPCD electronically.

Table 2-3: Road Source Groups in AERMOD

Plant Road	AERMOD Source Group Name	AERMOD Source Name
Recycle/Aggregate Plant Paved Road	RD_AGGP	RDPAVEA
		ROADAGGP
Recycle/Aggregate Plant Unpaved Road	RD_AGGU	ROADAGGU
Concrete Batch Plant Paved Road	RD_CONCP	RDCONCP1
		RDCONCP2
		RDPAVEC
Concrete Batch Plant Unpaved Road	RD_CONCU	RDCONCU1
		RDCONCU2

Figure 2-2: RRP HRA Road Source Locations



2.4 HRA Results with Risk Reduction Measures

To demonstrate that the risk reduction measures will be sufficient to reduce the chronic worker HHI below the significance thresholds, an updated HRA was conducted.

The risk reduction HRA modeling was conducted using the emissions discussed in Section 2.3. This HRA only examined the chronic worker non-cancer health impacts, as this was the only health risk above the risk reduction thresholds. The HRA was conducted in the same manner as the previously submitted assessment, following the SDAPCD HRA guidelines (SDAPCD 2022), which are based on the Office of Environmental Health Hazard Assessment (OEHHA 2015) Tier 1 technique, and guidance from SDAPCD HRA staff.

The risk reduction HRA used the same methodology and modeling parameters as the SDAPCD HRA, including using the SDAPCD provided AERMOD files and the same Hotspots Analysis and Reporting Program, version 2 (HARP2) parameters, only revising the paved and unpaved road sources and emissions.

2.4.1 Risk Reduction HRA Results – Chronic Worker Health Hazard Index

The chronic worker HHI was calculated based on the period (annual) averaging time in AERMOD and annual emissions.

The risk reduction HRA calculated the chronic worker HHI to be below the threshold of 1.0 at all actual offsite worker receptors, locations where a non-Hanson worker may be present for an extended period of time. Locations in the road are not considered actual worker receptors. Figure 2-3 shows the chronic worker HHI isopleths and the locations of the point of maximum impact (PMI) and MEIW.

The chronic worker risk was predicted to be greater than 1.0 at four receptors on the plant road just south of the Recycle/Aggregate road source, locations where no person would congregate for any significant duration. Note, these receptors were in the SDAPCD HRA and were not assessed as worker locations. Additionally, there were a few receptors south of the entry road with chronic worker risks predicted to be greater than 1.0, in an area with no development.

The MEIW was predicted to occur at receptor 2 (UTM coordinates 487,763 m E, 3,635,649 m N), which is the same location as the previously predicted MEIW.

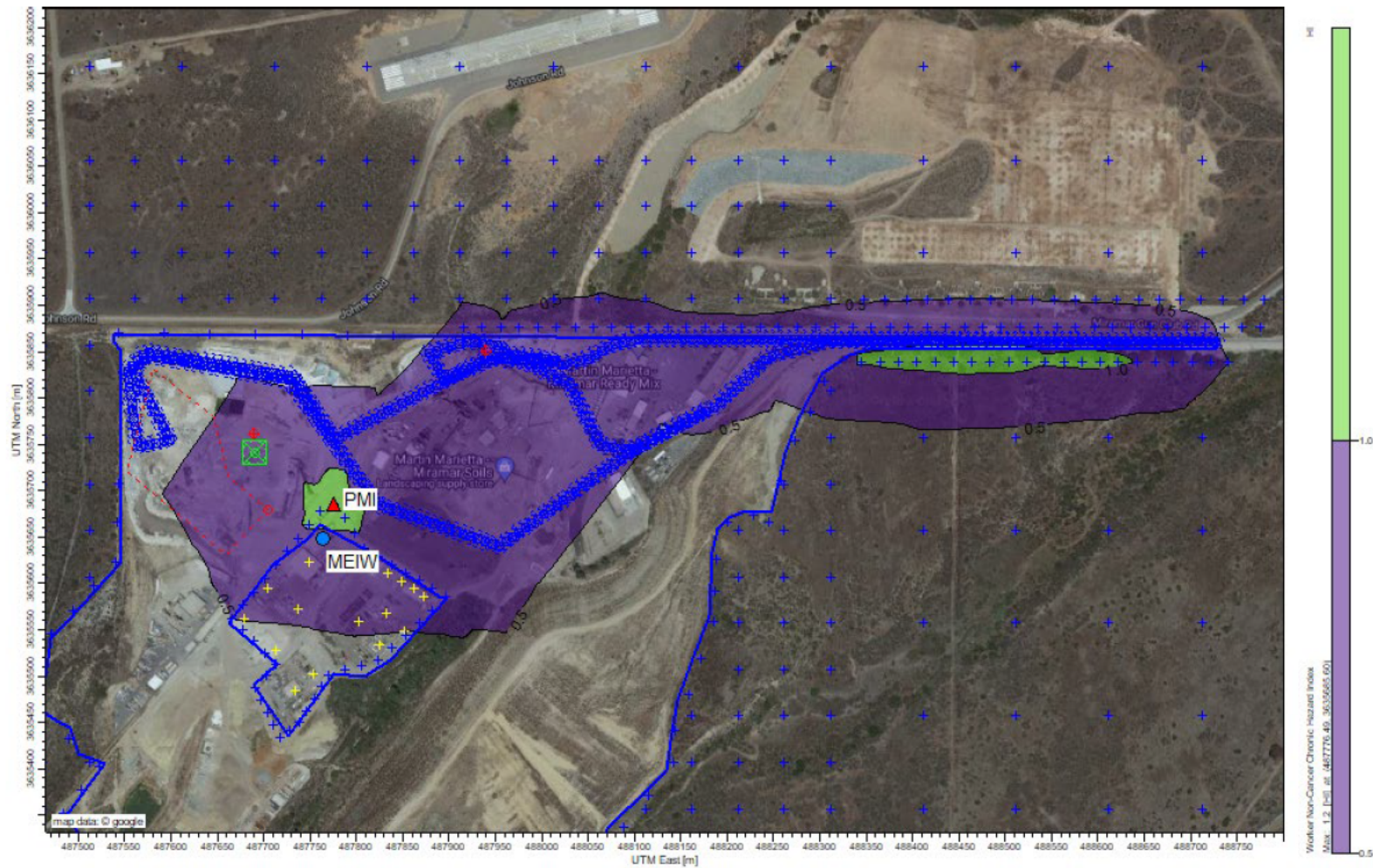
The chronic HHI at the Maximally Exposed Individual Worker (MEIW), receptor 2, was mainly due to arsenic (54%) and silica (43%) targeting the respiratory system. The primary sources were the unpaved haul roads accounting for 51% of the risk, as shown in Tables 2-4 and 2-5.

