Appendix A

Notice of Preparation and Comment Letter

Notice of Preparation

Date:	November 20, 2018
To:	Responsible Agencies, Interested Parties, and Organizations
Subject:	Notice of Preparation of an Environmental Impact Report for the Fresno Rendering Plant Relocation Project, Fresno, California
Lead Agency:	City of Fresno
Contact:	Mike Sanchez, AICP, MCRP, Assistant Director Development and Resource Management 2600 Fresno Street, Room 3065 Fresno, CA 93721 (559) 621-8040 Mike.Sanchez@fresno.gov
Comment Period:	November 20, 2018 to December 19, 2018

PURPOSE OF NOTICE

The City of Fresno is the lead agency responsible for preparation of an Environmental Impact Report (EIR) for the proposed Fresno Rendering Plant Relocation Project (proposed project), located in the City of Fresno. Pursuant to provisions of the California Environmental Quality Act (CEQA), the City has prepared this Notice of Preparation (NOP) for the proposed project. Once a decision is made to prepare an EIR, the lead agency must prepare a NOP to inform all responsible and trustee agencies that an EIR will be prepared (CEQA Guidelines Section 15082). The purpose of this NOP is to provide agencies, interested parties, and organizations with sufficient information describing the proposed project and the potential environmental effects to enable meaningful input related to the scope and content of information to be included in the EIR.

PUBLIC REVIEW PERIOD

This Notice of Preparation is being circulated for public review and comment for a period of 30 days beginning November 20, 2018. The City will hold a public scoping meeting to inform interested parties about the proposed project and to provide agencies and the public with an opportunity to provide comments on the scope and content of the EIR. The meeting time and location is as follows:

Sunset Elementary (Cafeteria)
1755 South Crystal Avenue
Fresno, CA 93706
Day: Wednesday, November 28, 2018
Time: 6:00 PM to 8:00 PM

Copies of the full Notice of Preparation may be reviewed at the following locations:

- Fresno County Public Library during library hours;
- City of Fresno, 2600 Fresno St, Room 3065 between 7:00 a.m. and 6:00 p.m.; or
- Online at: https://www.fresno.gov/cityclerk/notices-publications/

Your views and comments on how the project may affect the environment are welcomed. Please contact Mr. Sanchez if you have any questions about the environmental review process for the Fresno Rendering Plant Expansion and Relocation Project.

PROJECT LOCATION

The proposed Fresno Rendering Plant Expansion and Relocation Project would be located within the city limits, but not within the city proper; the site is located just east of the Fresno-Clovis Regional Wastewater Reclamation Facility (RWRF) within a large island of incorporated, City-owned property along West Jensen Avenue; see Exhibits 1 and 2.

PROJECT DESCRIPTION

The existing Darling Ingredients Inc. rendering facility is located on a 5.22-acre parcel on Belgravia Road between Church Avenue and E Street in the southwest area of the city. Over the last 60 years, non-industrial urban uses were developed in the surrounding area such that residential neighborhoods are now within one-quarter mile of the rendering plant with homes as close as 800 feet from the rendering plant structures. Therefore, the City is proposing to relocate this heavy industrial facility away from the residential neighborhoods that have been developed near the existing facility subsequent to its establishment.

The project would relocate the Darling facility from its current location to an approximately 40-acre parcel near the RWRF (Exhibits 1 and 2). Industrial activities related to the project would be similar to those of the existing Darling facility but would include an increase in processing capacity.

The new plant would continue to serve area businesses including packers, restaurants, food service establishments, butchers, and grocers in the production of animal and vegetable derived fats and proteins for use as ingredients in food, feed, fertilizer, and fuel. The primary industrial activities at the facility would include:

- raw material collection,
- conversion of raw materials,
- storage of finished products,
- shipment of finished products, and
- fleet-related activities.

Darling anticipates that the relocated operation would process up to 10 million pounds of food processing byproducts on a weekly basis. The anticipated daily production rate could reach 2 million pounds or more but would be limited on a weekly basis by the permitted maximum.

The collection routes and delivery schedules would be variable and would likely change day to day depending on the work schedules of the byproduct generators. The rendering process would be continuous and would typically operate 24 hours per day, 6 to 7 days per week. Delivery schedules would be relatively stable with only limited seasonal fluctuations. The types and numbers of vehicles would vary based on customer needs, type of service being provided, and economic conditions, but it is anticipated that project operation would use an average of 75 trucks per day, or 150 truck trips per day.

Approximately 60 to 70 full-time employees would work at the facility (23 new positions would be created as a result of the operational expansion). The facility would operate in three shifts with three production shifts and one maintenance shift. It is expected that there would be a maximum of 25 employees on site per shift.

The project would include a total of five buildings—the rendering plant (26,700 square feet [sf]), a meal area loadout (2,400 sf), a truck shop (8,000 sf), a maintenance shop (4,000 sf), and an office building (3,500 sf)—with a total floor area of approximately 44,600 sf, which is approximately 16,800 sf larger than the existing facility.

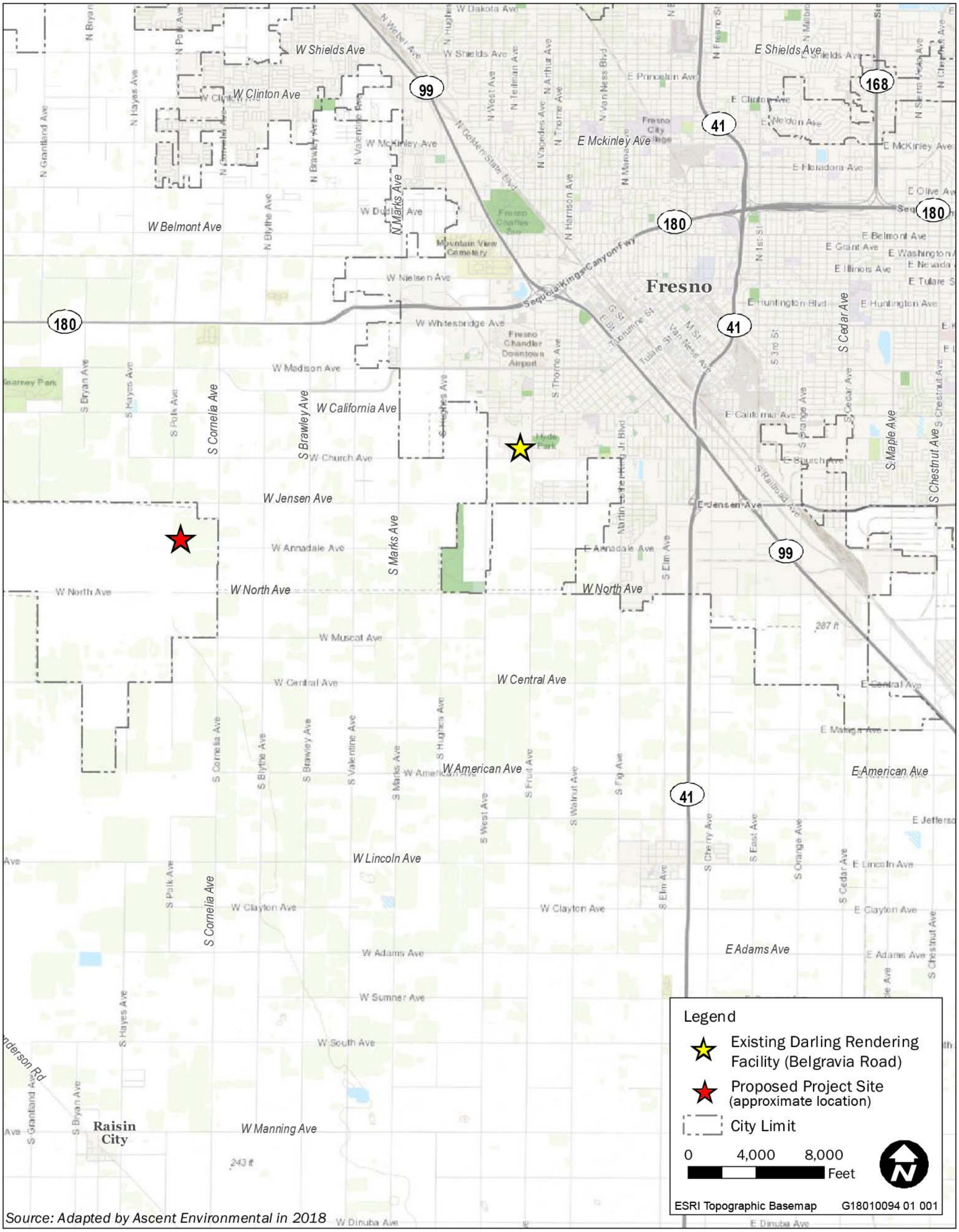

Exhibit 1 Regional Location

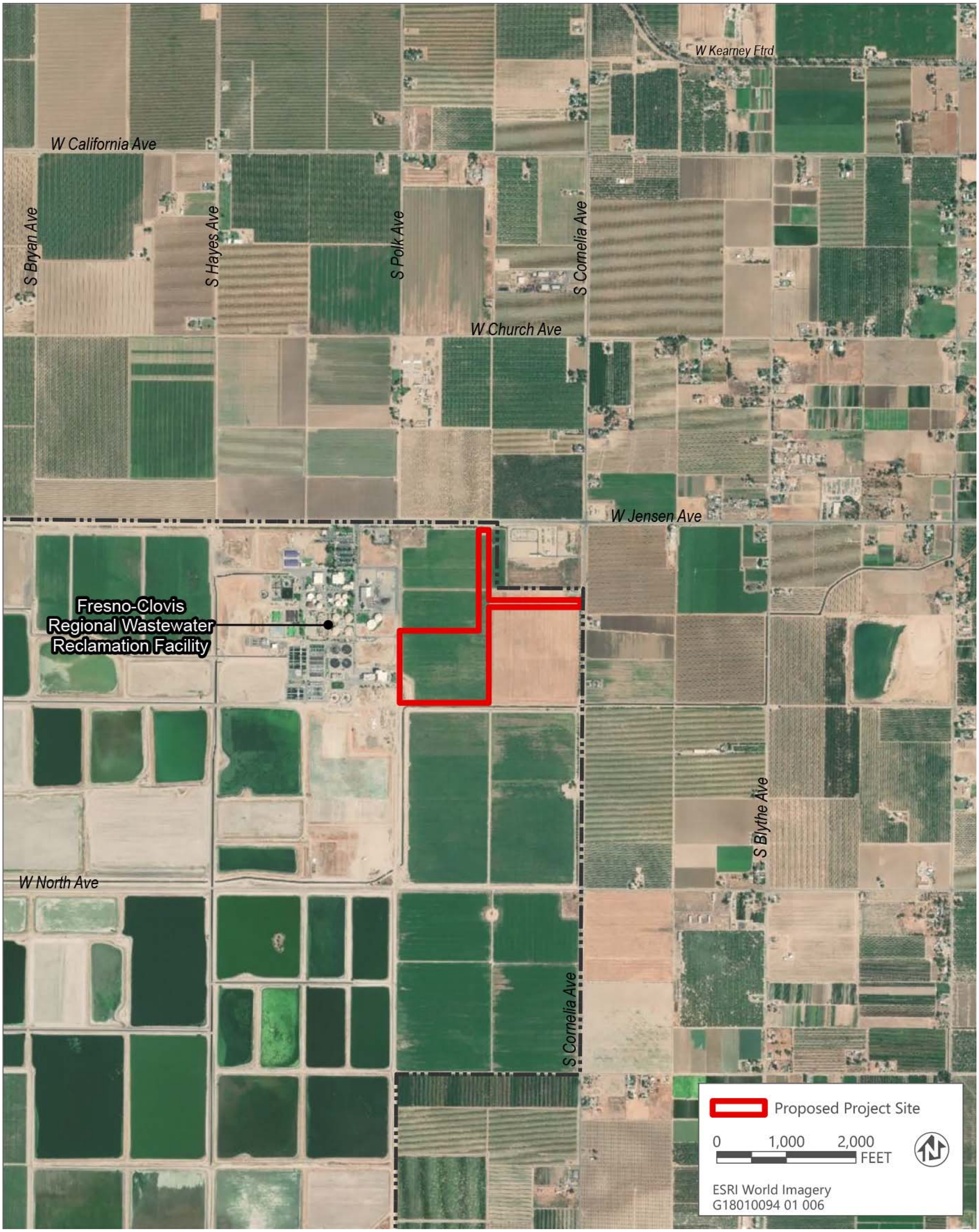

Exhibit 2 Project Location (Approximate)

Excluding equipment, typical building height would be approximately 28 feet with a maximum building height of 45 feet. The conversion facility would be a concrete pre-cast building, and the other three buildings would include metal, brick, or block veneer. The tallest equipment would include two new 60-foot protein storage silos.

Two dedicated access points would be provided for the site. Jensen Avenue would serve as the dedicated truck route, and all trucks would access the project site from Jensen Avenue. Employees and sales calls would access the site via Cornelia Avenue. The proposed parking lot would include up to 36 spaces for employees and visitors. This is exclusive of the truck parking needed for raw material trucks which must be segregated to avoid contaminating the raw material.

The project would require a General Plan Amendment to change the General Plan land use designation of land from Public Facility to Heavy Industrial, and a rezone of the same property from the PI/UGM (*Public and Institutional/Urban Growth Management*) zone district to the IH (*Heavy Industrial*). The proposed Darling facility would also require a conditional use permit (CUP) to operate within the IH zone.

The existing rendering plant on Belgravia Road would cease operations at its current location within six months after the new plant site is fully permitted and operational. The existing equipment would be dismantled and silos would be removed within one year after the new plant site is fully permitted and operational. No structure demolition is proposed. Deed restrictions would be recorded prohibiting the use of the existing rendering plant site for future use as a rendering plant with the City of Fresno as a third-party beneficiary to the restriction. Potential future land uses that could locate on the existing rendering plant site are unknown at this time (except that a rendering plant use would not be allowed). Because it is unknown, future use of the existing rendering plant site will not be evaluated in the EIR. Any future use proposed for the site would be subject to review under CEQA.

RESPONSIBLE AGENCIES

For the purposes of CEQA, the term "Responsible Agency" includes all public agencies other than the Lead Agency that have discretionary approval power over the project (CEQA Guidelines Section 15381). Discretionary approval power may include such actions as issuance of a permit, authorization, or easement needed to complete some aspect of the proposed project. Responsible agencies may include, but are not limited to, the following:

- California Department of Transportation (Caltrans),
- California State Water Resources Control Board (SWRCB),
- California Department of Fish and Wildlife (CDFW),
- San Joaquin Valley Air Pollution Control District (SJVAPCD), and
- County of Fresno.

POTENTIAL ENVIRONMENTAL EFFECTS

The EIR will describe the direct and indirect environmental impacts of construction and operation of Fresno Rendering Plant Project. It is anticipated that the EIR will address potential impacts associated with the proposed project in the following issue areas. In addition, the EIR will evaluate alternatives, growth-inducing impacts, and cumulative impacts.

Aesthetics

The new rendering plant would be constructed on land that is now agricultural land. The EIR will evaluate the project's potential impacts to the visual character of the area and to potential sensitive viewers.

Agriculture

The project site contains Prime Farmland and Farmland of Statewide Importance, as designated under the Department of Conservation, Farmland Mapping and Monitoring Program. The EIR will assess potential impacts to agriculture, with consideration of the City's prior Master EIR analysis in support of its last General Plan update.

Air Quality

The project area is within the jurisdiction of the San Joaquin Valley Air Basin (SJVAB) and is under the jurisdiction of the SJVAPCD. Project construction would result in emissions of criteria air pollutants and precursors, including reactive organic gases (ROG), oxides of nitrogen (NO_X), sulfur dioxide (SO_2), carbon monoxide (CO), respirable particulate matter (PM_{10}), and fine particulate matter ($PM_{2.5}$) from the use of heavy construction equipment, haul truck activity, and worker commute trips. Operational emissions would include vehicular exhaust from truck trips and employee vehicles, and emissions from plant operations. Odor emissions will also be assessed.

Biological Resources

The project site has been previously graded, cultivated, and is of limited value for wildlife. However, the site could serve as foraging and/or nesting habitat for three special-status bird species: Swainson's hawk, burrowing owl, and California horned lark. The EIR will assess the potential impacts of the project on biological resources.

Cultural and Tribal Cultural Resources

Outreach to the Native American community and local historical groups will be conducted to solicit information on tribal cultural resources and any known cultural resources concerns or issues. There is the potential for buried prehistoric and historic-era resources within the project area and potential impacts to these resources during project construction will be considered in the EIR.

Energy

CEQA Guidelines Section 15126 and Appendix F of the CEQA guidelines require that EIRs include a discussion of the potential energy impacts of projects, with emphasis on considering if a project would result in inefficient, wasteful, and unnecessary consumption of energy. The EIR will evaluate energy impacts of the rendering plant relocation, including any net increase in fuel and energy use during project construction and operation.

Greenhouse Gas Emissions

The SJVAPCD has guidance on evaluating greenhouse gas (GHG) emissions for stationary source projects using Best Performance Standards. In accordance with this guidance, GHG emissions will be quantified and disclosed in the EIR.

Hazards and Hazardous Materials

The site was used historically for crop cultivation; therefore, residue from pesticides, fertilizers, and other agricultural chemicals may be present on the site. The use of hazardous materials in project operation and disposal of any hazardous wastes generated by the rendering plant would be subject to numerous laws and regulations at all levels of government. The EIR will identify any existing issues related to hazards and hazardous materials in the project area, identify impacts that could occur from construction and operation of the proposed rendering plant.

Hydrology and Water Quality

There are no surface waters on the site and the rendering plant would extract its water supply from a new well. The EIR will assess potential effects to groundwater quality and quantity.

Land Use and Planning

The project would require a General Plan Amendment to change the General Plan land use designation of land from Public Facility to Heavy Industrial, and a rezone of the same property from PI to IH. The proposed Darling facility would also require a CUP to operate within the IH zone. In addition, the previously considered

40-acre site adjacent to W. Jensen Avenue would be revised from Public Facility to Agriculture to accommodate orchard uses, specifically nut trees. The EIR will evaluate the potential consequences of the land use change.

Noise

Implementing the proposed project would result in short-term and long-term increases in ambient noise levels. The EIR will include a description of the existing noise environment, including noise sources and sensitive receptors in the project area. The EIR will then assess potential short-term (i.e., construction) and long-term (i.e., operational) noise impacts to sensitive receptors. Operational noise changes may be generated by proposed stationary sources such as operation of the plant and truck and vehicle traffic on local roadways.

Transportation

Local access to the project site would be via existing paved roads and in the vicinity, including Jensen and Cornelia Avenues, and regional access would be via State Route 99. The traffic analysis will address intersections and roadway segments in the project vicinity. The analysis will consider temporary construction traffic and identify necessary construction traffic management measures, and operational vehicle and truck traffic.

Cumulative Impacts

Implementation of the proposed project could potentially result in significant impacts to the above resource areas. When taken together with the effects of past projects, other current projects, and probable future projects, the project’s contribution to the overall cumulative effect of all these activities could be considerable.

Alternatives

In accordance with the State CEQA Guidelines (14 CCR Section 15126.6), the EIR will describe a range of reasonable alternatives to the proposed project that are capable of meeting most of the projects’ objectives, and that would avoid or substantially lessen any of the significant effects of the project. The EIR will also identify any alternatives that were considered but rejected by the lead agency as infeasible and briefly explain the reasons why. The EIR will provide an analysis of the No-Project Alternative and will also identify the environmentally superior alternative.

DEPARTMENT OF TRANSPORTATION
DISTRICT 6
1352 WEST OLIVE AVENUE
P.O. BOX 12616
FRESNO, CA 93778-2616
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TTY 711
www.dot.ca.gov

Making Conservation a California way of life.

December 11, 2018

FRE-180-52.597
SCH# 2018111043
Fresno Rendering Plant Relocation Project

Mr. Mike Sanchez, Assistant Director
Development and Resource Management
2600 Fresno Street, Room 3065
Fresno, CA 93721

Dear Mr. Sanchez:

Thank you for including Caltrans in the environmental review process for the project referenced above. The proposed project entails construction and operation of an approximately 44,600 sq. ft. facility for the production of animal and vegetable derived fats and proteins. The Project site is located in the City of Fresno, on approximately 40 acres of land, a short distance from State Routes (SR) 180, 41 and 99.

Caltrans focuses on the safe and efficient operation of the transportation systems under its care. It is our assessment that more information is needed in terms of site access, work schedules, and delivery timing to provide specific comments on the transportation element of the forthcoming Environmental Impact Report. Therefore, Caltrans requests to review the scope of work for the traffic study before that work is begun. Likewise, we are available to provide verbal comment at a scoping meeting should one be called. We look forward to working with you to build resiliency in our shared transportation network.

Please direct questions to me at (559) 488-7307 or Jamaica.Gentry@dot.ca.gov.

Sincerely,

JAMAICA GENTRY
Associate Transportation Planner
Transportation Planning - North

Appendix B

Air Quality, Greenhouse Gases Emissions, and Energy Modeling Data

Emissions Summary

Construction Emissions

Emission Scenario	ROG (lb/day)	NOX (lb/day)	PM10 (lb/day)	PM2.5 (lb/day)	CO (lb/day)	SOX (lb/day)
Maximum Daily	19.6486	19.5163	5.553	3.2722	16.2774	3.06E-02

Operational Emissions - Annual

Emission Activity	ROG (tons/year)	NOX (tons/year)	PM10 (tons/year)	PM2.5 (tons/year)	CO (tons/year)	SOX (tons/year)	MTCO2e/year
Area	0.2052	0	0	0	4.10E-04	0	8.50E-04
Vehicle Trips (Mobile Sources)	0.1468	1.9419	0.8606	0.2401	2.2693	1.28E-02	1,191
Electricity Consumption (Building Energy)							570
Stationary Source-Related Natural Gas (excluding WWTP-provided gas)	0.6727	0.7735	0.9295	0.9295	10.2735	0.0734	10,992
Water Consumption							57
Solid Waste Generation							28
Total Annual Emissions	1.025	2.715	1.790	1.170	12.543	0.086	12,837

Operational Emissions - Daily

Emission Activity						
Area	1.1248	4.00E-05	2.00E-05	2.00E-05	4.57E-03	0.00E+00
Vehicle Trips (Mobile Sources)	1.102	12.9329	6.1175	1.7017	18.2139	0.0933
Electricity Consumption (Building Energy)						
Stationary Source-Related Natural Gas (excluding WWTP-provided gas)	3.737	4.297	5.164	5.164	57.075	0.408
Water Consumption						
Solid Waste Generation						
Total Daily Emissions	5.964	17.230	11.281	6.866	75.294	0.501

Construction Phase Adjustment

CalEEMod Default Construction Phases

Phase	Days
Site Prep	1
Grading	2
Building	100
Paving	5
Arch Coating	5
Total	113

Adjusted Construction Phases

Start Date	1/1/2019
End Date	12/31/2020
Total work days	730
Ratio	6.46017699

Phase	Days
Site Prep	6
Grading	13
Building	646
Paving	32
Arch Coating	32
Total	730

CalEEMod Default VMT Estimate

CalEEMod VMT Calculator (UNMITIGATED SCENARIO)

Trip Type

CalEEMod defaults based on land uses inputted

Land Use	Miles			Trip %			Trip Purpose		
	H-w or C-W	H-S or C-C	H-O or C-O	H-w or C-W	H-S or C-C	H-O or C-O	Primary	Diverted	Pass-by
Manufacturing	14.70	6.60	6.60	59.0%	28.0%	13.0%	92.0%	5.0%	3.0%

Total Trips

Total Trips = (TripRate weekday x 5 +Trip Sat + Trip Sun)

Average Daily Trips Based on CalEEMod Trip Gen Defaults per land use unit. Total trips Calculated

Land Use	Average Daily Trip Rate			
	weekday	Saturday	Sunday	Total Trips (weekly)
Manufacturing	152.8	59.6	24.8	**848.4**

Trip Length Calc

AVG Trip Length = Link % primary x trip length primary+link % divertedx0.25x length trip primary+link % passbyx0.1

Trip length calculated for each trip type based on trip purpose % and length defaults from CalEEMod

Land Use

Manufacturing	link % primary	trip length primary	link % diverted	Constant (0.25)	trip length primary	link % passby	constant	Trip Length
H-W or c-w	92.0%	14.70	5.0%	0.25	14.7	3.0%	0.1	13.7
h-s or c-c	92.0%	6.60	5.0%	0.25	6.6	3.0%	0.1	6.2
h-o or c-o	92.0%	6.60	5.0%	0.25	6.6	3.0%	0.1	6.2

VMT Calc Per Land Use Type (Weekly)

VMT = #Trips x AVG Trip Length per land use and trip type

Trip number for each trip type are derived by multiplying the total trips for each land use calculated above in the Total Trip Calcs by the trip % shown in the Trip Type table for each land use

Manufacturing	# trips	trip length	Weekly VMT	Annual VMT
H-W or c-w	501	13.7	6,863	
h-s or c-c	238	6.2	1,463	
h-o or c-o	110	6.2	679	
Total VMT			9,005	468,252.08

Annual VMT Calc

the calculated weekly VMT for each land use is summed. This value is multiplied by 50 weeks/year to equal the annual VMT number calculated by CalEEMod

Summed Weekly VMT from Each Land Use	9,004.85			
Weeks per Year CalEEMod Uses for Annual VMT	52.00		52.0000	52.14285714
Calculated Annual VMT	**468,252**	468,252		

VMT Estimate from Traffic Study

CalEEMod VMT Calculator (MITIGATED SCENARIO)

Daily VMT Provided by Traffic Study	**6,379**	23.37	
Annual VMT	**2,213,513**		6379

Trip Type

CalEEMod defaults based on land uses inputted

Land Use	Miles			Trip %			Trip Purpose		
	H-w or C-W	H-S or C-C	H-O or C-O	H-w or C-W	H-S or C-C	H-O or C-O	Primary	Diverted	Pass-by
Manufacturing	70.09	20.00	10.00	59.0%	28.0%	13.0%	92.0%	5.0%	3.0%

Total Trips

Total Trips = (TripRate weekday x 5 +Trip Sat + Trip Sun)

Average Daily Trips Based on CalEEMod Trip Gen Defaults per land use unit. Total trips Calculated

Land Use	Average Daily Trip Rate			
	weekday	Saturday	Sunday	Total Trips (weekly)
Manufacturing	170.37	66.45	27.65	**945.95**

Trip Length Calc

AVG Trip Length = Link % primary x trip length primary+link % divertedx0.25x length trip primary+link % passbyx0.1

Trip length calculated for each trip type based on trip purpose % and length defaults from CalEEMod

Land Use

Manufacturing	link % primary	trip length primary	link % diverted	Constant (0.25)	trip length primary	link % passby	constant	Trip Length
H-W or c-w	92.0%	70.09	5.0%	0.25	70.09	3.0%	0.1	65.4
h-s or c-c	92.0%	20.00	5.0%	0.25	20	3.0%	0.1	18.7
h-o or c-o	92.0%	10.00	5.0%	0.25	10	3.0%	0.1	9.3

VMT Calc Per Land Use Type (Weekly)

VMT = #Trips x AVG Trip Length per land use and trip type

Trip number for each trip type are derived by multiplying the total trips for each land use calculated above in the Total Trip Calcs by the trip % shown in the Trip Type table for each land use

Manufacturing	**# trips**	**trip length**	**Weekly VMT**	**Annual VMT**
H-W or c-w	558	65.4	36,479	
h-s or c-c	265	18.7	4,941	
h-o or c-o	123	9.3	1,147	
Total VMT			42,567	2,213,474.59

Annual VMT Calc

the calculated weekly VMT for each land use is summed. This value is multiplied by 50 weeks/year to equal the annual VMT number calculated by CalEEMod

Summed Weekly VMT from Each Land Use			42,566.82		
Weeks per Year CalEEMod Uses for Annual VMT			52.00		52.0000 52.14285714
Calculated Annual VMT			**2,213,475**	2,213,475	
			38		
				6,064	
VMT by Vehicle Type					
Proposed (Trucks)	5461	0.856090296			
Proposed (Passenger Cars)	918	0.143909704			
Total	6379	1			
Existing (Trucks)	4514				
Existing (Passenger Cars)	924				
Existing + Proposed (Trucks)	9975				
Existing + Proposed (Passenger Cars)	1842				

Energy Usage

Natural Gas (Stationary Source)	Amount	Unit				
			679.4666667	mcf/day	10166	kbtu/sf/yr
Usage	244,608	mcf/year	0.06		10.166	mmbtu/sf/year
18% from WWTP	44,029	mcf/year	244.61	mmcf/year	453403.6	mmbtu/yr total project of 44600 sf
Usage from nonrenewables	200,579	mcf/year	4164			
Total Usage	2,069,971	therm	0.679466667	mmcf/day		
Total Usage	206,947,602	KBTU				
	205,793,602,560.00	BTU	250,967,808,000.00			
	205,793.60	MMBTU	250,967.81			
PG&E GHG Intensity Factor (2020)	0.00531	MT CO2/therm	Source: https://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf			
CalEEMod Boiler Emission Factors						
ROG	0.005392157	lb/MMBTU				
NOX	0.0062	lb/MMBTU				
PM10	0.00745098	lb/MMBTU				
PM2.5	0.00745098	lb/MMBTU				
CO	0.08235294	lb/MMBTU				
SOX	0.00058824	lb/MMBTU				

Electricity Usage (Building Energy)	Amount	Unit	
Usage (kwh)	4349700	kWh	
Usage (MWh)	4,350	MWh	
PG&E GHG Intensity Factor (2020)	0.131	MT CO2/MWh	Source: https://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

Conversion Factors	Amount	Unit
	10.32	therm/mcf
	99976.1	BTU/therm
	1020	BTU/scf
	1	kwh
	0.001	MWh
	1020000	BTU/mcf

Energy Calculations Summary

Construction Fuel Usage Summary

	Diesel	Gasoline	Diesel	Diesel
Construction Phase	**Off-road Equipment (gallons)**	**On-road (gallons)**	**On-road (gallons)**	**Total**
1	13,084	3,295,502	35,363	48,447
2	10,549	2,968,923	30,925	41,474
TOTAL	**23,633**	**6,264,426**	**66,288**	**89,921**

Total Gasoline	**6,264,426**	**gallons**
Total Diesel	**89,921**	**gallons**

Year 1 Construction Offroad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor	Number of days	Average Daily Factor	Diesel Fuel Usage
Site Preparation	Rubber Tired Dozers	1	7	247	0.4	5	0.6	104
Site Preparation	Tractors/Loaders/Backhoes	1	8	97	0.37	5	0.6	43
Site Preparation	Graders	1	8	187	0.41	5	0.6	92
Grading	Rubber Tired Dozers	1	6.00	247	0.40	9	0.6	160
Grading	Graders	1	6.00	187	0.41	9	0.6	124
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37	9	0.6	68
Building Construction	Cranes	1	6.00	231	0.29	247	0.6	2,978
Building Construction	Forklifts	1	6.00	89	0.20	247	0.6	791
Building Construction	Generator Sets	1	8.00	84	0.74	247	0.6	3,685
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37	247	0.6	1,596
Building Construction	Welders	3	8.00	46	0.45	247	0.6	3,681
							TOTAL	**13,084**

Notes: Equipment assumptions are consistent with CalEEMod. Fuel usage average of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Trips and VMT

Phase Name	Daily Worker Trip	Daily Vendor Trip	Days per Year	Total Worker Trips	Total Vendor Trips	Worker Trip Length (miles)	Vendor Trip Length (miles)	Total Worker Trip Length (miles)	Total Vendor Trip Length (miles)	Average Daily Factor (worker and vendor)	**Total gallons of gasoline**	**Total gallons of diesel**
Site Preparation	8	0	5	40	0	16.80	6.60	672	0	0.6	0	0
Building Construction	50	7	247	12,350	1,729	16.80	6.60	207,480.00	11,411.40	0.6	3,276,401	35,363
Grading	8	0	9	72	0	16.80	6.60	1,209.60	0.00	0.6	19,101	0
										TOTAL	**3,295,502**	**35,363**

Notes: Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor trips are assumed to be 100% diesel Heavy-Duty Trucks (T7).

Year 2 Construction Offroad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor	Number of days	Average Daily Factor	Diesel Fuel Usage
Building Construction	Cranes	1	6.00	231	0.29	216	0.6	2,605
Building Construction	Forklifts	1	6.00	89	0.20	216	0.6	692
Building Construction	Generator Sets	1	8.00	84	0.74	216	0.6	3,222
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37	216	0.6	
Building Construction	Welders	3	8.00	46	0.45	216	0.6	3,219
Paving	Cement and Mortar Mixers	1	6.00	9	0.56	23	0.6	21
Paving	Pavers	1	6.00	130	0.42	23	0.6	226
Paving	Paving Equipment	1	8.00	132	0.36	23	0.6	262
Paving	Rollers	1	7.00	80	0.38	23	0.6	147
Architectural Coating	Air Compressors	1	6.00	78	0.48	23	0.6	155
							TOTAL	**10,549**

Notes: Equipment assumptions are consistent with CalEEMod. Fuel usage average of 0.05 gallons of diesel fuel per horsepower-hour is from the SCAQMD CEQA Air Quality Handbook, Table A9-3E.

Trips and VMT

Phase Name	Daily Worker Trip	Daily Vendor Trip	Days per Year	Total Worker Trips	Total Vendor Trips	Worker Trip Length (miles)	Vendor Trip Length (miles)	Total Worker Trip Length (miles)	Total Vendor Trip Length (miles)	Average Daily Factor (worker and vendor)	**Total gallons of gasoline**	**Total gallons of diesel**
Architectural Coating	4	0	23	92	0	16.80	6.60	1,545.60	0.00	0.6	24,407	0
Building Construction	50	7	216	10,800	1,512	16.80	6.60	181,440.00	9,979.20	0.6	2,865,193	30,925
Paving	13	0	23	299	0	16.80	6.60	5,023.20	0.00	0.6	79,323	0
										TOTAL	**2,968,923**	**30,925**

Notes: Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor trips are assumed to be 100% diesel Heavy-Duty Trucks (T7).

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: County
Region: FRESNO
Calendar Year: 2019
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	CalYr	VehClass	MdlYr	Speed miles/hr	Fuel	Population vehicles	VMT miles/day	Trips trips/day	Fuel gas 1,000 gallons/day	Diesel gas 1,000 gallons/day	Miles per gallon	Gasoline miles per gallon	Diesel miles per gallon
FRESNO	2019	LDA	Aggregated	Aggregated	GAS	339,447	13,160,429	1,589,637	451.8	0.00	29.13	26.32	5.16
FRESNO	2019	LDT1	Aggregated	Aggregated	GAS	37,867	1,308,457	168,842	53.0	0.00	24.69		
FRESNO	2019	LDT2	Aggregated	Aggregated	GAS	126,073	4,656,414	579,854	208.5	0.00	22.33		
FRESNO	2019	T7 tractor construction	Aggregated	Aggregated	DSL	653	45,743	2,950	0.00	8.86	5.16		

Notes: Consistent with CalEEMod, worker vehicles assumed to be gasoline and 50% LDA, 25% LDT1, and 25% LDT2. Vendor trips are assumed to be 100% diesel Heavy-Duty Trucks (T7).