Appendix C presents detailed tables summarizing the HRA results at each receptor type, broken down by pollutant and source.

This HRA demonstrates that the additional road paving and road watering frequency reduces the chronic worker HHI below the risk reduction threshold at all actual receptors.

Air dispersion modeling and risk calculation files will be provided electronically to the SDAPCD.

Figure 2-3: Risk Reduction Chronic Worker HHI Isopleth and Locations of PMI and MEIW



Notes:

Red TrianglePMI

Blue Circle.....MEIW

Table 2-4: Risk Reduction Chronic HHI Results Per Source from All Pollutants Targeting the Respiratory System at MEIW

Sources	Description	Source Group	Maximally Exposed Individual Worker (MEIW)	
			Chronic Hazard Index	Contribution (%)
ALL	-	-	9.33E-01	100%
2337-8	Unpaved Import Recycle Material	Recycle/Aggregate Unpaved Road	2.25E-01	24.14%
2337-9	Unpaved Export Recycle		1.82E-01	19.50%
4081-2c	Unpaved Import Sand and Aggregate		1.39E-02	1.49%
4081-4	Unpaved Export Concrete	Concrete Plant Unpaved Road	4.51E-02	4.83%
4081-2a	Unpaved Import Cement		7.30E-03	0.78%
4081-2b	Unpaved Import Fly Ash		1.03E-03	0.11%
2337-7	Magnetic Separator	Recycle/Aggregate Plant	1.22E-01	13.06%
2337-6	Screen		6.85E-02	7.34%
2337-4	Jaw Crusher		1.65E-02	1.77%
2337-5	Impact Crusher		1.65E-02	1.77%
2462-2462	Double Deck Screen		3.19E-03	0.34%
978623-978623	Portable Screen		1.94E-03	0.21%
2337-3	Aggregate Plant Open Storage	Recycle/Aggregate Storage Pile	1.30E-01	13.97%
4081-7	Paved Export Concrete	Paved Entry Road	5.44E-02	5.83%
2337-10	Paved Import Recycle		1.92E-02	2.06%
2337-11	Paved Export Recycle		1.55E-02	1.67%
4081-6a	Paved Import Cement		7.77E-03	0.83%
4081-6c	Paved Import Sand and Aggregate		8.99E-04	0.10%
4081-6b	Paved Import Fly Ash		1.10E-03	0.12%
4081-1	3 Cement Silos	Concrete Batch Plant	8.82E-06	0.00%
4081-4081	Concrete Production		0.00E+00	0.00%
4081-5	Fly Ash Silo		0.00E+00	0.00%
2336-2336	Diesel Engines	Engines	8.30E-04	0.09%

Table 2-5: Risk Reduction Chronic HHI Results Per Pollutant from All Sources at MEIW

Pollutant	CAS No.	Target Organs											
		Alimentary	Bone	Cardiovascular	Central Nervous	Endocrine	Eye	Hematologic	Immune	Kidney	Reproductive/ Development	Respiratory	Skin
Arsenic	7440382	0	0	0.4021	0.4021	0	0	0	0	0	0.4021	0.4021	0.402
Silica, Crystalline	1175	0	0	0	0	0	0	0	0	0	0	0.5068	0
Nickel	7440020	0	0	0	0	0	0	0.0201	0	0	0.0001	0.0201	0
Beryllium	7440417	4E-05	0	0	0	0	0	0	0.002	0	0	0.002	0
Cadmium	7440439	0	0	0	0	0	0	0	0	0.0009	0	0.0008	0
Diesel Particulate Matter	9901	0	0	0	0	0	0	0	0	0	0	0.0008	0
Chromium, Hexavalent	18540299	0	0	0	0	0	0	2E-10	0	0	0	4E-09	0
Manganese	7439965	0	0	0	0.0644	0	0	0	0	0	0	0	0
Selenium	7782492	3E-05	0	3E-05	3E-05	0	0	0	0	0	0	0	0
Total Chronic Worker HHI		7E-05	0	0.402	0.467	0	0	0.02	0.002	9E-04	0.402	0.933	0.402

2.5 Risk Reduction Schedule

The roads surrounding the concrete batch plant, the road across the middle of the site that services the concrete batch plant, and an extension to the exit road have been paved; and the Recycle/Aggregate plant permit (APCD2015-PTO-002337) was modified in 2020 to include a condition requiring unpaved road watering every 2-hours; thus, the risk reduction measures have already been implemented.

The validation HRA shows that these measures are sufficient to reduce the chronic worker HHI below the significant risk threshold. Therefore, no progress reports on the implementation of these reduction measures are needed. This plan culminates Hanson's requirements for the AB 2588 risk reduction program for chronic worker risks for reporting year 2017.

APPENDIX A – GENERAL PERMIT APPLICATION

Internal Use Only	
APP ID: APCD	-APP/CER-
SITE ID: APCD	-SITE-

GENERAL PERMIT OR REGISTRATION APPLICATION FORM



San Diego County
Air Pollution
Control District

Submittal of this application does not grant permission to construct or to operate equipment except as specified in Rule 24(c).

REASON FOR SUBMITTAL OF APPLICATION:

- | | | |
|--|---|--|
| <input type="checkbox"/> New Installation | <input type="checkbox"/> Existing Unpermitted Equipment or Rule 11 Change | <input type="checkbox"/> Modification of Existing Permitted Equipment |
| <input type="checkbox"/> Amendment to Existing Authority to Construct or Application | <input type="checkbox"/> Change of Equipment Location | <input type="checkbox"/> Change of Equipment Ownership (please provide proof of ownership) |
| <input type="checkbox"/> Change of Permit Conditions | <input type="checkbox"/> Change Permit to Operate Status to Inactive | <input type="checkbox"/> Banking Emissions |
| <input type="checkbox"/> Registration of Portable Equipment | <input checked="" type="checkbox"/> Other (Specify) <u>Risk Reduction Plan for 2017 HRA</u> | |

List affected APP/PTO Record ID(s): _____

APPLICANT INFORMATION

Name of Business (DBA) Hanson Aggregates Pacific Southwest LLC

Does this organization own or operate any other APCD permitted equipment at this or any other adjacent locations? ☒ Yes ☐ No

If yes, list assigned Site Record IDs listed on your Permits APCD1981-SITE-00105

Name of Legal Owner (if different from DBA) Martin Marietta

Equipment Owner	Authority to Construct Mailing Address
Name: <u>Hanson Aggregates Pacific Southwest LLC</u>	Name: <u>Environmental Manager</u>
Mailing Address: <u>34211 Ponderosa Ave #C, San Diego, CA 92123</u>	Mailing Address: <u>4211 Ponderosa Ave #C, San Diego, CA 92123</u>
City: _____ State: _____ Zip: _____	City: _____ State: _____ Zip: _____
Phone: () (734) 383-1010	Phone: () (734) 383-1010
E-Mail Address: <u>Erika.Guerra@MartinMarietta.com</u>	E-Mail Address: <u>Erika.Guerra@MartinMarietta.com</u>

Permit To Operate Mailing Address	Invoice Mailing Address
Name: <u>Environmental Manager</u>	Name: <u>Environmental Manager</u>
Mailing Address: <u>4211 Ponderosa Ave #C, San Diego, CA 92123</u>	Mailing Address: <u>4211 Ponderosa Ave #C, San Diego, CA 92123</u>
City: _____ State: _____ Zip: _____	City: _____ State: _____ Zip: _____
Phone: () (925)-365-0004	Phone: () (925)-365-0004
E-Mail Address: <u>Erika.Guerra@MartinMarietta.com</u>	E-Mail Address: <u>Erika.Guerra@MartinMarietta.com</u>

EQUIPMENT/PROCESS INFORMATION: Type of Equipment: ☒ Stationary ☐ Portable, *if portable please enter below the equipment storage address.* If portable, will operation exceed 12 consecutive months at the same location ☐ Yes ☐ No

Equipment Location Address 9229 Harris Plant Road San Diego, CA 92145 City _____ State: _____

Parcel No. _____ Zip _____ Phone () _____ E-mail: _____

Site Contact _____ Phone () _____

General Description of Equipment/Process _____

Application Submitted by ☐ Owner ☐ Operator ☐ Contractor ☒ Consultant Affiliation Yorke Engineering, LLC

EXPEDITED APPLICATION PROCESSING: ☐ I hereby request Expedited Application Processing and understand that:

a) Expedited processing will incur additional fees and permits will not be issued until the additional fees are paid in full (see Rule 40(d)(8)(iv) for details) b) Expedited processing is contingent on the availability of qualified staff c) Once engineering review has begun this request cannot be cancelled d) Expedited processing does not guarantee action by any specific date nor does it guarantee permit approval.

☐ **This application contains trade secret or confidential information (see reverse for instructions)**

Information provided on this application is true and correct.

Date October 20, 2022

Print Name _____ Company Hanson Aggregates PSW

Phone () (925)-365-0004 E-mail Address Erika.Guerra@MartinMarietta.com

Internal Use Only

Date _____	Staff Initials: _____	Amt Rec'd \$ _____	Fee Schedule _____
RNP: _____	EMF: _____	NBF: _____	TA: _____

GEN_APP_Form_Rev Date: Aug. 2017

10124 Old Grove Rd. – San Diego - California 92131-1649 – (858) 586-2600

www.sdapcd.org

**SAN DIEGO COUNTY AIR POLLUTION CONTROL DISTRICT
APPLICATION FEE ESTIMATE**

Applicant Site ID/EIF ID:	APCD1981-SITE-00105	Enter PTO/TVP for Modifications
Applicant DBA:	Hanson Aggregates	Fee Schedule: RRP
		Reason for Submittal: Modification
		Existing Site? Yes
APCD Engineer:	Jim Swaney	Estimate Date: 10/18/2022
Equipment Description:	Risk Reduction Plan for 2017 Hot Spots HRA	

ACTIVITY	EMPLOYEE CLASSIFICATION	LABOR HOURS	COST	SUBTOTAL
----------	-------------------------	-------------	------	----------

Initial Evaluation Fee - T&M (Rule 40(d)(3)(i))

Authority to Construct	Engineering Services		\$0.00		ETM
Permit to Operate	Engineering Services	10.0	\$2,380.00	\$2,380.00	ETM

T&M Application - No Fixed Fee, see above

Authority to Construct/Permit to Operate	N/A	T+M	\$0.00	ETM
--	-----	-----	--------	-----

Additional Evaluation and Processing Fees (Rule 40(d)(5))