EMFAC2017 (v1.0.2) Emissions Inventory
Region Type: County
Region: FRESNO
Calendar Year: 2021
Season: Annual
Vehicle Classification: EMFAC2007 Categories
Units: miles/day for VMT, trips/day for Trips, tons/day for Emissions, 1000 gallons/day for Fuel Consumption

Region	CalYr	VehClass	Class	MdlYr	Speed	Fuel	Population	VMT (mi/day)	% of vehicle class EI	% CalEEMod vehicle	% project vehicle cla
FRESNO	2021	HHDT	Truck	Aggregatec	Aggregatec	GAS	3.57828	472.6745653	0.000209341	0.124746	2.61145E-05
FRESNO	2021	HHDT	Truck	Aggregatec	Aggregatec	DSL	16286.77	2254835.323	0.998637246	0.124746	0.124576002
FRESNO	2021	HHDT	Truck	Aggregatec	Aggregatec	NG	63.83813	2604.304657	0.001153413	0.124746	0.000143884
FRESNO	2021	LDA	Passenger	Aggregatec	Aggregatec	GAS	360187	13826269.44	0.975836127	0.487139	0.475367835
FRESNO	2021	LDA	Passenger	Aggregatec	Aggregatec	DSL	2734.669	113419.567	0.008004973	0.487139	0.003899534
FRESNO	2021	LDA	Passenger	Aggregatec	Aggregatec	ELEC	5771.621	228949.6144	0.0161589	0.487139	0.00787163
FRESNO	2021	LDT1	Passenger	Aggregatec	Aggregatec	GAS	39099.95	1354856.639	0.995662603	0.031901	0.031762633
FRESNO	2021	LDT1	Passenger	Aggregatec	Aggregatec	DSL	29.87394	419.4733253	0.000308264	0.031901	9.83394E-06
FRESNO	2021	LDT1	Passenger	Aggregatec	Aggregatec	ELEC	129.7655	5482.677129	0.004029132	0.031901	0.000128533
FRESNO	2021	LDT2	Passenger	Aggregatec	Aggregatec	GAS	129640	4712300.458	0.989992706	0.169199	0.167505776
FRESNO	2021	LDT2	Passenger	Aggregatec	Aggregatec	DSL	548.3315	23832.76525	0.005006952	0.169199	0.000847171
FRESNO	2021	LDT2	Passenger	Aggregatec	Aggregatec	ELEC	713.4992	23801.29738	0.005000341	0.169199	0.000846053
FRESNO	2021	LHDT1	Truck	Aggregatec	Aggregatec	GAS	10624.69	355805.1831	0.489070007	0.017033	0.008330329
FRESNO	2021	LHDT1	Truck	Aggregatec	Aggregatec	DSL	10656.83	371708.625	0.510929993	0.017033	0.008702671
FRESNO	2021	LHDT2	Passenger	Aggregatec	Aggregatec	GAS	1825.478	59952.66741	0.318375795	0.004732	0.001506554
FRESNO	2021	LHDT2	Truck	Aggregatec	Aggregatec	DSL	3628.562	128355.2011	0.681624205	0.004732	0.003225446
FRESNO	2021	MCY	Passenger	Aggregatec	Aggregatec	GAS	18423.29	148923.4391	1	0.005154	0.005154
FRESNO	2021	MDV	Truck	Aggregatec	Aggregatec	GAS	124848.7	4140987.568	0.977047613	0.121386	0.118599902
FRESNO	2021	MDV	Truck	Aggregatec	Aggregatec	DSL	2105.942	86518.70538	0.020413704	0.121386	0.002477938
FRESNO	2021	MDV	Truck	Aggregatec	Aggregatec	ELEC	312.4967	10759.61149	0.002538683	0.121386	0.000308161
FRESNO	2021	MH	Truck	Aggregatec	Aggregatec	GAS	1759.976	15220.55632	0.706943809	0.000629	0.000444668
FRESNO	2021	MH	Truck	Aggregatec	Aggregatec	DSL	722.7873	6309.523058	0.293056191	0.000629	0.000184332
FRESNO	2021	MHDT	Truck	Aggregatec	Aggregatec	GAS	926.1475	51879.6628	0.0729174	0.033028	0.002408316
FRESNO	2021	MHDT	Truck	Aggregatec	Aggregatec	DSL	9736.505	659605.6985	0.9270826	0.033028	0.030619684
FRESNO	2021	OBUS	Bus	Aggregatec	Aggregatec	GAS	343.9262	17738.4867	0.505932948	0.002366	0.001197037
FRESNO	2021	OBUS	Bus	Aggregatec	Aggregatec	DSL	223.1446	17322.4572	0.494067052	0.002366	0.001168963
FRESNO	2021	SBUS	Bus	Aggregatec	Aggregatec	GAS	86.90521	4894.756624	0.123552964	0.001097	0.000135538
FRESNO	2021	SBUS	Bus	Aggregatec	Aggregatec	DSL	1106.638	34721.91042	0.876447036	0.001097	0.000961462
FRESNO	2021	UBUS	Bus	Aggregatec	Aggregatec	GAS	78.4502	6763.939254	0.304064133	0.00159	0.000483462
FRESNO	2021	UBUS	Bus	Aggregatec	Aggregatec	DSL	20.05815	2067.837991	0.09295698	0.00159	0.000147802
FRESNO	2021	UBUS	Bus	Aggregatec	Aggregatec	NG	119.5189	13413.33	0.602978887	0.00159	0.000958736

Project VMT	2213513
Project Mobile Emissions (MT/yr)	1,191

	Gas (gal)	Diesel (gal)
Passenger	53,340	222
Truck	17,217	51,091
Total	70,557	51,312

VMT by project vehicle class (mi	Gallons of fuel	Trips	CO2_TOTEX (tons/day)	CO2 (lb/day)	Fuel_Consumption (1000 gal/day)	Fuel (gal/day)	mi/gal
57.80	14.56522163	71.59422	1.128350555	2,257	0.119101015	119.1010147	3.968686299
275,750.60	41964.91044	188748.1	3850.30133	7,700,603	343.1505226	343150.5226	6.570980297
318.49	139.4287968	248.9687	9.863937528	19,728	1.140120734	1140.120734	2.284235853
1,052,232.88	34291.11562	1691919	4268.775804	8,537,552	450.5829573	450582.9573	30.68529162
8,631.67	170.4861348	13041.17	25.13577417	50,272	2.240176367	2240.176367	50.62974894
17,423.96		28804.4	0	0	0	0	
70,307.00	2704.912261	175754.9	493.8289452	987,658	52.1252267	52125.2267	25.99234046
21.77	0.858066025	93.98396	0.185534866	371	0.01653543	16.53542952	25.36815417
284.51		660.239	0	0	0	0	
370,776.21	15579.51598	596970	1875.873964	3,751,748	198.0045045	198004.5045	23.79895583
1,875.22	50.39377268	2687.423	7.186344569	14,373	0.640468806	640.4688058	37.211438
1,872.75		3620.137	0	0	0	0	
18,439.29	2226.552347	158292.1	407.0328985	814,066	42.963626	42963.626	8.28154456
19,263.47	1089.36311	134049.5	235.8580676	471,716	21.02038574	21020.38574	17.68324471
3,334.78	462.9998937	27196.9	78.8589756	157,718	8.323817429	8323.817429	7.202544737
7,139.57	452.8707749	45642.74	91.35367114	182,707	8.141716014	8141.716014	15.76512874
11,408.45	301.5188521	36846.58	37.28890427	74,578	3.935963267	3935.963267	37.83659271
262,522.42	13641.62381	564003.9	2038.600729	4,077,201	215.1808357	215180.8357	19.24422105
5,484.95	202.6237364	10153.69	35.86227984	71,725	3.196155058	3196.155058	27.06962078
682.12		1601.534	0	0	0	0	
984.28	207.8174634	176.068	30.44552963	60,891	3.213623157	3213.623157	4.73626047
408.02	42.14719657	72.27873	7.312934036	14,626	0.651750843	651.7508427	9.680882086
5,330.84	1126.659155	18530.36	103.877802	207,756	10.96463468	10964.63468	4.731545038
67,777.07	7338.748749	89451.01	801.3711254	1,602,742	71.4206232	71420.6232	9.235507461
2,649.66	569.3872105	6881.275	36.1129594	72,226	3.81183852	3811.83852	4.653525224
2,587.51	344.9010093	2244.981	25.90784598	51,816	2.308985746	2308.985746	7.502193216
300.01	32.76418485	347.6208	5.064273868	10,129	0.534550326	534.5503256	9.156774189
2,128.21	267.9601106	12770.45	49.05343606	98,107	4.371790876	4371.790876	7.94226243
1,070.15	239.8224055	313.8008	14.36063495	28,721	1.515811011	1515.811011	4.462257633
327.16	42.63621195	80.23259	3.02373669	6,047	0.269484577	269.4845771	7.673307371
2,122.18	488.4697807	478.0756	26.71114305	53,422	3.087400739	3087.400739	4.344538054

Gasoline Sum	71,159
Diesel Sum	51,657

Darling Ingredients

Fresno County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Manufacturing	44.60	1000sqft	1.02	44,600.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	290	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Adjusted PG&E CO2 intensity factor based on RPS. Source: https://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

Land Use - project total floor area of 44,600 sq ft.

Construction Phase - Construction anticipated to last 18-24 months (used more conservative 24 months).

Trips and VMT - Up to 50 workers per Project Description. Assumed to occur during most intense construction phase.

Vehicle Trips - Trip lengths adjusted to match traffic study.

Energy Use - 2019 Title 24 Part 6 Standards result in 30 percent reduction in energy demand over 2016 Standards. Source: http://www.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf

Water And Wastewater - 75,000 gallons of water/day demand.

Stationary Sources - Emergency Generators and Fire Pumps -

Stationary Sources - Process Boilers -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	200.00	463.00
tblConstructionPhase	NumDays	4.00	9.00
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	2.00	5.00
tblConstructionPhase	PhaseEndDate	12/10/2019	12/31/2020
tblConstructionPhase	PhaseEndDate	11/12/2019	10/28/2020
tblConstructionPhase	PhaseEndDate	2/5/2019	1/18/2019
tblConstructionPhase	PhaseEndDate	11/26/2019	11/30/2020
tblConstructionPhase	PhaseEndDate	1/30/2019	1/7/2019
tblConstructionPhase	PhaseStartDate	11/27/2019	12/1/2020
tblConstructionPhase	PhaseStartDate	2/6/2019	1/19/2019
tblConstructionPhase	PhaseStartDate	1/31/2019	1/8/2019
tblConstructionPhase	PhaseStartDate	11/13/2019	10/29/2020
tblConstructionPhase	PhaseStartDate	1/29/2019	1/1/2019
tblEnergyUse	NT24E	4.16	2.91
tblEnergyUse	T24E	1.96	1.37
tblGrading	AcresOfGrading	3.38	1.50
tblGrading	AcresOfGrading	2.50	1.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	290
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	19.00	50.00
tblVehicleTrips	CC_TL	6.60	20.00
tblVehicleTrips	CNW_TL	6.60	10.00
tblVehicleTrips	CW_TL	14.70	70.09
tblWater	IndoorWaterUseRate	10,313,750.00	27,375,000.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.3359	2.2348	2.0141	3.8200e-003	0.1175	0.1199	0.2374	0.0406	0.1155	0.1562	0.0000	325.9481	325.9481	0.0514	0.0000	327.2335
2020	0.5780	1.8262	1.7861	3.4300e-003	0.0741	0.0935	0.1676	0.0198	0.0901	0.1099	0.0000	291.0213	291.0213	0.0450	0.0000	292.1451
Maximum	**0.5780**	**2.2348**	**2.0141**	**3.8200e-003**	**0.1175**	**0.1199**	**0.2374**	**0.0406**	**0.1155**	**0.1562**	**0.0000**	**325.9481**	**325.9481**	**0.0514**	**0.0000**	**327.2335**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2019	0.3358	2.2348	2.0141	3.8200e-003	0.1175	0.1199	0.2374	0.0406	0.1155	0.1562	0.0000	325.9478	325.9478	0.0514	0.0000	327.2333
2020	0.5780	1.8262	1.7861	3.4300e-003	0.0741	0.0935	0.1676	0.0198	0.0901	0.1099	0.0000	291.0210	291.0210	0.0450	0.0000	292.1448
Maximum	**0.5780**	**2.2348**	**2.0141**	**3.8200e-003**	**0.1175**	**0.1199**	**0.2374**	**0.0406**	**0.1155**	**0.1562**	**0.0000**	**325.9478**	**325.9478**	**0.0514**	**0.0000**	**327.2333**

Darling Ingredients - Fresno County, Annual

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	1-1-2019	3-31-2019	0.6311	0.6311
2	4-1-2019	6-30-2019	0.6418	0.6418
3	7-1-2019	9-30-2019	0.6489	0.6489
4	10-1-2019	12-31-2019	0.6503	0.6503
5	1-1-2020	3-31-2020	0.5921	0.5921
6	4-1-2020	6-30-2020	0.5909	0.5909
7	7-1-2020	9-30-2020	0.5974	0.5974
		Highest	0.6503	0.6503

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2052	0.0000	4.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	8.0000e-004	8.0000e-004	0.0000	0.0000	8.5000e-004
Energy	5.0200e-003	0.0456	0.0383	2.7000e-004		3.4700e-003	3.4700e-003		3.4700e-003	3.4700e-003	0.0000	90.6212	90.6212	5.0500e-003	1.7600e-003	91.2712
Mobile	0.1468	1.9419	2.2693	0.0128	0.8486	0.0120	0.8606	0.2288	0.0114	0.2401	0.0000	1,189.9347	1,189.9347	0.0465	0.0000	1,191.0970
Waste						0.0000	0.0000		0.0000	0.0000	11.2254	0.0000	11.2254	0.6634	0.0000	27.8105
Water						0.0000	0.0000		0.0000	0.0000	8.6848	19.4848	28.1696	0.8940	0.0215	56.9154
Total	**0.3571**	**1.9875**	**2.3081**	**0.0131**	**0.8486**	**0.0155**	**0.8641**	**0.2288**	**0.0148**	**0.2436**	**19.9102**	**1,300.0415**	**1,319.9517**	**1.6089**	**0.0232**	**1,367.0949**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.2052	0.0000	4.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	8.0000e-004	8.0000e-004	0.0000	0.0000	8.5000e-004
Energy	5.0200e-003	0.0456	0.0383	2.7000e-004		3.4700e-003	3.4700e-003		3.4700e-003	3.4700e-003	0.0000	90.6212	90.6212	5.0500e-003	1.7600e-003	91.2712
Mobile	0.1468	1.9419	2.2693	0.0128	0.8486	0.0120	0.8606	0.2288	0.0114	0.2401	0.0000	1,189.934 7	1,189.934 7	0.0465	0.0000	1,191.097 0
Waste						0.0000	0.0000		0.0000	0.0000	11.2254	0.0000	11.2254	0.6634	0.0000	27.8105
Water						0.0000	0.0000		0.0000	0.0000	8.6848	19.4848	28.1696	0.8940	0.0215	56.9154
Total	**0.3571**	**1.9875**	**2.3081**	**0.0131**	**0.8486**	**0.0155**	**0.8641**	**0.2288**	**0.0148**	**0.2436**	**19.9102**	**1,300.041 5**	**1,319.951 7**	**1.6089**	**0.0232**	**1,367.094 9**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2019	1/7/2019	5	5	
2	Grading	Grading	1/8/2019	1/18/2019	5	9	
3	Building Construction	Building Construction	1/19/2019	10/28/2020	5	463	
4	Paving	Paving	10/29/2020	11/30/2020	5	23	
5	Architectural Coating	Architectural Coating	12/1/2020	12/31/2020	5	23	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 66,900; Non-Residential Outdoor: 22,300; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	6.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Paving	Paving Equipment	1	8.00	132	0.36
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Building Construction	Welders	3	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	50.00	7.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	4.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0137	0.0000	0.0137	7.3000e-003	0.0000	7.3000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.2800e-003	0.0487	0.0197	4.0000e-005		2.2100e-003	2.2100e-003		2.0300e-003	2.0300e-003	0.0000	3.8667	3.8667	1.2200e-003	0.0000	3.8973
Total	**4.2800e-003**	**0.0487**	**0.0197**	**4.0000e-005**	**0.0137**	**2.2100e-003**	**0.0159**	**7.3000e-003**	**2.0300e-003**	**9.3300e-003**	**0.0000**	**3.8667**	**3.8667**	**1.2200e-003**	**0.0000**	**3.8973**

3.2 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	9.0000e-005	9.0000e-004	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2198	0.2198	1.0000e-005	0.0000	0.2200
Total	**1.3000e-004**	**9.0000e-005**	**9.0000e-004**	**0.0000**	**2.5000e-004**	**0.0000**	**2.5000e-004**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.2198**	**0.2198**	**1.0000e-005**	**0.0000**	**0.2200**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0137	0.0000	0.0137	7.3000e-003	0.0000	7.3000e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.2800e-003	0.0487	0.0197	4.0000e-005		2.2100e-003	2.2100e-003		2.0300e-003	2.0300e-003	0.0000	3.8667	3.8667	1.2200e-003	0.0000	3.8973
Total	**4.2800e-003**	**0.0487**	**0.0197**	**4.0000e-005**	**0.0137**	**2.2100e-003**	**0.0159**	**7.3000e-003**	**2.0300e-003**	**9.3300e-003**	**0.0000**	**3.8667**	**3.8667**	**1.2200e-003**	**0.0000**	**3.8973**

3.2 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.3000e-004	9.0000e-005	9.0000e-004	0.0000	2.5000e-004	0.0000	2.5000e-004	7.0000e-005	0.0000	7.0000e-005	0.0000	0.2198	0.2198	1.0000e-005	0.0000	0.2200
Total	**1.3000e-004**	**9.0000e-005**	**9.0000e-004**	**0.0000**	**2.5000e-004**	**0.0000**	**2.5000e-004**	**7.0000e-005**	**0.0000**	**7.0000e-005**	**0.0000**	**0.2198**	**0.2198**	**1.0000e-005**	**0.0000**	**0.2200**

3.3 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0211	0.0000	0.0211	0.0113	0.0000	0.0113	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.3900e-003	0.0722	0.0297	6.0000e-005		3.3100e-003	3.3100e-003		3.0500e-003	3.0500e-003	0.0000	5.7005	5.7005	1.8000e-003	0.0000	5.7456
Total	**6.3900e-003**	**0.0722**	**0.0297**	**6.0000e-005**	**0.0211**	**3.3100e-003**	**0.0244**	**0.0113**	**3.0500e-003**	**0.0143**	**0.0000**	**5.7005**	**5.7005**	**1.8000e-003**	**0.0000**	**5.7456**

3.3 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	1.7000e-004	1.6200e-003	0.0000	4.5000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3957	0.3957	1.0000e-005	0.0000	0.3960
Total	**2.4000e-004**	**1.7000e-004**	**1.6200e-003**	**0.0000**	**4.5000e-004**	**0.0000**	**4.5000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3957**	**0.3957**	**1.0000e-005**	**0.0000**	**0.3960**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0211	0.0000	0.0211	0.0113	0.0000	0.0113	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.3900e-003	0.0722	0.0297	6.0000e-005		3.3100e-003	3.3100e-003		3.0500e-003	3.0500e-003	0.0000	5.7005	5.7005	1.8000e-003	0.0000	5.7456
Total	**6.3900e-003**	**0.0722**	**0.0297**	**6.0000e-005**	**0.0211**	**3.3100e-003**	**0.0244**	**0.0113**	**3.0500e-003**	**0.0143**	**0.0000**	**5.7005**	**5.7005**	**1.8000e-003**	**0.0000**	**5.7456**

3.3 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.4000e-004	1.7000e-004	1.6200e-003	0.0000	4.5000e-004	0.0000	4.5000e-004	1.2000e-004	0.0000	1.2000e-004	0.0000	0.3957	0.3957	1.0000e-005	0.0000	0.3960
Total	**2.4000e-004**	**1.7000e-004**	**1.6200e-003**	**0.0000**	**4.5000e-004**	**0.0000**	**4.5000e-004**	**1.2000e-004**	**0.0000**	**1.2000e-004**	**0.0000**	**0.3957**	**0.3957**	**1.0000e-005**	**0.0000**	**0.3960**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2806	1.9736	1.6657	2.7200e-003		0.1131	0.1131		0.1092	0.1092	0.0000	226.0938	226.0938	0.0435	0.0000	227.1804
Total	**0.2806**	**1.9736**	**1.6657**	**2.7200e-003**		**0.1131**	**0.1131**		**0.1092**	**0.1092**	**0.0000**	**226.0938**	**226.0938**	**0.0435**	**0.0000**	**227.1804**

3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.7300e-003	0.1117	0.0190	2.3000e-004	5.1800e-003	7.7000e-004	5.9500e-003	1.5000e-003	7.4000e-004	2.2400e-003	0.0000	21.7981	21.7981	2.9700e-003	0.0000	21.8724
Worker	0.0405	0.0284	0.2775	7.5000e-004	0.0768	4.9000e-004	0.0772	0.0204	4.5000e-004	0.0208	0.0000	67.8734	67.8734	1.9400e-003	0.0000	67.9219
Total	**0.0442**	**0.1401**	**0.2964**	**9.8000e-004**	**0.0819**	**1.2600e-003**	**0.0832**	**0.0219**	**1.1900e-003**	**0.0231**	**0.0000**	**89.6715**	**89.6715**	**4.9100e-003**	**0.0000**	**89.7943**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2806	1.9736	1.6657	2.7200e-003		0.1131	0.1131		0.1092	0.1092	0.0000	226.0935	226.0935	0.0435	0.0000	227.1802
Total	**0.2806**	**1.9736**	**1.6657**	**2.7200e-003**		**0.1131**	**0.1131**		**0.1092**	**0.1092**	**0.0000**	**226.0935**	**226.0935**	**0.0435**	**0.0000**	**227.1802**

3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.7300e-003	0.1117	0.0190	2.3000e-004	5.1800e-003	7.7000e-004	5.9500e-003	1.5000e-003	7.4000e-004	2.2400e-003	0.0000	21.7981	21.7981	2.9700e-003	0.0000	21.8724
Worker	0.0405	0.0284	0.2775	7.5000e-004	0.0768	4.9000e-004	0.0772	0.0204	4.5000e-004	0.0208	0.0000	67.8734	67.8734	1.9400e-003	0.0000	67.9219
Total	**0.0442**	**0.1401**	**0.2964**	**9.8000e-004**	**0.0819**	**1.2600e-003**	**0.0832**	**0.0219**	**1.1900e-003**	**0.0231**	**0.0000**	**89.6715**	**89.6715**	**4.9100e-003**	**0.0000**	**89.7943**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2193	1.5971	1.4243	2.3800e-003		0.0860	0.0860		0.0830	0.0830	0.0000	196.0655	196.0655	0.0364	0.0000	196.9754
Total	**0.2193**	**1.5971**	**1.4243**	**2.3800e-003**		**0.0860**	**0.0860**		**0.0830**	**0.0830**	**0.0000**	**196.0655**	**196.0655**	**0.0364**	**0.0000**	**196.9754**

3.4 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6600e-003	0.0898	0.0142	2.0000e-004	4.5300e-003	4.5000e-004	4.9800e-003	1.3100e-003	4.3000e-004	1.7400e-003	0.0000	18.8989	18.8989	2.5100e-003	0.0000	18.9616
Worker	0.0324	0.0219	0.2166	6.4000e-004	0.0671	4.1000e-004	0.0675	0.0178	3.8000e-004	0.0182	0.0000	57.5080	57.5080	1.4800e-003	0.0000	57.5450
Total	**0.0350**	**0.1117**	**0.2308**	**8.4000e-004**	**0.0717**	**8.6000e-004**	**0.0725**	**0.0192**	**8.1000e-004**	**0.0200**	**0.0000**	**76.4070**	**76.4070**	**3.9900e-003**	**0.0000**	**76.5066**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.2193	1.5971	1.4243	2.3800e-003		0.0860	0.0860		0.0830	0.0830	0.0000	196.0653	196.0653	0.0364	0.0000	196.9752
Total	**0.2193**	**1.5971**	**1.4243**	**2.3800e-003**		**0.0860**	**0.0860**		**0.0830**	**0.0830**	**0.0000**	**196.0653**	**196.0653**	**0.0364**	**0.0000**	**196.9752**

3.4 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.6600e-003	0.0898	0.0142	2.0000e-004	4.5300e-003	4.5000e-004	4.9800e-003	1.3100e-003	4.3000e-004	1.7400e-003	0.0000	18.8989	18.8989	2.5100e-003	0.0000	18.9616
Worker	0.0324	0.0219	0.2166	6.4000e-004	0.0671	4.1000e-004	0.0675	0.0178	3.8000e-004	0.0182	0.0000	57.5080	57.5080	1.4800e-003	0.0000	57.5450
Total	**0.0350**	**0.1117**	**0.2308**	**8.4000e-004**	**0.0717**	**8.6000e-004**	**0.0725**	**0.0192**	**8.1000e-004**	**0.0200**	**0.0000**	**76.4070**	**76.4070**	**3.9900e-003**	**0.0000**	**76.5066**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.6600e-003	0.0972	0.1021	1.6000e-004		5.4000e-003	5.4000e-003		4.9800e-003	4.9800e-003	0.0000	13.5306	13.5306	4.2900e-003	0.0000	13.6378
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.6600e-003**	**0.0972**	**0.1021**	**1.6000e-004**		**5.4000e-003**	**5.4000e-003**		**4.9800e-003**	**4.9800e-003**	**0.0000**	**13.5306**	**13.5306**	**4.2900e-003**	**0.0000**	**13.6378**

3.5 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-004	6.1000e-004	6.0000e-003	2.0000e-005	1.8600e-003	1.0000e-005	1.8700e-003	4.9000e-004	1.0000e-005	5.0000e-004	0.0000	1.5921	1.5921	4.0000e-005	0.0000	1.5931
Total	**9.0000e-004**	**6.1000e-004**	**6.0000e-003**	**2.0000e-005**	**1.8600e-003**	**1.0000e-005**	**1.8700e-003**	**4.9000e-004**	**1.0000e-005**	**5.0000e-004**	**0.0000**	**1.5921**	**1.5921**	**4.0000e-005**	**0.0000**	**1.5931**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.6600e-003	0.0972	0.1021	1.6000e-004		5.4000e-003	5.4000e-003		4.9800e-003	4.9800e-003	0.0000	13.5305	13.5305	4.2900e-003	0.0000	13.6378
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**9.6600e-003**	**0.0972**	**0.1021**	**1.6000e-004**		**5.4000e-003**	**5.4000e-003**		**4.9800e-003**	**4.9800e-003**	**0.0000**	**13.5305**	**13.5305**	**4.2900e-003**	**0.0000**	**13.6378**

3.5 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.0000e-004	6.1000e-004	6.0000e-003	2.0000e-005	1.8600e-003	1.0000e-005	1.8700e-003	4.9000e-004	1.0000e-005	5.0000e-004	0.0000	1.5921	1.5921	4.0000e-005	0.0000	1.5931
Total	**9.0000e-004**	**6.1000e-004**	**6.0000e-003**	**2.0000e-005**	**1.8600e-003**	**1.0000e-005**	**1.8700e-003**	**4.9000e-004**	**1.0000e-005**	**5.0000e-004**	**0.0000**	**1.5921**	**1.5921**	**4.0000e-005**	**0.0000**	**1.5931**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3101					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7900e-003	0.0194	0.0211	3.0000e-005		1.2800e-003	1.2800e-003		1.2800e-003	1.2800e-003	0.0000	2.9362	2.9362	2.3000e-004	0.0000	2.9419
Total	**0.3129**	**0.0194**	**0.0211**	**3.0000e-005**		**1.2800e-003**	**1.2800e-003**		**1.2800e-003**	**1.2800e-003**	**0.0000**	**2.9362**	**2.9362**	**2.3000e-004**	**0.0000**	**2.9419**

3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-004	1.9000e-004	1.8400e-003	1.0000e-005	5.7000e-004	0.0000	5.8000e-004	1.5000e-004	0.0000	1.6000e-004	0.0000	0.4899	0.4899	1.0000e-005	0.0000	0.4902
Total	**2.8000e-004**	**1.9000e-004**	**1.8400e-003**	**1.0000e-005**	**5.7000e-004**	**0.0000**	**5.8000e-004**	**1.5000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.4899**	**0.4899**	**1.0000e-005**	**0.0000**	**0.4902**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.3101					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.7900e-003	0.0194	0.0211	3.0000e-005		1.2800e-003	1.2800e-003		1.2800e-003	1.2800e-003	0.0000	2.9362	2.9362	2.3000e-004	0.0000	2.9419
Total	**0.3129**	**0.0194**	**0.0211**	**3.0000e-005**		**1.2800e-003**	**1.2800e-003**		**1.2800e-003**	**1.2800e-003**	**0.0000**	**2.9362**	**2.9362**	**2.3000e-004**	**0.0000**	**2.9419**

3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.8000e-004	1.9000e-004	1.8400e-003	1.0000e-005	5.7000e-004	0.0000	5.8000e-004	1.5000e-004	0.0000	1.6000e-004	0.0000	0.4899	0.4899	1.0000e-005	0.0000	0.4902
Total	**2.8000e-004**	**1.9000e-004**	**1.8400e-003**	**1.0000e-005**	**5.7000e-004**	**0.0000**	**5.8000e-004**	**1.5000e-004**	**0.0000**	**1.6000e-004**	**0.0000**	**0.4899**	**0.4899**	**1.0000e-005**	**0.0000**	**0.4902**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Mitigated	0.1468	1.9419	2.2693	0.0128	0.8486	0.0120	0.8606	0.2288	0.0114	0.2401	0.0000	1,189.9347	1,189.9347	0.0465	0.0000	1,191.0970
Unmitigated	0.1468	1.9419	2.2693	0.0128	0.8486	0.0120	0.8606	0.2288	0.0114	0.2401	0.0000	1,189.9347	1,189.9347	0.0465	0.0000	1,191.0970

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Manufacturing	170.37	66.45	27.65	2,213,512	2,213,512
Total	170.37	66.45	27.65	2,213,512	2,213,512

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Manufacturing	70.09	20.00	10.00	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Manufacturing	0.487139	0.031901	0.169199	0.121386	0.017033	0.004732	0.033028	0.124746	0.002366	0.001590	0.005154	0.001097	0.000629

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	40.9500	40.9500	4.1000e-003	8.5000e-004	41.3049
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	40.9500	40.9500	4.1000e-003	8.5000e-004	41.3049
NaturalGas Mitigated	5.0200e-003	0.0456	0.0383	2.7000e-004		3.4700e-003	3.4700e-003		3.4700e-003	3.4700e-003	0.0000	49.6711	49.6711	9.5000e-004	9.1000e-004	49.9663
NaturalGas Unmitigated	5.0200e-003	0.0456	0.0383	2.7000e-004		3.4700e-003	3.4700e-003		3.4700e-003	3.4700e-003	0.0000	49.6711	49.6711	9.5000e-004	9.1000e-004	49.9663

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Manufacturing	930802	5.0200e-003	0.0456	0.0383	2.7000e-004		3.4700e-003	3.4700e-003		3.4700e-003	3.4700e-003	0.0000	49.6711	49.6711	9.5000e-004	9.1000e-004	49.9663
Total		**5.0200e-003**	**0.0456**	**0.0383**	**2.7000e-004**		**3.4700e-003**	**3.4700e-003**		**3.4700e-003**	**3.4700e-003**	**0.0000**	**49.6711**	**49.6711**	**9.5000e-004**	**9.1000e-004**	**49.9663**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Manufacturing	930802	5.0200e-003	0.0456	0.0383	2.7000e-004		3.4700e-003	3.4700e-003		3.4700e-003	3.4700e-003	0.0000	49.6711	49.6711	9.5000e-004	9.1000e-004	49.9663
Total		**5.0200e-003**	**0.0456**	**0.0383**	**2.7000e-004**		**3.4700e-003**	**3.4700e-003**		**3.4700e-003**	**3.4700e-003**	**0.0000**	**49.6711**	**49.6711**	**9.5000e-004**	**9.1000e-004**	**49.9663**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Manufacturing	311308	40.9500	4.1000e-003	8.5000e-004	41.3049
Total		**40.9500**	**4.1000e-003**	**8.5000e-004**	**41.3049**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Manufacturing	311308	40.9500	4.1000e-003	8.5000e-004	41.3049
Total		**40.9500**	**4.1000e-003**	**8.5000e-004**	**41.3049**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.2052	0.0000	4.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	8.0000e-004	8.0000e-004	0.0000	0.0000	8.5000e-004
Unmitigated	0.2052	0.0000	4.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	8.0000e-004	8.0000e-004	0.0000	0.0000	8.5000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0310					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1742					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.0000e-005	0.0000	4.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	8.0000e-004	8.0000e-004	0.0000	0.0000	8.5000e-004
Total	**0.2052**	**0.0000**	**4.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**8.0000e-004**	**8.0000e-004**	**0.0000**	**0.0000**	**8.5000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0310					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.1742					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.0000e-005	0.0000	4.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	8.0000e-004	8.0000e-004	0.0000	0.0000	8.5000e-004
Total	**0.2052**	**0.0000**	**4.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**8.0000e-004**	**8.0000e-004**	**0.0000**	**0.0000**	**8.5000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	28.1696	0.8940	0.0215	56.9154
Unmitigated	28.1696	0.8940	0.0215	56.9154

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Manufacturing	27.375 / 0	28.1696	0.8940	0.0215	56.9154
Total		**28.1696**	**0.8940**	**0.0215**	**56.9154**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Manufacturing	27.375 / 0	28.1696	0.8940	0.0215	56.9154
Total		**28.1696**	**0.8940**	**0.0215**	**56.9154**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	11.2254	0.6634	0.0000	27.8105
Unmitigated	11.2254	0.6634	0.0000	27.8105

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Manufacturing	55.3	11.2254	0.6634	0.0000	27.8105
Total		**11.2254**	**0.6634**	**0.0000**	**27.8105**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Manufacturing	55.3	11.2254	0.6634	0.0000	27.8105
Total		**11.2254**	**0.6634**	**0.0000**	**27.8105**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Darling Ingredients

Fresno County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Manufacturing	44.60	1000sqft	1.02	44,600.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	45
Climate Zone	3			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	290	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Adjusted PG&E CO2 intensity factor based on RPS. Source: https://www.pge.com/includes/docs/pdfs/shared/environment/calculator/pge_ghg_emission_factor_info_sheet.pdf

Land Use - project total floor area of 44,600 sq ft.

Construction Phase - Construction anticipated to last 18-24 months (used more conservative 24 months).

Trips and VMT - Up to 50 workers per Project Description. Assumed to occur during most intense construction phase.

Vehicle Trips - Trip lengths adjusted to match traffic study.

Energy Use - 2019 Title 24 Part 6 Standards result in 30 percent reduction in energy demand over 2016 Standards. Source: http://www.energy.ca.gov/title24/2019standards/documents/2018_Title_24_2019_Building_Standards_FAQ.pdf

Water And Wastewater - 75,000 gallons of water/day demand.

Stationary Sources - Emergency Generators and Fire Pumps -

Stationary Sources - Process Boilers -

Darling Ingredients - Fresno County, Summer

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	200.00	463.00
tblConstructionPhase	NumDays	4.00	9.00
tblConstructionPhase	NumDays	10.00	23.00
tblConstructionPhase	NumDays	2.00	5.00
tblConstructionPhase	PhaseEndDate	12/10/2019	12/31/2020
tblConstructionPhase	PhaseEndDate	11/12/2019	10/28/2020
tblConstructionPhase	PhaseEndDate	2/5/2019	1/18/2019
tblConstructionPhase	PhaseEndDate	11/26/2019	11/30/2020
tblConstructionPhase	PhaseEndDate	1/30/2019	1/7/2019
tblConstructionPhase	PhaseStartDate	11/27/2019	12/1/2020
tblConstructionPhase	PhaseStartDate	2/6/2019	1/19/2019
tblConstructionPhase	PhaseStartDate	1/31/2019	1/8/2019
tblConstructionPhase	PhaseStartDate	11/13/2019	10/29/2020
tblConstructionPhase	PhaseStartDate	1/29/2019	1/1/2019
tblEnergyUse	NT24E	4.16	2.91
tblEnergyUse	T24E	1.96	1.37
tblGrading	AcresOfGrading	3.38	1.50
tblGrading	AcresOfGrading	2.50	1.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	290
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	WorkerTripNumber	19.00	50.00
tblVehicleTrips	CC_TL	6.60	20.00
tblVehicleTrips	CNW_TL	6.60	10.00
tblVehicleTrips	CW_TL	14.70	70.09
tblWater	IndoorWaterUseRate	10,313,750.00	27,375,000.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	2.6624	19.5163	16.2774	0.0306	5.5836	0.9260	6.4666	2.9465	0.8941	3.7588	0.0000	2,880.159 2	2,880.159 2	0.5425	0.0000	2,890.970 6
2020	27.2322	15.7985	15.6786	0.0304	0.6816	0.8039	1.4855	0.1817	0.7763	0.9580	0.0000	2,840.965 4	2,840.965 4	0.4155	0.0000	2,851.281 5
Maximum	**27.2322**	**19.5163**	**16.2774**	**0.0306**	**5.5836**	**0.9260**	**6.4666**	**2.9465**	**0.8941**	**3.7588**	**0.0000**	**2,880.159 2**	**2,880.159 2**	**0.5425**	**0.0000**	**2,890.970 6**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2019	2.6624	19.5163	16.2774	0.0306	5.5836	0.9260	6.4666	2.9465	0.8941	3.7588	0.0000	2,880.159 2	2,880.159 2	0.5425	0.0000	2,890.970 6
2020	27.2322	15.7985	15.6786	0.0304	0.6816	0.8039	1.4855	0.1817	0.7763	0.9580	0.0000	2,840.965 4	2,840.965 4	0.4155	0.0000	2,851.281 5
Maximum	**27.2322**	**19.5163**	**16.2774**	**0.0306**	**5.5836**	**0.9260**	**6.4666**	**2.9465**	**0.8941**	**3.7588**	**0.0000**	**2,880.159 2**	**2,880.159 2**	**0.5425**	**0.0000**	**2,890.970 6**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.1248	4.0000e-005	4.5700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.7600e-003	9.7600e-003	3.0000e-005		0.0104
Energy	0.0275	0.2500	0.2100	1.5000e-003		0.0190	0.0190		0.0190	0.0190		300.0168	300.0168	5.7500e-003	5.5000e-003	301.7996
Mobile	1.1020	12.9329	18.2139	0.0933	6.0344	0.0831	6.1175	1.6230	0.0787	1.7017		9,544.9419	9,544.9419	0.3590		9,553.9175
Total	**2.2543**	**13.1830**	**18.4284**	**0.0948**	**6.0344**	**0.1022**	**6.1365**	**1.6230**	**0.0977**	**1.7207**		**9,844.9684**	**9,844.9684**	**0.3648**	**5.5000e-003**	**9,855.7275**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.1248	4.0000e-005	4.5700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.7600e-003	9.7600e-003	3.0000e-005		0.0104
Energy	0.0275	0.2500	0.2100	1.5000e-003		0.0190	0.0190		0.0190	0.0190		300.0168	300.0168	5.7500e-003	5.5000e-003	301.7996
Mobile	1.1020	12.9329	18.2139	0.0933	6.0344	0.0831	6.1175	1.6230	0.0787	1.7017		9,544.9419	9,544.9419	0.3590		9,553.9175
Total	**2.2543**	**13.1830**	**18.4284**	**0.0948**	**6.0344**	**0.1022**	**6.1365**	**1.6230**	**0.0977**	**1.7207**		**9,844.9684**	**9,844.9684**	**0.3648**	**5.5000e-003**	**9,855.7275**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2019	1/7/2019	5	5	
2	Grading	Grading	1/8/2019	1/18/2019	5	9	
3	Building Construction	Building Construction	1/19/2019	10/28/2020	5	463	
4	Paving	Paving	10/29/2020	11/30/2020	5	23	
5	Architectural Coating	Architectural Coating	12/1/2020	12/31/2020	5	23	

Acres of Grading (Site Preparation Phase): 1

Acres of Grading (Grading Phase): 1.5

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 66,900; Non-Residential Outdoor: 22,300; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	1	6.00	78	0.48
Paving	Cement and Mortar Mixers	1	6.00	9	0.56
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Cranes	1	6.00	231	0.29
Building Construction	Forklifts	1	6.00	89	0.20
Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	6.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Grading	Rubber Tired Dozers	1	6.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	1	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Grading	Graders	1	6.00	187	0.41
Paving	Paving Equipment	1	8.00	132	0.36
Site Preparation	Rubber Tired Dozers	1	7.00	247	0.40
Building Construction	Welders	3	8.00	46	0.45

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	3	8.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	7	50.00	7.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	5	13.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	4.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.4814	0.0000	5.4814	2.9194	0.0000	2.9194			0.0000			0.0000
Off-Road	1.7123	19.4821	7.8893	0.0172		0.8824	0.8824		0.8118	0.8118		1,704.918 9	1,704.918 9	0.5394		1,718.404 4
Total	**1.7123**	**19.4821**	**7.8893**	**0.0172**	**5.4814**	**0.8824**	**6.3638**	**2.9194**	**0.8118**	**3.7311**		**1,704.918 9**	**1,704.918 9**	**0.5394**		**1,718.404 4**

3.2 Site Preparation - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0577	0.0342	0.4237	1.0700e-003	0.1022	6.3000e-004	0.1028	0.0271	5.8000e-004	0.0277		106.3671	106.3671	3.1000e-003		106.4446
Total	**0.0577**	**0.0342**	**0.4237**	**1.0700e-003**	**0.1022**	**6.3000e-004**	**0.1028**	**0.0271**	**5.8000e-004**	**0.0277**		**106.3671**	**106.3671**	**3.1000e-003**		**106.4446**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					5.4814	0.0000	5.4814	2.9194	0.0000	2.9194			0.0000			0.0000
Off-Road	1.7123	19.4821	7.8893	0.0172		0.8824	0.8824		0.8118	0.8118	0.0000	1,704.918 9	1,704.918 9	0.5394		1,718.404 4
Total	**1.7123**	**19.4821**	**7.8893**	**0.0172**	**5.4814**	**0.8824**	**6.3638**	**2.9194**	**0.8118**	**3.7311**	**0.0000**	**1,704.918 9**	**1,704.918 9**	**0.5394**		**1,718.404 4**

3.2 Site Preparation - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0577	0.0342	0.4237	1.0700e-003	0.1022	6.3000e-004	0.1028	0.0271	5.8000e-004	0.0277		106.3671	106.3671	3.1000e-003		106.4446
Total	**0.0577**	**0.0342**	**0.4237**	**1.0700e-003**	**0.1022**	**6.3000e-004**	**0.1028**	**0.0271**	**5.8000e-004**	**0.0277**		**106.3671**	**106.3671**	**3.1000e-003**		**106.4446**

3.3 Grading - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.6933	0.0000	4.6933	2.5018	0.0000	2.5018			0.0000			0.0000
Off-Road	1.4197	16.0357	6.6065	0.0141		0.7365	0.7365		0.6775	0.6775		1,396.3909	1,396.3909	0.4418		1,407.4359
Total	**1.4197**	**16.0357**	**6.6065**	**0.0141**	**4.6933**	**0.7365**	**5.4298**	**2.5018**	**0.6775**	**3.1793**		**1,396.3909**	**1,396.3909**	**0.4418**		**1,407.4359**

3.3 Grading - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0577	0.0342	0.4237	1.0700e-003	0.1022	6.3000e-004	0.1028	0.0271	5.8000e-004	0.0277		106.3671	106.3671	3.1000e-003		106.4446
Total	**0.0577**	**0.0342**	**0.4237**	**1.0700e-003**	**0.1022**	**6.3000e-004**	**0.1028**	**0.0271**	**5.8000e-004**	**0.0277**		**106.3671**	**106.3671**	**3.1000e-003**		**106.4446**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					4.6933	0.0000	4.6933	2.5018	0.0000	2.5018			0.0000			0.0000
Off-Road	1.4197	16.0357	6.6065	0.0141		0.7365	0.7365		0.6775	0.6775	0.0000	1,396.3909	1,396.3909	0.4418		1,407.4359
Total	**1.4197**	**16.0357**	**6.6065**	**0.0141**	**4.6933**	**0.7365**	**5.4298**	**2.5018**	**0.6775**	**3.1793**	**0.0000**	**1,396.3909**	**1,396.3909**	**0.4418**		**1,407.4359**

3.3 Grading - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0577	0.0342	0.4237	1.0700e-003	0.1022	6.3000e-004	0.1028	0.0271	5.8000e-004	0.0277		106.3671	106.3671	3.1000e-003		106.4446
Total	**0.0577**	**0.0342**	**0.4237**	**1.0700e-003**	**0.1022**	**6.3000e-004**	**0.1028**	**0.0271**	**5.8000e-004**	**0.0277**		**106.3671**	**106.3671**	**3.1000e-003**		**106.4446**

3.4 Building Construction - 2019

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2721	15.9802	13.4870	0.0220		0.9158	0.9158		0.8846	0.8846		2,018.0224	2,018.0224	0.3879		2,027.7210
Total	**2.2721**	**15.9802**	**13.4870**	**0.0220**		**0.9158**	**0.9158**		**0.8846**	**0.8846**		**2,018.0224**	**2,018.0224**	**0.3879**		**2,027.7210**

3.4 Building Construction - 2019

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0298	0.8921	0.1422	1.8800e-003	0.0429	6.2000e-003	0.0491	0.0124	5.9300e-003	0.0183		197.3425	197.3425	0.0251		197.9708
Worker	0.3606	0.2137	2.6482	6.6800e-003	0.6387	3.9300e-003	0.6426	0.1694	3.6200e-003	0.1730		664.7943	664.7943	0.0194		665.2787
Total	**0.3903**	**1.1059**	**2.7903**	**8.5600e-003**	**0.6816**	**0.0101**	**0.6917**	**0.1817**	**9.5500e-003**	**0.1913**		**862.1368**	**862.1368**	**0.0445**		**863.2496**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2721	15.9802	13.4870	0.0220		0.9158	0.9158		0.8846	0.8846	0.0000	2,018.0224	2,018.0224	0.3879		2,027.7210
Total	**2.2721**	**15.9802**	**13.4870**	**0.0220**		**0.9158**	**0.9158**		**0.8846**	**0.8846**	**0.0000**	**2,018.0224**	**2,018.0224**	**0.3879**		**2,027.7210**

3.4 Building Construction - 2019

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0298	0.8921	0.1422	1.8800e-003	0.0429	6.2000e-003	0.0491	0.0124	5.9300e-003	0.0183		197.3425	197.3425	0.0251		197.9708
Worker	0.3606	0.2137	2.6482	6.6800e-003	0.6387	3.9300e-003	0.6426	0.1694	3.6200e-003	0.1730		664.7943	664.7943	0.0194		665.2787
Total	**0.3903**	**1.1059**	**2.7903**	**8.5600e-003**	**0.6816**	**0.0101**	**0.6917**	**0.1817**	**9.5500e-003**	**0.1913**		**862.1368**	**862.1368**	**0.0445**		**863.2496**

3.4 Building Construction - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688		2,001.1595	2,001.1595	0.3715		2,010.4467
Total	**2.0305**	**14.7882**	**13.1881**	**0.0220**		**0.7960**	**0.7960**		**0.7688**	**0.7688**		**2,001.1595**	**2,001.1595**	**0.3715**		**2,010.4467**

3.4 Building Construction - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0242	0.8218	0.1215	1.8700e-003	0.0429	4.1500e-003	0.0471	0.0124	3.9700e-003	0.0163		195.6634	195.6634	0.0242		196.2692
Worker	0.3295	0.1885	2.3690	6.4700e-003	0.6387	3.8100e-003	0.6425	0.1694	3.5100e-003	0.1729		644.1426	644.1426	0.0169		644.5656
Total	**0.3537**	**1.0102**	**2.4905**	**8.3400e-003**	**0.6816**	**7.9600e-003**	**0.6895**	**0.1817**	**7.4800e-003**	**0.1892**		**839.8059**	**839.8059**	**0.0412**		**840.8348**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.0305	14.7882	13.1881	0.0220		0.7960	0.7960		0.7688	0.7688	0.0000	2,001.1595	2,001.1595	0.3715		2,010.4467
Total	**2.0305**	**14.7882**	**13.1881**	**0.0220**		**0.7960**	**0.7960**		**0.7688**	**0.7688**	**0.0000**	**2,001.1595**	**2,001.1595**	**0.3715**		**2,010.4467**

3.4 Building Construction - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0242	0.8218	0.1215	1.8700e-003	0.0429	4.1500e-003	0.0471	0.0124	3.9700e-003	0.0163		195.6634	195.6634	0.0242		196.2692
Worker	0.3295	0.1885	2.3690	6.4700e-003	0.6387	3.8100e-003	0.6425	0.1694	3.5100e-003	0.1729		644.1426	644.1426	0.0169		644.5656
Total	**0.3537**	**1.0102**	**2.4905**	**8.3400e-003**	**0.6816**	**7.9600e-003**	**0.6895**	**0.1817**	**7.4800e-003**	**0.1892**		**839.8059**	**839.8059**	**0.0412**		**840.8348**

3.5 Paving - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8402	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328		1,296.9461	1,296.9461	0.4111		1,307.2246
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8402**	**8.4514**	**8.8758**	**0.0135**		**0.4695**	**0.4695**		**0.4328**	**0.4328**		**1,296.9461**	**1,296.9461**	**0.4111**		**1,307.2246**

3.5 Paving - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0857	0.0490	0.6159	1.6800e-003	0.1661	9.9000e-004	0.1670	0.0440	9.1000e-004	0.0450		167.4771	167.4771	4.4000e-003		167.5871
Total	**0.0857**	**0.0490**	**0.6159**	**1.6800e-003**	**0.1661**	**9.9000e-004**	**0.1670**	**0.0440**	**9.1000e-004**	**0.0450**		**167.4771**	**167.4771**	**4.4000e-003**		**167.5871**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.8402	8.4514	8.8758	0.0135		0.4695	0.4695		0.4328	0.4328	0.0000	1,296.9461	1,296.9461	0.4111		1,307.2246
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.8402**	**8.4514**	**8.8758**	**0.0135**		**0.4695**	**0.4695**		**0.4328**	**0.4328**	**0.0000**	**1,296.9461**	**1,296.9461**	**0.4111**		**1,307.2246**

3.5 Paving - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0857	0.0490	0.6159	1.6800e-003	0.1661	9.9000e-004	0.1670	0.0440	9.1000e-004	0.0450		167.4771	167.4771	4.4000e-003		167.5871
Total	**0.0857**	**0.0490**	**0.6159**	**1.6800e-003**	**0.1661**	**9.9000e-004**	**0.1670**	**0.0440**	**9.1000e-004**	**0.0450**		**167.4771**	**167.4771**	**4.4000e-003**		**167.5871**

3.6 Architectural Coating - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	26.9636					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109		281.4481	281.4481	0.0218		281.9928
Total	**27.2058**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**		**281.4481**	**281.4481**	**0.0218**		**281.9928**

3.6 Architectural Coating - 2020

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0264	0.0151	0.1895	5.2000e-004	0.0511	3.1000e-004	0.0514	0.0136	2.8000e-004	0.0138		51.5314	51.5314	1.3500e-003		51.5653
Total	**0.0264**	**0.0151**	**0.1895**	**5.2000e-004**	**0.0511**	**3.1000e-004**	**0.0514**	**0.0136**	**2.8000e-004**	**0.0138**		**51.5314**	**51.5314**	**1.3500e-003**		**51.5653**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	26.9636					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.2422	1.6838	1.8314	2.9700e-003		0.1109	0.1109		0.1109	0.1109	0.0000	281.4481	281.4481	0.0218		281.9928
Total	**27.2058**	**1.6838**	**1.8314**	**2.9700e-003**		**0.1109**	**0.1109**		**0.1109**	**0.1109**	**0.0000**	**281.4481**	**281.4481**	**0.0218**		**281.9928**

3.6 Architectural Coating - 2020

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0264	0.0151	0.1895	5.2000e-004	0.0511	3.1000e-004	0.0514	0.0136	2.8000e-004	0.0138		51.5314	51.5314	1.3500e-003		51.5653
Total	**0.0264**	**0.0151**	**0.1895**	**5.2000e-004**	**0.0511**	**3.1000e-004**	**0.0514**	**0.0136**	**2.8000e-004**	**0.0138**		**51.5314**	**51.5314**	**1.3500e-003**		**51.5653**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	1.1020	12.9329	18.2139	0.0933	6.0344	0.0831	6.1175	1.6230	0.0787	1.7017		9,544.941 9	9,544.941 9	0.3590		9,553.917 5
Unmitigated	1.1020	12.9329	18.2139	0.0933	6.0344	0.0831	6.1175	1.6230	0.0787	1.7017		9,544.941 9	9,544.941 9	0.3590		9,553.917 5

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Manufacturing	170.37	66.45	27.65	2,213,512	2,213,512
Total	170.37	66.45	27.65	2,213,512	2,213,512

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Manufacturing	70.09	20.00	10.00	59.00	28.00	13.00	92	5	3

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Manufacturing	0.487139	0.031901	0.169199	0.121386	0.017033	0.004732	0.033028	0.124746	0.002366	0.001590	0.005154	0.001097	0.000629

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0275	0.2500	0.2100	1.5000e-003		0.0190	0.0190		0.0190	0.0190		300.0168	300.0168	5.7500e-003	5.5000e-003	301.7996
NaturalGas Unmitigated	0.0275	0.2500	0.2100	1.5000e-003		0.0190	0.0190		0.0190	0.0190		300.0168	300.0168	5.7500e-003	5.5000e-003	301.7996

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Manufacturing	2550.14	0.0275	0.2500	0.2100	1.5000e-003		0.0190	0.0190		0.0190	0.0190		300.0168	300.0168	5.7500e-003	5.5000e-003	301.7996
Total		**0.0275**	**0.2500**	**0.2100**	**1.5000e-003**		**0.0190**	**0.0190**		**0.0190**	**0.0190**		**300.0168**	**300.0168**	**5.7500e-003**	**5.5000e-003**	**301.7996**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Manufacturing	2.55014	0.0275	0.2500	0.2100	1.5000e-003		0.0190	0.0190		0.0190	0.0190		300.0168	300.0168	5.7500e-003	5.5000e-003	301.7996
Total		**0.0275**	**0.2500**	**0.2100**	**1.5000e-003**		**0.0190**	**0.0190**		**0.0190**	**0.0190**		**300.0168**	**300.0168**	**5.7500e-003**	**5.5000e-003**	**301.7996**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.1248	4.0000e-005	4.5700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.7600e-003	9.7600e-003	3.0000e-005		0.0104
Unmitigated	1.1248	4.0000e-005	4.5700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.7600e-003	9.7600e-003	3.0000e-005		0.0104

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1699					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.9544					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.3000e-004	4.0000e-005	4.5700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.7600e-003	9.7600e-003	3.0000e-005		0.0104
Total	**1.1248**	**4.0000e-005**	**4.5700e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**9.7600e-003**	**9.7600e-003**	**3.0000e-005**		**0.0104**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.1699					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.9544					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	4.3000e-004	4.0000e-005	4.5700e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005		9.7600e-003	9.7600e-003	3.0000e-005		0.0104
Total	**1.1248**	**4.0000e-005**	**4.5700e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**		**9.7600e-003**	**9.7600e-003**	**3.0000e-005**		**0.0104**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Annual Averages

Explore projected changes in Annual Average Maximum Temperature, Annual Average Minimum Temperature and Annual Total Precipitation through end of this century for California.

EXPLORE ABOUT

MAXIMUM TEMPERATURE MINIMUM TEMPERATURE PRECIPITATION

Save Chart Download Data

Maximum Temperature

Fresno County, California

Emissions continue to rise strongly through 2050 and plateau around 2100 (RCP 8.5)

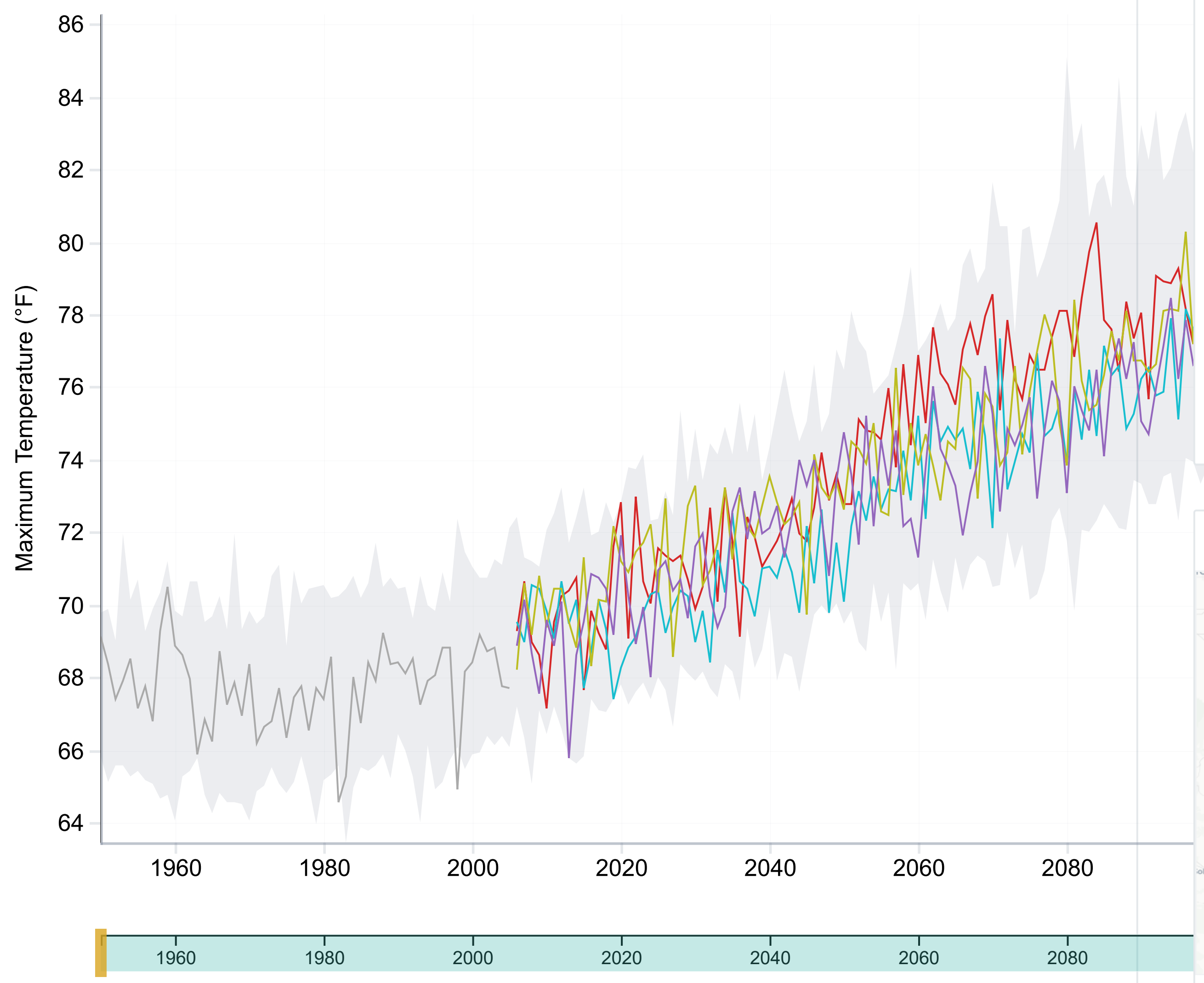
Range of annual average values from all 32 LOCA downscaled climate models

Modeled Variability Envelope

Observed Data (1950–2005)

Modeled Data (2006–2099)

- HadGEM2-ES
- CNRM-CM5
- CanESM2
- MIROC5



SCENARIOS

RCP 4.5
Emissions peak around 2040, then decline

RCP 8.5
Emissions continue to rise strongly through 2050 and plateau around 2100

QUICK STATS

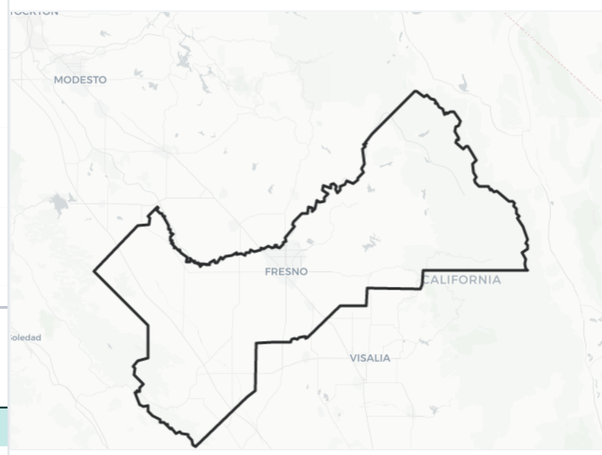
Historical Annual Mean for 1950–2005

67.7°F Observed

Modeled Projected Annual Mean for 2050–2099

75.6°F

Change Location



CLIMATE MODELS

Show Modeled Historical

HadGEM2-ES*	Show/Hide	Warm/Drier
CNRM-CM5*	Show/Hide	Cooler/Wetter
CanESM2*	Show/Hide	Average

NOTES

- This chart shows annual averages of observed and projected Maximum Temperature values for the selected area on map under the RCP 8.5 scenario. The gray line (1950 – 2005) is observed data. The colored lines (2006 – 2100) are projections from 10 LOCA downscaled climate models selected for California. The light gray band in the background

CanESM2	Show/Hide	Average
MIROC5*	Show/Hide	Complement
ACCESS1-0	Show/Hide	
CCSM4	Show/Hide	
CESM1-BGC	Show/Hide	
CMCC-CMS	Show/Hide	
GFDL-CM3	Show/Hide	
HadGEM2-CC	Show/Hide	

shows the least and highest annual average values from all 32 LOCA downscaled climate models.

- * These models have been selected by California state agencies as priority models for research contributing to California's Fourth Climate Change Assessment.
- Use year sliders to get means for different time periods. The projected mean is calculated for all visible models in the chart. Use slider below the chart to zoom and pan within the chart.

About the Tool

Overall temperatures are projected to rise substantially throughout this century. These projections differ depending on the time of year and the type of measurement (highs vs. lows), all of which have different potential effects to the state's ecosystem health, agricultural production, water use and availability, and energy demand. On average, the projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next century. The Mediterranean seasonal precipitation pattern is expected to continue, with most precipitation falling during winter from North Pacific storms. However, even modest changes would have a significant impact because California ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized.

With this tool you can explore projections of annually averaged maximum temperature, minimum temperature and precipitation. These climate projections have been downscaled from global climate models from the CMIP5 archive, using the Localized Constructed Analogs (LOCA) statistical technique developed by Scripps Institution Of Oceanography. LOCA is a statistical downscaling technique that uses past history to add improved fine-scale detail to global climate models. On average, the projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next century. However, even modest changes would have a significant impact because California ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized.

Data Sources

LOCA Downscaled Climate Projections for Temperature & Precipitation

Scripps Institution Of Oceanography - University of California, San Diego

Projected daily minimum and maximum temperature and daily precipitation data. These data were statistically downscaled from 32 global climate models from the CMIP5 archive at a 1/16º (approximately 6 km) spatial resolution on a daily timescale using the LOCA technique. The historical period is 1950–2005, and there are two future scenarios available: RCP 4.5 and RCP 8.5 over the period 2006–2100 (although some models stop in 2099). Details are described in Pierce et al., 2014.

Gridded Historical Observed Meteorological and Hydrological Data

University of Colorado, Boulder

Historical observed daily temperature and precipitation data from approximately 20,000 NOAA Cooperative Observer (COOP) stations form the basis of this gridded dataset from 1950–2013 at a spatial resolution of 1/16º (approximately 6 km). Observation-based meteorological data sets offer insights into changes to the hydro-climatic system by diagnosing spatio-temporal characteristics and providing a historical baseline for future projections. Details are described in Livneh et al., 2015.

Additional Calculations

Geospatial Innovation Facility - University of California, Berkeley

In order to create data layers used in this visualization tool, we calculated annual averages of daily values of maximum temperature (daily high) minimum temperature (daily low) and precipitation for each year (1950–2100). This process was done for each of the 32 LOCA downscaled climate models for the historical scenario and the future scenarios - RCP 4.5 and RCP 8.5.

An envelope of modeled variability for each variable-scenario combination was generated by selecting the highest and lowest values from annual averages of all 32 LOCA downscaled climate models.

California agencies have selected 10 of the 32 LOCA downscaled climate models for performance in the California/Nevada region. For more details on this process see Perspectives and Guidance for Climate Change Analysis. Data for these 10 models and the gridded historical observed data are displayed in the tool and are available through the Cal-Adapt API.

About Cal-Adapt

Cal-Adapt has been developed by the Geospatial Innovation Facility at University of California, Berkeley with funding and advisory oversight by the California Energy Commission.

Annual Averages

Explore projected changes in Annual Average Maximum Temperature, Annual Average Minimum Temperature and Annual Total Precipitation through end of this century for California.

EXPLORE ABOUT

MAXIMUM TEMPERATURE MINIMUM TEMPERATURE PRECIPITATION

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Fresno County, California

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Modeled Variability Envelope

Observed Data (1950–2005)

Modeled Data (2006–2099)

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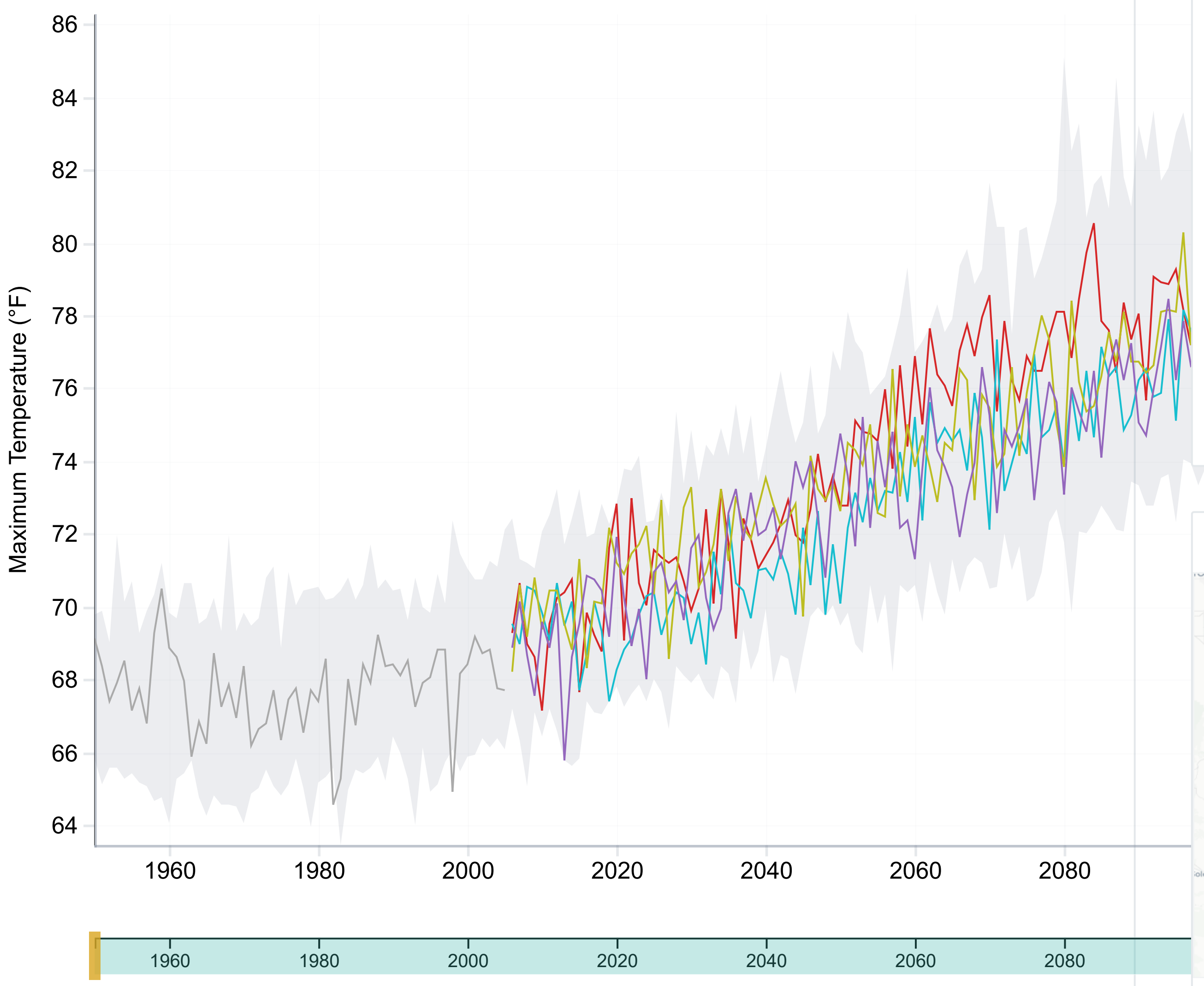

SCENARIOS

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Emissions peak around 2040, then decline

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Emissions continue to rise strongly through 2050 and plateau around 2100

QUICK STATS

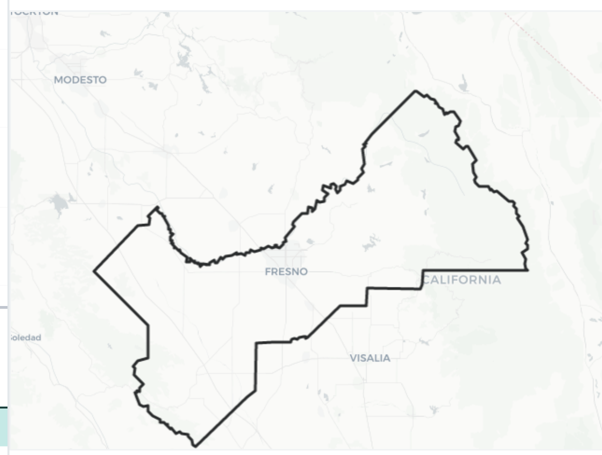
Historical Annual Mean for 1950–2005

67.7°F Observed

Modeled Projected Annual Mean for 2020–2050

71.4°F

Change Location



CLIMATE MODELS

Show Modeled Historical

HadGEM2-ES*	Show/Hide	Warm/Drier
CNRM-CM5*	Show/Hide	Cooler/Wetter
CanESM2*	Show/Hide	Average

NOTES

- This chart shows annual averages of observed and projected Maximum Temperature values for the selected area on map under the RCP 8.5 scenario. The gray line (1950 – 2005) is observed data. The colored lines (2006 – 2100) are projections from 10 LOCA downscaled climate models selected for California. The light gray band in the background

CanESM2	Show/Hide	Average
MIROC5*	Show/Hide	Complement
ACCESS1-0	Show/Hide	
CCSM4	Show/Hide	
CESM1-BGC	Show/Hide	
CMCC-CMS	Show/Hide	
GFDL-CM3	Show/Hide	
HadGEM2-CC	Show/Hide	

shows the least and highest annual average values from all 32 LOCA downscaled climate models.

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Geospatial Innovation Facility - University of California, Berkeley

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EXPLORE ABOUT

MAXIMUM TEMPERATURE MINIMUM TEMPERATURE PRECIPITATION

Save Chart Download Data

Maximum Temperature

Fresno County, California

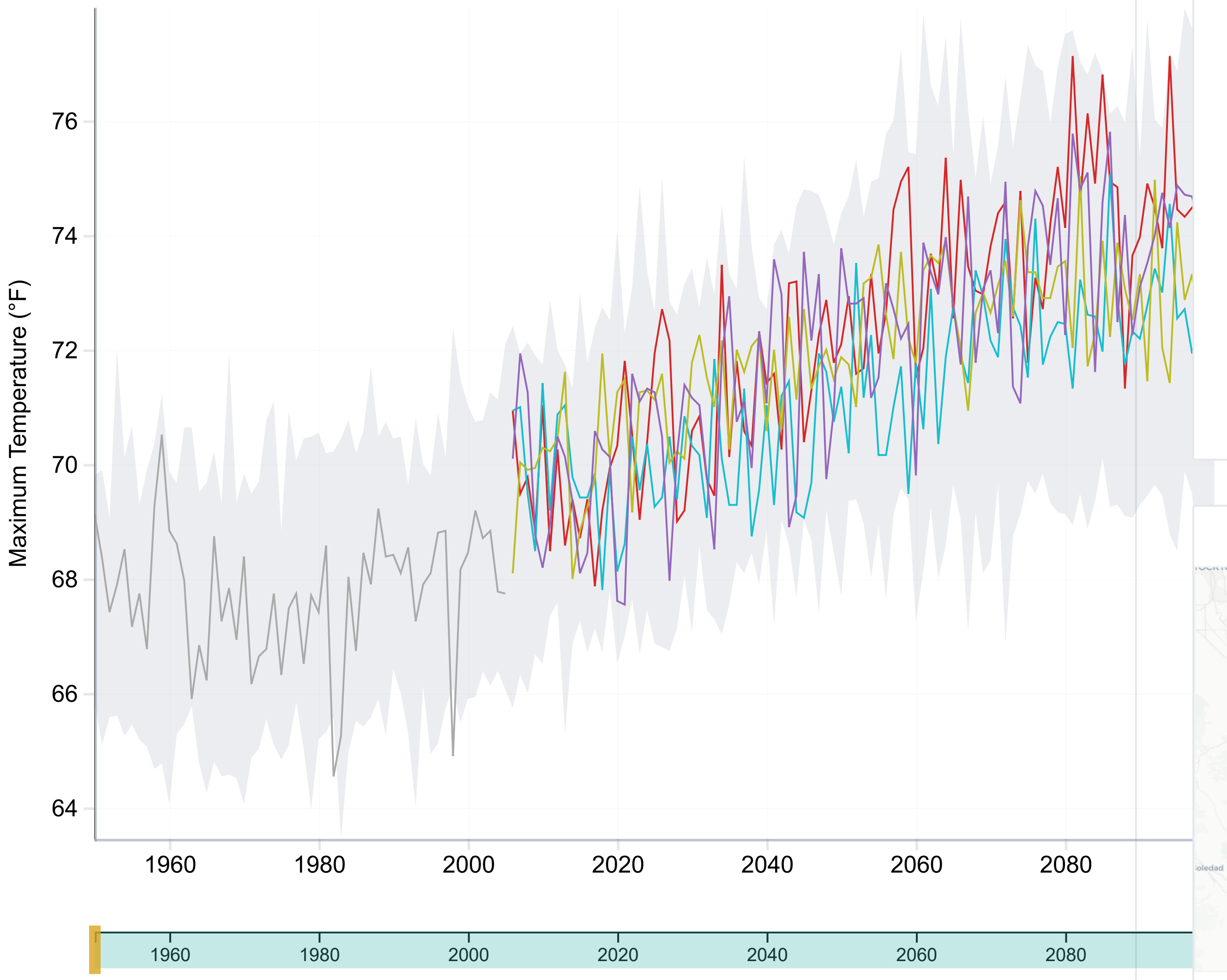
Emissions peak around 2040, then decline (RCP 4.5)

Range of annual average values from all 32 LOCA downscaled climate models

- Modeled Variability Envelope
- Observed Data (1950–2005)

Modeled Data (2006–2099)

- HadGEM2-ES
- CNRM-CM5
- CanESM2
- MIROC5



SCENARIOS

RCP 4.5
Emissions peak around 2040, then decline

RCP 8.5
Emissions continue to rise strongly through 2050 and plateau around 2100

QUICK STATS

Historical Annual Mean for 1950–2005

67.7°F Observed

Modeled Projected Annual Mean for 2020–2050

70.9°F

Change Location

CLIMATE MODELS

Show Modeled Historical

HadGEM2-ES*	Show/Hide	Warm/Drier
CNRM-CM5*	Show/Hide	Cooler/Wetter
CanESM2*	Show/Hide	Average

NOTES

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CanESM2	Show/Hide	Average
MIROC5*	Show/Hide	Complement
ACCESS1-0	Show/Hide	
CCSM4	Show/Hide	
CESM1-BGC	Show/Hide	
CMCC-CMS	Show/Hide	
GFDL-CM3	Show/Hide	
HadGEM2-CC	Show/Hide	

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EXPLORE ABOUT

MAXIMUM TEMPERATURE MINIMUM TEMPERATURE PRECIPITATION

Save Chart Download Data

Maximum Temperature

Fresno County, California

Emissions peak around 2040, then decline (RCP 4.5)

Range of annual average values from all 32 LOCA downscaled climate models

Modeled Variability Envelope

Observed Data (1950–2005)

Modeled Data (2006–2099)