New Source Review	Engineering Services		\$0.00	\$0.00	NSR
	Monitoring Services		\$0.00	\$0.00	AQI
Prev. Significant Deterioration	Engineering Services		\$0.00	\$0.00	PSD
Toxics New Source Review (Health Risk Assessment)	Engineering Services		\$0.00		
	Monitoring Services		\$0.00		
	HRA Base Estimate	Standard	\$2,536.00	\$2,536.00	TNS
Tile V	Engineering Services		\$0.00	\$0.00	TIV
NESHAPS/ATCM/NSPS	Engineering Services		\$0.00	\$0.00	HAP
CEQA	Engineering Services		\$0.00	\$0.00	CEQ
AB 3205 Notice	Engineering Services		\$0.00		
	Public Notice Costs		\$0.00	\$0.00	AB3
Equipment subject to Rule 11(a)(3)	Engineering Services		\$0.00	\$0.00	R51
H&SC 42301(e)	Engineering Services		\$0.00	\$0.00	HSC
Testing or Test Witness	Engineering Services		\$0.00		STF
	Source Testing Services		\$0.00		ad-hoc
Fixed Test Fee Sched.	NA	Fixed Testing Fees	\$0.00	\$0.00	ad-hoc

Miscellaneous Fees

Processing Fee (Rule 40(d)(1)(ii))	1.0	\$98	\$98.00	EFX
Renewal Fee (Rule 40(e)(2)(ii))	N/A	N/A	\$0.00	REN
Emissions Fee (Rule 40(e)(2)(iv))	N/A	N/A	\$0.00	EMF

NOTES:

ESTIMATE TOTAL: **\$5,014.00**

- (1) To avoid possible processing delays, this document should be submitted with your application forms.
- (2) The fees contained in this estimate are based on APCD Rule 40. Final fee may be more or less than this estimate (see Rule 40(d)(1)(iii)).
- (3) Emissions determined to be greater than 5 tons per year will be charged a emission fee on a ton per year basis. (see Rule 40 (e)(2)(iv)(A))
- (4) Fees paid by credit card will be assessed a 2.19% processing fee (see Rule 40(c)(5))
- (5) Federal government payments made through DFAS: Please reference the above list Site ID Record number in your DFAS submittal.
- (6) This estimate is valid only for applications received by the District by June 30, 2023

APPENDIX B – HAUL ROAD EMISSIONS

**Martin Marietta - Hanson 2017
Road Summary**

Plant Road	AERMOD Source Group Name	Total Source Group Length (m)	AERMOD Source Name	Source Length (m)	AERMOD Emission Rate (g/s)
Recycle/Aggregate Plant Paved Road	RD_AGGP	1,371.0	RDPAVEA	1,279.0	0.9329
			ROADAGGP	92.0	0.0671
Recycle/Aggregate Plant Unpaved Road	RD_AGGU	1,397.3	ROADAGGU	1,397.3	1.0000
Concrete Batch Plant Paved Road	RD_CONCP	1,604.2	RDCONCP1	122.8	0.0765
			RDCONCP2	202.4	0.1262
			RDPAVEC	1,279.0	0.7973
Concrete Batch Plant Unpaved Road	RD_CONCU	201.1	RDCONCU1	55.4	0.2755
			RDCONCU2	145.7	0.7245

Source Type	Inventory Source Name	AERMOD Source Group Name	Plotfile Name	HARP Source ID	Road Length (m)	Road Length (mi)	Annual PM10 Emission Rate (lb/yr)
Paved Roads	2337-11 Paved Haul Roads, Export Recycle Trucks	RD AGGP	6	2337-11	1,371.0	0.85	741.30
	2337-10 Paved Haul Roads, Import Recyclable Material	RD AGGP	6	2337-10	1,371.0	0.85	917.74
	4081-61 Paved Haul Roads - Cement	RD CONCP	8	4081-6a	1,604.2	1.00	285.64
	4081-62 Paved Haul Roads - Fly Ash	RD CONCP	8	4081-6b	1,604.2	1.00	40.37
	4081-63 Paved Haul Roads - Aggregate & Sand	RD AGGP	6	4081-6c	1,371.0	0.85	42.92
	4081-7 Paved Haul Roads, Export - Concrete	RD CONCP	8	4081-7	1,604.2	1.00	2,001.25
Unpaved Roads	2337-9 Unpaved Haul Roads, Export Recycle Trucks	RD AGGU	5	2337-9	1,397.3	0.87	1,675.72
	2337-8 Unpaved Haul Roads, Import Recyclable Material	RD AGGU	5	2337-8	1,397.3	0.87	2,074.56
	4081-21 Unpaved Haul Roads - Cement	RD CONCU	7	4081-2a	201.1	0.12	104.66
	4081-22 Unpaved Haul Roads - Fly Ash	RD CONCU	7	4081-2b	201.1	0.12	14.79
	4081-23 Unpaved Haul Roads - Aggregate & Sand	RD AGGU	5	4081-2c	1,397.3	0.87	127.85
	4081-4 Unpaved Haul Roads, Export - Concrete	RD CONCU	7	4081-4	201.1	0.12	647.75

**Martin Marietta - Hanson 2017
Paved Haul Roads TAC Emissions**

Paved Roads																
Pollutant	CAS		2337-11 Paved Haul Roads, Export Recycle Trucks		2337-10 Paved Haul Roads, Import Recyclable Material		4081-61 Paved Haul Roads - Cement		4081-62 Paved Haul Roads - Fly Ash		4081-63 Paved Haul Roads - Aggregate & Sand		4081-7 Paved Haul Roads, Export - Concrete		Total Emissions	
			lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr
Particulate Matter (PM10)	85101		741.30	2.64E-01	917.74	3.27E-01	285.64	1.02E-01	40.37	1.44E-02	42.92	1.53E-02	2001.25	7.13E-01	4,029.2	1.4
Total Suspended Particulate (TSP)	11101		3706.52	1.32E+00	4588.72	1.63E+00	1428.19	5.09E-01	201.85	7.19E-02	214.60	7.64E-02	10006.26	3.56E+00	20,146.1	7.2