- HadGEM2-ES
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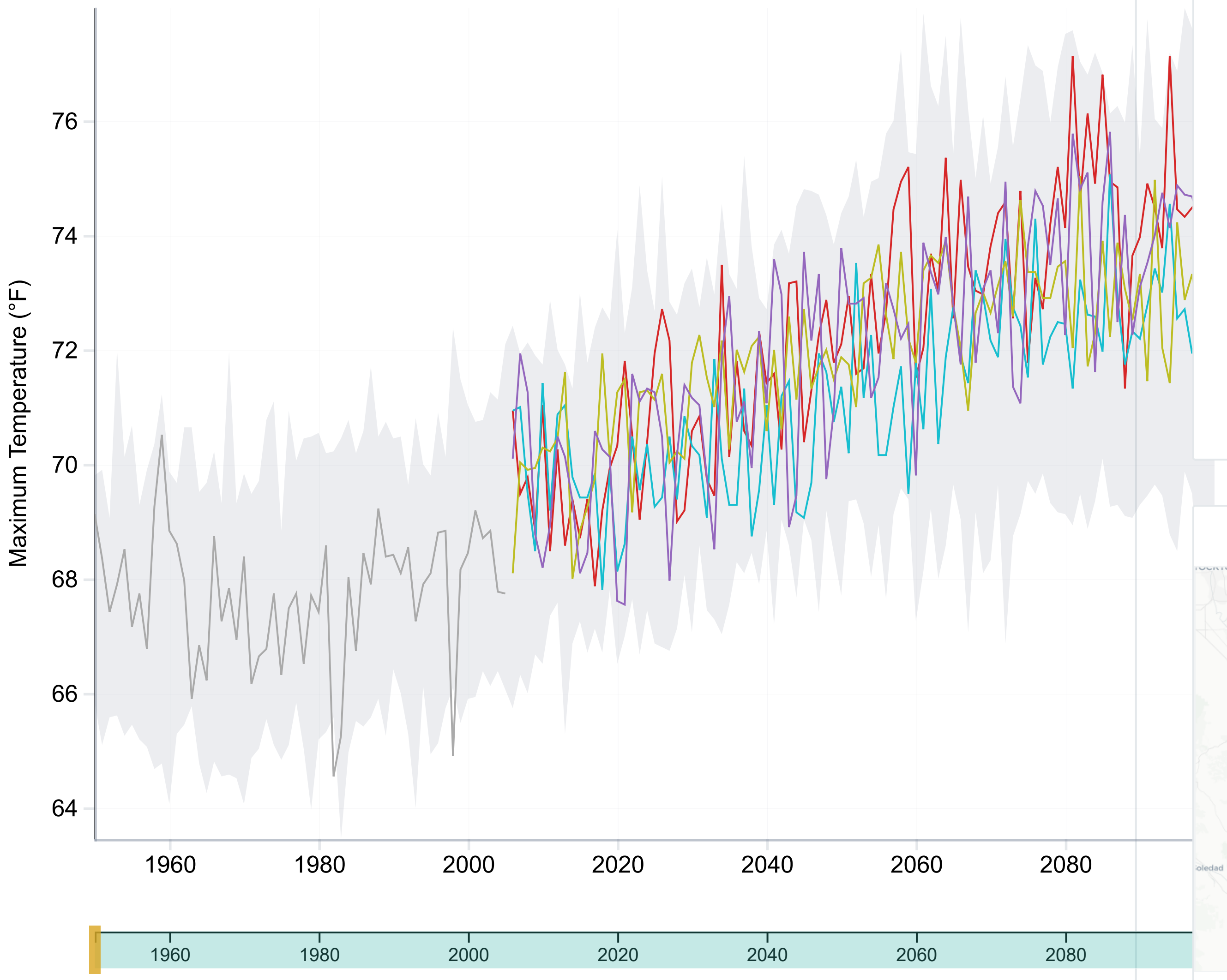


SCENARIOS

RCP 4.5
Emissions peak around 2040, then decline

RCP 8.5
Emissions continue to rise strongly through 2050 and plateau around 2100

QUICK STATS

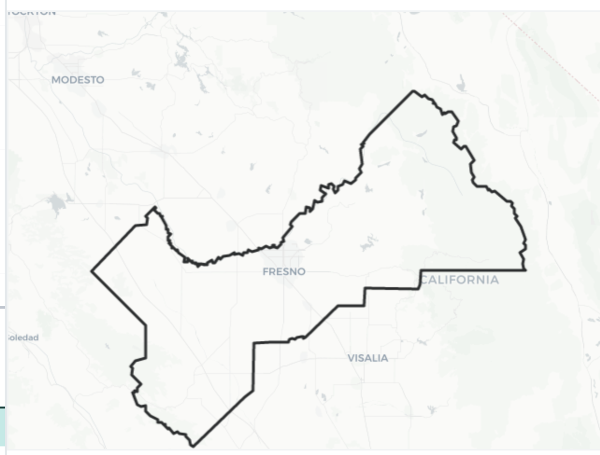
Historical Annual Mean for 1950–2005

67.7°F Observed

Modeled Projected Annual Mean for 2050–2099

73.1°F

Change Location



CLIMATE MODELS

Show Modeled Historical

HadGEM2-ES*	Show/Hide	Warm/Drier
CNRM-CM5*	Show/Hide	Cooler/Wetter
CanESM2*	Show/Hide	Average

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CanESM2	Show/Hide	Average
MIROC5*	Show/Hide	Complement
ACCESS1-0	Show/Hide	
CCSM4	Show/Hide	
CESM1-BGC	Show/Hide	
CMCC-CMS	Show/Hide	
GFDL-CM3	Show/Hide	
HadGEM2-CC	Show/Hide	

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EXPLORE ABOUT

MAXIMUM TEMPERATURE MINIMUM TEMPERATURE PRECIPITATION

Save Chart Download Data

Precipitation

Fresno County, California

Emissions peak around 2040, then decline (RCP 4.5)

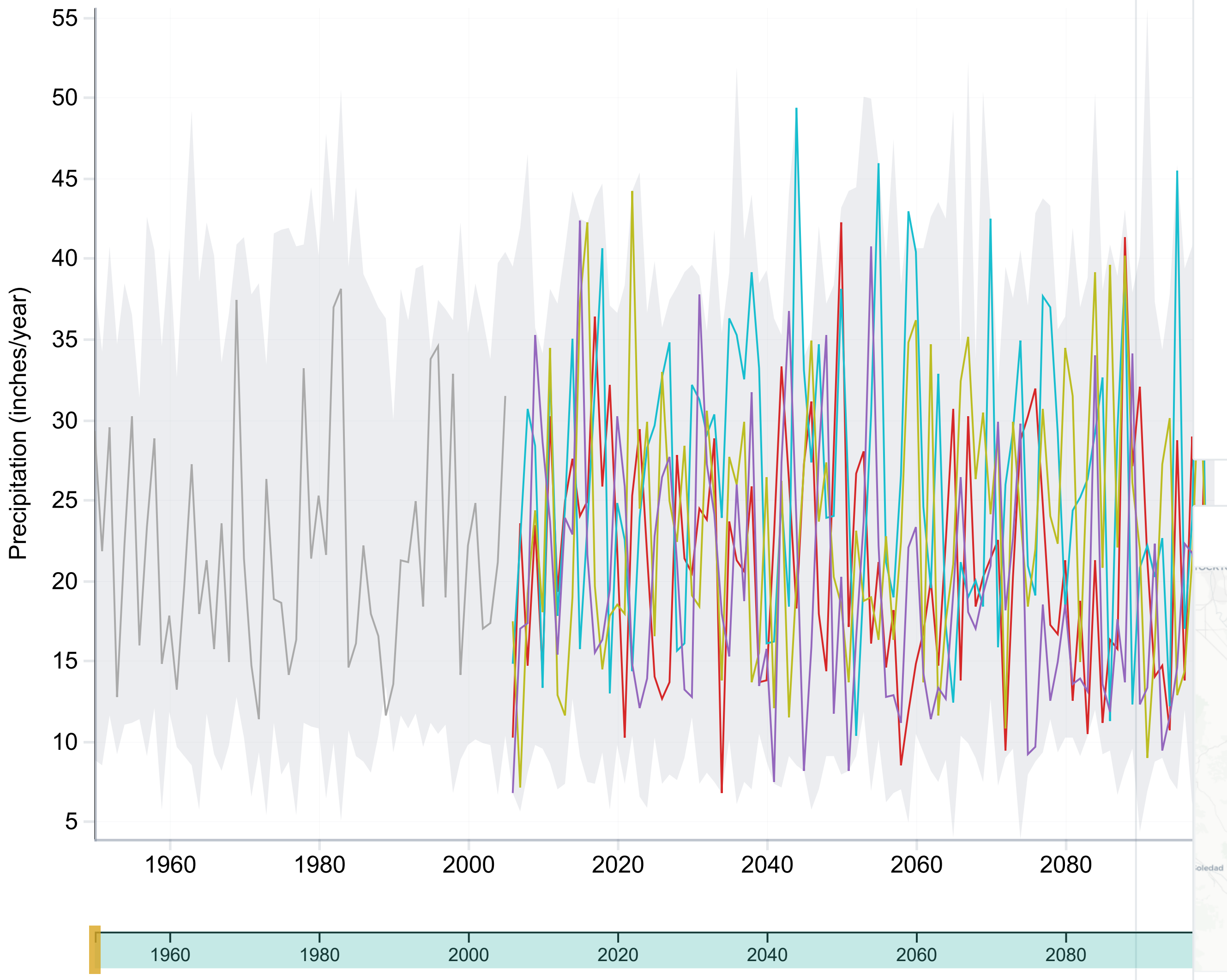
Range of annual average values from all 32 LOCA downscaled climate models

Modeled Variability Envelope

Observed Data (1950–2005)

Modeled Data (2006–2099)

- HadGEM2-ES
- CNRM-CM5
- CanESM2
- MIROC5



SCENARIOS

RCP 4.5
Emissions peak around 2040, then decline

RCP 8.5
Emissions continue to rise strongly through 2050 and plateau around 2100

QUICK STATS

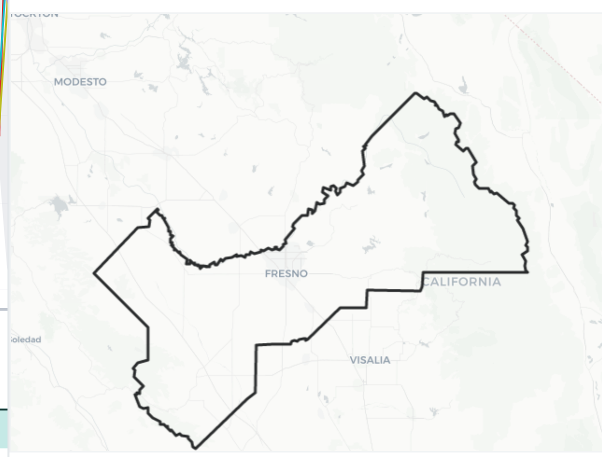
Historical Annual Mean for 1950–2005

21.8" Observed

Modeled Projected Annual Mean for 2020–2050

23.7"

Change Location



CLIMATE MODELS

Show Modeled Historical

HadGEM2-ES*	Show/Hide	Warm/Drier
CNRM-CM5*	Show/Hide	Cooler/Wetter
CanESM2*	Show/Hide	Average

NOTES

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CanESM2	Show/Hide	Average
MIROC5*	Show/Hide	Complement
ACCESS1-0	Show/Hide	
CCSM4	Show/Hide	
CESM1-BGC	Show/Hide	
CMCC-CMS	Show/Hide	
GFDL-CM3	Show/Hide	
HadGEM2-CC	Show/Hide	

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EXPLORE ABOUT

MAXIMUM TEMPERATURE MINIMUM TEMPERATURE PRECIPITATION

Save Chart Download Data

Precipitation

Fresno County, California

Emissions peak around 2040, then decline (RCP 4.5)

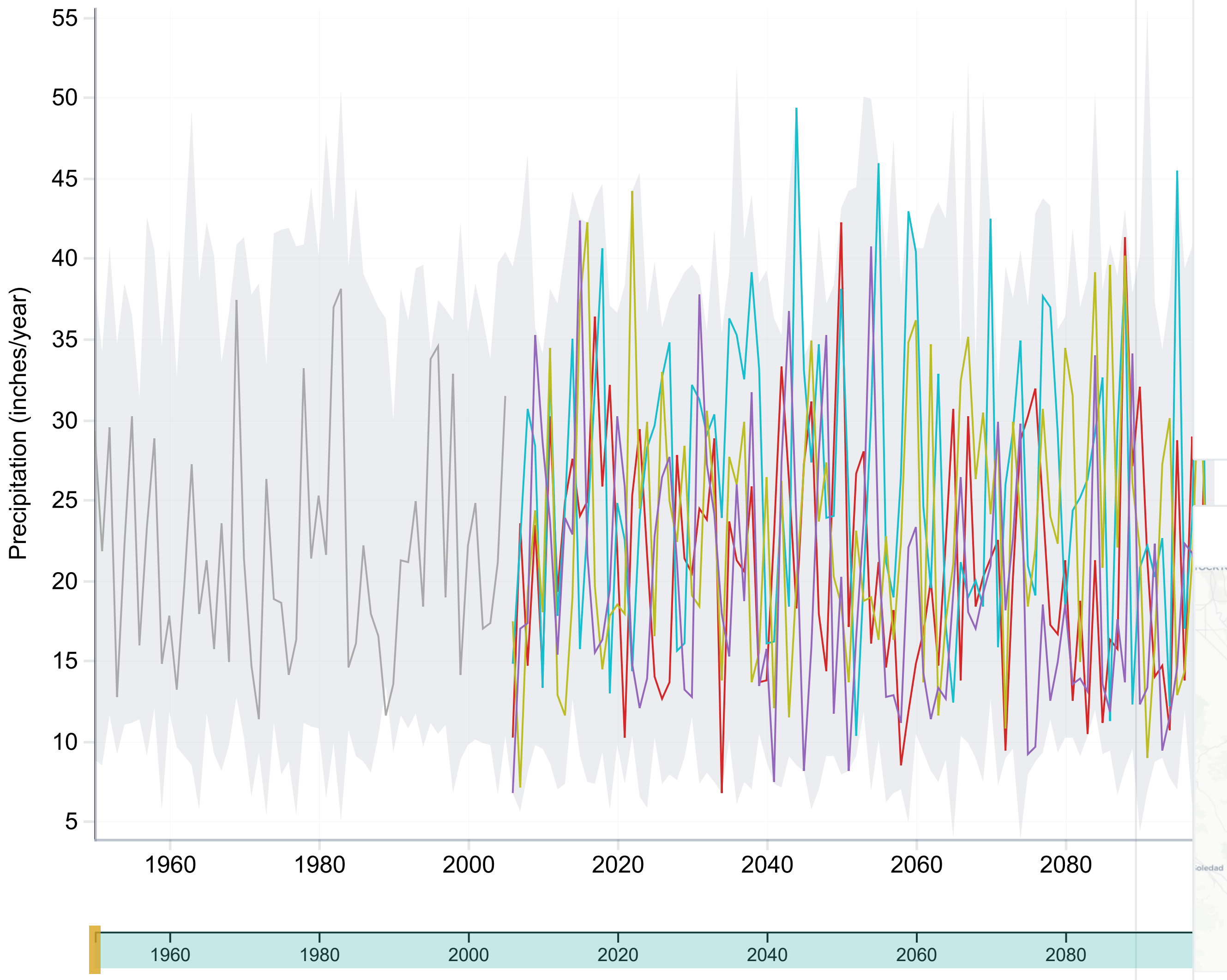
Range of annual average values from all 32 LOCA downscaled climate models

Modeled Variability Envelope

Observed Data (1950–2005)

Modeled Data (2006–2099)

- HadGEM2-ES
- CNRM-CM5
- CanESM2
- MIROC5



SCENARIOS

RCP 4.5
Emissions peak around 2040, then decline

RCP 8.5
Emissions continue to rise strongly through 2050 and plateau around 2100

QUICK STATS

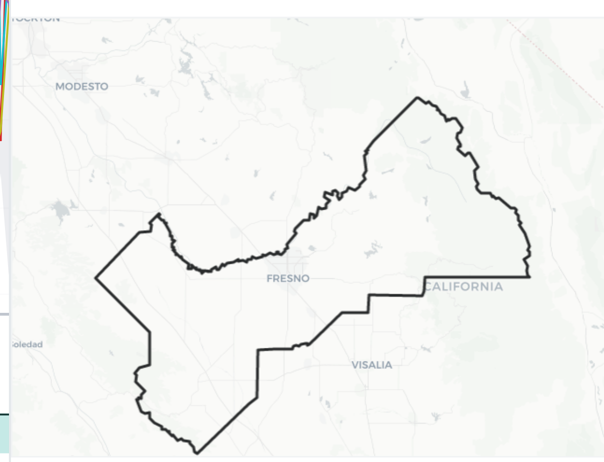
Historical Annual Mean for 1950–2005

21.8″ Observed

Modeled Projected Annual Mean for 2050–2099

22.2″

Change Location



CLIMATE MODELS

Show Modeled Historical

HadGEM2-ES*	Show/Hide	Warm/Drier
CNRM-CM5*	Show/Hide	Cooler/Wetter
CanESM2*	Show/Hide	Average

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CanESM2	Show/Hide	Average
MIROC5*	Show/Hide	Complement
ACCESS1-0	Show/Hide	
CCSM4	Show/Hide	
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EXPLORE ABOUT

MAXIMUM TEMPERATURE MINIMUM TEMPERATURE PRECIPITATION

Save Chart Download Data

Precipitation

Fresno County, California

Emissions continue to rise strongly through 2050 and plateau around 2100 (RCP 8.5)

Range of annual average values from all 32 LOCA downscaled climate models

Modeled Variability Envelope

Observed Data (1950–2005)

Modeled Data (2006–2099)

- HadGEM2-ES
- CNRM-CM5
- CanESM2
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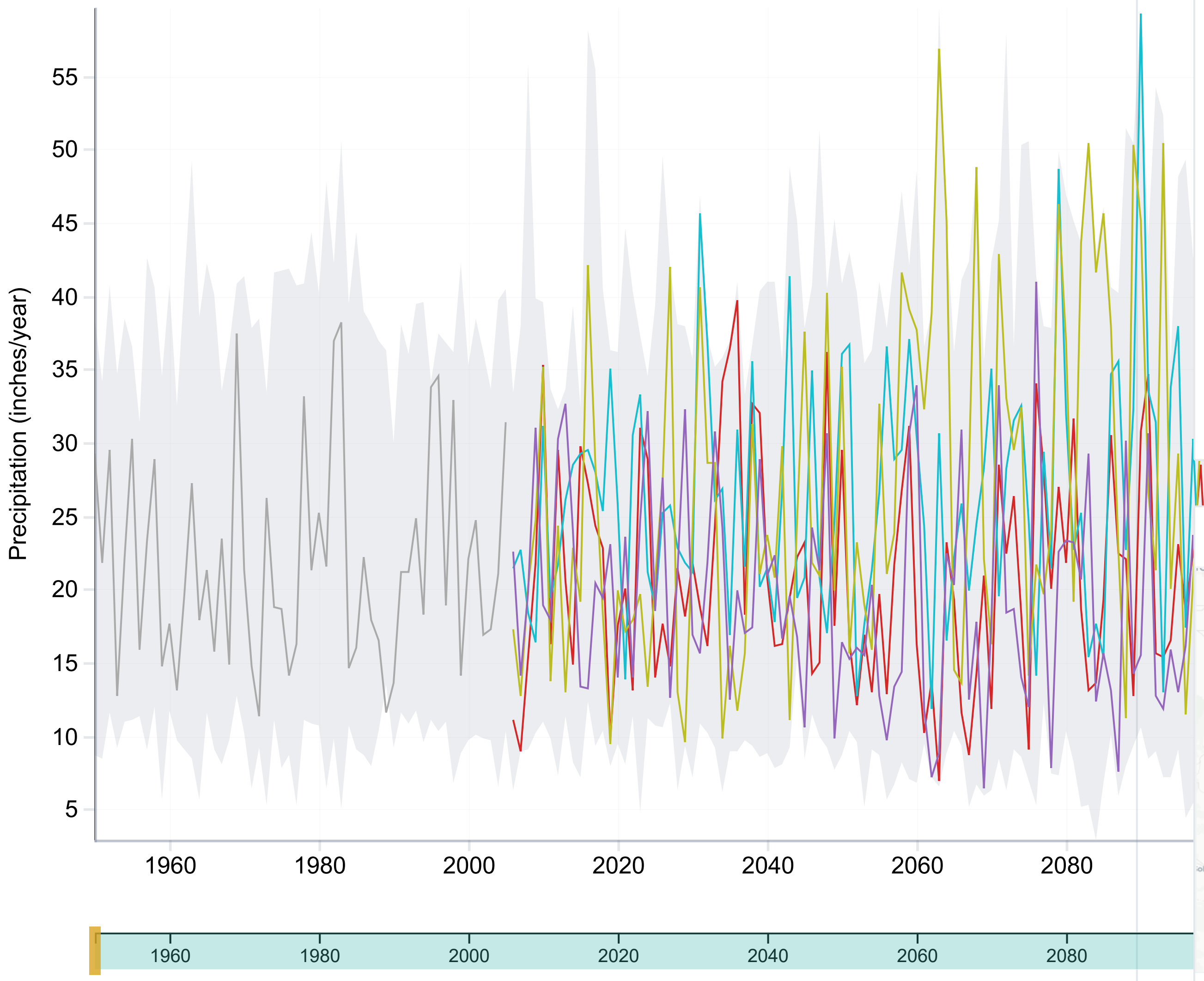

SCENARIOS

RCP 4.5
Emissions peak around 2040, then decline

RCP 8.5
Emissions continue to rise strongly through 2050 and plateau around 2100

QUICK STATS

Historical Annual Mean for 1950–2005

21.8″ Observed

Modeled Projected Annual Mean for 2020–2050

23.0″

Change Location

CLIMATE MODELS

Show Modeled Historical

HadGEM2-ES*	Show/Hide	Warm/Drier
CNRM-CM5*	Show/Hide	Cooler/Wetter
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NOTES

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CanESM2	Show/Hide	Average
MIROC5*	Show/Hide	Complement
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Projected daily minimum and maximum temperature and daily precipitation data. These data were statistically downscaled from 32 global climate models from the CMIP5 archive at a 1/16º (approximately 6 km) spatial resolution on a daily timescale using the LOCA technique. The historical period is 1950–2005, and there are two future scenarios available: RCP 4.5 and RCP 8.5 over the period 2006–2100 (although some models stop in 2099). Details are described in Pierce et al., 2014.

Gridded Historical Observed Meteorological and Hydrological Data

University of Colorado, Boulder

Historical observed daily temperature and precipitation data from approximately 20,000 NOAA Cooperative Observer (COOP) stations form the basis of this gridded dataset from 1950–2013 at a spatial resolution of 1/16º (approximately 6 km). Observation-based meteorological data sets offer insights into changes to the hydro-climatic system by diagnosing spatio-temporal characteristics and providing a historical baseline for future projections. Details are described in Livneh et al., 2015.

Additional Calculations

Geospatial Innovation Facility - University of California, Berkeley

In order to create data layers used in this visualization tool, we calculated annual averages of daily values of maximum temperature (daily high) minimum temperature (daily low) and precipitation for each year (1950–2100). This process was done for each of the 32 LOCA downscaled climate models for the historical scenario and the future scenarios - RCP 4.5 and RCP 8.5.

An envelope of modeled variability for each variable-scenario combination was generated by selecting the highest and lowest values from annual averages of all 32 LOCA downscaled climate models.

California agencies have selected 10 of the 32 LOCA downscaled climate models for performance in the California/Nevada region. For more details on this process see Perspectives and Guidance for Climate Change Analysis. Data for these 10 models and the gridded historical observed data are displayed in the tool and are available through the Cal-Adapt API.

About Cal-Adapt

Cal-Adapt has been developed by the Geospatial Innovation Facility at University of California, Berkeley with funding and advisory oversight by the California Energy Commission.

Annual Averages

Explore projected changes in Annual Average Maximum Temperature, Annual Average Minimum Temperature and Annual Total Precipitation through end of this century for California.

EXPLORE ABOUT

MAXIMUM TEMPERATURE MINIMUM TEMPERATURE PRECIPITATION

Save Chart Download Data

Precipitation

Fresno County, California

Emissions continue to rise strongly through 2050 and plateau around 2100 (RCP 8.5)

Range of annual average values from all 32 LOCA downscaled climate models

Modeled Variability Envelope

Observed Data (1950–2005)

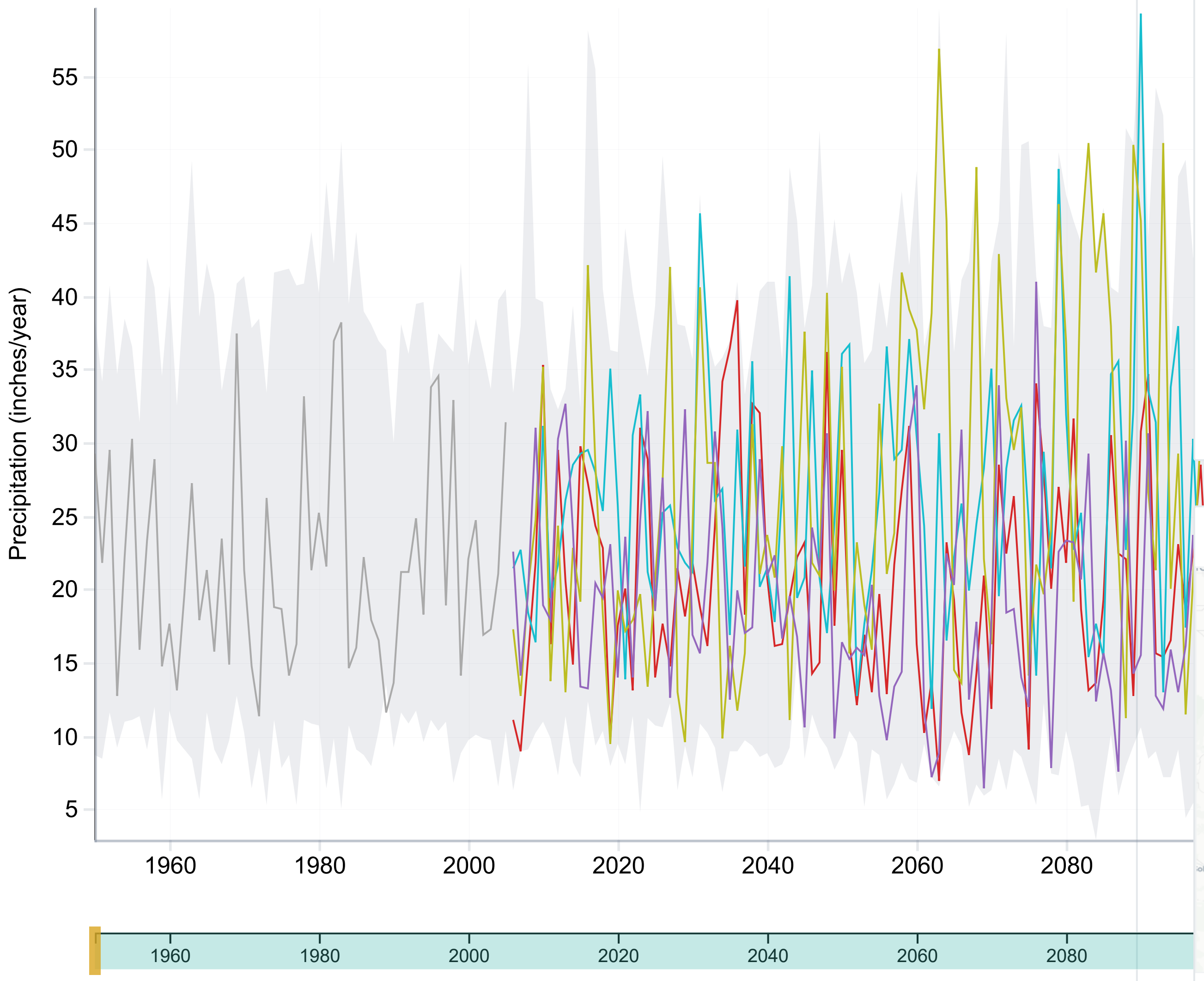
Modeled Data (2006–2099)

HadGEM2-ES

CNRM-CM5

CanESM2

MIROC5



SCENARIOS

RCP 4.5
Emissions peak around 2040, then decline

RCP 8.5
Emissions continue to rise strongly through 2050 and plateau around 2100

QUICK STATS

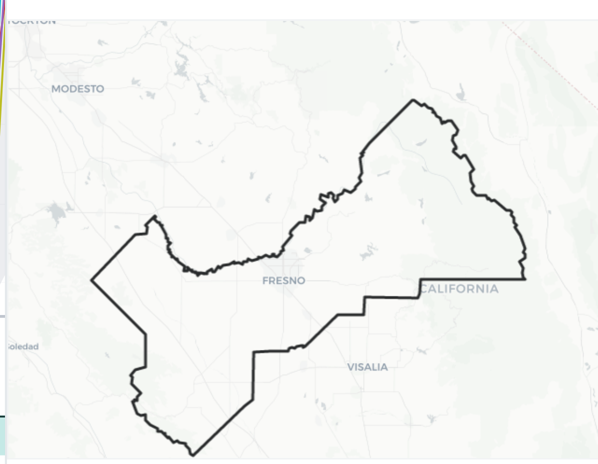
Historical Annual Mean for 1950–2005

21.8″ Observed

Modeled Projected Annual Mean for 2050–2099

24.0″

Change Location



CLIMATE MODELS

Show Modeled Historical

HadGEM2-ES*	Show/Hide	Warm/Drier
CNRM-CM5*	Show/Hide	Cooler/Wetter
CanESM2*	Show/Hide	Average

NOTES

- This chart shows annual averages of observed and projected Precipitation values for the selected area on map under the RCP 8.5 scenario. The gray line (1950 – 2005) is observed data. The colored lines (2006 – 2100) are projections from 10 LOCA downscaled climate models selected for California. The light gray band in the background shows the least and highest

CanESM2	Show/Hide	Average
MIROC5*	Show/Hide	Complement
ACCESS1-0	Show/Hide	
CCSM4	Show/Hide	
CESM1-BGC	Show/Hide	
CMCC-CMS	Show/Hide	
GFDL-CM3	Show/Hide	
HadGEM2-CC	Show/Hide	

annual average values from all 32 LOCA downscaled climate models.

- * These models have been selected by California state agencies as priority models for research contributing to California's Fourth Climate Change Assessment.
- Use year sliders to get means for different time periods. The projected mean is calculated for all visible models in the chart. Use slider below the chart to zoom and pan within the chart.

About the Tool

Overall temperatures are projected to rise substantially throughout this century. These projections differ depending on the time of year and the type of measurement (highs vs. lows), all of which have different potential effects to the state's ecosystem health, agricultural production, water use and availability, and energy demand. On average, the projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next century. The Mediterranean seasonal precipitation pattern is expected to continue, with most precipitation falling during winter from North Pacific storms. However, even modest changes would have a significant impact because California ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized.

With this tool you can explore projections of annually averaged maximum temperature, minimum temperature and precipitation. These climate projections have been downscaled from global climate models from the CMIP5 archive, using the Localized Constructed Analogs (LOCA) statistical technique developed by Scripps Institution Of Oceanography. LOCA is a statistical downscaling technique that uses past history to add improved fine-scale detail to global climate models. On average, the projections show little change in total annual precipitation in California. Furthermore, among several models, precipitation projections do not show a consistent trend during the next century. However, even modest changes would have a significant impact because California ecosystems are conditioned to historical precipitation levels and water resources are nearly fully utilized.

Data Sources

LOCA Downscaled Climate Projections for Temperature & Precipitation

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Additional Calculations

Geospatial Innovation Facility - University of California, Berkeley

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California agencies have selected 10 of the 32 LOCA downscaled climate models for performance in the California/Nevada region. For more details on this process see Perspectives and Guidance for Climate Change Analysis. Data for these 10 models and the gridded historical observed data are displayed in the tool and are available through the Cal-Adapt API.

About Cal-Adapt

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EXPLORE ABOUT

MAXIMUM TEMPERATURE MINIMUM TEMPERATURE PRECIPITATION

Save Chart Download Data

Maximum Temperature

Grid Cell (36.65625, -119.90625)

Emissions continue to rise strongly through 2050 and plateau around 2100 (RCP 8.5)

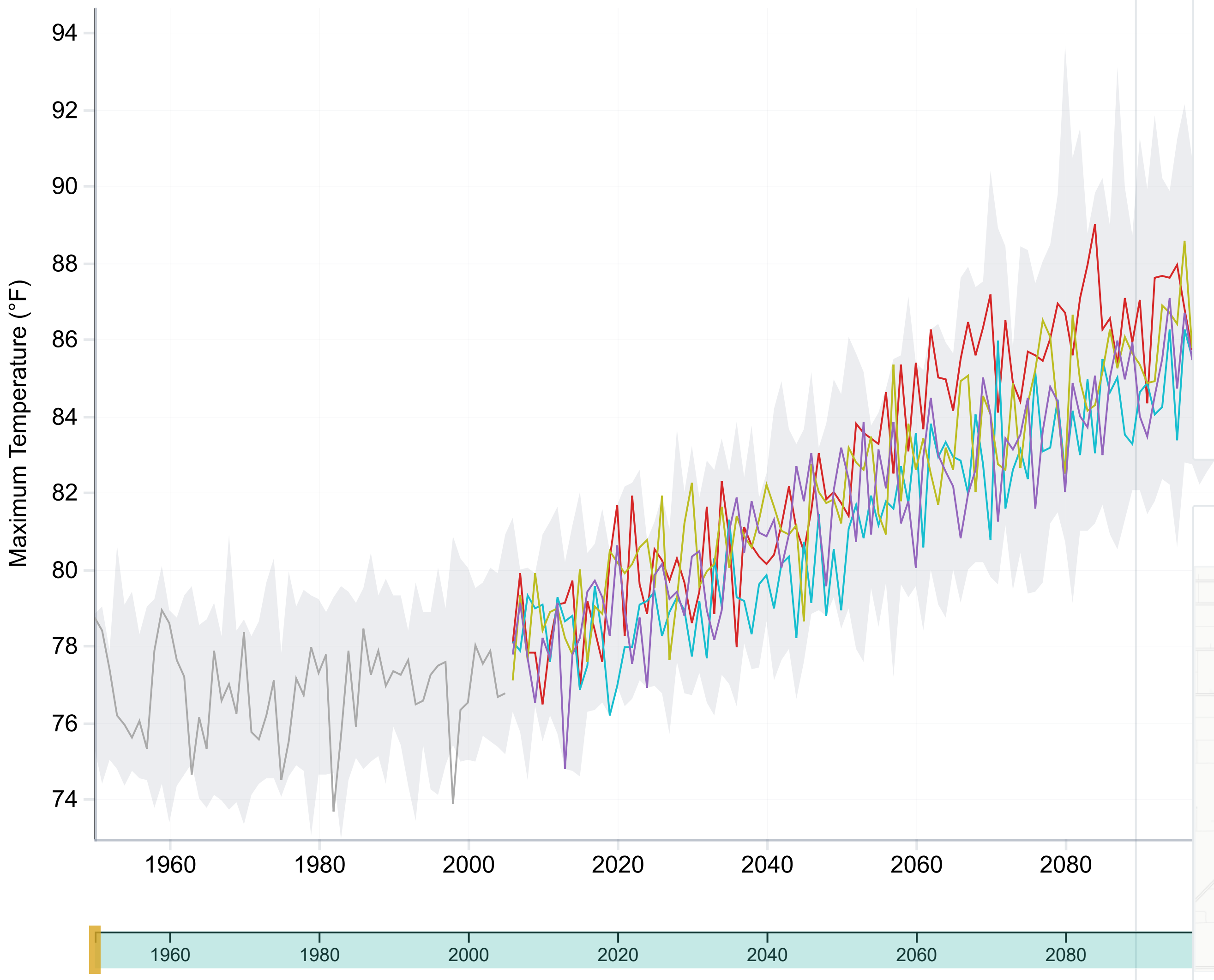
Range of annual average values from all 32 LOCA downscaled climate models

Modeled Variability Envelope

Observed Data (1950–2005)

Modeled Data (2006–2099)

- HadGEM2-ES
- CNRM-CM5
- CanESM2
- MIROC5



SCENARIOS

RCP 4.5
Emissions peak around 2040, then decline

RCP 8.5
Emissions continue to rise strongly through 2050 and plateau around 2100

QUICK STATS

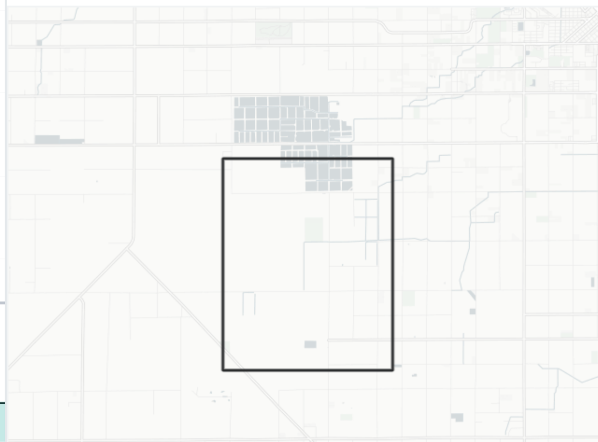
Historical Annual Mean for 1950–2005

76.8°F Observed

Modeled Projected Annual Mean for 2020–2090

82.3°F

Change Location



CLIMATE MODELS

Show Modeled Historical

HadGEM2-ES*	Show/Hide	Warm/Drier
CNRM-CM5*	Show/Hide	Cooler/Wetter
CanESM2*	Show/Hide	Average

NOTES

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CanESM2	Show/Hide	Average
MIROC5*	Show/Hide	Complement
ACCESS1-0	Show/Hide	
CCSM4	Show/Hide	
CESM1-BGC	Show/Hide	
CMCC-CMS	Show/Hide	
GFDL-CM3	Show/Hide	
HadGEM2-CC	Show/Hide	

shows the least and highest annual average values from all 32 LOCA downscaled climate models.