Pollutant	CAS	Emission Factor (ppm)	2337-11 Paved Haul Roads,		2337-10 Paved Haul Roads,		4081-61 Paved Haul Roads -		4081-62 Paved Haul Roads -		4081-63 Paved Haul Roads -		4081-7 Paved Haul Roads,		Total Emissions	
			lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr
Aluminum	7429905	15,000	1.11E+01	3.96E-03	1.38E+01	4.90E-03	4.28E+00	1.53E-03	6.06E-01	2.16E-04	6.44E-01	2.29E-04	3.00E+01	1.07E-02	6.04E+01	2.15E-02
Arsenic (Inorganic)	7440382	21	1.56E-02	5.54E-06	1.93E-02	6.86E-06	6.00E-03	2.14E-06	8.48E-04	3.02E-07	9.01E-04	3.21E-07	4.20E-02	1.50E-05	8.46E-02	3.01E-05
Barium	7440393	145	1.07E-01	3.83E-05	1.33E-01	4.74E-05	4.14E-02	1.47E-05	5.85E-03	2.08E-06	6.22E-03	2.22E-06	2.90E-01	1.03E-04	5.84E-01	2.08E-04
Beryllium	7440417	1	7.41E-04	2.64E-07	9.18E-04	3.27E-07	2.86E-04	1.02E-07	4.04E-05	1.44E-08	4.29E-05	1.53E-08	2.00E-03	7.13E-07	4.03E-03	1.43E-06
Cadmium	7440439	1	7.41E-04	2.64E-07	9.18E-04	3.27E-07	2.86E-04	1.02E-07	4.04E-05	1.44E-08	4.29E-05	1.53E-08	2.00E-03	7.13E-07	4.03E-03	1.43E-06
Chromium, Non-Hexavalent	7440473	25	1.85E-02	6.60E-06	2.29E-02	8.17E-06	7.14E-03	2.54E-06	1.01E-03	3.59E-07	1.07E-03	3.82E-07	5.00E-02	1.78E-05	1.01E-01	3.59E-05
Chromium, Hexavalent	18540299	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	7440508	40	2.97E-02	1.06E-05	3.67E-02	1.31E-05	1.14E-02	4.07E-06	1.61E-03	5.75E-07	1.72E-03	6.11E-07	8.01E-02	2.85E-05	1.61E-01	5.74E-05
Lead (Inorganic)	7439921	30	2.22E-02	7.92E-06	2.75E-02	9.80E-06	8.57E-03	3.05E-06	1.21E-03	4.31E-07	1.29E-03	4.59E-07	6.00E-02	2.14E-05	1.21E-01	4.30E-05
Manganese	7439965	490	3.63E-01	1.29E-04	4.50E-01	1.60E-04	1.40E-01	4.98E-05	1.98E-02	7.04E-06	2.10E-02	7.49E-06	9.81E-01	3.49E-04	1.97E+00	7.03E-04
Mercury	7439976	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel	7440020	19	1.41E-02	5.02E-06	1.74E-02	6.21E-06	5.43E-03	1.93E-06	7.67E-04	2.73E-07	8.15E-04	2.90E-07	3.80E-02	1.35E-05	7.66E-02	2.73E-05
Selenium	7782492	1	7.41E-04	2.64E-07	9.18E-04	3.27E-07	2.86E-04	1.02E-07	4.04E-05	1.44E-08	4.29E-05	1.53E-08	2.00E-03	7.13E-07	4.03E-03	1.43E-06
Silica, Crystalline	1175	100,000	7.41E+01	2.64E-02	9.18E+01	3.27E-02	2.86E+01	1.02E-02	4.04E+00	1.44E-03	4.29E+00	1.53E-03	2.00E+02	7.13E-02	4.03E+02	1.43E-01
Zinc	7440666	112	8.30E-02	2.96E-05	1.03E-01	3.66E-05	3.20E-02	1.14E-05	4.52E-03	1.61E-06	4.81E-03	1.71E-06	2.24E-01	7.98E-05	4.51E-01	1.61E-04

Notes:

PM10 & TSP emission factors per SDAPCD <https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/haul-road-emissions/APCD-Haul-Road-Emissions.pdf> which is based on AP-42 Paved Road Dust (AP-42 Section 13.2.1)

TAC Emission factors based on SDAPCD 015-R03-Haul Road Vehicle Traffic-Mineral Industry Sites-Unpaved-Uncontrolled. From SDAPCD inventory

Mileage provided by Hanson and confirmed in Google Earth

No emissions were estimated for 2337-11 in SDAPCD inventory - it appears to have been forgotten

Emission factor parameters for PM10 calculations															
Parameter	Source	Units	Source												
			2337-11 Paved Haul Roads, Export Recycle Trucks		2337-10 Paved Haul Roads, Import Recyclable Material		4081-61 Paved Haul Roads - Cement		4081-62 Paved Haul Roads - Fly Ash		4081-63 Paved Haul Roads - Aggregate & Sand		4081-7 Paved Haul Roads, Export - Concrete		
Source ID			2337-11		2337-10		4081-61		4081-62		4081-63		4081-7		
Annual Material Hauled	MM	tons/year	191,315		236,850		53,123		7,508		9,340		325,319		
Wt empty	SDAPCD 2017 Inv	tons	12		12		15		15		15		13		
Wt full	SDAPCD 2017 Inv	tons	40		40		40		40		40		30		
Paved mile/trip	SDAPCD 2017 Inv	miles/round trip	0.85		0.85		1.00		1.00		0.85		1.00		
PAVEDROAD SILT LOADING	SDAPCD Default	ounces/yard2	0.4		0.4		0.4		0.4		0.4		0.4		
hours/day	MM	hours/day	9		9		9		9		9		9		
days/week	MM	days/week	6		6		6		6		6		6		
days/year	MM	days/year	312		312		312		312		312		312		
Paved Road Control Efficiency	SDAPCD Default	%	80%		80%		80%		80%		80%		80%		
Load weight	Calculated	tons	28		28		25		25		25		17		
trip/year	Calculated	trip/year	6,833		8,459		2,125		300		374		19,136		
Annual Paved VMT	Calculated	paved VMT	5,821		7,206		2,118		299		318		19,075		

SDAPCD HAUL ROAD EMISSIONS (1/6/2022) based on Paved Road Dust (AP-42 Section 13.2.1) 2011

<https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/haul-road-emissions/APCD-Haul-Road-Emissions.pdf>

$$E_a = k \cdot (sL)^{0.91} \cdot (W)^{1.02} \cdot (1-P/4N) \cdot (1-e)$$

k particle size multiplier for PM10

0.0022

0.0022

0.0022

0.0022

0.0022

0.0022

k particle size multiplier for TSP

0.011

0.011

0.011

0.011

0.011

0.011

W average weight (tons) of the vehicles traveling the road

26

26

27.5

27.5

27.5

21.5

sL Silt loading (g/m2)

13.56

13.56

13.56

13.56

13.56

13.56

P number of "wet" days with at least 0.254 mm (0.01 in) of precipitation, default 40

40

40

40

40

40

40

N number of days in the averaging period (365 for annual)

365

365

365

365

365

365

EF_{PM10} Controlled PM10 Emission factor (lb/VMT)

0.1274

0.1274

0.1349

0.1349

0.1349

0.1049

EF_{TSP} Controlled TSP Emission factor (lb/VMT)

0.6368

0.6368

0.6743

0.6743

0.6743

0.5246

Note SDAPCD HAUL ROAD EMISSIONS Guidance incorrectly lists silt loading units. i.e. sL Paved haul road surface silt loading, (in oz/yd2) but per AP-42 should be in g/m2

**Martin Marietta - Hanson 2017
Unpaved Haul Roads TAC Emissions**

Unpaved Roads														
Pollutant			2337-9 Unpaved Haul Roads, Export Recycle Trucks		2337-8 Unpaved Haul Roads, Import Recyclable Material		4 1-21 Unpaved Haul Roads Cement		4 1-22 Unpaved Haul Roads Fly Ash		4 1-23 Unpaved Haul Roads Aggregate & Sand		4 1-4 Unpaved Haul Roads, Export - Concrete	
			lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr
Particulate Matter (PM10)	85101		1,675.7	0.60	2,074.6	0.74	104.7	0.04	14.8	0.01	127.9	0.05	647.8	0.23
Total Suspended Particulate (TSP)	11101		3,723.8	1.33	4,610.1	1.64	232.6	0.08	32.9	0.01	284.1	0.10	1,439.5	0.51

Tot	
lb/yr	lb/hr
4,645.3	1.7
10,323.0	3.7

Pollutant	CAS	Emission Factor (ppm)	2337-9 Unpaved Haul Roads,		2337-8 Unpaved Haul Roads,		4081-21 Unpaved Haul Roads		4081-22 Unpaved Haul Roads		4081-23 Unpaved Haul Roads		4081-4 Unpaved Haul Roads,		Total Emissions	
			lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	lb/hr
Aluminum	7429905	15,000	2.51E+01	8.95E-03	3.11E+01	1.11E-02	1.57E+00	5.59E-04	2.22E-01	7.90E-05	1.92E+00	6.83E-04	9.72E+00	3.46E-03	6.97E+01	2.48E-02
Arsenic (inorganic)	7440382	21	3.52E-02	1.25E-05	4.36E-02	1.55E-05	2.20E-03	7.83E-07	3.11E-04	1.11E-07	2.68E-03	9.56E-07	1.36E-02	4.84E-06	9.76E-02	3.47E-05
Barium	7440393	145	2.43E-01	8.65E-05	3.01E-01	1.07E-04	1.52E-02	5.40E-06	2.14E-03	7.64E-07	1.85E-02	6.60E-06	9.39E-02	3.34E-05	6.74E-01	2.40E-04
Beryllium	7440417	1	1.68E-03	5.97E-07	2.07E-03	7.39E-07	1.05E-04	3.73E-08	1.48E-05	5.27E-09	1.28E-04	4.55E-08	6.48E-04	2.31E-07	4.65E-03	1.65E-06
Cadmium	7440439	1	1.68E-03	5.97E-07	2.07E-03	7.39E-07	1.05E-04	3.73E-08	1.48E-05	5.27E-09	1.28E-04	4.55E-08	6.48E-04	2.31E-07	4.65E-03	1.65E-06
Chromium, Non-Hexavalent	7440473	25	4.19E-02	1.49E-05	5.19E-02	1.85E-05	2.62E-03	9.32E-07	3.70E-04	1.32E-07	3.20E-03	1.14E-06	1.62E-02	5.77E-06	1.16E-01	4.14E-05
Chromium, Hexavalent	18540299	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Copper	7440508	40	6.70E-02	2.39E-05	8.30E-02	2.96E-05	4.19E-03	1.49E-06	5.92E-04	2.11E-07	5.11E-03	1.82E-06	2.59E-02	9.23E-06	1.86E-01	6.62E-05
Lead (inorganic)	7439921	30	5.03E-02	1.79E-05	6.22E-02	2.22E-05	3.14E-03	1.12E-06	4.44E-04	1.58E-07	3.84E-03	1.37E-06	1.94E-02	6.92E-06	1.39E-01	4.96E-05
Manganese	7439965	490	8.21E-01	2.92E-04	1.02E+00	3.62E-04	5.13E-02	1.83E-05	7.25E-03	2.58E-06	6.26E-02	2.23E-05	3.17E-01	1.13E-04	2.28E+00	8.11E-04
Mercury	7439976	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Nickel	7440020	19	3.18E-02	1.13E-05	3.94E-02	1.40E-05	1.99E-03	7.08E-07	2.81E-04	1.00E-07	2.43E-03	8.65E-07	1.23E-02	4.38E-06	8.83E-02	3.14E-05
Selenium	7782492	1	1.68E-03	5.97E-07	2.07E-03	7.39E-07	1.05E-04	3.73E-08	1.48E-05	5.27E-09	1.28E-04	4.55E-08	6.48E-04	2.31E-07	4.65E-03	1.65E-06
Silica, Crystalline	1175	100,000	1.68E+02	5.97E-02	2.07E+02	7.39E-02	1.05E+01	3.73E-03	1.48E+00	5.27E-04	1.28E+01	4.55E-03	6.48E+01	2.31E-02	4.65E+02	1.65E-01
Zinc	7440666	112	1.88E-01	6.68E-05	2.32E-01	8.27E-05	1.17E-02	4.17E-06	1.66E-03	5.90E-07	1.43E-02	5.10E-06	7.25E-02	2.58E-05	5.20E-01	1.85E-04