- * These models have been selected by California state agencies as priority models for research contributing to California's Fourth Climate Change Assessment.
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Additional Calculations

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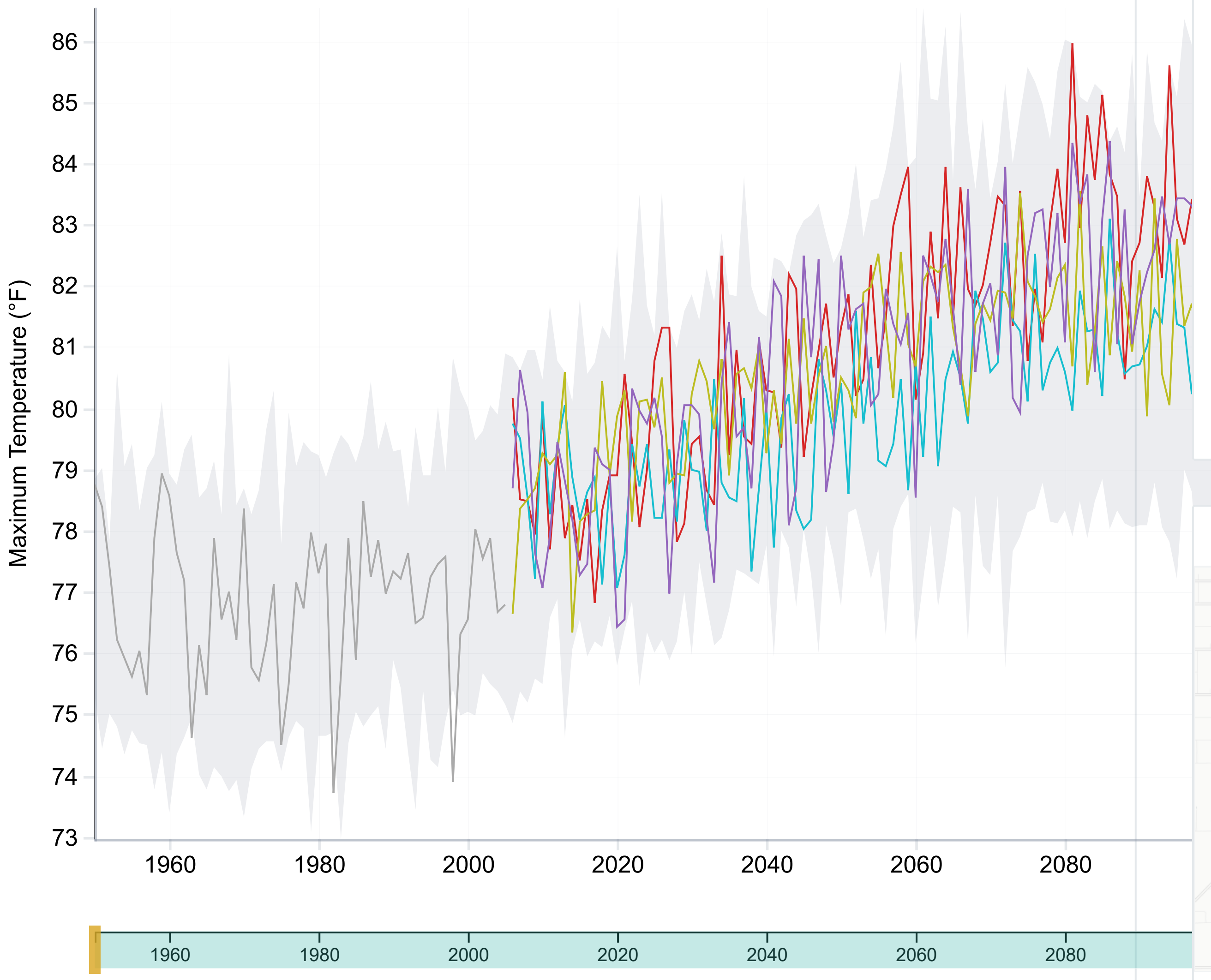
HadGEM2-ES
CNRM-CM5
CanESM2
MIROC5



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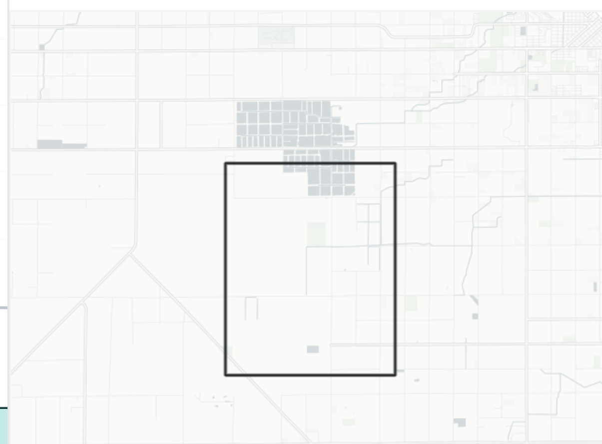
80.8°F

Change Location



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Name — **Prioritization Calculator**

Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in grey areas.
Author or updater	Matthew Cegielski — *Last Update* August 20, 2018
Facility:	Darling Ingredients
ID#:	
Project #:	
Unit and Process#	1-0 p1
Operating Hours hr/yr	4,164.00

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	2.77E-01	8.64E-04	0.00E+00	2.77E-01
100≤R<250	**0.250**	6.92E-02	2.16E-04	0.00E+00	6.92E-02
250≤R<500	**0.040**	1.11E-02	3.46E-05	0.00E+00	1.11E-02
500≤R<1000	**0.011**	3.05E-03	9.50E-06	0.00E+00	3.05E-03
1000≤R<1500	**0.003**	8.31E-04	2.59E-06	0.00E+00	8.31E-04
1500≤R<2000	**0.002**	5.54E-04	1.73E-06	0.00E+00	5.54E-04
2000<R	**0.001**	2.77E-04	8.64E-07	0.00E+00	2.77E-04

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

1-0 p1

Enter the unit's CAS# of the substances emitted and their amounts.

Prioritzation score for each substance generated below. Totals on last row.

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
Diesel engine exhaust, particulate matter (Diesel PM)	9901	1.20E-01	8.08E-01	2.88E-05	2.77E-01	8.64E-04	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	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	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	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	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	0.00E+00	0.00E+00	0.00E+00
				0.00E+00	0.00E+00	0.00E+00	0.00E+00
				Totals	**2.77E-01**	**8.64E-04**	**0.00E+00**

Name — Prioritization Calculator

Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in grey areas.
Author or updater	Matthew Cegielski — *Last Update* August 20, 2018
Facility:	Darling Ingredients - Natural Gas-Fired Four Stroke Lean Burn (4SLB) Internal Combustion Engine
ID#:	
Project #:	
Unit and Process#	1-0 p1
Operating Hours hr/yr	4,164.00

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	7.87E+02	1.85E+02	3.11E+03	3.11E+03
100≤R<250	**0.250**	1.97E+02	4.62E+01	7.77E+02	7.77E+02
250≤R<500	**0.040**	3.15E+01	7.39E+00	1.24E+02	1.24E+02
500≤R<1000	**0.011**	8.66E+00	2.03E+00	3.42E+01	34.20
1000≤R<1500	**0.003**	2.36E+00	5.54E-01	9.33E+00	9.33E+00
1500≤R<2000	**0.002**	1.57E+00	3.69E-01	6.22E+00	6.22E+00
2000<R	**0.001**	7.87E-01	1.85E-01	3.11E+00	3.11E+00

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1-0 p1

Enter the unit's CAS# of the substances emitted and their amounts.

Prioritzation score for each substance generated below. Totals on last row.

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
1,1,2,2-Tetrachloroethane	79345	9.78E+00	2.72E-02	2.35E-03	4.37E+00	0.00E+00	0.00E+00
1,1,2-Trichloroethane	79005	7.78E+00	2.16E-02	1.87E-03	9.58E-01	0.00E+00	0.00E+00
1,1-Dichloroethane	75343	5.77E+00	1.60E-02	1.39E-03	7.11E-02	0.00E+00	0.00E+00
1,2,4-Trimethylbenze	95636	3.50E+00	9.72E-03	8.40E-04	0.00E+00	0.00E+00	0.00E+00
Ethylene dichloride {EDC}	107062	5.77E+00	1.60E-02	1.39E-03	9.33E-01	5.20E-04	0.00E+00
1,3-Butadiene	106990	6.53E+01	1.81E-01	1.57E-02	8.55E+01	1.18E+00	4.12E-01
2,2,4-Trimethylpentane	540841	6.12E+01	1.70E-01	1.47E-02	0.00E+00	0.00E+00	0.00E+00
2-Methyl naphthalene	91576	8.12E+00	2.26E-02	1.95E-03	0.00E+00	0.00E+00	0.00E+00
Acenaphthene	83329	3.06E-01	8.49E-04	7.34E-05	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	208968	1.35E+00	3.76E-03	3.25E-04	0.00E+00	0.00E+00	0.00E+00
Acetaldehyde	75070	2.04E+03	5.68E+00	4.91E-01	4.25E+01	5.26E-01	1.81E+01
Acrolein	107028	1.26E+03	3.49E+00	3.02E-01	0.00E+00	1.29E+02	2.10E+03
Benzene	71432	1.08E+02	2.99E-01	2.58E-02	2.40E+01	1.29E+00	1.66E+01
Benzo[b]fluoranthene	205992	4.06E-02	1.13E-04	9.75E-06	3.44E-02	0.00E+00	0.00E+00
Benzo[e]pyrene	192972	1.02E-01	2.82E-04	2.44E-05	0.00E+00	0.00E+00	0.00E+00
Benzo[g,h,i]perylene	191242	1.01E-01	2.81E-04	2.43E-05	0.00E+00	0.00E+00	0.00E+00
Biphenyl	92524	5.19E+01	1.44E-01	1.25E-02	0.00E+00	0.00E+00	0.00E+00
Carbon tetrachloride	56235	8.98E+00	2.49E-02	2.16E-03	2.90E+00	8.08E-03	1.97E-02
Chlorobenzene	108907	7.44E+00	2.07E-02	1.79E-03	0.00E+00	2.68E-04	0.00E+00
Chloroform	67663	6.97E+00	1.94E-02	1.67E-03	2.84E-01	8.37E-04	1.94E-01
Chrysene	218019	1.70E-01	4.71E-04	4.07E-05	1.44E-02	0.00E+00	0.00E+00
Ethyl benzene	100414	9.71E+00	2.70E-02	2.33E-03	1.87E-01	1.75E-04	0.00E+00
Ethylene dibromide {EDB}	106934	1.08E+01	3.01E-02	2.60E-03	5.92E+00	4.88E-01	0.00E+00
Fluoranthene	206440	2.72E-01	7.54E-04	6.52E-05	0.00E+00	0.00E+00	0.00E+00
Fluorene	86737	1.39E+00	3.85E-03	3.33E-04	0.00E+00	0.00E+00	0.00E+00
Formaldehyde	50000	1.29E+04	3.59E+01	3.10E+00	5.97E+02	5.17E+01	9.78E+02
Methanol	67561	6.12E+02	1.70E+00	1.47E-01	0.00E+00	5.51E-03	9.10E-02
Methylene chloride {Dichloromethane}	75092	4.89E+00	1.36E-02	1.17E-03	3.77E-02	4.41E-04	1.46E-03
Hexane	110543	2.72E+02	7.54E-01	6.52E-02	0.00E+00	1.40E-03	0.00E+00
Naphthalene	91203	1.82E+01	5.06E-02	4.37E-03	4.76E+00	7.28E-02	0.00E+00
PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA]	1151	1.90E+00	5.27E-03	4.55E-04	1.61E+01	0.00E+00	0.00E+00
Phenanthrene	85018	2.54E+00	7.07E-03	6.11E-04	0.00E+00	0.00E+00	0.00E+00
Phenol	108952	5.87E+00	1.63E-02	1.41E-03	0.00E+00	1.06E-03	4.22E-03
Pyrene	129000	3.33E-01	9.24E-04	7.99E-05	0.00E+00	0.00E+00	0.00E+00
Styrene	100425	5.77E+00	1.60E-02	1.39E-03	0.00E+00	2.31E-04	1.15E-03
Toluene	108883	9.98E+01	2.77E-01	2.40E-02	0.00E+00	1.20E-02	1.12E-02
Vinyl chloride	75014	3.64E+00	1.01E-02	8.75E-04	2.19E+00	0.00E+00	8.44E-05
Xylene	1330207	4.50E+01	1.25E-01	1.08E-02	0.00E+00	0.00E+00	0.00E+00
				Totals	**7.87E+02**	**1.85E+02**	**3.11E+03**

Name

Prioritization Calculator

Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in grey areas.
Author or updater	Matthew Cegielski — *Last Update* — August 20, 2018
Facility:	Darling Ingredients - Natural Gas-Fired Four Stroke Rich Burn (4SRB) Internal Combustion Engine
ID#:	
Project #:	
Unit and Process#	1-0 p1
Operating Hours hr/yr	4,164.00

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	6.51E+02	9.44E+01	1.52E+03	1.52E+03
100≤R<250	**0.250**	1.63E+02	2.36E+01	3.80E+02	3.80E+02
250≤R<500	**0.040**	2.60E+01	3.78E+00	6.08E+01	6.08E+01
500≤R<1000	**0.011**	7.16E+00	1.04E+00	1.67E+01	16.71
1000≤R<1500	**0.003**	1.95E+00	2.83E-01	4.56E+00	4.56E+00
1500≤R<2000	**0.002**	1.30E+00	1.89E-01	3.04E+00	3.04E+00
2000<R	**0.001**	6.51E-01	9.44E-02	1.52E+00	1.52E+00

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

1-0 p1

Enter the unit's CAS# of the substances emitted and their amounts.

Prioritzation score for each substance generated below. Totals on last row.

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
1,1,2,2-Tetrachloroethane	**79345**	6.19E+00	1.72E-02	1.49E-03	2.76E+00	0.00E+00	0.00E+00
1,1,2-Trichloroethane	**79005**	3.74E+00	1.04E-02	8.99E-04	4.61E-01	0.00E+00	0.00E+00
1,1-Dichloroethane	**75343**	2.76E+00	7.68E-03	6.64E-04	3.41E-02	0.00E+00	0.00E+00
Ethylene dichloride {EDC}	**107062**	2.76E+00	7.68E-03	6.64E-04	4.47E-01	2.49E-04	0.00E+00
1,3-Butadiene	**106990**	1.62E+02	4.50E-01	3.89E-02	2.12E+02	2.92E+00	1.02E+00
Acetaldehyde	**75070**	6.82E+02	1.90E+00	1.64E-01	1.42E+01	1.76E-01	6.05E+00
Acrolein	**107028**	6.43E+02	1.79E+00	1.54E-01	0.00E+00	6.62E+01	1.07E+03
Benzene	**71432**	3.86E+02	1.07E+00	9.28E-02	8.63E+01	4.64E+00	5.96E+01
Carbon tetrachloride	**56235**	4.33E+00	1.20E-02	1.04E-03	1.40E+00	3.90E-03	9.49E-03
Chlorobenzene	**108907**	3.16E+00	8.76E-03	7.58E-04	0.00E+00	1.14E-04	0.00E+00
Chloroform	**67663**	3.35E+00	9.31E-03	8.05E-04	1.37E-01	4.02E-04	9.31E-02
Ethyl benzene	**100414**	6.07E+00	1.69E-02	1.46E-03	1.17E-01	1.09E-04	0.00E+00
Ethylene dibromide {EDB}	**106934**	5.21E+00	1.45E-02	1.25E-03	2.85E+00	2.35E-01	0.00E+00
Formaldehyde	**50000**	5.01E+03	1.39E+01	1.20E+00	2.32E+02	2.01E+01	3.80E+02
Methanol	**67561**	7.48E+02	2.08E+00	1.80E-01	0.00E+00	6.74E-03	1.11E-01
Methylene chloride {Dichloromethane}	**75092**	1.01E+01	2.80E-02	2.42E-03	7.76E-02	9.08E-04	3.00E-03
Naphthalene	**91203**	2.38E+01	6.60E-02	5.70E-03	6.22E+00	9.51E-02	0.00E+00
PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA]	**1151**	1.07E+01	2.98E-02	2.58E-03	9.10E+01	0.00E+00	0.00E+00
Styrene	**100425**	2.91E+00	8.09E-03	6.99E-04	0.00E+00	1.17E-04	5.78E-04
Toluene	**108883**	1.36E+02	3.79E-01	3.28E-02	0.00E+00	1.64E-02	1.54E-02
Vinyl chloride	**75014**	1.76E+00	4.88E-03	4.22E-04	1.05E+00	0.00E+00	4.07E-05
Xylene	**1330207**	4.77E+01	1.32E-01	1.15E-02	0.00E+00	0.00E+00	0.00E+00
				Totals	**6.51E+02**	**9.44E+01**	**1.52E+03**

Name	Prioritization Calculator			
Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in grey areas.			
Author or updater	Matthew Cegielski	*Last Update*	August 20, 2018	
Facility:	Darling Ingredients - Natural Gas-Fired Four Stroke Lean Burn (4SLB) Internal Combustion Engine with OC			
ID#:				
Project #:				
Unit and Process#	1-0 p1			
Operating Hours hr/yr	4,164.00			

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	1.89E+02	4.43E+01	7.46E+02	7.46E+02
100≤R<250	**0.250**	4.72E+01	1.11E+01	1.87E+02	1.87E+02
250≤R<500	**0.040**	7.56E+00	1.77E+00	2.99E+01	2.99E+01
500≤R<1000	**0.011**	2.08E+00	4.88E-01	8.21E+00	8.21E+00
1000≤R<1500	**0.003**	5.67E-01	1.33E-01	2.24E+00	2.24E+00
1500≤R<2000	**0.002**	3.78E-01	8.86E-02	1.49E+00	1.49E+00
2000<R	**0.001**	1.89E-01	4.43E-02	7.46E-01	7.46E-01

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

1-0 p1

Enter the unit's CAS# of the substances emitted and their amounts.

Prioritzation score for each substance generated below. Totals on last row.

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
1,1,2,2-Tetrachloroethane	79345	2.35E+00	6.52E-03	5.64E-04	1.05E+00	0.00E+00	0.00E+00
1,1,2-Trichloroethane	79005	1.87E+00	5.19E-03	4.48E-04	2.30E-01	0.00E+00	0.00E+00
1,1-Dichloroethane	75343	1.39E+00	3.85E-03	3.33E-04	1.71E-02	0.00E+00	0.00E+00
1,2,4-Trimethylbenze	95636	8.40E-01	2.33E-03	2.02E-04	0.00E+00	0.00E+00	0.00E+00
Ethylene dichloride {EDC}	107062	1.39E+00	3.85E-03	3.33E-04	2.24E-01	1.25E-04	0.00E+00
1,3-Butadiene	106990	1.57E+01	4.35E-02	3.76E-03	2.05E+01	2.82E-01	9.90E-02
2,2,4-Trimethylpentane	540841	1.47E+01	4.08E-02	3.52E-03	0.00E+00	0.00E+00	0.00E+00
2-Methyl naphthalene	91576	1.95E+00	5.41E-03	4.68E-04	0.00E+00	0.00E+00	0.00E+00
Acenaphthene	83329	7.34E-02	2.04E-04	1.76E-05	0.00E+00	0.00E+00	0.00E+00
Acenaphthylene	208968	3.25E-01	9.02E-04	7.80E-05	0.00E+00	0.00E+00	0.00E+00
Acetaldehyde	75070	4.91E+02	1.36E+00	1.18E-01	1.02E+01	1.26E-01	4.35E+00
Acrolein	107028	3.02E+02	8.38E-01	7.25E-02	0.00E+00	3.11E+01	5.03E+02
Benzene	71432	2.58E+01	7.18E-02	6.20E-03	5.77E+00	3.10E-01	3.99E+00
Benzo[b]fluoranthene	205992	9.75E-03	2.71E-05	2.34E-06	8.25E-03	0.00E+00	0.00E+00
Benzo[e]pyrene	192972	2.44E-02	6.77E-05	5.85E-06	0.00E+00	0.00E+00	0.00E+00
Benzo[g,h,i]perylene	191242	2.43E-02	6.75E-05	5.84E-06	0.00E+00	0.00E+00	0.00E+00
Biphenyl	92524	1.24E+01	3.46E-02	2.99E-03	0.00E+00	0.00E+00	0.00E+00
Carbon tetrachloride	56235	2.15E+00	5.98E-03	5.17E-04	6.97E-01	1.94E-03	4.72E-03
Chlorobenzene	108907	1.78E+00	4.96E-03	4.29E-04	0.00E+00	6.43E-05	0.00E+00
Chloroform	67663	1.67E+00	4.65E-03	4.02E-04	6.83E-02	2.01E-04	4.65E-02
Chrysene	218019	4.07E-02	1.13E-04	9.77E-06	3.45E-03	0.00E+00	0.00E+00
Ethyl benzene	100414	2.33E+00	6.47E-03	5.60E-04	4.49E-02	4.20E-05	0.00E+00
Ethylene dibromide {EDB}	106934	2.60E+00	7.22E-03	6.25E-04	1.42E+00	1.17E-01	0.00E+00
Fluoranthene	206440	6.52E-02	1.81E-04	1.56E-05	0.00E+00	0.00E+00	0.00E+00
Fluorene	86737	3.33E-01	9.25E-04	7.99E-05	0.00E+00	0.00E+00	0.00E+00
Formaldehyde	50000	3.10E+03	8.61E+00	7.44E-01	1.43E+02	1.24E+01	2.35E+02
Methanol	67561	1.47E+02	4.08E-01	3.52E-02	0.00E+00	1.32E-03	2.18E-02
Methylene chloride {Dichloromethane}	75092	1.17E+00	3.26E-03	2.82E-04	9.04E-03	1.06E-04	3.49E-04
Hexane	110543	6.52E+01	1.81E-01	1.56E-02	0.00E+00	3.35E-04	0.00E+00
Naphthalene	91203	4.37E+00	1.21E-02	1.05E-03	1.14E+00	1.75E-02	0.00E+00
PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA]	1151	4.55E-01	1.26E-03	1.09E-04	3.85E+00	0.00E+00	0.00E+00
Phenanthrene	85018	6.11E-01	1.70E-03	1.47E-04	0.00E+00	0.00E+00	0.00E+00
Phenol	108952	1.41E+00	3.91E-03	3.38E-04	0.00E+00	2.54E-04	1.01E-03
Pyrene	129000	7.98E-02	2.22E-04	1.92E-05	0.00E+00	0.00E+00	0.00E+00
Styrene	100425	1.39E+00	3.85E-03	3.33E-04	0.00E+00	5.55E-05	2.75E-04
Toluene	108883	2.40E+01	6.65E-02	5.75E-03	0.00E+00	2.88E-03	2.70E-03
Vinyl chloride	75014	8.75E-01	2.43E-03	2.10E-04	5.25E-01	0.00E+00	2.02E-05
Xylene	1330207	1.08E+01	3.00E-02	2.59E-03	0.00E+00	0.00E+00	0.00E+00
				Totals	**1.89E+02**	**4.43E+01**	**7.46E+02**

Name — Prioritization Calculator

Applicability	Use to provide a Prioritization score based on the emission potency method. Entries required in yellow areas, output in grey areas.
Author or updater	Matthew Cegielski — *Last Update* August 20, 2018
Facility:	Darling Ingredients - Natural Gas-Fired Four Stroke Rich Burn (4SRB) Internal Combustion Engine with NSCR
ID#:	
Project #:	
Unit and Process#	1-0 p1
Operating Hours hr/yr	4,164.00

Receptor Proximity and Proximity Factors		Cancer Score	Chronic Score	Acute Score	Max Score
0< R<100	**1.000**	1.56E+02	2.27E+01	3.65E+02	3.65E+02
100≤R<250	**0.250**	3.90E+01	5.66E+00	9.11E+01	9.11E+01
250≤R<500	**0.040**	6.25E+00	9.06E-01	1.46E+01	1.46E+01
500≤R<1000	**0.011**	1.72E+00	2.49E-01	4.01E+00	4.01E+00
1000≤R<1500	**0.003**	4.68E-01	6.80E-02	1.09E+00	1.09E+00
1500≤R<2000	**0.002**	3.12E-01	4.53E-02	7.29E-01	7.29E-01
2000<R	**0.001**	1.56E-01	2.27E-02	3.65E-01	3.65E-01

Receptor proximity is in meters. Priortization scores are calculated by multiplying the total scores summed below by the proximity factors. Record the Max score for your receptor distance. If the substance list for the unit is longer than the number of rows here or if there are multiple processes use additional worksheets and sum the totals of the Max Scores.

1-0 p1

Enter the unit's CAS# of the substances emitted and their amounts.

Prioritzation score for each substance generated below. Totals on last row.

Substance	CAS#	Annual Emissions (lbs/yr)	Maximum Hourly (lbs/hr)	Average Hourly (lbs/hr)	Cancer	Chronic	Acute
1,1,2,2-Tetrachloroethane	79345	1.49E+00	4.13E-03	3.57E-04	6.63E-01	0.00E+00	0.00E+00
1,1,2-Trichloroethane	79005	8.98E-01	2.50E-03	2.16E-04	1.11E-01	0.00E+00	0.00E+00
1,1-Dichloroethane	75343	6.63E-01	1.84E-03	1.59E-04	8.17E-03	0.00E+00	0.00E+00
Ethylene dichloride {EDC}	107062	6.63E-01	1.84E-03	1.59E-04	1.07E-01	5.97E-05	0.00E+00
1,3-Butadiene	106990	3.89E+01	1.08E-01	9.35E-03	5.09E+01	7.01E-01	2.46E-01
Acetaldehyde	75070	1.64E+02	4.55E-01	3.93E-02	3.41E+00	4.21E-02	1.45E+00
Acrolein	107028	1.54E+02	4.29E-01	3.71E-02	0.00E+00	1.59E+01	2.57E+02
Benzene	71432	9.28E+01	2.58E-01	2.23E-02	2.07E+01	1.11E+00	1.43E+01
Carbon tetrachloride	56235	1.04E+00	2.89E-03	2.50E-04	3.36E-01	9.36E-04	2.28E-03
Chlorobenzene	108907	7.57E-01	2.10E-03	1.82E-04	0.00E+00	2.73E-05	0.00E+00
Chloroform	67663	8.04E-01	2.23E-03	1.93E-04	3.28E-02	9.66E-05	2.23E-02
Ethyl benzene	100414	1.46E+00	4.04E-03	3.50E-04	2.80E-02	2.62E-05	0.00E+00
Ethylene dibromide {EDB}	106934	1.25E+00	3.47E-03	3.00E-04	6.84E-01	5.63E-02	0.00E+00
Formaldehyde	50000	1.20E+03	3.34E+00	2.89E-01	5.56E+01	4.82E+00	9.12E+01
Methanol	67561	1.80E+02	4.99E-01	4.31E-02	0.00E+00	1.62E-03	2.67E-02
Methylene chloride {Dichloromethane}	75092	2.42E+00	6.72E-03	5.81E-04	1.86E-02	2.18E-04	7.20E-04
Naphthalene	91203	5.70E+00	1.58E-02	1.37E-03	1.49E+00	2.28E-02	0.00E+00
PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA]	1151	2.57E+00	7.13E-03	6.17E-04	2.18E+01	0.00E+00	0.00E+00
Styrene	100425	6.99E-01	1.94E-03	1.68E-04	0.00E+00	2.80E-05	1.39E-04
Toluene	108883	3.28E+01	9.10E-02	7.87E-03	0.00E+00	3.93E-03	3.69E-03
Vinyl chloride	75014	4.22E-01	1.17E-03	1.01E-04	2.53E-01	0.00E+00	9.76E-06
Xylene	1330207	1.14E+01	3.18E-02	2.75E-03	0.00E+00	0.00E+00	0.00E+00
				Totals	**1.56E+02**	**2.27E+01**	**3.65E+02**

Substance	CAS	URF	Acute REL	Chronic REL
1,1,2,2-Tetrachloroethane	79345	5.80E-05	0	0
1,1,2-Trichloroethane	79005	1.60E-05	0	0
1,1-Dichloroethane	75343	1.60E-06	0	0
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	39001020	1.10E-02	0	0.13
1,2,3,4,6,7,8,9-Octachlorodibenzo-P-dioxin	3268879	1.10E-02	0	0.13
1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562394	3.80E-01	0	0.004
1,2,3,4,6,7,8-Heptachlorodibenzo-P-dioxin	35822469	3.80E-01	0	0.004
1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673897	3.80E-01	0	0.004
1,2,3,4,7,8-Hexachlorodibenzofuran	70648269	3.80E+00	0	0.0004
1,2,3,4,7,8-Hexachlorodibenzo-P-dioxin	39227286	3.80E+00	0	0.0004
1,2,3,6,7,8-Hexachlorodibenzofuran	57117449	3.80E+00	0	0.0004
1,2,3,6,7,8-Hexachlorodibenzo-P-dioxin	57653857	3.80E+00	0	0.0004
1,2,3,7,8,9-Hexachlorodibenzofuran	72918219	3.80E+00	0	0.0004
1,2,3,7,8,9-Hexachlorodibenzo-P-dioxin	19408743	3.80E+00	0	0.0004
1,2,3,7,8-Pentachlorodibenzofuran	57117416	1.10E+00	0	0.0013
1,2,3,7,8-Pentachlorodibenzo-P-dioxin	40321764	3.80E+01	0	0.00004
1,2-Dibromo-3-chloropropane	96128	2.00E-03	0	0
1,2-Epoxybutane	106887		0	20
1,3-Butadiene	106990	1.70E-04	660	2
1,3-Propane sultone	1120714	6.90E-04	0	0
1,4-Dioxane	123911	7.70E-06	3000	3000
1,6-Dinitropyrene	42397648	1.10E-02	0	0
1,8-Dinitropyrene	42397659	1.10E-03	0	0
1-Nitropyrene	5522430	1.10E-04	0	0
2,3,3',4,4',5,5'-HEPTACHLORBIPHENYL (PCB 189)	39635319	1.10E-03	0	1.3
2,3,3',4,4',5-HEXACHLOROBIPHENYL (PCB 156)	38380084	1.10E-03	0	1.3
2,3,3',4,4',5'-HEXACHLOROBIPHENYL (PCB 157)	69782907	1.10E-03	0	1.3
2,3,3',4,4'-Pentachlorobiphenyl {PCB 105}	32598144	1.10E-03	0	1.3
2,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 167)	52663726	1.10E-03	0	1.3
2,3,4,4',5-PENTACHLOBIPHENYL (PCB114)	74472370	1.10E-03	0	1.3
2,3',4,4',5-PENTACHLOROBIPHENYL (PCB 118)	31508006	1.10E-03	0	1.3
2,3',4,4',5'-PENTACHOROBIPHENYL (PCB 123)	65510443	1.10E-03	0	1.3
2,3,4,6,7,8-Hexachlorodibenzofuran	60851345	3.80E+00	0	0.0004
2,3,4,7,8-Pentachlorodibenzofuran	57117314	1.10E+01	0	0.00013
2,3,7,8-Tetrachlorodibenzofuran	51207319	3.80E+00	0	0.0004
2,3,7,8-Tetrachlorodibenzo-P-Dioxin	1746016	3.80E+01	0	0.00004
2,4,6-Trichlorophenol	88062	2.00E-05	0	0
2,4-Diaminoanisole	615054	6.60E-06	0	0
2,4-Diaminotoluene	95807	1.10E-03	0	0
2,4-Dinitrotoluene	121142	8.90E-05	0	0
2-Aminoanthraquinone	117793	9.40E-06	0	0
2-Nitrofluorene	607578	1.10E-05	0	0
3,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 169)	32774166	1.10E+00	0	0.0013
3,3',4,4',5-PENTACHLOROBIPHENYL (PCB 126)	57465288	3.80E+00	0	0.0004
3,3',4,4'-TETRACHLORBIPHENYL (PCB77)	32598133	3.80E-03	0	0.4
3,3'-Dichlorobenzidine	91941	3.40E-04	0	0
3,4,4',5-TETRACHLOROBIPHENYL (PCB 81)	70362504	1.10E-02	0	0.13
3-Methylcholanthrene	56495	6.30E-03	0	0
4,4'-Methylene bis(2 Chloroaniline) (MOCA)	101144	4.30E-04	0	0
4,4'-Methylenedianiline	101779	4.60E-04	0	20

4-Chloro-o-phenylenediamine	**95830**	**4.60E-06**	**0**	**0**
4-Dimethylaminoazobenzene	60117	1.30E-03	0	0
4-Nitropyrene	57835924	1.10E-04	0	0
5-Methylchrysene	3697243	1.10E-03	0	0
5-Nitroacenaphthene	602879	3.70E-05	0	0
6-Nitrochrysene	7496028	1.10E-02	0	0
7,12-Dimethylbenz[a]anthracene	57976	7.10E-02	0	0
7H-Dibenzo[c,g]carbazole	194592	1.10E-03	0	0
Acetaldehyde	75070	2.70E-06	470	140
Acetamide	60355	2.00E-05	0	0
Acrolein	107028		2.5	0.35
Acrylamide	79061	1.30E-03	0	0
Acrylic acid	79107		6000	0
Acrylonitrile	107131	2.90E-04	0	5
Allyl chloride	107051	6.00E-06	0	0
alpha-Hexachlorocyclohexane	319846	1.10E-03	0	0
Ammonia	7664417		3200	200
Aniline	62533	1.60E-06	0	0
Arsenic	7440382	3.30E-03	0.2	0.015
Arsenic compounds (inorganic)	1016	3.30E-03	0.2	0.015
Arsine	7784421		0.2	0.015
Asbestos	1332214	1.90E-04	0	0
Barium chromate	10294403	1.50E-01	0	0.2
Benz[a]anthracene	56553	1.10E-04	0	0
Benzene	71432	2.90E-05	27	3
Benzidine (and its salts)	92875	1.40E-01	0	0
Benzidine-based dyes	1020	1.40E-01	0	0
Benzo[a]pyrene	50328	1.10E-03	0	0
Benzo[b]fluoranthene	205992	1.10E-04	0	0
Benzo[j]fluoranthene	205823	1.10E-04	0	0
Benzo[k]fluoranthene	207089	1.10E-04	0	0
Benzyl chloride	100447	4.90E-05	240	0
Beryllium	7440417	2.40E-03	0	0.007
beta-Hexachlorocyclohexane	319857	1.10E-03	0	0
Bis(2-chloroethyl) ether {DCEE}	**111444**	**7.10E-04**	**0**	**0**
Bis(chloromethyl) ether	542881	1.30E-02	0	0
Cadmium	7440439	4.20E-03	0	0.02
Calcium chromate	13765190	1.50E-01	0	0.2
Caprolactam	105602	0.00E+00	50	2.2
Carbon disulfide	75150		6200	800
Carbon monoxide	630080		23000	0
Carbon tetrachloride	56235	4.20E-05	1900	40
Chlorinated paraffin	108171262	2.50E-05	0	0
Chlorine	7782505		210	0.2
Chlorine dioxide	10049044		0	0.6
Chlorobenzene	108907		0	1000
Chloroform	67663	5.30E-06	150	300
Chloropicrin	76062		29	0.4
Chromium trioxide	1333820	1.50E-01	0	0.002
Chromium, hexavalent	18540299	1.50E-01	0	0.2
Chrysene	218019	1.10E-05	0	0

Copper	7440508		100	0
Cresols (mixtures of) {Cresylic acid}	1319773		0	600
Cupferron	135206	6.30E-05	0	0
Cyanide compounds	1073		340	9
CYANIDE COMPOUNDS [Inorganic)	57125		340	9
Di(2-ethylhexyl) phthalate	117817	2.40E-06	0	0
Dibenz[a,h]acridine	226368	1.10E-04	0	0
Dibenz[a,h]anthracene	53703	1.20E-03	0	0
Dibenz[a,j]acridine	224420	1.10E-04	0	0
Dibenzo[a,e]pyrene	192645	1.10E-03	0	0
Dibenzo[a,h]pyrene	189640	1.10E-02	0	0
Dibenzo[a,i]pyrene	189559	1.10E-02	0	0
Dibenzo[a,l]pyrene	191300	1.10E-02	0	0
Dibenzofurans (chlorinated) {PCDFs} [Treated as 2378TCDD for HRA]	1080	3.80E+01		0.00004
Dichlorodifluoromethene Freon 12	75718	0.00E+00	0	0
Diesel engine exhaust, particulate matter (Diesel PM)	9901	3.00E-04	0	5
Diethanolamine	111422		0	3
Dimethyl formamide	68122		0	80
Dioxins, total, w/o individ. isomers reported {PCDDs} [Treat as 2378TCDD for HRA	1086	3.80E+01	0	0.00004
Direct Black 38	1937377	1.40E-01	0	0
Direct Blue 6	2602462	1.40E-01	0	0
Direct Brown 95 (technical grade)	16071866	1.40E-01	0	0
Epichlorohydrin	106898	2.30E-05	1300	3
Ethyl benzene	100414	2.50E-06	0	2000
Ethyl chloride {Chlorethane)	75003		0	30000
Ethylene dibromide {EDB}	106934	7.10E-05	0	0.8
Ethylene dichloride {EDC}	107062	2.10E-05	0	400
Ethylene glycol	107211		0	400
Ethylene glycol monobutyl ether	111762		14000	0
Ethylene glycol monoethyl ether	110805		370	70
Ethylene glycol monoethyl ether acetate	111159		140	300
Ethylene glycol monomethyl ether	109864		93	60
Ethylene glycol monomethyl ether acetate	110496		0	90
Ethylene oxide	75218	8.80E-05	0	30
Ethylene thiourea	96457	1.30E-05	0	0
Fluorides	1101		240	13
Formaldehyde	50000	6.00E-06	55	9
Glutaraldehyde	111308		0	0.08
Hexachlorobenzene	118741	5.10E-04	0	0
Hexachlorocyclohexanes (mixed or technical grade)	608731	1.10E-03	0	0
Hexane	110543		0	7000
Hydrazine	302012	4.90E-03	0	0.2
Hydrochloric acid	7647010		2100	9
Hydrocyanic acid	74908		340	9
Hydrogen fluoride	7664393		240	14
Hydrogen Selenide	7783075		5	0
Hydrogen sulfide	7783064		42	10
Indeno[1,2,3-cd]pyrene	193395	1.10E-04	0	0
Isophorone	78591		0	2000

Isopropyl alcohol	67630		3200	7000
Lead	7439921	1.20E-05	0	0
Lead acetate	301042	1.20E-05	0	0
Lead chromate	7758976	1.50E-01	0	0.2
Lead compounds (inorganic)	1128	1.20E-05	0	0
Lead phosphate	7446277	1.20E-05	0	0
Lead subacetate	1335326	1.20E-05	0	0
Lindane {gamma-Hexachlorocyclohexane}	58899	3.10E-04	0	0
Maleic anhydride	108316		0	0.7
Manganese	7439965		0	0.09
m-Cresol	108394		0	600
Mercuric chloride	7487947		0.6	0.03
Mercury	7439976		0.6	0.03
Methanol	67561		28000	4000
Methyl bromide {Bromomethane}	74839		3900	5
Methyl chloroform {1,1,1-Trichloroethane}	71556		68000	1000
Methyl ethyl ketone	78933		13000	0
Methyl isocyanate	624839		0	1
Methyl tert-butyl ether	1634044	2.60E-07	0	8000
Methylene chloride {Dichloromethane}	75092	1.00E-06	14000	400
Methylene diphenyl diisocyanate {MDI}	101688		12	0.08
Michler's ketone	90948	2.50E-04	0	0
m-Xylene	108383		22000	700
Naphthalene	91203	3.40E-05	0	9
Nickel	7440020	2.60E-04	0.2	0.014
Nickel acetate	373024	2.60E-04	0.2	0.014
Nickel carbonate	3333673	2.60E-04	0.2	0.014
Nickel carbonyl	13463393	2.60E-04	0.2	0.014
Nickel hydroxide	12054487	2.60E-04	0.2	0.014
Nickel oxide	1313991	2.60E-04	0.2	0.02
Nickel refinery dust	1146	2.60E-04	0.2	0.014
Nickel subsulfide	12035722	2.60E-04	0.2	0.014
Nickelocene	1271289	2.60E-04	0.2	0.014
Nitric acid	7697372		86	0
NITROGEN DIOXIDE	10102440		470	0
N-Nitrosodiethylamine	55185	1.00E-02	0	0
N-Nitrosodimethylamine	62759	4.60E-03	0	0
N-Nitrosodi-n-butylamine	924163	3.10E-03	0	0
N-Nitrosodi-n-propylamine	621647	2.00E-03	0	0
N-Nitrosodiphenylamine	86306	2.60E-06	0	0
N-Nitrosomethylethylamine	10595956	6.30E-03	0	0
N-Nitrosomorpholine	59892	1.90E-03	0	0
N-Nitrosopiperidine	100754	2.70E-03	0	0
N-Nitrosopyrrolidine	930552	6.00E-04	0	0
o-Cresol	95487		0	600
OLEUM	8014957		120	0
o-Xylene	95476		22000	700
Ozone	10028156		180	0
PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA]	1151	1.10E-03	0	0
PCBs {Polychlorinated biphenyls}	1336363	5.70E-04	0	0

p-Chloro-o-toluidine	95692	7.70E-05	0	0
p-Cresidine	120718	4.30E-05	0	0
p-Cresol	106445		0	600
p-Dichlorobenzene	106467	1.10E-05	0	800
Pentachlorophenol	87865	5.10E-06	0	0
Perchloroethylene {Tetrachloroethene}	127184	6.10E-06	20000	35
Phenol	108952		5800	200
Phosgene	75445		4	0
Phosphine	7803512		0	0.8
Phosphoric acid	7664382		0	7
Phthalic anhydride	85449		0	20
p-Nitrosodiphenylamine	156105	6.30E-06	0	0
Potassium bromate	7758012	1.40E-04	0	0
Propylene	115071		0	3000
Propylene glycol monomethyl ether	107982		0	7000
Propylene oxide	75569	3.70E-06	3100	30
p-Xylene	106423		22000	700
Selenium	7782492		0	20
Selenium sulfide	7446346		0	20
Silica, crystalline	1175		0	3
Silica, crystalline	7631869		0	3
Sodium dichromate	10588019	1.50E-01	0	0.2
Sodium hydroxide	1310732		8	0
Strontium chromate	7789062	1.50E-01	0	0.2
Styrene	100425		21000	900
Sulfates	9960		120	0
Sulfur Dioxide	7446095		660	0
Sulfur Trioxide	7446719		120	1
Sulfuric acid	7664939		120	1
t-Butyl acetate	540885	1.30E-06		
Thioacetamide	62555	1.70E-03	0	0
Toluene	108883		37000	300
TOLUENE DIISOCYANATE	26471625	1.10E-05	2	0.008
Toluene-2,4-diisocyanate	584849	1.10E-05	2	0.008
Toluene-2,6-diisocyanate	91087	1.10E-05	2	0.008
Trichloroethylene	79016	2.00E-06	0	600
Triethylamine	121448		2800	200
Urethane	51796	2.90E-04	0	0
Vanadium (fume or dust)	7440622		30	0
VANADIUM PENTOXIDE	1314621		30	0
Vinyl acetate	108054		0	200
Vinyl chloride	75014	7.80E-05	180000	0
Vinylidene chloride	75354		0	70
XYLENES (mixed xylenes)	1330207		22000	700

CAS	Substance	Substance	CAS
1000	Aflatoxins	1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea {Methyl CCNU}	13909096
1005	Analgesic mixtures containing phenacetin	1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea {CCNU}	13010474
1010	Androgenic (anabolic) steroids	1,1,1,2-Tetrafluoroethane {HFC-134a}	811972
1016	Arsenic compounds (inorganic)	1,1,2,2-Tetrachloroethane	79345
1017	Arsenic compounds (other than inorganic)	1,1,2-Trichloroethane	79005
1020	Benzidine-based dyes	1,1-Dichloroethane	75343
1025	Betel quid with tobacco	1,1-Difluoroethane {Freon 152a}	75376
1030	Bitumens, extracts of steam-refined and air-refined bitumens	1,1-Dimethylhydrazine	57147
1035	Bleomycins	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	39001020
1050	Carbon black extract	1,2,3,4,6,7,8,9-Octachlorodibenzo-P-dioxin	3268879
1055	Carrageenan (degraded)	1,2,3,4,6,7,8-Heptachlorodibenzofuran	67562394
1056	Ceramic fibers (man-made)	1,2,3,4,6,7,8-Heptachlorodibenzo-P-dioxin	35822469
1058	Chlorobenzenes	1,2,3,4,7,8,9-Heptachlorodibenzofuran	55673897
1059	p-Chloro-o-toluidine	1,2,3,4,7,8-Hexachlorodibenzofuran	70648269
1060	Chlorophenols	1,2,3,4,7,8-Hexachlorodibenzo-P-dioxin	39227286
1065	Chlorophenoxy herbicides	1,2,3,6,7,8-Hexachlorodibenzofuran	57117449
1068	Conjugated estrogens	1,2,3,6,7,8-Hexachlorodibenzo-P-dioxin	57653857
1070	Creosotes	1,2,3,7,8,9-Hexachlorodibenzofuran	72918219
1073	Cyanide compounds	1,2,3,7,8,9-Hexachlorodibenzo-P-dioxin	19408743
1075	Dialkylnitrosamines	1,2,3,7,8-Pentachlorodibenzofuran	57117416
1078	Diaminotoluenes (mixed isomers)	1,2,3,7,8-Pentachlorodibenzo-P-dioxin	40321764
1080	Dibenzofurans (chlorinated) {PCDFs} [Treated as 2378TCDD for HRA]	1,2,3-Trichloropropane	96184
1085	Dioxins, total, with individ. isomers also reported {PCDDs}	1,2,4-Trichlorobenze	120821
1086	Dioxins, total, w/o individ. isomers reported {PCDDs} [Treat as 2378TCDD for HRA	1,2,4-Trimethylbenze	95636
1090	Environmental Tobacco Smoke	1,2-Dibromo-3-chloropropane	96128
1091	Epoxy resins	1,2-Dichlorobenzene	95501
1095	Estrogens, non-steroidal	1,2-Dichloroethylene	540590
1100	Estrogens, steroidal	1,2-Diethylhydrazine	1615801
1101	Fluorides	1,2-Dimethylhydrazine	540738
1103	Fluorocarbons (brominated)	1,2-Epoxybutane	106887
1104	Fluorocarbons (chlorinated)	1,3-Butadiene	106990
1110	Gasoline vapors	1,3-Dichlorobenzene	541731
1111	Glasswool (man-made fibers)	1,3-Propane sultone	1120714
1115	Glycol ethers (and their acetates)	1,4-Butanediol dimethanesulfonate	55981
1125	Isocyanates	1,4-Dichloro-2-butene	764410
1128	Lead compounds (inorganic)	1,4-Dioxane	123911
1129	Lead compounds (other than inorganic)	1,6-Dinitropyrene	42397648
1131	Lubricant base oils	1,8-Dinitropyrene	42397659
1135	Mineral fibers (other than man-made)	1-[(5-Nitrofurfurylidene)amino]-2-imidazolidinone	555840
1136	Mineral fibers (fine: man-made)	1-Amino-2-methylanthraquinone	82280
1140	Mineral oils (untreated and mildly treated oils)	1-Naphthylamine	134327
1146	Nickel refinery dust	1-Nitropyrene	5522430
1148	Nitrilotriacetic acid (salts)	2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole	3570750
1150	PAHs, total, with individ. components also reported	2,2,4-Trimethylpentane	540841

1151	PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA]	2,3,3',4,4',5,5'-HEPTACHLORBIPHENYL (PCB 189)	39635319
1155	Polybrominated biphenyls	2,3,3',4,4',5-HEXACHLOROBIPHENYL (PCB 156)	38380084
1160	Progestins	2,3,3',4,4',5'-HEXACHLOROBIPHENYL (PCB 157)	69782907
1165	Radionuclides	2,3,3',4,4'-Pentachlorobiphenyl {PCB 105}	32598144
1166	Radon and its decay	2,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 167)	52663726
1167	Retinol/retinyl este	2,3,4,4',5-PENTACHLOBIPHENYL (PCB114)	74472370
1168	Rockwool (man-made fibers)	2,3',4,4',5-PENTACHLOROBIPHENYL (PCB 118)	31508006
1175	Silica, crystalline	2,3',4,4',5'-PENTACHOROBIPHENYL (PCB 123)	65510443
1180	Shale oils	2,3,4,6,7,8-Hexachlorodibenzofuran	60851345
1181	Slagwool (man-made fibers)	2,3,4,6-Tetrachlorophenol	58902
1185	Soots	2,3,4,7,8-Pentachlorodibenzofuran	57117314
1190	Talc containing asbestiform fibers	2,3,7,8-Tetrachlorodibenzofuran	51207319
1200	Tobacco products, smokeless	2,3,7,8-Tetrachlorodibenzo-P-Dioxin	1746016
1205	alpha-chlorinated Toluenes	2,3-Dibromo-1-propanol	96139
1206	Wood preservatives (containing arsenic and chromate)	2,3-Dichloropropene	78886
2222	Polybrominated diphenyl ethers {PBDEs}	2,4,5-Trichlorophenol	95954
9901	Diesel engine exhaust, particulate matter (Diesel PM)	2,4,6-Trichlorophenol	88062
9902	Diesel engine exhaust, total organic gas	2,4-Diaminoanisole	615054
9910	Gasoline engine exhaust, particulate matter	2,4-Diaminoanisole sulfate	39156417
9911	Gasoline engine exhaust, total organic gas	2,4-Diaminotoluene	95807
9960	Sulfates	2,4-Dichlorophenol	120832
9960	SULFATES	2,4-Dimethylphenol {2,4-Xylenol}	105679
9961	SULFURIC ACID+OLEUM	2,4-Dinitrophenol	51285
11101	Particulate Matter	2,4-Dinitrotoluene	121142
16113	Reactive Organic Gas	2,6-Dinitrotoluene	606202
42101	Carbon Monoxide [Criteria Pollutant]	2,6-Xylidene	87627
42401	Oxides of sulfur	2-Amino-3-methyl-9H-pyrido(2,3-b) indole {MeA-alpha-C}	68006837
42603	Oxides of Nitrogen	2-Amino-5-(5-nitro-2-furyl)-1,3,4-thiadiazole	712685
43101	Total Organic Gases	2-Aminoanthraquinone	117793
43104	Volatile Organic Compounds (VOC)	2-Chloroacetophenone	532274
50000	Formaldehyde	2-CHLOROPHENOL	95578
50066	Phenobarbital	2-Methyl naphthalene	91576
50077	Mitomycin C	2-Methyl-1-nitroanthraquinone (uncertain purity)	129157
50180	Cyclophosphamide	2-Methylaziridine	75558
50282	Estradiol 17 beta	2-Methyllactonitrile	75865
50293	DDT {1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane}	2-Methylpyridine	109068
50328	Benzo[a]pyrene	2-Naphthylamine	91598
50351	Thalidomide	2-Nitrofluorene	607578
50419	Clomiphene citrate	2-Nitrophenol	88755
50760	Actinomycin D	2-Nitropropane	79469
50782	Aspirin	2-Phenylphenol	90437
51218	Fluorouracil	3-(N-Nitrosomethylamino)propionitrile	60153493

51285	2,4-Dinitrophenol	3,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 169)	32774166
51525	Propylthiouracil	3,3',4,4',5-PENTACHLOROBIPHENYL (PCB 126)	57465288
51752	Nitrogen mustard	3,3',4,4'-TETRACHLORBIPHENYL (PCB77)	32598133
51796	Urethane	3,3'-Dichloro-4,4'-diaminodiphenyl ether	28434868
52244	Tris(1-aziridinyl) phosphine sulfide	3,3'-Dichlorobenzidine	91941
52675	Penicillamine	3,3'-Dimethoxybenzidine	119904
52686	Trichlorfon	3,3'-Dimethoxybenzidine dihydrochloride	20325400
53167	Estrone	3,3'-Dimethylbenzidine {o-Tolidine}	119937
53703	Dibenz[a,h]anthracene	3,4,4',5-TETRACHLOROBIPHENYL (PCB 81)	70362504
54115	Nicotine	3-Amino-9-ethylcarbazole hydrochloride	6109973
54626	Aminopterin	3-Chloro-2-methylpropene	563473
54911	Pipobroman	3-Methylcholanthrene	56495
55185	N-Nitrosodiethylamine	4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone {NNK}	64091914
55210	Benzamide	4,4'-Diaminodiphenyl ether	101804
55630	Nitroglycerin	4,4'-Isopropylidenediphenol	80057
55867	Nitrogen mustard hydrochloride	4,4'-Methylene bis (N,N-dimethyl) benzenamine	101611
55981	1,4-Butanediol dimethanesulfonate	4,4'-Methylene bis(2 Chloroaniline) (MOCA)	101144
56042	Methylthiouracil	4,4'-Methylene bis(2-methylaniline)	838880
56235	Carbon tetrachloride	4,4'-Methylenedianiline	101779
56382	Parathion	4,4'-Thiodianiline	139651
56495	3-Methylcholanthrene	4,6-Dinitro-o-cresol	534521
56531	Diethylstilbestrol	4-Chloro-o-phenylenediamine	95830
56553	Benz[a]anthracene	4-Dimethylaminoazobenzene	60117
56757	Chloramphenicol	4-Nitrobiphenyl	92933
57125	CYANIDE COMPOUNDS [Inorganic)	4-Nitrophenol	100027
57147	1,1-Dimethylhydrazine	4-Nitropyrene	57835924
57330	Pentobarbital sodium	4-Vinyl-1-cyclohexene diepoxide	106876
57410	Phenytoin	4-Vinylcyclohexene	100403
57636	Ethinyl estradiol	5-(Morpholinomethyl)-3-[(5-nitrofurfurylidene)amino]-2-oxazolidinone	139913
57830	Progesterone	5-Methoxypsoralen	484208
57976	7,12-Dimethylbenz[a]anthracene	5-Methylchrysene	3697243
58184	Methyltestosterone	5-Nitroacenaphthene	602879
58220	Testosterone and its esters	5-Nitro-o-anisidine	99592
58899	Lindane {gamma-Hexachlorocyclohexane}	6-Nitrochrysene	7496028
58902	2,3,4,6-Tetrachlorophenol	7,12-Dimethylbenz[a]anthracene	57976
59052	Methotrexate	7H-Dibenzo[c,g]carbazole	194592
59870	Nitrofurazone	A-alpha-C {2-Amino-9H-pyrido[2,3-b]indole}	26148685
59892	N-Nitrosomorpholine	Acenaphthene	83329
59961	Phenoxybenzamine	Acenaphthylene	208968
60093	p-Aminoazobenzene	Acetaldehyde	75070
60117	4-Dimethylaminoazobenzene	Acetamide	60355
60344	Methyl hydrazine	Acetochlor	34256821
60355	Acetamide	Acetohydroxamic acid	546883
60560	Methimazole	Acetonitrile	75058
60571	Dieldrin	Acetophenone	98862
61574	Niridazole	Acifluorfen	62476599
62442	Phenacetin	Acrolein	107028

62500	Ethyl methanesulfonate	Acrylamide	79061
62533	Aniline	Acrylic acid	79107
62555	Thioacetamide	Acrylonitrile	107131
62759	N-Nitrosodimethylamine	Actinomycin D	50760
63252	Carbaryl	Adriamycin	23214928
63923	Phenoxybenzimide hydrochloride	AF-2	3688537
63989	Phenacemide	Aflatoxins	1000
64675	Diethyl sulfate	Alachlor	15972608
64755	Tetracycline hydrochoride	Aldrin	309002
66273	Methyl methanesulfon	all-trans-Retinoic acid	302794
66751	Uracil mustard	Allyl alcohol	107186
66819	Cycloheximide	Allyl chloride	107051
67209	Nitrofurantoin	alpha-chlorinated Toluenes	1205
67458	Furazolidone	alpha-Hexachlorocyclohexane	319846
67561	Methanol	Alprazolam	28981977
67630	Isopropyl alcohol	Aluminum	7429905
67663	Chloroform	Aluminum oxide (fibrous)	1344281
68122	Dimethyl formamide	Amikacin sulfate	39831555
68224	Norethisterone	Aminoglutethimide	125848
68768	Tris(aziridinyl)-p-benzoquinone	Aminopterin	54626
70257	N-Methyl-N'-nitro-N-nitrosoguanidine	Ammonia	7664417
71363	n-Butyl alcohol	Ammonium nitrate	6484522
71432	Benzene	Ammonium sulfate	7783202
71556	Methyl chloroform {1,1,1-Trichloroethane}	Analgesic mixtures containing phenacetin	1005
71589	Medroxyprogesterone	Androgenic (anabolic) steroids	1010
72333	Mestranol	Aniline	62533
72435	Methoxychlor	Anthracene	120127
72548	Dichlorodiphenyldichloroethane {DDD}	Antimony	7440360
72571	Trypan blue	Antimony trioxide	1309644
74828	Methane	Aramite	140578
74839	Methyl bromide {Bromomethane}	Arsenic	7440382
74851	Ethylene	Arsenic compounds (inorganic)	1016
74873	Methyl chloride {Chloromethane}	Arsenic compounds (other than inorganic)	1017
74884	Methyl iodide {Iodomethane}	Arsine	7784421
74908	Hydrocyanic acid	Asbestos	1332214
74953	Methylene bromide	Aspirin	50782
75003	Ethyl chloride {Chlorethane)	Auramine	492808
75014	Vinyl chloride	Azaserine	115026
75025	Vinyl fluoride	Azathioprine	446866
75058	Acetonitrile	Azobenzene	103333
75070	Acetaldehyde	Barium	7440393
75092	Methylene chloride {Dichloromethane}	Barium chromate	10294403
75150	Carbon disulfide	Benz[a]anthracene	56553
75218	Ethylene oxide	Benzal chloride	98873
75252	Bromoform	Benzamide	55210
75274	Bromodichloromethane	Benzene	71432
75343	1,1-Dichloroethane	Benzidine (and its salts)	92875
75354	Vinylidene chloride	Benzidine-based dyes	1020
75376	1,1-Difluoroethane {Freon 152a}	Benzo[a]pyrene	50328
75434	Dichlorofluoromethane {Freon 21}	Benzo[b]fluoranthene	205992
75445	Phosgene	Benzo[e]pyrene	192972
75456	Chlorodifluoromethane {Freon 22}	Benzo[g,h,i]perylene	191242
75467	Trifluoromethane {Freon 23}	Benzo[j]fluoranthene	205823
75558	2-Methylaziridine	Benzo[k]fluoranthene	207089

75569	Propylene oxide	Benzofuran	271896
75650	tert-Butyl alcohol	Benzoic trichloride	98077
75694	Trichlorofluoromethane {Freon 11}	Benzoyl chloride	98884
75718	Dichlorodifluoromethene (Freon 12)	Benzoyl peroxide	94360
75730	Carbon tetrafluoride	Benzphetamine hydrochloride	5411223
75865	2-Methyllactonitrile	Benzyl chloride	100447
76062	Chloropicrin	Benzyl violet 4B	1694093
76131	Chlorinated Fluorocarbon {CFC-113} {1,1,2-Trichloro-1,2,2-trifluoroethane}	Beryllium	7440417
76437	Fluoxymesterone	beta-Butyrolactone	3068880
77474	Hexachlorocyclopentadiene	beta-Hexachlorocyclohexane	319857
77781	Dimethyl sulfate	Betel quid with tobacco	1025
78308	Triorthocresyl phosphate	Biphenyl	92524
78400	Triethyl phosphine	Bis(2-chloro-1-methylethyl) ether	108601
78591	Isophorone	Bis(2-chloroethyl) ether {DCEE}	111444
78795	Isoprene, except from vegetative emission sources	Bis(2-ethylhexyl) adipate	103231
78842	Isobutyraldehyde	Bis(chloromethyl) ether	542881
78886	2,3-Dichloropropene	Bischloroethyl nitrosourea	154938
78922	sec-Butyl alcohol	Bitumens, extracts of steam-refined and air-refined bitumens	1030
78933	MEK	Bleomycins	1035
78933	Methyl ethyl ketone	Bromine	7726956
79005	1,1,2-Trichloroethane	Bromine Pentafluoride	7789302
79016	Trichloroethylene	Bromodichloromethane	75274
79061	Acrylamide	Bromoform	75252
79107	Acrylic acid	Bromoxynil	1689845
79118	Chloroacetic acid	Butyl acrylate	141322
79210	Peracetic acid	Butyl benzyl phthalate	85687
79345	1,1,2,2-Tetrachloroethane	Butylated hydroxyanisole {BHA}	25013165
79469	2-Nitropropane	Butyraldehyde	123728
79572	Oxytetracycline	C. I. Acid Green 3	4680788
80057	4,4'-Isopropylidenediphenol	C. I. Basic Green 4	569642
80159	Cumene hydroperoxide	C. I. Basic Red 1	989388
80626	Methyl methacrylate	C. I. Basic Red 9 monohydrochloride	569619
81072	Saccharin	C. I. Disperse Yellow 3	2832408
81812	Warfarin	Cadmium	7440439
81889	D and C Red No. 19	Calcium chromate	13765190
82280	1-Amino-2-methylanthraquinone	Calcium cyanamide	156627
82688	Pentachloronitrobenzene {Quintobenzene}	Caprolactam	105602
83329	Acenaphthene	Carbaryl	63252
84173	Dienestrol	Carbon black extract	1050
84662	Diethyl phthalate	Carbon disulfide	75150
84742	Dibutyl phthalate	Carbon monoxide	630080
85018	Phenanthrene	Carbon Monoxide [Criteria Pollutant]	42101
85101	Particulate Matter 1	Carbon tetrachloride	56235
85449	Phthalic anhydride	Carbon tetrafluoride	75730
85687	Butyl benzyl phthalate	Carbonyl sulfide	463581
86306	N-Nitrosodiphenylamine	Carboplatin	41575944
86737	Fluorene	Carrageenan (degraded)	1055
87296	Cinnamyl anthranilate	Catechol	120809
87627	2,6-Xylidene	Ceramic fibers (man-made)	1056
87683	Hexachlorobutadiene	Chenodiol	474259
87865	Pentachlorophenol	Chloramben	133904
88062	2,4,6-Trichlorophenol	Chlorambucil	305033
88101	Particulate Matter 2.5 Microns or less	Chloramphenicol	56757

88755	2-Nitrophenol	Chlorcyclizine hydrochloride	1620219
88857	Dinoseb	Chlordecone {Kepone}	143500
88891	Picric acid	Chlordimeform	6164983
90437	2-Phenylphenol	Chlorendic acid	115286
90948	Michler's ketone	Chlorinated Fluorocarbon {CFC-113} {1,1,2-Trichloro-1,2,2-trifluoroethane}	76131
91087	Toluene-2,6-diisocyanate	Chlorinated paraffin	1.08E+08
91203	Naphthalene	Chlorine	7782505
91225	Quinoline	Chlorine dioxide	10049044
91576	2-Methyl naphthalene	Chloroacetic acid	79118
91598	2-Naphthylamine	Chlorobenzene	108907
91941	3,3'-Dichlorobenzidine	Chlorobenzenes	1058
92524	Biphenyl	Chlorodibromomethane	124481
92875	Benzidine (and its salts)	Chlorodifluoromethane {Freon 22}	75456
92933	4-Nitrobiphenyl	Chloroform	67663
94360	Benzoyl peroxide	Chlorophenols	1060
94586	Dihydrosafrole	Chlorophenoxy herbicides	1065
94597	Safrole	Chloropicrin	76062
94757	Dichlorophenoxyacetic acid, salts and esters {2,4-D}	Chloroprene	126998
94780	Phenazopyridine hydrochloride	Chlorothalonil	1897456
95067	Sulfallate	Chromium	7440473
95476	o-Xylene	Chromium trioxide	1333820
95487	o-Cresol	Chromium, hexavalent	18540299
95501	1,2-Dichlorobenzene	Chrysene	218019
95578	2-CHLOROPHENOL	Cinnamyl anthranilate	87296
95636	1,2,4-Trimethylbenze	Cisplatin	15663271
95692	p-Chloro-o-toluidine	Citrus Red No. 2	6358538
95807	2,4-Diaminotoluene	Clomiphene citrate	50419
95830	4-Chloro-o-phenylenediamine	Coal tars	8007452
95954	2,4,5-Trichlorophenol	Cobalt	7440484
96093	Styrene oxide	Conjugated estrogens	1068
96128	1,2-Dibromo-3-chloropropane	Copper	7440508
96139	2,3-Dibromo-1-propanol	Creosotes	1070
96184	1,2,3-Trichloropropane	Cresols (mixtures of) {Cresylic acid}	1319773
96333	Methyl acrylate	Crotonaldehyde	4170303
96457	Ethylene thiourea	Cumene	98828
97563	o-Aminoazotoluene	Cumene hydroperoxide	80159
98077	Benzoic trichloride	Cupferron	135206
98828	Cumene	Cyanazine	21725462
98862	Acetophenone	Cyanide compounds	1073
98873	Benzal chloride	CYANIDE COMPOUNDS [Inorganic)	57125
98884	Benzoyl chloride	Cycasin	14901087
98953	Nitrobenzene	Cyclohexane	110827
99592	5-Nitro-o-anisidine	Cyclohexanol	108930
99650	m-Dinitrobenzene	Cycloheximide	66819
99661	Valproate	Cyclophosphamide	50180
100027	4-Nitrophenol	Cyhexatin	13121705
100210	Terephthalic acid	Cytarabine	147944
100254	p-Dinitrobenzene	D and C Orange No. 1	3468631
100403	4-Vinylcyclohexene	D and C Red No. 19	81889
100414	Ethyl benzene	D and C Red No. 8	2092560
100425	Styrene	D and C Red No. 9	5160021
100447	Benzyl chloride	Dacarbazine	4342034
100754	N-Nitrosopiperidine	Daminozide	1596845
101020	Triphenyl phosphite	Danazol	17230885

101144	4,4'-Methylene bis(2 Chloroaniline) (MOCA)	Daunomycin	20830813
101611	4,4'-Methylene bis (N,N-dimethyl) benzenamine	Daunorubicin hydrochloride	23541506
101688	Methylene diphenyl diisocyanate {MDI}	DDT {1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane}	50293
101779	4,4'-Methylenedianiline	Decabromodiphenyl oxide	1163195
101804	4,4'-Diaminodiphenyl ether	Di(2-ethylhexyl) phthalate	117817
101906	Diglycidyl resorcinol ether {DGRE}	Dialkylnitrosamines	1075
103231	Bis(2-ethylhexyl) adipate	Diallate	2303164
103333	Azobenzene	Diaminotoluenes (mixed isomers)	1078
104949	p-Anisidine	Diazomethane	334883
105602	Caprolactam	Dibenz[a,h]acridine	226368
105679	2,4-Dimethylphenol {2,4-Xylenol}	Dibenz[a,h]anthracene	53703
106423	p-Xylene	Dibenz[a,j]acridine	224420
106445	p-Cresol	Dibenzo[a,e]pyrene	192654
106467	p-Dichlorobenzene	Dibenzo[a,h]pyrene	189640
106478	p-Chloroaniline	Dibenzo[a,i]pyrene	189559
106490	p-Toluidine	Dibenzo[a,l]pyrene	191300
106503	p-Phenylenediamine	Dibenzofuran	132649
106514	Quinone	Dibenzofurans (chlorinated) {PCDFs} [Treated as 2378TCDD for HRA]	1080
106876	4-Vinyl-1-cyclohexene diepoxide	Dibutyl phthalate	84742
106887	1,2-Epoxybutane	Dichlorobenzenes (mixed isomers)	25321226
106898	Epichlorohydrin	Dichlorodifluoromethene (Freon 12)	75718
106934	Ethylene dibromide {EDB}	Dichlorodiphenyldichloroethane {DDD}	72548
106990	1,3-Butadiene	Dichlorofluoromethane {Freon 21}	75434
107028	Acrolein	Dichlorophenoxyacetic acid, salts and esters {2,4-D}	94757
107051	Allyl chloride	Dicofol	115322
107062	Ethylene dichloride {EDC}	Dieldrin	60571
107131	Acrylonitrile	Dienestrol	84173
107186	Allyl alcohol	Diepoxybutane	1464535
107211	Ethylene glycol	Diesel engine exhaust, particulate matter (Diesel PM)	9901
107982	PGME	Diesel engine exhaust, total organic gas	9902
107982	Propylene glycol monomethyl ether	Diethanolamine	111422
108054	Vinyl acetate	Diethyl phthalate	84662
108101	Methyl isobutyl ketone {Hexone}	Diethyl sulfate	64675
108101	MIK	Diethylene glycol	111466
108316	Maleic anhydride	Diethylene glycol dimethyl ether	111966
108383	m-Xylene	Diethylene glycol monobutyl ether	112345
108394	m-Cresol	Diethylene glycol monoethyl ether	111900
108601	Bis(2-chloro-1-methylethyl) ether	Diethylene glycol monomethyl ether	111773
108656	PGME Acetate	Diethylstilbestrol	56531
108656	Propylene glycol monomethyl ether acetate	Diglycidyl resorcinol ether {DGRE}	101906
108883	Toluene	Dihydrosafrole	94586
108907	Chlorobenzene	Dimethyl formamide	68122
108930	Cyclohexanol	Dimethyl phthalate	131113
108952	Phenol	Dimethyl sulfate	77781
109068	2-Methylpyridine	Dimethylamine	124403
109864	Ethylene glycol monomethyl ether	Dimethylvinylchloride {DMVC}	513371
110009	Furan	Dinitrobenzenes (mixitures of)	25154545
110496	Ethylene glycol monomethyl ether acetate	Dinitrotoluenes (mixed isomers)	25321146
110543	Hexane	Dinocap	39300453
110714	Ethylene glycol dimethyl ether	Dinoseb	88857

110805	Ethylene glycol monoethyl ether	Dioxins, total, w/o individ. isomers reported {PCDDs} [Treat as 2378TCDD for HRA	1086
110827	Cyclohexane	Dioxins, total, with individ. isomers also reported {PCDDs}	1085
110861	Pyridine	Diphenylhydantoin	630933
111159	Ethylene glycol monoethyl ether acetate	Dipropylene glycol	25265718
111308	Glutaraldehyde	Dipropylene glycol monomethyl ether	34590948
111422	Diethanolamine	Direct Black 38	1937377
111444	Bis(2-chloroethyl) ether {DCEE}	Direct Blue 6	2602462
111466	Diethylene glycol	Direct Brown 95 (technical grade)	16071866
111762	EGBE	Disperse Blue 1	2475458
111762	Ethylene glycol monobutyl ether	Doxycycline	564250
111773	Diethylene glycol monomethyl ether	EGBE	111762
111900	Diethylene glycol monoethyl ether	Environmental Tobacco Smoke	1090
111966	Diethylene glycol dimethyl ether	Epichlorohydrin	106898
112345	Diethylene glycol monobutyl ether	Epoxy resins	1091
112492	Triethylene glycol dimethyl ether	Ergotamine tartrate	379793
114261	Propoxur	Erionite	12510428
115026	Azaserine	Estradiol 17 beta	50282
115071	Propylene	Estrogens, non-steroidal	1095
115286	Chlorendic acid	Estrogens, steroidal	1100
115322	Dicofol	Estrone	53167
115673	Paramethadione	Ethinyl estradiol	57636
115866	Triphenyl phosphate	Ethyl acrylate	140885
117793	2-Aminoanthraquinone	Ethyl benzene	100414
117817	Di(2-ethylhexyl) phthalate	Ethyl chloride {Chlorethane)	75003
117840	n-Dioctyl phthalate	Ethyl chloroformate	541413
118741	Hexachlorobenzene	Ethyl methanesulfonate	62500
119904	3,3'-Dimethoxybenzidine	Ethylene	74851
119937	3,3'-Dimethylbenzidine {o-Tolidine}	Ethylene dibromide {EDB}	106934
120127	Anthracene	Ethylene dichloride {EDC}	107062
120581	Isosafrole	Ethylene glycol	107211
120718	p-Cresidine	Ethylene glycol diethyl ether	629141
120809	Catechol	Ethylene glycol dimethyl ether	110714
120821	1,2,4-Trichlorobenze	Ethylene glycol monobutyl ether	111762
120832	2,4-Dichlorophenol	Ethylene glycol monoethyl ether	110805
121142	2,4-Dinitrotoluene	Ethylene glycol monoethyl ether acetate	111159
121448	Triethylamine	Ethylene glycol monomethyl ether	109864
121697	N,N-Dimethylaniline	Ethylene glycol monomethyl ether acetate	110496
122601	Phenyl glycidyl ether	Ethylene glycol monopropyl ether	2807309
123319	Hydroquinone	Ethylene oxide	75218
123386	Propionaldehyde	Ethylene thiourea	96457
123728	Butyraldehyde	Etoposide	33419420
123911	1,4-Dioxane	Etretinate	54350480
124403	Dimethylamine	Fluometuron	2164172
124481	Chlorodibromomethane	Fluoranthene	206440
125848	Aminoglutethimide	Fluorene	86737
126078	Griseofulvin	Fluorides	1101
126727	Tris(2,3-dibromopropyl)phosphate	Fluorocarbons (brominated)	1103
126738	Tributyl phosphate	Fluorocarbons (chlorinated)	1104
126998	Chloroprene	Fluorouracil	51218
127184	Perchloroethylene {Tetrachloroethene}	Fluoxymesterone	76437
127480	Trimethadione	Flutamide	13311847
128449	Sodium saccharin	Folpet	133073

129000	Pyrene	Formaldehyde	50000
129157	2-Methyl-1-nitroanthraquinone (uncertain purity)	Furan	110009
131113	Dimethyl phthalate	Furazolidone	67458
132274	Sodium o-phenylphenate	Furmecyclox	60568050
132649	Dibenzofuran	Gasoline engine exhaust, particulate matter	9910
133073	Folpet	Gasoline engine exhaust, total organic gas	9911
133904	Chloramben	Gasoline vapors	1110
134292	o-Anisidine hydrochloride	Glasswool (man-made fibers)	1111
134327	1-Naphthylamine	Glu-P-1 {2-Amino-6-methyldipyrido[1,2-a:3',2'-d]imidazole}	67730114
135206	Cupferron	Glu-P-2 {2-Aminodipyrido[1,2-a:3',2'-d]imidazole}	67730103
139651	4,4'-Thiodianiline	Glutaraldehyde	111308
139913	5-(Morpholinomethyl)-3-[(5-nitrofurfurylidene)amino]-2-oxazolidinone	Glycidaldehyde	765344
140578	Aramite	Glycidol	556525
140885	Ethyl acrylate	Glycol ethers (and their acetates)	1115
141322	Butyl acrylate	Griseofulvin	126078
143500	Chlordecone {Kepone}	Gyromitrin	16568028
143679	Vinblastine sulfate	Halazepam	23092173
147944	Cytarabine	HC Blue 1	2784943
148823	Melphalan	Heptachlor epoxide	1024573
154427	Thioguanine	Hexachlorobenzene	118741
154938	Bischloroethyl nitrosourea	Hexachlorobutadiene	87683
156105	p-Nitrosodiphenylamine	Hexachlorocyclohexanes (mixed or technical grade)	608731
156627	Calcium cyanamide	Hexachlorocyclopentadiene	77474
189559	Dibenzo[a,i]pyrene	Hexachloronaphthalene	1335871
189640	Dibenzo[a,h]pyrene	Hexamethylene-1,6-diisocyanate	822060
191242	Benzo[g,h,i]perylene	Hexamethylphosphoramide	680319
191300	Dibenzo[a,l]pyrene	Hexane	110543
192654	Dibenzo[a,e]pyrene	Hydrazine	302012
192972	Benzo[e]pyrene	Hydrazine sulfate	10034932
193395	Indeno[1,2,3-cd]pyrene	Hydrochloric acid	7647010
194592	7H-Dibenzo[c,g]carbazole	Hydrocyanic acid	74908
198550	Perylene	Hydrogen bromide	10035106
205823	Benzo[j]fluoranthene	Hydrogen fluoride	7664393
205992	Benzo[b]fluoranthene	Hydrogen Selenide	7783075
206440	Fluoranthene	Hydrogen sulfide	7783064
207089	Benzo[k]fluoranthene	Hydroquinone	123319
208968	Acenaphthylene	Ifosfamide	3778732
218019	Chrysene	Indeno[1,2,3-cd]pyrene	193395
224420	Dibenz[a,j]acridine	Iodine-131	24267569
226368	Dibenz[a,h]acridine	IQ {2-Amino-3-methylimidazo[4,5-f]quinoline}	76180966
271896	Benzofuran	Iron dextran complex	9004664
299752	Treosulfan	Iron pentacarbonyl	13463406
301042	Lead acetate	Isobutyraldehyde	78842
302012	Hydrazine	Isocyanates	1125
302705	Nitrogen mustard N-oxide	Isophorone	78591
302794	all-trans-Retinoic acid	Isoprene, except from vegetative emission sources	78795
303344	Lasiocarpine	Isopropyl alcohol	67630
303479	Ochratoxin A	Isosafrole	120581