Notes:

PM10 & TSP emission factors per SDAPCD HAUL ROAD EMISSIONS <https://www.sdapcd.org/content/dam/sdapcd/documents/permits/emissions-calculation/haul-road-emissions/APCD-Haul-Road-Emissions.pdf> which is based on AP-42 Unpaved Road Dust (AP-42 Section 13.2.2) from 1995

TAC Emission factors based on SDAPCD 015-R03-Haul Road Vehicle Traffic-Mineral Industry Sites-Unpaved-Uncontrolled. From SDAPCD inventory

The control efficiency is from the SDAPCD guidelines and accounts for watering every 2-hr as required in permit 2337

mileage provided by Hanson

Emission factor parameters for PM10 calculations														
Parameter	Source	Units	Source											
			2337-9 Unpaved Haul Roads, Export Recycle Trucks		2337-8 Unpaved Haul Roads, Import Recyclable Material		4081-21 Unpaved Haul Roads Cement		4081-22 Unpaved Haul Roads Fly Ash		4081-23 Unpaved Haul Roads Aggregate & Sand		4081-4 Unpaved Haul Roads, Export - Concrete	
Source ID			2337-9		2337-8		4081-21		4081-22		4081-23		4081-4	
Annual Material Hauled	MM	tons/year	191,315		236,850		53,123		7,508		9,340		325,319	
Wt empty	SDAPCD 2017 Inv	tons	12		12		15		15		15		13	
Wt full	SDAPCD 2017 Inv	tons	40		40		40		40		40		30	
Wheels	SDAPCD 2017 Inv	# of Vehicle Wheels	10		10		18		18		18		12	
Speed	permit	miles/hour	10		10		10		10		10		10	
Unpaved mile/trip	SDAPCD 2017 Inv	miles/round trip	0.87		0.87		0.12		0.12		0.87		0.12	
UNPAVEDROAD SILT CONTENT	SDAPCD Default	weight %	15		15		15		15		15		15	
hours/day	MM	hours/day	9		9		9		9		9		9	
days/week	MM	days/week	6		6		6		6		6		6	
days/year	MM	days/year	312		312		312		312		312		312	
Unpaved Road Control Efficiency	2-hr watering	%	95%		95%		95%		95%		95%		95%	
Load weight	Calculated	tons	28		28		25		25		25		17	
trip/year	Calculated	trip/year	6,833		8459		2125		300		374		19136	
Annual Unpaved VMT	Calculated	unpaved VMT	5,932		7,344		266		38		324		2,391	

Unpaved Road Dust (AP-42 Section 13.2.2) 1995

$$E = k * 5.9 * (s/12) * (S/30) * (W/3)^{0.7} * (w/4)^{0.5} * (365-P)/365 * (1-e)$$

k particle size multiplier for PM10

k particle size multiplier for TSP

s silt content, percent

S speed mph

W average vehicle weight (ton)

w wheels

P number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging p

EF_{PM10} Controlled PM10 Emission factor (lb/VMT)

EF_{TSP} Controlled TSP Emission factor (lb/VMT)

0.36	0.36	0.36	0.36	0.36	0.36
0.8	0.8	0.8	0.8	0.8	0.8
15	15	15	15	15	15
10	10	10	10	10	10
26	26	27.5	27.5	27.5	21.5
10	10	18	18	18	12
40	40	40	40	40	40
0.282	0.282	0.394	0.394	0.394	0.271
0.628	0.628	0.876	0.876	0.876	0.602

APPENDIX C – HEALTH RISK ASSESSMENT RESULTS

**Maximum Chronic Hazard Index by Pollutant at PMI, MEIR, MEIW and Sensitive Receptor
Hanson77 Risk Reduction - RY2017 AB2588 HRA**

Pollutant CAS	Pollutant	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	1643	receptor #	10	receptor #	8	receptor #	2	receptor #	2
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		488464	3635839	490126	3633471	488076	3632931	487763	3635649	487763	3635649
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic 8-hr Hazard Index	Contribution (%)
-	ALL	2.54E+00	100%	2.56E-02	100%	2.40E-02	100%	9.33E-01	100%	4.83E-02	100%
1175	Silica, Crystln	4.96E-01	19.50%	5.97E-03	23.37%	5.73E-03	23.82%	5.07E-01	54.34%	0.00E+00	0.00%
7440382	Arsenic	2.03E+00	79.59%	1.93E-02	75.36%	1.80E-02	74.99%	4.02E-01	43.11%	1.42E-02	29.36%
7439965	Manganese	8.09E-02	3.18%	8.38E-04	3.28%	7.92E-04	3.29%	6.44E-02	6.91%	3.41E-02	70.64%
7440020	Nickel	2.02E-02	0.79%	2.39E-04	0.94%	2.29E-04	0.95%	2.01E-02	2.16%	4.69E-03	9.72%
7440417	Beryllium	2.13E-03	0.08%	2.56E-05	0.10%	2.45E-05	0.10%	2.17E-03	0.23%	0.00E+00	0.00%
7440439	Cadmium	1.56E-03	0.06%	1.88E-05	0.07%	1.80E-05	0.07%	9.13E-04	0.10%	0.00E+00	0.00%
9901	DieselExhPM	1.67E-04	0.01%	4.98E-05	0.19%	2.48E-05	0.10%	8.30E-04	0.09%	0.00E+00	0.00%
7782492	Selenium	1.69E-04	0.01%	2.92E-06	0.01%	2.86E-06	0.01%	3.10E-05	0.00%	0.00E+00	0.00%
18540299	Cr(VI)	8.22E-10	0.00%	2.56E-10	0.00%	2.44E-10	0.00%	4.46E-09	0.00%	0.00E+00	0.00%

Notes:

Individual pollutants are not additive because risk is based on specific target organs, which may be different per pollutant

**Chronic Hazard Index by Source for All Pollutants Combined at PMI, MEIR, MEIW and Sensitive Receptor
Hanson77 Risk Reduction - RY2017 AB2588 HRA**

Sources	Description	Point of Maximum Impact (PMI)		Maximally Exposed Individual Resident (MEIR)		Sensitive Receptor		Maximally Exposed Individual Worker (MEIW)		Maximally Exposed Individual Worker (MEIW)	
		receptor #	1643	receptor #	10	receptor #	8	receptor #	2	receptor #	2
		UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)	UTM Easting (m)	UTM Northing (m)
		488464	3635839	490126	3633471	488076	3632931	487763	3635649	487763	3635649
		Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic Hazard Index	Contribution (%)	Chronic 8-hr Hazard Index	Contribution (%)
ALL	-	2.54E+00	100%	2.56E-02	100%	2.40E-02	100%	9.33E-01	100%	4.83E-02	100%
2337-8	Unpaved Haul Roads, Import Recyclable Material	1.73E-02	0.68%	4.89E-03	19.13%	4.91E-03	20.44%	2.25E-01	24.14%	1.29E-02	26.77%
2337-9	Unpaved Haul Roads Export Trucks	1.40E-02	0.55%	3.95E-03	15.45%	3.97E-03	16.51%	1.82E-01	19.50%	1.04E-02	21.63%
2337-3	Open Material Storage	2.05E-03	0.08%	1.58E-03	6.18%	1.62E-03	6.74%	1.30E-01	13.97%	5.59E-03	11.58%
2337-7	Magnetic Separator (SCREEN-SCREEN)	2.29E-03	0.09%	1.54E-03	6.01%	1.61E-03	6.71%	1.22E-01	13.06%	5.22E-03	10.80%
2337-6	Screen and Conveyor	1.29E-03	0.05%	8.64E-04	3.38%	9.08E-04	3.78%	6.85E-02	7.34%	2.93E-03	6.08%
4081-7	Paved Haul Roads, Export - Concrete	1.16E+00	45.52%	4.97E-03	19.44%	4.20E-03	17.48%	5.44E-02	5.83%	3.12E-03	6.47%
4081-4	Unpaved Haul Roads, Export - Concrete	6.51E-03	0.26%	1.61E-03	6.31%	1.51E-03	6.30%	4.51E-02	4.83%	2.59E-03	5.36%
2337-10	Paved Haul Roads, Import Recyclable Material	6.21E-01	24.38%	2.27E-03	8.90%	1.89E-03	7.85%	1.92E-02	2.06%	1.10E-03	2.29%
2337-4	JAW CRUSHER	3.11E-04	0.01%	2.08E-04	0.81%	2.19E-04	0.91%	1.65E-02	1.77%	7.05E-04	1.46%
2337-5	Impact Crusher	3.11E-04	0.01%	2.08E-04	0.81%	2.18E-04	0.91%	1.65E-02	1.77%	7.05E-04	1.46%
2337-11	Paved Haul Roads Export Trucks	5.01E-01	19.70%	1.84E-03	7.19%	1.52E-03	6.34%	1.55E-02	1.67%	8.92E-04	1.85%
4081-2c	Unpaved Haul Roads - Aggregate & Sand	1.07E-03	0.04%	3.01E-04	1.18%	3.03E-04	1.26%	1.39E-02	1.49%	7.96E-04	1.65%
4081-6a	Paved Haul Roads - Cement	1.66E-01	6.50%	7.10E-04	2.78%	6.01E-04	2.50%	7.77E-03	0.83%	4.46E-04	0.92%
4081-2a	Unpaved Haul Roads - Cement	1.05E-03	0.04%	2.61E-04	1.02%	2.45E-04	1.02%	7.30E-03	0.78%	4.18E-04	0.87%
2462-2462	Double Deck Screen	6.00E-05	0.00%	4.02E-05	0.16%	4.22E-05	0.18%	3.19E-03	0.34%	1.36E-04	0.28%
978623-978623	Screen and Conveyor	3.65E-05	0.00%	2.44E-05	0.10%	2.57E-05	0.11%	1.94E-03	0.21%	8.30E-05	0.17%
4081-6b	Paved Haul Roads - Fly Ash	2.34E-02	0.92%	1.00E-04	0.39%	8.49E-05	0.35%	1.10E-03	0.12%	6.30E-05	0.13%
4081-2b	Unpaved Haul Roads - Fly Ash	1.49E-04	0.01%	3.69E-05	0.14%	3.46E-05	0.14%	1.03E-03	0.11%	5.91E-05	0.12%
4081-6c	Paved Haul Roads - Aggregate & Sand	2.90E-02	1.14%	1.06E-04	0.42%	8.82E-05	0.37%	8.99E-04	0.10%	5.16E-05	0.11%
2336-2336	Diesel ICE Powering Aggregate Processing Plant	1.67E-04	0.01%	4.98E-05	0.19%	2.48E-05	0.10%	8.30E-04	0.09%	0.00E+00	0.00%
4081-4081	Concrete Production	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%
4081-1	3 Cement Silos	1.90E-06	0.00%	5.92E-07	0.00%	5.65E-07	0.00%	8.82E-06	0.00%	4.97E-07	0.00%
4081-5	Fly Ash Silo	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%	0.00E+00	0.00%

Notes:

Individual sources are not additive because risk is based on specific target organs, which may be different per source