305033	Chlorambucil	Isotretinoin	4759482
309002	Aldrin	Lactofen	77501634
315220	Monocrotaline	Lasiocarpine	303344
315377	Testosterone enanthate	Lead	7439921
319846	alpha-Hexachlorocyclohexane	Lead acetate	301042
319857	beta-Hexachlorocyclohexane	Lead chromate	7758976
334883	Diazomethane	Lead compounds (inorganic)	1128
366701	Procarbazine hydrochloride	Lead compounds (other than inorganic)	1129
373024	Nickel acetate	Lead phosphate	7446277
379793	Ergotamine tartrate	Lead subacetate	1335326
434071	Oxymetholone	Lindane {gamma-Hexachlorocyclohexane}	58899
443481	Metronidazole	Lithium carbonate	554132
446866	Azathioprine	Lithium citrate	919164
463581	Carbonyl sulfide	Lorazepam	846491
474259	Chenodiol	Lubricant base oils	1131
484208	5-Methoxypsoralen	Maleic anhydride	108316
492808	Auramine	Mancozeb	8018017
494031	N-N-Bis(2-chloroethyl)-2-naphthylamine {Chlornaphazine}	Maneb	12427382
505602	Mustard gas	Manganese	7439965
509148	Tetranitromethane	m-Cresol	108394
512561	Trimethyl phosphate	m-Dinitrobenzene	99650
513371	Dimethylvinylchloride {DMVC}	Medroxyprogesterone	71589
528290	o-Dinitrobenzene	Megestrol acetate	595335
531760	Merphalan	MEK	78933
531828	N-[4-(5-Nitro-2-furyl)-2-thiazolyl]acetamide	Melphalan	148823
532274	2-Chloroacetophenone	Menotropins	9002680
534521	4,6-Dinitro-o-cresol	Mercaptopurine	6112761
540590	1,2-Dichloroethylene	Mercuric chloride	7487947
540738	1,2-Dimethylhydrazine	Mercury	7439976
540841	2,2,4-Trimethylpentane	Merphalan	531760
540885	t-Butyl acetate	Mestranol	72333
541413	Ethyl chloroformate	Methacycline hydrochloride	3963959
541731	1,3-Dichlorobenzene	Methane	74828
542881	Bis(chloromethyl) ether	Methanol	67561
546883	Acetohydroxamic acid	Methimazole	60560
554132	Lithium carbonate	Methotrexate	59052
555840	1-[(5-Nitrofurfurylidene)amino]-2-imidazolidinone	Methotrexate sodium	15475566
556525	Glycidol	Methoxychlor	72435
563473	3-Chloro-2-methylpropene	Methyl acrylate	96333
564250	Doxycycline	Methyl bromide {Bromomethane}	74839
569619	C. I. Basic Red 9 monohydrochloride	Methyl chloride {Chloromethane}	74873
569642	C. I. Basic Green 4	Methyl chloroform {1,1,1-Trichloroethane}	71556
584849	Toluene-2,4-diisocyanate	Methyl ethyl ketone	78933
590965	Methylazoxymethanol	Methyl hydrazine	60344
592621	Methylazoxymethanol acetate	Methyl iodide {Iodomethane}	74884
593602	Vinyl bromide	Methyl isobutyl ketone {Hexone}	108101
593748	Methyl mercury	Methyl isocyanate	624839
595335	Megestrol acetate	Methyl mercury	593748
602879	5-Nitroacenaphthene	Methyl methacrylate	80626
606202	2,6-Dinitrotoluene	Methyl methanesulfon	66273
607578	2-Nitrofluorene	Methyl tert-butyl ether	1634044
608731	Hexachlorocyclohexanes (mixed or technical grade)	Methylazoxymethanol	590965
613354	N,N'-Diacetylbenzidine	Methylazoxymethanol acetate	592621

615054	2,4-Diaminoanisole	Methylene bromide	74953
615532	N-Nitroso-N-methylurethane	Methylene chloride {Dichloromethane}	75092
621647	N-Nitrosodi-n-propylamine	Methylene diphenyl diisocyanate {MDI}	101688
624839	Methyl isocyanate	Methyltestosterone	58184
629141	Ethylene glycol diethyl ether	Methylthiouracil	56042
630080	Carbon monoxide	Metiram	9006422
630933	Diphenylhydantoin	Metronidazole	443481
636215	o-Toluidine hydrochloride	Michler's ketone	90948
680319	Hexamethylphosphoramide	Midazolam hydrochloride	59467968
712685	2-Amino-5-(5-nitro-2-furyl)-1,3,4-thiadiazole	MIK	108101
759739	N-Nitroso-N-ethylurea	Mineral fibers (fine: man-made)	1136
764410	1,4-Dichloro-2-butene	Mineral fibers (other than man-made)	1135
765344	Glycidaldehyde	Mineral oils (untreated and mildly treated oils)	1140
794934	Panfuran S	Mirex	2385855
811972	1,1,1,2-Tetrafluoroethane {HFC-134a}	Misoprostol	62015398
822060	Hexamethylene-1,6-diisocyanate	Mitomycin C	50077
838880	4,4'-Methylene bis(2-methylaniline)	Mitoxantrone hydrochloride	70476823
846491	Lorazepam	Molybdenum trioxide	1313275
846504	Temazepam	Monocrotaline	315220
919164	Lithium citrate	Mustard gas	505602
924163	N-Nitrosodi-n-butylamine	m-Xylene	108383
924425	N-Methyloacrylamide	N,N'-Diacetylbenzidine	613354
930552	N-Nitrosopyrrolidine	N,N-Dimethylaniline	121697
961115	Tetrachlorvinphos	N-[4-(5-Nitro-2-furyl)-2-thiazolyl]acetamide	531828
989388	C. I. Basic Red 1	Nafarelin acetate	86220420
1E+06	Heptachlor epoxide	Nafenopin	3771195
1E+06	1,3-Propane sultone	Naphthalene	91203
1E+06	Decabromodiphenyl oxide	n-Butyl alcohol	71363
1E+06	Nickelocene	n-Dioctyl phthalate	117840
1E+06	Antimony trioxide	Neomycin sulfate	1405103
1E+06	Sodium hydroxide	Netilmicin sulfate	56391572
1E+06	Molybdenum trioxide	Nickel	7440020
1E+06	Nickel oxide	Nickel acetate	373024
1E+06	Zinc oxide	Nickel carbonate	3333673
1E+06	Thorium dioxide	Nickel carbonyl	13463393
1E+06	Phosphorus pentoxide	Nickel hydroxide	12054487
1E+06	VANADIUM PENTOXIDE	Nickel oxide	1313991
1E+06	Cresols (mixtures of) {Cresylic acid}	Nickel refinery dust	1146
1E+06	Xylene	Nickel subsulfide	12035722
1E+06	Asbestos	Nickelocene	1271289
1E+06	Chromium trioxide	Nicotine	54115
1E+06	Lead subacetate	Niridazole	61574
1E+06	Hexachloronaphthalene	Nitric acid	7697372
1E+06	PCBs {Polychlorinated biphenyls}	Nitrilotriacetic acid (salts)	1148
1E+06	Aluminum oxide (fibrous)	Nitrilotriacetic acid, trisodium salt monohydrate	18662538
1E+06	Neomycin sulfate	Nitrobenzene	98953
1E+06	Diepoxybutane	Nitrofen (technical grade)	1836755
2E+06	Trifluralin	Nitrofurantoin	67209
2E+06	Daminozide	Nitrofurazone	59870
2E+06	1,2-Diethylhydrazine	Nitrogen Dioxide	10102440
2E+06	Chlorcyclizine hydrochloride	Nitrogen mustard	51752
2E+06	Methyl tert-butyl ether	Nitrogen mustard hydrochloride	55867
2E+06	Bromoxynil	Nitrogen mustard N-oxide	302705
2E+06	Benzyl violet 4B	Nitroglycerin	55630

2E+06	2,3,7,8-Tetrachlorodibenzo-P-Dioxin	Nitrous oxide	10024972
2E+06	Nitrofen (technical grade)	N-Methyl-N'-nitro-N-nitrosoguanidine	70257
2E+06	Chlorothalonil	N-Methyloacrylamide	924425
2E+06	Direct Black 38	N-N-Bis(2-chloroethyl)-2-naphthylamine {Chlornaphazine}	494031
2E+06	Vincristine sulfate	N-Nitrosodiethylamine	55185
2E+06	D and C Red No. 8	N-Nitrosodimethylamine	62759
2E+06	Fluometuron	N-Nitrosodi-n-butylamine	924163
2E+06	Octachloronaphthalene	N-Nitrosodi-n-propylamine	621647
2E+06	Diallate	N-Nitrosodiphenylamine	86306
2E+06	Mirex	N-Nitrosomethylethylamine	10595956
2E+06	Disperse Blue 1	N-Nitrosomethylvinylamine	4549400
3E+06	Sulfur Hexafluoride	N-Nitrosomorpholine	59892
3E+06	Direct Blue 6	N-Nitroso-N-ethylurea	759739
3E+06	Oil Orange SS	N-Nitroso-N-methylurethane	615532
3E+06	HC Blue 1	N-Nitrosonornicotine	16543558
3E+06	Perfluorooctanoic acid {PFOA} (and its salts, esters, and sulfonates)	N-Nitrosopiperidine	100754
3E+06	Ethylene glycol monopropyl ether	N-Nitrosopyrrolidine	930552
3E+06	C. I. Disperse Yellow 3	N-Nitrososarcosine	13256229
3E+06	beta-Butyrolactone	Norethisterone	68224
3E+06	1,2,3,4,6,7,8,9-Octachlorodibenzo-P-dioxin	Norgestrel	6533002
3E+06	Nickel carbonate	o-Aminoazotoluene	97563
3E+06	D and C Orange No. 1	o-Anisidine hydrochloride	134292
4E+06	Phenesterin	Ochratoxin A	303479
4E+06	Ponceau 3R	o-Cresol	95487
4E+06	2-(2-Formylhydrazino)-4-(5-nitro-2-furyl)thiazole	Octachloronaphthalene	2234131
4E+06	AF-2	o-Dinitrobenzene	528290
4E+06	5-Methylchrysene	Oil Orange SS	2646175
4E+06	Ponceau MX	OLEUM	8014957
4E+06	Nafenopin	Osmium tetroxide	20816120
4E+06	Ifosfamide	o-Toluidine hydrochloride	636215
4E+06	Streptomycin sulfate	Oxides of Nitrogen	42603
4E+06	Methacycline hydrochloride	Oxides of sulfur	42401
4E+06	Crotonaldehyde	o-Xylene	95476
4E+06	Dacarbazine	Oxymetholone	434071
5E+06	N-Nitrosomethylvinylamine	Oxytetracycline	79572
5E+06	C. I. Acid Green 3	Ozone	10028156
5E+06	Isotretinoin	PAHs, total, w/o individ. components reported [Treated as B(a)P for HRA]	1151
5E+06	D and C Red No. 9	PAHs, total, with individ. components also reported	1150
5E+06	p-alpha,alpha,alpha-Tetrachlorotoluene	p-alpha,alpha,alpha-Tetrachlorotoluene	5216251
5E+06	Benzphetamine hydrochloride	p-Aminoazobenzene	60093
6E+06	1-Nitropyrene	Panfuran S	794934
6E+06	3-Amino-9-ethylcarbazole hydrochloride	p-Anisidine	104949
6E+06	Mercaptopurine	Paramethadione	115673
6E+06	Chlordimeform	Parathion	56382
6E+06	Citrus Red No. 2	Particulate Matter	11101
6E+06	Ammonium nitrate	Particulate Matter 1	85101
7E+06	Norgestrel	Particulate Matter 2.5 Microns or less	88101
7E+06	Aluminum	PCBs {Polychlorinated biphenyls}	1336363
7E+06	Lead	p-Chloroaniline	106478
7E+06	Manganese	p-Chloro-o-toluidine	1059
7E+06	Mercury	p-Chloro-o-toluidine	95692
7E+06	Nickel	p-Cresidine	120718

7E+06	Silver	p-Cresol	106445
7E+06	Thallium	p-Dichlorobenzene	106467
7E+06	Antimony	p-Dinitrobenzene	100254
7E+06	Arsenic	Penicillamine	52675
7E+06	Barium	Pentachloronitrobenzene {Quintobenzene}	82688
7E+06	Beryllium	Pentachlorophenol	87865
7E+06	Cadmium	Pentobarbital sodium	57330
7E+06	Chromium	Peracetic acid	79210
7E+06	Cobalt	Perchloroethylene {Tetrachloroethene}	127184
7E+06	Copper	Perfluorooctanoic acid {PFOA} (and its salts, esters, and sulfonates)	2795393
7E+06	Vanadium (fume or dust)	Perylene	198550
7E+06	Zinc	PGME	107982
7E+06	Sulfur Dioxide	PGME Acetate	108656
7E+06	Lead phosphate	Phenacemide	63989
7E+06	Selenium sulfide	Phenacetin	62442
7E+06	Sulfur Trioxide	Phenanthrene	85018
7E+06	Mercuric chloride	Phenazopyridine hydrochloride	94780
7E+06	6-Nitrochrysene	Phenesterin	3546109
8E+06	Titanium tetrachloride	Phenobarbital	50066
8E+06	Silica, crystalline	Phenol	108952
8E+06	Hydrochloric acid	Phenoxybenzamine	59961
8E+06	Phosphoric acid	Phenoxybenzimide hydrochloride	63923
8E+06	Hydrogen fluoride	Phenyl glycidyl ether	122601
8E+06	Ammonia	Phenytoin	57410
8E+06	Sulfuric acid	Phosgene	75445
8E+06	Nitric acid	Phosphine	7803512
8E+06	Phosphorus trichloride	Phosphoric acid	7664382
8E+06	Phosphorus	Phosphorus	7723140
8E+06	Bromine	Phosphorus oxychloride	10025873
8E+06	Potassium bromate	Phosphorus pentachloride	10026138
8E+06	Lead chromate	Phosphorus pentoxide	1314563
8E+06	Selenium	Phosphorus trichloride	7719122
8E+06	Chlorine	Phthalic anhydride	85449
8E+06	Hydrogen sulfide	Picric acid	88891
8E+06	Hydrogen Selenide	Pipobroman	54911
8E+06	Ammonium sulfate	Plicamycin	18378897
8E+06	Arsine	p-Nitrosodiphenylamine	156105
8E+06	Strontium chromate	Polybrominated biphenyls	1155
8E+06	Bromine Pentafluoride	Polybrominated diphenyl ethers {PBDEs}	2222
8E+06	Phosphine	Polygeenan	53973981
8E+06	Coal tars	Ponceau 3R	3564098
8E+06	OLEUM	Ponceau MX	3761533
8E+06	Mancozeb	Potassium bromate	7758012
9E+06	Menotropins	p-Phenylenediamine	106503
9E+06	Iron dextran complex	Procarbazine hydrochloride	366701
9E+06	Metiram	Progesterone	57830
1E+07	Nitrous oxide	Progestins	1160
1E+07	Phosphorus oxychloride	Propionaldehyde	123386
1E+07	Phosphorus pentachloride	Propoxur	114261
1E+07	Ozone	Propylene	115071
1E+07	Hydrazine sulfate	Propylene glycol monomethyl ether	107982
1E+07	Hydrogen bromide	Propylene glycol monomethyl ether acetate	108656
1E+07	Sterigmatocystin	Propylene oxide	75569

1E+07	Chlorine dioxide	Propylthiouracil	51525
1E+07	Nitrogen Dioxide	p-Toluidine	106490
1E+07	Barium chromate	p-Xylene	106423
1E+07	Sodium dichromate	Pyrene	129000
1E+07	N-Nitrosomethylethylamine	Pyridine	110861
1E+07	Nickel subsulfide	Quinoline	91225
1E+07	Nickel hydroxide	Quinone	106514
1E+07	Zineb	Radionuclides	1165
1E+07	Maneb	Radon and its decay	1166
1E+07	Erionite	Reactive Organic Gas	16113
1E+07	1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea {CCNU}	Retinol/retinyl este	1167
1E+07	Cyhexatin	Ribavirin	36791045
1E+07	N-Nitrososarcosine	Rockwool (man-made fibers)	1168
1E+07	Flutamide	Saccharin	81072
1E+07	Nickel carbonyl	Safrole	94597
1E+07	Iron pentacarbonyl	sec-Butyl alcohol	78922
1E+07	Trilostane	Selenium	7782492
1E+07	Calcium chromate	Selenium sulfide	7446346
1E+07	1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea {Methyl CCNU}	Shale oils	1180
1E+07	Cycasin	Silica, crystalline	1175
2E+07	Methotrexate sodium	Silica, crystalline	7631869
2E+07	Cisplatin	Silver	7440224
2E+07	Alachlor	Slagwool (man-made fibers)	1181
2E+07	Direct Brown 95 (technical grade)	Sodium dichromate	10588019
2E+07	N-Nitrosonornicotine	Sodium hydroxide	1310732
2E+07	Gyromitrin	Sodium o-phenylphenate	132274
2E+07	Danazol	Sodium saccharin	128449
2E+07	Plicamycin	Soots	1185
2E+07	Chromium, hexavalent	Sterigmatocystin	10048132
2E+07	Nitrilotriacetic acid, trisodium salt monohydrate	Streptomycin sulfate	3810740
2E+07	Streptozotocin	Streptozotocin	18883664
2E+07	1,2,3,7,8,9-Hexachlorodibenzo-P-dioxin	Strontium chromate	7789062
2E+07	3,3'-Dimethoxybenzidine dihydrochloride	Styrene	100425
2E+07	Osmium tetroxide	Styrene oxide	96093
2E+07	Daunomycin	Sulfallate	95067
2E+07	Cyanazine	Sulfates	9960
2E+07	Halazepam	Sulfur Dioxide	7446095
2E+07	Adriamycin	Sulfur Hexafluoride	2551624
2E+07	Daunorubicin hydrochloride	Sulfur Trioxide	7446719
2E+07	Iodine-131	Sulfuric acid	7664939
3E+07	Butylated hydroxyanisole {BHA}	SULFURIC ACID+OLEUM	9961
3E+07	Dinitrobenzenes (mixitures of)	t-Butyl acetate	540885
3E+07	TETRACHLOROPHENOLS	Talc containing asbestiform fibers	1190
3E+07	Dipropylene glycol	Tamoxifen citrate	54965241
3E+07	Dinitrotoluenes (mixed isomers)	Temazepam	846504
3E+07	Dichlorobenzenes (mixed isomers)	Terephthalic acid	100210
3E+07	TRIMETHYLBENZENES	tert-Butyl alcohol	75650
3E+07	A-alpha-C {2-Amino-9H-pyrido[2,3-b]indole}	Testosterone and its esters	58220
3E+07	TOLUENE DIISOCYANATE	Testosterone enanthate	315377
3E+07	Urofollitropin	TETRACHLOROPHENOLS	25167833
3E+07	3,3'-Dichloro-4,4'-diaminodiphenyl ether	Tetrachlorvinphos	961115
3E+07	Triazolam	Tetracycline hydrochoride	64755
3E+07	Alprazolam	Tetranitromethane	509148
3E+07	Total Pentachlorodibenzofuran	Thalidomide	50351

3E+07	2,3',4,4',5-PENTACHLOROBIPHENYL (PCB 118)	Thallium	7440280
3E+07	3,3',4,4'-TETRACHLORBIPHENYL (PCB77)	Thioacetamide	62555
3E+07	2,3,3',4,4'-Pentachlorobiphenyl {PCB 105}	Thioguanine	154427
3E+07	3,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 169)	Thorium dioxide	1314201
3E+07	Etoposide	Titanium tetrachloride	7550450
3E+07	Acetochlor	Tobacco products, smokeless	1200
3E+07	Total Hexachlorodibenzo-p-dioxin	Tobramycin sulfate	49842071
3E+07	Dipropylene glycol monomethyl ether	Toluene	108883
4E+07	1,2,3,4,6,7,8-Heptachlorodibenzo-P-dioxin	TOLUENE DIISOCYANATE	26471625
4E+07	Total Pentachlorodibenzo-p-dioxin	Toluene-2,4-diisocyanate	584849
4E+07	Ribavirin	Toluene-2,6-diisocyanate	91087
4E+07	Total Heptachlorodibenzo-p-dioxin	Total Heptachlorodibenzofuran	38998753
4E+07	2,3,3',4,4',5-HEXACHLOROBIPHENYL (PCB 156)	Total Heptachlorodibenzo-p-dioxin	37871004
4E+07	Total Heptachlorodibenzofuran	Total Hexachlorodibenzofuran	55684941
4E+07	1,2,3,4,6,7,8,9-Octachlorodibenzofuran	Total Hexachlorodibenzo-p-dioxin	34465468
4E+07	2,4-Diaminoanisole sulfate	Total Organic Gases	43101
4E+07	1,2,3,4,7,8-Hexachlorodibenzo-P-dioxin	Total Pentachlorodibenzofuran	30402154
4E+07	Dinocap	Total Pentachlorodibenzo-p-dioxin	36088229
4E+07	2,3,3',4,4',5,5'-HEPTACHLORBIPHENYL (PCB 189)	Total Tetrachlorodibenzofuran	55722275
4E+07	Amikacin sulfate	Total Tetrachlorodibenzo-p-dioxin	41903575
4E+07	1,2,3,7,8-Pentachlorodibenzo-P-dioxin	trans-2-[(Dimethylamino)methylimino]-5-[2-(5-nitro-2-furyl)vinyl-1,3,4-oxadiazol	55738540
4E+07	Carboplatin	Treosulfan	299752
4E+07	Total Tetrachlorodibenzo-p-dioxin	Triazolam	28911015
4E+07	1,6-Dinitropyrene	Tributyl phosphate	126738
4E+07	1,8-Dinitropyrene	Trichlorfon	52686
5E+07	Tobramycin sulfate	Trichloroethylene	79016
5E+07	2,3,7,8-Tetrachlorodibenzofuran	Trichlorofluoromethane {Freon 11}	75694
5E+07	2,3',4,4',5,5'-HEXACHLOROBIPHENYL (PCB 167)	Triethyl phosphine	78400
5E+07	Polygeenan	Triethylamine	121448
5E+07	Etretinate	Triethylene glycol dimethyl ether	112492
5E+07	Tamoxifen citrate	Trifluoromethane {Freon 23}	75467
6E+07	1,2,3,4,7,8,9-Heptachlorodibenzofuran	Trifluralin	1582098
6E+07	Total Hexachlorodibenzofuran	Trilostane	13647353
6E+07	Total Tetrachlorodibenzofuran	Trimethadione	127480
6E+07	trans-2-[(Dimethylamino)methylimino]-5-[2-(5-nitro-2-furyl)vinyl-1,3,4-oxadiazol	Trimethyl phosphate	512561
6E+07	Netilmicin sulfate	TRIMETHYLBENZENES	25551137
6E+07	2,3,4,7,8-Pentachlorodibenzofuran	Triorthocresyl phosphate	78308
6E+07	1,2,3,7,8-Pentachlorodibenzofuran	Triphenyl phosphate	115866
6E+07	1,2,3,6,7,8-Hexachlorodibenzofuran	Triphenyl phosphite	101020
6E+07	3,3',4,4',5-PENTACHLOROBIPHENYL (PCB 126)	Tris(1-aziridinyl) phosphine sulfide	52244
6E+07	1,2,3,6,7,8-Hexachlorodibenzo-P-dioxin	Tris(2,3-dibromopropyl)phosphate	126727
6E+07	4-Nitropyrene	Tris(aziridinyl)-p-benzoquinone	68768
6E+07	Midazolam hydrochloride	Trp-P-1 {3-Amino-1,4-dimethyl-5H-pyrido[4,3-b]indole}	62450060
6E+07	3-(N-Nitrosomethylamino)propionitrile	Trp-P-2 {3-Amino-1-methyl-5H-pyrido[4,3-b]indole}	62450071
6E+07	Furmecyclox	Trypan blue	72571
6E+07	2,3,4,6,7,8-Hexachlorodibenzofuran	Uracil mustard	66751

6E+07	Misoprostol	Urethane	51796
6E+07	Trp-P-1 {3-Amino-1,4-dimethyl-5H-pyrido[4,3-b]indole}	Urofollitropin	26995915
6E+07	Trp-P-2 {3-Amino-1-methyl-5H-pyrido[4,3-b]indole}	Valproate	99661
6E+07	Acifluorfen	Vanadium (fume or dust)	7440622
6E+07	4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone {NNK}	VANADIUM PENTOXIDE	1314621
7E+07	2,3',4,4',5'-PENTACHOROBIPHENYL (PCB 123)	Vinblastine sulfate	143679
7E+07	1,2,3,4,6,7,8-Heptachlorodibenzofuran	Vincristine sulfate	2068782
7E+07	Glu-P-2 {2-Aminodipyrido[1,2-a:3',2'-d]imidazole}	Vinyl acetate	108054
7E+07	Glu-P-1 {2-Amino-6-methyldipyrido[1,2-a:3',2'-d]imidazole}	Vinyl bromide	593602
7E+07	2-Amino-3-methyl-9H-pyrido(2,3-b) indole {MeA-alpha-C}	Vinyl chloride	75014
7E+07	2,3,3',4,4',5'-HEXACHLOROBIPHENYL (PCB 157)	Vinyl fluoride	75025
7E+07	3,4,4',5-TETRACHLOROBIPHENYL (PCB 81)	Vinylidene chloride	75354
7E+07	Mitoxantrone hydrochloride	Volatile Organic Compounds (VOC)	43104
7E+07	1,2,3,4,7,8-Hexachlorodibenzofuran	Warfarin	81812
7E+07	1,2,3,7,8,9-Hexachlorodibenzofuran	Wood preservatives (containing arsenic and chromate)	1206
7E+07	2,3,4,4',5-PENTACHLOBIPHENYL (PCB114)	Xylene	1330207
8E+07	IQ {2-Amino-3-methylimidazo[4,5-f]quinoline}	Zinc	7440666
8E+07	Lactofen	Zinc oxide	1314132
9E+07	Nafarelin acetate	Zineb	12122677
1E+08	Chlorinated paraffin		

Name — Natural Gas-Fired Two Stroke Lean Burn (2SLB) Internal Combustion Engine

Applicability	Use this spreadsheet for Natural Gas-Fired Internal Combustion 2 Stroke Lean Burn (2SLB) Engine. Entries required in yellow areas, output in grey areas.
Author or updater	Matthew Cegielski — *Last Update* September 26, 2016
Facility:	Darling Ingredients
ID#:	
Project #:	

Inputs	MMscf /hr	MMscf /yr
Natural Gas usage rate	6.79E-01	244.610
VOC g/ Bhp-hr	0.3954	
VOC Control %	0.00	

Formula

Supply the necessary rate in MMscf. Enter the VOC value in g/bhp-hr. VOC values cannot be greater than uncontrolled value of 0.3954. The VOC control reduction will be calculated in the box below. If unknown, leave as 0.3954. Emissions are calculated by the multiplication of Fuel Rates and Emission Factors.

Substances	CAS#	Emission Factor lbs/ MMscf	LB/HR	LB/YR
1,1,2,2-Tetrachloroethane	**79345**	6.63E-02	4.50E-02	1.62E+01
1,1,2-Trichloroethane	**79005**	5.27E-02	3.58E-02	1.29E+01
1,1-Dichloroethane	**75343**	3.91E-02	2.66E-02	9.56E+00
1,2,4-Trimethylbenze	**95636**	9.80E-03	6.66E-03	2.40E+00
1,2, Dichloroethane EDCL	**107062**	4.22E-02	2.87E-02	1.03E+01
1,3-Butadiene	**106990**	8.20E-01	5.57E-01	2.01E+02
2,2,4-Trimethylpentane	**540841**	8.46E-01	5.75E-01	2.07E+02
2-Methyl naphthalene	**91576**	2.14E-02	1.45E-02	5.23E+00
Acenaphthene	**83329**	1.33E-03	9.04E-04	3.25E-01
Acenaphthylene	**208968**	3.17E-03	2.15E-03	7.75E-01
Acetaldehyde	**75070**	7.76E+00	5.27E+00	1.90E+03
Acrolein	**107028**	7.78E+00	5.29E+00	1.90E+03
Anthracene	**120127**	7.18E-04	4.88E-04	1.76E-01
Benz[a]anthracene	**56553**	3.36E-04	2.28E-04	8.22E-02
Benzene	**71432**	1.94E+00	1.32E+00	4.75E+02
Benzo[a]pyrene	**50328**	5.68E-06	3.86E-06	1.39E-03
Benzo[b]fluoranthene	**205992**	8.51E-06	5.78E-06	2.08E-03
Benzo[e]pyrene	**192972**	2.34E-05	1.59E-05	5.72E-03
Benzo[g,h,i]perylene	**191242**	2.48E-05	1.69E-05	6.07E-03
Benzo[k]fluoranthene	**207089**	4.26E-06	2.89E-06	1.04E-03
Biphenyl	**92524**	3.95E-03	2.68E-03	9.66E-01
Carbon tetrachloride	**56235**	6.07E-02	4.12E-02	1.48E+01
Chlorobenzene	**108907**	4.44E-02	3.02E-02	1.09E+01
Chloroform	**67663**	4.71E-02	3.20E-02	1.15E+01
Chrysene	**218019**	6.72E-04	4.57E-04	1.64E-01
Cyclohexane	**110827**	3.08E-01	2.09E-01	7.53E+01
Ethyl benzene	**100414**	1.08E-01	7.34E-02	2.64E+01
Ethylene dibromide	**106934**	7.34E-02	4.99E-02	1.80E+01
Fluoranthene	**206440**	3.61E-04	2.45E-04	8.83E-02
Fluorene	**86737**	1.69E-03	1.15E-03	4.13E-01
Formaldehyde	**50000**	5.52E+01	3.75E+01	1.35E+04
Indeno[1,2,3-cd]pyrene	**193395**	9.93E-06	6.75E-06	2.43E-03
Methanol	**67561**	2.48E+00	1.69E+00	6.07E+02
Methylene chloride	**75092**	1.47E-01	9.99E-02	3.60E+01
n-Hexane	**110543**	4.45E-01	3.02E-01	1.09E+02
Naphthalene	**91203**	9.63E-02	6.54E-02	2.36E+01
PAH#	**1151**	3.47E-02	2.36E-02	8.49E+00
Perylene	**198550**	4.97E-06	3.38E-06	1.22E-03
Phenanthrene	**85018**	3.53E-03	2.40E-03	8.63E-01
Phenol	**108952**	4.21E-02	2.86E-02	1.03E+01
Pyrene	**129000**	5.84E-04	3.97E-04	1.43E-01
Styrene	**100425**	5.48E-02	3.72E-02	1.34E+01
Toluene	**108883**	9.63E-01	6.54E-01	2.36E+02
Vinyl Chloride	**75014**	2.47E-02	1.68E-02	6.04E+00
Xylene	**1330207**	2.68E-01	1.82E-01	6.56E+01

NG Bhp Fuel Use Convertor

Bhp	Scf/hr	MMscf/hr
1,000.0	7.264E+03	7.264E-03

Conversion factor for HP to Btu/hr is $2.5425E^3$, HHV of NG is 1,000 Btu/scf. Thermal Efficiency of engine is 0.35. Scf/hr= Bhp ((2,542.5/(1,000*0.35) $1E^6$ scf=1 MMscf

References:

* The emission factors are derived from Table 3.2-1 (pg. 7), "Uncontrolled Emission Factors For 2-Stroke Lean-Burn Engines" in July 2000 *AP 42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Section 2: Natural Gas-Fired Reciprocating Engine.* Assumes 1,000 btu per scf natural gas.

#According to EPA, PAH's value includes Naphthalene. Corrected value.

Pollutants required for toxic reporting: TACs w/o Risk Factor. Current as of update date

Name	**Natural Gas-Fired Four Stroke Lean Burn (4SLB) Internal Combustion Engine**			
Applicability	Use this spreadsheet for Natural Gas-Fired Internal Combustion 4 Stroke Lean Burn (4SLB) Engine. Entries required in yellow areas, output in grey areas.			
Author or updater	Matthew Cegielski	*Last Update*	September 26, 2016	
Facility:	Darling Ingredients			
ID#:				
Project #:				

Inputs	MMscf /hr	MMscf /yr	**Formula**
Natural Gas usage rate	6.79E-01	244.610	Supply the necessary rate in MMscf. Enter the VOC in g/bhp-hr. VOC values cannot be greater than uncontrolled value of 0.38881. The VOC control reduction will be calculated in the box below. If unknown leave as 0.38881. Emissions are calculated by the multiplication of Fuel Rates and Emission Factors.
VOC g/ Bhp-hr	0.38881		
VOC Control %	0.00		

Substances	**CAS#**	**Emission Factor lbs/ MMscf**	**LB/HR**	**LB/YR**
1,1,2,2-Tetrachloroethane	**79345**	4.00E-02	2.72E-02	9.78E+00
1,1,2-Trichloroethane	**79005**	3.18E-02	2.16E-02	7.78E+00
1,1-Dichloroethane	**75343**	2.36E-02	1.60E-02	5.77E+00
1,2,4-Trimethylbenze	**95636**	1.43E-02	9.72E-03	3.50E+00
1,2 Dichloroethane EDCL	**107062**	2.36E-02	1.60E-02	5.77E+00
1,3-Butadiene	**106990**	2.67E-01	1.81E-01	6.53E+01
2,2,4-Trimethylpentane	**540841**	2.50E-01	1.70E-01	6.12E+01
2-Methyl naphthalene	**91576**	3.32E-02	2.26E-02	8.12E+00
Acenaphthene	**83329**	1.25E-03	8.49E-04	3.06E-01
Acenaphthylene	**208968**	5.53E-03	3.76E-03	1.35E+00
Acetaldehyde	**75070**	8.36E+00	5.68E+00	2.04E+03
Acrolein	**107028**	5.14E+00	3.49E+00	1.26E+03
Benzene	**71432**	4.40E-01	2.99E-01	1.08E+02
Benzo[b]fluoranthene	**205992**	1.66E-04	1.13E-04	4.06E-02
Benzo[e]pyrene	**192972**	4.15E-04	2.82E-04	1.02E-01
Benzo[g,h,i]perylene	**191242**	4.14E-04	2.81E-04	1.01E-01
Biphenyl	**92524**	2.12E-01	1.44E-01	5.19E+01
Carbon tetrachloride	**56235**	3.67E-02	2.49E-02	8.98E+00
Chlorobenzene	**108907**	3.04E-02	2.07E-02	7.44E+00
Chloroform	**67663**	2.85E-02	1.94E-02	6.97E+00
Chrysene	**218019**	6.93E-04	4.71E-04	1.70E-01
Ethyl benzene	**100414**	3.97E-02	2.70E-02	9.71E+00
Ethylene dibromide	**106934**	4.43E-02	3.01E-02	1.08E+01
Fluoranthene	**206440**	1.11E-03	7.54E-04	2.72E-01
Fluorene	**86737**	5.67E-03	3.85E-03	1.39E+00
Formaldehyde	**50000**	5.28E+01	3.59E+01	1.29E+04
Methanol	**67561**	2.50E+00	1.70E+00	6.12E+02
Methylene chloride	**75092**	2.00E-02	1.36E-02	4.89E+00
n-Hexane	**110543**	1.11E+00	7.54E-01	2.72E+02
Naphthalene	**91203**	7.44E-02	5.06E-02	1.82E+01
PAH#	**1151**	7.75E-03	5.27E-03	1.90E+00
Phenanthrene	**85018**	1.04E-02	7.07E-03	2.54E+00
Phenol	**108952**	2.40E-02	1.63E-02	5.87E+00
Pyrene	**129000**	1.36E-03	9.24E-04	3.33E-01
Styrene	**100425**	2.36E-02	1.60E-02	5.77E+00
Toluene	**108883**	4.08E-01	2.77E-01	9.98E+01
Vinyl Chloride	**75014**	1.49E-02	1.01E-02	3.64E+00
Xylene	**1330207**	1.84E-01	1.25E-01	4.50E+01

References:

* The emission factors derived from Table 3.2-2 (pg. 11), "Uncontrolled Emission Factors For 4-Stroke Lean-Burn Engines" in July 2000 *AP 42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Section 2: Natural Gas-Fired Reciprocating Engine* . Assumes 1,000 Btu per scf natural gas.

#According to EPA, PAH's value includes Naphthalene. Since the Naphthalene value for 4SLB is suspected of including an outlier (higher than PAH), the average % of Naphthalene from the other two engine types is applied as a reduction.Corrected value.

Pollutants required for toxic reporting: TACs w/o Risk Factor. Current as of update date

NG Bhp Fuel Use Convertor

Bhp	Scf/hr	MMscf/hr
1,000.0	7.264E+03	7.264E-03

Conversion factor for HP to Btu/hr is 2.5425E^{3}, HHV of NG is 1,000 Btu/scf. Thermal Efficiency of engine is 0.35. Scf/hr= Bhp ((2,542.5/(1,000*0.35) 1E^{6} scf=1 MMscf

Name	Natural Gas-Fired Four Stroke Rich Burn (4SRB) Internal Combustion Engine		
Applicability	Use this spreadsheet for Natural Gas-Fired 4 Stroke Rich Burn (4SRB) Internal Combustion Engine. Entries required in yellow areas, output in grey areas.		
Author or updater	Matthew Cegielski	*Last Update*	September 26, 2016
Facility:	Darling Ingredients		
ID#:			
Project #:			

Inputs	MMscf /hr	MMscf /yr	**Formula**
Natural Gas usage rate	6.79E-01	244.610	Supply the necessary rate in MMscf. Enter the VOC in g/bhp-hr. VOC values cannot be greater than uncontrolled value of 0.09885. The VOC control reduction will be calculated in the box below. If unknown leave as 0.09885. Emissions are calculated by the multiplication of Fuel Rates and Emission Factors.
VOC g/ Bhp-hr	0.09885		
VOC Control %	0.00		

Substances	CAS#	Emission Factor lbs/ MMscf	LB/HR	LB/YR
1,1,2,2-Tetrachloroethane	**79345**	2.53E-02	1.72E-02	6.19E+00
1,1,2-Trichloroethane	**79005**	1.53E-02	1.04E-02	3.74E+00
1,1-Dichloroethane	**75343**	1.13E-02	7.68E-03	2.76E+00
1,2 Dichloroethane EDCL	**107062**	1.13E-02	7.68E-03	2.76E+00
1,3-Butadiene	**106990**	6.63E-01	4.50E-01	1.62E+02
Acetaldehyde	**75070**	2.79E+00	1.90E+00	6.82E+02
Acrolein	**107028**	2.63E+00	1.79E+00	6.43E+02
Benzene	**71432**	1.58E+00	1.07E+00	3.86E+02
Carbon tetrachloride	**56235**	1.77E-02	1.20E-02	4.33E+00
Chlorobenzene	**108907**	1.29E-02	8.76E-03	3.16E+00
Chloroform	**67663**	1.37E-02	9.31E-03	3.35E+00
Ethyl benzene	**100414**	2.48E-02	1.69E-02	6.07E+00
Ethylene dibromide	**106934**	2.13E-02	1.45E-02	5.21E+00
Formaldehyde	**50000**	2.05E+01	1.39E+01	5.01E+03
Methanol	**67561**	3.06E+00	2.08E+00	7.48E+02
Methylene chloride	**75092**	4.12E-02	2.80E-02	1.01E+01
Naphthalene	**91203**	9.71E-02	6.60E-02	2.38E+01
PAH#	**1151**	4.39E-02	2.98E-02	1.07E+01
Styrene	**100425**	1.19E-02	8.09E-03	2.91E+00
Toluene	**108883**	5.58E-01	3.79E-01	1.36E+02
Vinyl Chloride	**75014**	7.18E-03	4.88E-03	1.76E+00
Xylene	**1330207**	1.95E-01	1.32E-01	4.77E+01

References:

* The emission factors derived from Table 3.2-3 (pg. 15), "Uncontrolled Emission Factors For 4-Stroke Rich-Burn Engines" in July 2000 *AP 42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Section 2: Natural Gas-Fired Reciprocating Engine*. Assumes 1,000 Btu's per scf natural gas.

#According to EPA, PAH's value includes Naphthalene. Corrected value.

Pollutants required for toxic reporting: TACs w/o Risk Factor. Current as of update date

NG Bhp Fuel Use Convertor

Bhp	Scf/hr	MMscf/hr
1,000.0	7.264E+03	7.264E-03

Conversion factor for HP to Btu/hr is $2.5425E^3$, HHV of NG is 1,000 Btu/scf. Thermal Efficiency of engine is 0.35. Scf/hr= Bhp ((2,542.5/(1,000*0.35) $1E^6$ scf=1 MMscf

Name	Natural Gas-Fired Four Stroke Lean Burn (4SLB) Internal Combustion Engine with OC
Applicability	Use this spreadsheet for Natural Gas-Fired Internal Combustion 4 Stroke Lean Burn (4SLB) Engine with an Oxidation Catalyst (OC). Entries required in yellow areas, output in grey areas.
Author or updater	Matthew Cegielski *Last Update* September 26, 2016
Facility:	Darling Ingredients
ID#:	
Project #:	

Inputs	MMscf /hr	MMscf /yr	Formula
Natural Gas usage rate	6.79E-01	244.610	Supply the necessary rate in MMscf. The use of the Oxidation Catalyst reduces the TACs by 76%. Emissions are calculated by the multiplication of Fuel Rates and Emission Factors.

Substances	CAS#	Emission Factor lbs/ MMscf	LB/HR	LB/YR
1,1,2,2-Tetrachloroethane	**79345**	9.60E-03	6.52E-03	2.35E+00
1,1,2-Trichloroethane	**79005**	7.63E-03	5.19E-03	1.87E+00
1,1-Dichloroethane	**75343**	5.66E-03	3.85E-03	1.39E+00
1,2,4-Trimethylbenze	**95636**	3.43E-03	2.33E-03	8.40E-01
1,2 Dichloroethane EDCL	**107062**	5.66E-03	3.85E-03	1.39E+00
1,3-Butadiene	**106990**	6.41E-02	4.35E-02	1.57E+01
2,2,4-Trimethylpentane	**540841**	6.00E-02	4.08E-02	1.47E+01
2-Methyl naphthalene	**91576**	7.97E-03	5.41E-03	1.95E+00
Acenaphthene	**83329**	3.00E-04	2.04E-04	7.34E-02
Acenaphthylene	**208968**	1.33E-03	9.02E-04	3.25E-01
Acetaldehyde	**75070**	2.01E+00	1.36E+00	4.91E+02
Acrolein	**107028**	1.23E+00	8.38E-01	3.02E+02
Benzene	**71432**	1.06E-01	7.18E-02	2.58E+01
Benzo[b]fluoranthene	**205992**	3.98E-05	2.71E-05	9.75E-03
Benzo[e]pyrene	**192972**	9.96E-05	6.77E-05	2.44E-02
Benzo[g,h,i]perylene	**191242**	9.94E-05	6.75E-05	2.43E-02
Biphenyl	**92524**	5.09E-02	3.46E-02	1.24E+01
Carbon tetrachloride	**56235**	8.81E-03	5.98E-03	2.15E+00
Chlorobenzene	**108907**	7.30E-03	4.96E-03	1.78E+00
Chloroform	**67663**	6.84E-03	4.65E-03	1.67E+00
Chrysene	**218019**	1.66E-04	1.13E-04	4.07E-02
Ethyl benzene	**100414**	9.53E-03	6.47E-03	2.33E+00
Ethylene dibromide	**106934**	1.06E-02	7.22E-03	2.60E+00
Fluoranthene	**206440**	2.66E-04	1.81E-04	6.52E-02
Fluorene	**86737**	1.36E-03	9.25E-04	3.33E-01
Formaldehyde	**50000**	1.27E+01	8.61E+00	3.10E+03
Methanol	**67561**	6.00E-01	4.08E-01	1.47E+02
Methylene chloride	**75092**	4.80E-03	3.26E-03	1.17E+00
n-Hexane	**110543**	2.66E-01	1.81E-01	6.52E+01
Naphthalene	**91203**	1.79E-02	1.21E-02	4.37E+00
PAH#	**1151**	1.86E-03	1.26E-03	4.55E-01
Phenanthrene	**85018**	2.50E-03	1.70E-03	6.11E-01
Phenol	**108952**	5.76E-03	3.91E-03	1.41E+00
Pyrene	**129000**	3.26E-04	2.22E-04	7.98E-02
Styrene	**100425**	5.66E-03	3.85E-03	1.39E+00
Toluene	**108883**	9.79E-02	6.65E-02	2.40E+01
Vinyl Chloride	**75014**	3.58E-03	2.43E-03	8.75E-01
Xylene	**1330207**	4.42E-02	3.00E-02	1.08E+01

NG Bhp Fuel Use Convertor

Bhp	Scf/hr	MMscf/hr
1,000.0	7.264E+03	7.264E-03

Conversion factor for HP to Btu/hr is 2.5425E[3], HHV of NG is 1,000 Btu/scf. Thermal Efficiency of engine is 0.35. Scf/hr= Bhp ((2,542.5/(1,000*0.35) 1E[6] scf=1 MMscf

References:

* The emission factors derived from Table 3.2-2 (pg. 11), "Uncontrolled Emission Factors For 4-Stroke Lean-Burn Engines" in July 2000 *AP 42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Section 2: Natural Gas-Fired Reciprocating Engine*. Assumes 1,000 Btu per scf natural gas. The use of a catalyst reduces TACs by 76% (NESHAP).

#According to EPA, PAH's value includes Naphthalene. Since the Naphthalene value for 4SLB is suspected of including an outlier (higher than PAH), the average % of Naphthalene from the other two engine types is applied as a reduction.Corrected value.

Pollutants required for toxic reporting: TACs w/o Risk Factor Current as of update date

Name

Natural Gas-Fired Four Stroke Rich Burn (4SRB) Internal Combustion Engine with NSCR

Applicability	Use this spreadsheet for Natural Gas-Fired 4 Stroke Rich Burn (4SRB) Internal Combustion Engine with NSCR catalyst. Entries required in yellow areas, output in grey areas.

Author or updater Matthew Cegielski *Last Update* September 26, 2016

Facility: Darling Ingredients
ID#:
Project #:

Inputs	MMscf /hr	MMscf /yr	**Formula**
Natural Gas usage rate	6.79E-01	244.610	Supply the necessary rate in MMscf. The use of the NSCR Catalyst reduces the TACs by 76%. Emissions are calculated by the multiplication of Fuel Rates and Emission Factors.

Substances	CAS#	Emission Factor lbs/ MMscf	LB/HR	LB/YR
1,1,2,2-Tetrachloroethane	**79345**	6.07E-03	4.13E-03	1.49E+00
1,1,2-Trichloroethane	**79005**	3.67E-03	2.50E-03	8.98E-01
1,1-Dichloroethane	**75343**	2.71E-03	1.84E-03	6.63E-01
1,2 Dichloroethane EDCL	**107062**	2.71E-03	1.84E-03	6.63E-01
1,3-Butadiene	**106990**	1.59E-01	1.08E-01	3.89E+01
Acetaldehyde	**75070**	6.70E-01	4.55E-01	1.64E+02
Acrolein	**107028**	6.31E-01	4.29E-01	1.54E+02
Benzene	**71432**	3.79E-01	2.58E-01	9.28E+01
Carbon tetrachloride	**56235**	4.25E-03	2.89E-03	1.04E+00
Chlorobenzene	**108907**	3.10E-03	2.10E-03	7.57E-01
Chloroform	**67663**	3.29E-03	2.23E-03	8.04E-01
Ethyl benzene	**100414**	5.95E-03	4.04E-03	1.46E+00
Ethylene dibromide	**106934**	5.11E-03	3.47E-03	1.25E+00
Formaldehyde	**50000**	4.92E+00	3.34E+00	1.20E+03
Methanol	**67561**	7.34E-01	4.99E-01	1.80E+02
Methylene chloride	**75092**	9.89E-03	6.72E-03	2.42E+00
Naphthalene	**91203**	2.33E-02	1.58E-02	5.70E+00
PAH#	**1151**	1.05E-02	7.13E-03	2.57E+00
Styrene	**100425**	2.86E-03	1.94E-03	6.99E-01
Toluene	**108883**	1.34E-01	9.10E-02	3.28E+01
Vinyl Chloride	**75014**	1.72E-03	1.17E-03	4.22E-01
Xylene	**1330207**	4.68E-02	3.18E-02	1.14E+01

References:

* The emission factors derived from Table 3.2-3 (pg. 15), "Uncontrolled Emission Factors For 4-Stroke Rich-Burn Engines" in July 2000 *AP 42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Section 2: Natural Gas-Fired Reciprocating Engine*. Assumes 1,000 Btu's per scf natural gas. The use of a catalyst reduces TACs by 76% (NESHAP).

#According to EPA, PAH's value includes Naphthalene. Corrected value.

Pollutants required for toxic reporting: TACs w/o Risk Factor Current as of update date

NG Bhp Fuel Use Convertor

Bhp	Scf/hr	MMscf/hr
1,000.0	7.264E+03	7.264E-03

Conversion factor for HP to Btu/hr is 2.5425E^{3}, HHV of NG is 1,000 Btu/scf. Thermal Efficiency of engine is 0.35. Scf/hr= Bhp ((2,542.5/(1,000*0.35) 1E^{6} scf=1 MMscf

Appendix C

Noise Modeling Data

Construction Source Noise Prediction Model

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	4,356	50.0
Residence 1	2440	55.0
		#NUM!

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Grader	85	0.4
Grader	85	0.4
Dozer	85	0.4
Dozer	85	0.4
Excavator	85	0.4
Excavator	85	0.4

Ground Type	HARD
Source Height	12
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Grader	81.0
Grader	81.0
Dozer	81.0
Dozer	81.0
Excavator	81.0
Excavator	81.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
88.8

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

$L_{eq}(equip) = E.L.+10*\log(U.F.) - 20*\log(D/50) - 10*G*\log(D/50)$

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Construction Source Noise Prediction Model

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{max} dBA)
Threshold	6,887	50.0
Residence 1	2440	59.0
		#NUM!

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Grader	85	1
Grader	85	1
Dozer	85	1
Dozer	85	1
Excavator	85	1
Excavator	85	1

Ground Type	HARD
Source Height	12
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{max} dBA at 50 feet[3]
Grader	85.0
Grader	85.0
Dozer	85.0
Dozer	85.0
Excavator	85.0
Excavator	85.0

Combined Predicted Noise Level (L_{max} dBA at 50 feet)
92.8

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Operational Source Noise Prediction Model

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{eq} dBA)
Threshold	2,759	50.0
Residence 1	2440	51.1
		#NUM!

Equipment	Reference Emission Noise Levels (L_{eq}) at 50 feet[1]	Usage Factor[1]
Man Lift	85	0.2
Pickup Truck	55	0.4
Front End Loader	80	0.4
Flat Bed Truck	84	0.4
Flat Bed Truck	84	0.4
Pickup Truck	55	0.4

Ground Type	HARD
Source Height	12
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{eq} dBA at 50 feet[3]
Man Lift	78.0
Pickup Truck	51.0
Front End Loader	76.0
Flat Bed Truck	80.0
Flat Bed Truck	80.0
Pickup Truck	51.0

Combined Predicted Noise Level (L_{eq} dBA at 50 feet)
84.8

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Operational Source Noise Prediction Model

Location	Distance to Nearest Receptor in feet	Combined Predicted Noise Level (L_{max} dBA)
Threshold	4,794	50.0
Residence 1	2440	55.9
		#NUM!

Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[1]
Man Lift	85	1
Pickup Truck	55	1
Front End Loader	80	1
Flat Bed Truck	84	1
Flat Bed Truck	84	1
Pickup Truck	55	1

Ground Type	HARD
Source Height	12
Receiver Height	5
Ground Factor[2]	0.00

Predicted Noise Level [3]	L_{max} dBA at 50 feet[3]
Man Lift	85.0
Pickup Truck	55.0
Front End Loader	80.0
Flat Bed Truck	84.0
Flat Bed Truck	84.0
Pickup Truck	55.0
Combined Predicted Noise Level (L_{max} dBA at 50 feet)	89.6

Sources:

[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006. Table 1.

[2] Based on Figure 6-5 from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 6-23).

[3] Based on the following from the Federal Transit Noise and Vibration Impact Assessment, 2006 (pg 12-3).

L_{eq}(equip) = E.L.+10*log (U.F.) - 20*log (D/50) - 10*G*log (D/50)

Where: E.L. = Emission Level;

U.F.= Usage Factor;

G = Constant that accounts for topography and ground effects (FTA 2006: pg 6-23); and

D = Distance from source to receiver.

Traffic Noise Spreadsheet Calculator

Project: **Fresno-Darling Rendering Plant**

Number	Segment Description and Location Name	From	To	Existing Conditions	Existing + Project Conditions	Δ Existing – Existing + Project
Summary of Net Changes						
1	Jensen Avenue	Project Access	Cornelia Avenue	56.4	56.7	0.3
2	Jensen Avenue	Cornelia Avenue	Brawley Avenue	65.9	66.3	0.4
3	Jensen Avenue	Brawley Avenue	Marks Avenue	68.3	68.7	0.3
4	Jensen Avenue	Marks Avenue	West Avenue	59.4	59.8	0.3
5	Jensen Avenue	West Avenue	Fruit Avenue	60.0	60.3	0.3
6	Cornelia Avenue	Church Avenue	Jensen Avenue	56.8	56.8	0.0
7	Cornelia Avenue	Jensen Avenue	North Avenue	57.1	57.7	0.6
8	Brawley Avenue	Church Avenue	Jensen Avenue	59.9	59.9	0.0
9	Brawley Avenue	Jensen Avenue	North Avenue	60.1	60.2	0.1
10	Marks Avenue	Church Avenue	Jensen Avenue	56.3	56.4	0.0
11	Marks Avenue	Jensen Avenue	North Avenue	55.4	55.5	0.0
12	West Avenue	Church Avenue	Jensen Avenue	45.5	45.5	0.0
13	West Avenue	Jensen Avenue	North Avenue	51.1	51.1	0.0

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator

Project: **Fresno-Darling Rendering Plant**

Noise Level Descriptor: Ldn
Site Conditions: Soft
Traffic Input: Peak
Traffic K-Factor: 10

	Segment Description and Location			Input										Output				
				Peak Hour	Speed	Distance to Directional Centerline, (feet)[4]		Traffic Distribution Characteristics						Ldn,	Distance to Contour, (feet)[3]			
Number	**Name**	**From**	**To**	**Volume**	**(mph)**	**Near**	**Far**	**% Auto**	**% Medium**	**% Heavy**	**% Day**	**% Eve**	**% Night**	**(dBA)[5,6,7]**	**70 dBA**	**65 dBA**	**60 dBA**	**55 dBA**
Existing Conditions																		
1	Jensen Avenue	Project Access	Cornelia Avenue	337	45	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.4	12	27	58	124
2	Jensen Avenue	Cornelia Avenue	Brawley Avenue	373	45	25	25	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	65.9	13	29	62	133
3	Jensen Avenue	Brawley Avenue	Marks Avenue	468	45	20	20	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.3	15	33	72	155
4	Jensen Avenue	Marks Avenue	West Avenue	483	45	80	80	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.4	16	34	73	158
5	Jensen Avenue	West Avenue	Fruit Avenue	499	45	75	75	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.0	16	35	75	161
6	Cornelia Avenue	Church Avenue	Jensen Avenue	112	45	45	45	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.8	6	13	28	60
7	Cornelia Avenue	Jensen Avenue	North Avenue	119	45	45	45	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.1	6	13	29	62
8	Brawley Avenue	Church Avenue	Jensen Avenue	93	45	25	25	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.9	5	11	24	53
9	Brawley Avenue	Jensen Avenue	North Avenue	71	45	20	20	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.1	4	9	20	44
10	Marks Avenue	Church Avenue	Jensen Avenue	201	35	45	45	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.3	6	12	26	55
11	Marks Avenue	Jensen Avenue	North Avenue	127	35	38	38	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	55.4	4	9	19	41
12	West Avenue	Church Avenue	Jensen Avenue	55	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	45.5	2	5	11	23
13	West Avenue	Jensen Avenue	North Avenue	41	35	35	35	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	51.1	2	4	9	19

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Traffic Noise Spreadsheet Calculator

Project: **Fresno-Darling Rendering Plant**

Noise Level Descriptor: Ldn
Site Conditions: Soft
Traffic Input: Peak
Traffic K-Factor: 10

	Segment Description and Location			Input										Output				
				Peak Hour		Distance to Directional Centerline, (feet)$_4$		Traffic Distribution Characteristics						Ldn,	Distance to Contour, (feet)$_3$			
Number	Name	From	To	Volume	Speed (mph)	Near	Far	% Auto	% Medium	% Heavy	% Day	% Eve	% Night	(dBA)$_{5,6,7}$	70 dBA	65 dBA	60 dBA	55 dBA
Existing + Project Conditions																		
1	Jensen Avenue	Project Access	Cornelia Avenue	360	45	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.7	13	28	60	130
2	Jensen Avenue	Cornelia Avenue	Brawley Avenue	413	45	25	25	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	66.3	14	31	66	142
3	Jensen Avenue	Brawley Avenue	Marks Avenue	507	45	20	20	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	68.7	16	35	76	163
4	Jensen Avenue	Marks Avenue	West Avenue	521	45	80	80	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.8	17	36	77	166
5	Jensen Avenue	West Avenue	Fruit Avenue	536	45	75	75	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.3	17	36	79	169
6	Cornelia Avenue	Church Avenue	Jensen Avenue	112	45	45	45	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.8	6	13	28	60
7	Cornelia Avenue	Jensen Avenue	North Avenue	137	45	45	45	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	57.7	7	15	32	68
8	Brawley Avenue	Church Avenue	Jensen Avenue	94	45	25	25	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	59.9	5	11	25	53
9	Brawley Avenue	Jensen Avenue	North Avenue	72	45	20	20	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	60.2	4	10	21	44
10	Marks Avenue	Church Avenue	Jensen Avenue	202	35	45	45	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	56.4	6	12	26	55
11	Marks Avenue	Jensen Avenue	North Avenue	128	35	38	38	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	55.5	4	9	19	41
12	West Avenue	Church Avenue	Jensen Avenue	55	35	100	100	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	45.5	2	5	11	23
13	West Avenue	Jensen Avenue	North Avenue	41	35	35	35	97.0%	2.0%	1.0%	80.0%	15.0%	5.0%	51.1	2	4	9	19

*All modeling assumes average pavement, level roadways (less than 1.5% grade), constant traffic flow and does not account for shielding of any type or finite roadway adjustments. All levels are reported as A-weighted noise levels.

Appendix D

Transportation Impact Analysis

Fresno Rendering Plant Relocation Project

Transportation Impact Analysis Draft

March 2019

Prepared for:
City of Fresno

Submitted by:
FEHR & PEERS
1001 K Street, 3rd Floor
Sacramento, CA 95814

Table of Contents

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CHAPTER 1. INTRODUCTION

This study analyzes the potential impacts to the transportation system associated with the proposed relocation of the Darling facility from its current location on Belgravia Avenue to a new location on about 35 to 50 acres near the City's wastewater treatment plan. The impact analysis examines the roadway, transit, bicycle, pedestrian, rail, and aviation components of the transportation system.

The technical analysis contained in this report will form the basis of the transportation chapter for the Environmental Impact Report (EIR) and includes traffic operations of the roadway segments within the study area. This report also evaluates policy impacts related to air traffic patterns, hazards, emergency access, transit, bicycle, and pedestrian facilities. The study identifies mitigation measures to address project impacts where appropriate. The methodologies used in this study comply with applicable California Environmental Quality Act (CEQA) guidelines and requirements.

This study analyzes the following scenarios:

- Existing Conditions Analysis – The existing and existing plus project analyses are used to identify impacts directly related to the development of the proposed project. Existing roadway operations were analyzed using roadway geometrics as observed in Spring 2017 and traffic volumes obtained in May 2017.
- Cumulative Conditions Analysis **–** The Cumulative Conditions scenario analyzes the proposed project's effects on transportation when viewed in connection with the effects of reasonably foreseeable future projects. Outside of the City of Fresno sphere-of-influence (SOI), the analysis uses the Fresno Council of Governments (Fresno COG) 2035 population and employment forecasts as land use inputs for future development in the region. The analysis also includes reasonably foreseeable roadway network changes consistent with the City of Fresno General Plan.

STUDY AREA

The study area was developed with input from the City of Fresno and includes the following roadway segments and their intersections:

- Jensen Avenue (Project Access to Fruit Avenue)
- Cornelia Avenue (Church Avenue to North Avenue)
- Brawley Avenue (Church Avenue to North Avenue)
- Marks Avenue (Church Avenue to North Avenue)
- West Avenue (Church Avenue to North Avenue)

ANALYSIS METHODOLOGY

TRAVEL DEMAND FORECASTING

This study uses a modified version of the Fresno COG regional travel demand forecasting (TDF) model used for the City of Fresno General Plan Update. All traffic volume forecasts were adjusted, using the difference method, to account for the difference between existing counts and the base year model forecasts.

TRAFFIC OPERATIONS

The analysis of traffic operations was conducted for roadway segments and their intersections.

Study Intersections

Traffic operations at the study intersections were analyzed using procedures and methodologies contained in the Highway Capacity Manual (HCM), Transportation Research Board, 2010. These methodologies were applied using Synchro software package (Version 9), developed by Trafficware. **Table 1** displays the delay range associated with each LOS category for signalized and unsignalized intersections based on the HCM.

TABLE 1:
INTERSECTION LEVEL OF SERVICE CRITERIA

Level of Service	Average Control Delay [seconds/vehicle]		Description
	Signalized	Stop Controlled	
A	< 10.0	< 10.0	Very low delay. At signalized intersections, most vehicles do not stop.
B	10.1 to 20.0	10.1 to 15.0	Generally good progression of vehicles. Slight delays.
C	>20.1 to 35.0	>15.1 to 25.0	Fair progression. At signalized intersections, increased number of stopped vehicles.
D	>35.1 to 55.0	>25.1 to 35.0	Noticeable congestion. At signalized intersections, large portion of vehicles stopped.
E	>55.1 to 80.0	>35.1 to 50.0	Poor progression. High delays and frequent cycle failure.
F	>80.0	>50.0	Oversaturation. Forced flow. Extensive queuing.

Source: Highway Capacity Manual (Transportation Research Board, 2010)

The HCM methodology determines the level of service (LOS) at signalized intersections by comparing the average control delay (i.e. delay resulting from initial deceleration, queue move-up time, time actually stopped, and final acceleration) per vehicle at the intersection to the established thresholds. The LOS for traffic signal controlled and all-way stop controlled intersections is based on the average control delay for the entire intersection. For side-street stop-controlled intersections, the LOS is evaluated separately for each individual movement with delay reported for the critical (i.e., worst case) turning movement.

Study Roadway Segments

Roadway segment traffic operations was conducted using the roadway segment analysis methodology applied for the City's General Plan update. Traffic volumes on the study roadway segments are used to determine the overall usage and congestion. Note that the roadway segment analysis is based on traffic counts taken at a single location, which was intended to be representative of the entire segment. A link connects two intersections; a segment is a series of links. The segments used in this analysis were developed based on where a series of links had common physical and traffic conditions. Typically, intersection operations control the perception of drivers on a roadway facility, since drivers experience delay at intersections.

Traffic operations on the study roadway segments were measured using a qualitative measure called level of service (LOS). LOS is a general measure of traffic operating conditions whereby a letter grade, from A (the best) to F (the worst), is assigned. These grades represent the perspective of drivers and are an indication of the comfort and convenience associated with driving, as well as speed, travel time, traffic interruptions, and freedom to maneuver. The LOS grades are generally defined as follows:

- **LOS A** represents free-flow travel with an excellent level of comfort and convenience and the freedom to maneuver.
- **LOS B** has stable operating conditions, but the presence of other road users causes a noticeable, though slight, reduction in comfort, convenience, and maneuvering freedom.
- **LOS C** has stable operating conditions, but the operation of individual users is substantially affected by the interaction with others in the traffic stream.
- **LOS D** represents high-density, but stable flow. Users experience severe restriction in speed and freedom to maneuver, with poor levels of comfort and convenience.
- **LOS E** represents operating conditions at or near capacity. Speeds are reduced to a low but relatively uniform value. Freedom to maneuver is difficult with users experiencing frustration and poor comfort and convenience. Unstable operation is frequent, and minor disturbances in traffic flow can cause breakdown conditions.
- **LOS F** is used to define forced or breakdown conditions. This condition exists wherever the volume of traffic exceeds the capacity of the roadway. Long queues can form behind these bottleneck points with queued traffic traveling in a stop-and-go fashion.

The LOS was calculated for each study roadway segment to evaluate the quality of traffic conditions. LOS was determined by comparing traffic volumes for each roadway segments, incorporating roadway functional classification, and number of travel lanes, presence of two-way left-turn lanes with peak hour LOS capacity thresholds. These thresholds are shown in **Table 2** and were calculated based on the methodology contained in the Highway Capacity Manual (HCM) (Transportation Research Board 2000). The HCM methodology is the prevailing measurement standard used throughout the United States and is recommended for use in the City of Fresno *Traffic Impact Study Report Guidelines* (2009). In addition to LOS, the ratio of volume-to-capacity is also provided. The volume-to-capacity ratio is provided for information purposes to provide the reader with a general sense of how close the peak hour traffic volume on a subject roadway segment is to the assigned capacity of the roadway. A volume-to-capacity ration of 1.00 would signify a roadway at capacity.

TABLE 2:
ROADWAY FUNCTIONAL CLASS AND PEAK HOUR LOS THRESHOLDS

Functional Class	Median	Lanes	Peak Hour Level of Service Capacity Thresholds				
			A	B	C	D	E
Freeway	N/A[1]	4	2,720	4,460	6,630	7,720	8,630
		3+Aux[2]	2,360	3,860	5,640	6,730	7,530
		3	2,000	3,270	4,660	5,740	6,430
		2+Aux	1,650	2,700	3,850	4,760	5,340
		2	1,300	2,130	3,050	3,790	4,260
State Expressway	Divided	6	2,410	3,960	5,730	7,450	8,450
		4	1,610	2,650	3,810	4,960	5,630
		2	810	1,340	1,890	2,470	2,810
City Expressway	Raised Median	6			1,860	6,170	6,520
		5			1,520	5,110	5,430
		4			1,180	4,050	4,340
		2			520	1,910	2,160
Super Arterial	Raised Median	6				4,910	6,240
		5				4,040	5,195
		4				3,170	4,150
Arterial	Raised Median	8			2,120	7,070	7,490
		6			1,560	5,270	5,610
		5			1,280	4,370	4,670
		4			1,000	3,470	3,730
		3			720	2,555	2,795
		2			440	1,640	1,860
	TWLTL	4			940	3,290	3,550
		2			420	1,550	1,760
	Undivided	4			770	2,740	2,980
		2			340	1,270	1,480
Collector	TWLTL	4			940	3,290	3,550
		2			420	1,550	1,760
	Undivided	4			770	2,740	2,980
		2			340	1,270	1,480
One-Way	Undivided	3		1,960	2,240	2,430	2,610
		2		1,250	1,490	1,620	1,740
		1		550	740	800	870
Rural State Highway	Undivided	2	310	570	1,020	1,730	2,470
Rural Arterial	Divided	4			1,950	3,580	3,780
	Undivided	2			570	1,230	1,310
Rural Collector/Local	Undivided	2			700	930	1,000

Notes:
1 N/A – Not applicable for operational class
2 Aux – Auxiliary Lane
– LOS is not achievable because of type of facility.
Source: Fehr & Peers 2012.

ANALYSIS ASSUMPTIONS AND METHODOLOGY LIMITATIONS

Key assumptions made in the process of this study include:

- Existing traffic counts collected in May 2017 and are representative of existing conditions and included passenger cars and light trucks, and heavy vehicles. The share of heavy vehicles entering the study intersections is outlined below for AM and PM peak hour conditions:

Intersection With Jensen Avenue	AM	PM
Cornelia Avenue	21%	6%
Brawley Avenue	25%	5%
Marks Avenue	10%	5%
West Avenue	12%	5%

Travel Demand Forecasting Limitations

As noted earlier, this study uses a modified version of the Fresno COG regional travel demand forecasting (TDF) model used for the City of Fresno General Plan Update, which was calibrated and validated for the that analysis. While this makes the TDF model the most valid and capable tool for forecasting future traffic volumes, the TDF model has some limitations in its application for this study. For example, the model was designed to model traffic for regional air quality conformity, and typically only includes the regional roadway network within Fresno County. The TDF model does not included roadway network and traffic analysis zone detail in adjacent counties like Madera County, Merced County, San Benito County, Kings County, and Tulare County. Refinements to the traffic model's traffic analysis zone connections to the roadway network were made to better model development access and traffic assignment. In addition, local roadways were added to the model within the project study area to be able to generate future travel forecasts.

While the model was calibrated and is able to closely replicate existing roadway segment volumes, the model is more limited in its ability to forecast subtle differences in the operational characteristics of the transportation system. With multiple routes available, drivers may choose to use different routes for the same trip depending on traffic signal progression, congestion, and individual preferences. While the model accounts for segment level congestion, it is more limited in its ability to directly account for changes in routes due to signal operations, merge, diverge, and weaving operations at freeway interchanges, and driver preferences.

To account for some of these limitations, this study uses a process known as the "difference method" to develop traffic volume forecasts. This approach adjusts raw model volume forecasts by adding the forecasted incremental growth from the TDF model to the existing traffic counts.

Traffic Operations Limitations

This study uses analysis methodologies that are consistent with the City of Fresno's *Traffic Impact Study Report Guidelines* (2009). However, the roadway segment methodology has certain limitations. For example, while the development of the roadway segment capacity thresholds in **Table 2** considered corridor level inputs specific to City of Fresno roadways, such as median type, signal density, and signal cycle length for arterial-level facilities, segment-level analysis does not account for the full effect of subtle operational characteristics of the corridor operations like vehicle queuing that may occur due to a queue spilling out of or blocking a turn pocket at an intersection or vehicle queues spilling back from adjacent intersections or operations of arterial-level facilities with freeway facilities at interchange locations.

In addition, this methodology does not consider the potential impact on walking, bicycling, and transit. Pedestrians, bicyclists, and transit riders are all users of the roadway system but may not be fully recognized in the traffic operations analysis and the calculation of LOS. The LOS thresholds in **Table 2** are based on driver's comfort and convenience. Identifying the need for roadway improvements based on the resulting roadway LOS can have unintended impacts to other modes such as increasing the walking time for pedestrians. In evaluating the roadway system, a lower vehicle LOS may be desired when balanced against other community values related to resource protection, social equity, economic development, and consideration of pedestrians, bicyclists, and transit users. To address some of these limitations, peak hour intersection operations are also conducted.

REGULATORY SETTING

This section summarizes the transportation policies, laws, and regulations that apply to the proposed project. This information provides context for the impact discussion related to the project's consistency with applicable regulatory conditions. Further, this study identifies impacts to traffic operations by comparing roadway LOS analysis results against LOS policies set forth by the City of Fresno.

Federal Plans, Policies, Regulations, Laws

No federal plans, policies, regulations or laws pertaining to transportation are applicable.

State Plans, Policies, Regulations, and Laws

Senate Bill 743

On September 27, 2013, Governor Brown signed Senate Bill 743 (SB 743), which made several changes to the California Environmental Quality Act (CEQA) for project located in areas served by transit. The changes direct the Governor's Office of Planning and Research (OPR) to develop a new approach for analyzing the transportation impacts under CEQA, which may eliminate vehicle delay and level of service as CEQA impacts for many parts of California. SB 743 also creates a new exemption for certain projects that are consistent with a Specific Plan and, eliminates the need to evaluate aesthetic and parking impacts of a project, in some circumstances. The guidelines will likely go into effect in late 2017/early 2018 after the Natural Resource Agency completes its rulemaking process, unless OPR elects to allow an opt-in period of one to two years.

City of Fresno

The City of Fresno provides for the mobility of people and goods within the city.

City of Fresno 2035 General Plan

The City of Fresno adopted the Fresno General Plan in December 2014 as an update to the previous 2002 Fresno General Plan. The Fresno General Plan serves as the community's guide for the continued development, enhancement, and revitalization of the Fresno metropolitan area.

The General Plan includes the following policies related to transportation and circulation that are relevant to this analysis:

- **MT-2-i:** Transportation Impact Studies. Require a Transportation Impact Study (currently named Traffic Impact Study) to assess the impacts of new development projects on existing and planned streets for projects meeting one or more of the following criteria, unless it is determined by the City Traffic Engineer that the project site and surrounding area already has appropriate multi-modal infrastructure improvements.
  - When a project includes a General Plan amendment that changes the General Plan Land Use Designation.
  - When the project will substantially change the off-site transportation system (auto, transit, bike or pedestrian) or connection to the system, as determined by the City Traffic Engineer.
  - Transportation impact criteria are tiered based on a project's location within the City's Sphere of Influence. This is to assist with areas being incentivized for development. The four zones, as defined on Figure MT-4, are listed below. The following criteria apply:
    - Traffic Impact Zone I (TIZ-I): TIZ-I represents the Downtown Planning Area. Maintain a peak hour LOS standard of F or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 200 or more peak hour new vehicle trips.
    - Traffic Impact Zone II (TIZ-II): TIZ-II generally represents areas of the City currently built up and wanting to encourage infill development. Maintain a peak hour LOS standard of E or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 200 or more peak hour new vehicle trips.
    - Traffic Impact Zone III (TIZ-III): TIZ-III generally represents areas near or outside the City Limits but within the SOI as of December 31, 2012. Maintain a peak hour LOS standard

of D or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 100 or more peak hour new vehicle trips.

- Traffic Impact Zone IV (TIZ-IV): TIZ-IV represents the southern employment areas within and planned by the City. Maintain a peak hour LOS standard of E or better for all intersections and roadway segments. A TIS will be required for all development projected to generate 200 or more peak hour new vehicle trips.

City of Fresno Traffic Impact Study Report Guidelines

The City of Fresno's Traffic Impact Study Report Guidelines establish general procedures and requirements for the preparation of traffic impact studies associated with development within the city. The guidelines are intended to be a checklist to ensure regular study items are not missed but are not intended to be prescriptive to the point of eliminating professional judgment.

The guidelines include the preferred traffic analysis methodologies, significance criteria, and documentation requirements. This study is conducted using the preferred analysis methodologies and significance criteria as outlined in the guidelines.

City of Fresno Bicycle Active Transportation Plan

The City of Fresno Active Transportation Plan (ATP) is a comprehensive guide outlining the vision of active transportation in the City of Fresno, and a roadmap for achieving that vision. ***County of Fresno 2000 General Plan***

The County of Fresno 2000 General Plan includes the following policy related to transportation and circulation that are relevant to this analysis:

- **Policy TR-A.2:** The County shall plan and design its roadway system in a manner that strives to meet Level of Service (LOS) D on urban roadways within the spheres of influence of the cities of Fresno and Clovis and LOS C on all other roadways in the county.

SIGNIFICANCE CRITERIA

In accordance with CEQA, the effects of a project are evaluated to determine if they will result in significant adverse impact on the environment. The criteria used to determine the significance of an impact to transportation and traffic are based on the Environmental Checklist in Appendix G of the State CEQA Guidelines. Accordingly, transportation and traffic impacts resulting from the proposed project are considered significant through application of the following thresholds of significance.

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

e) Result in inadequate emergency access?

f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?

As allowed with the passage of CA Assembly Bill 2419 (Bowler), the Fresno COG Policy Board rescinded the Congestion Management Program on September 25, 1997 at the request of the local member agencies. Therefore, no roadway segment in Fresno is identified in a county congestion management program. This issue will not be discussed further in this EIR.

City of Fresno

The proposed project is located in TIZ III as defined by Policy MT-2-1 of the City of Fresno General Plan. Therefore, the project would cause a significant impact to the roadway system if it would result in the following conditions:

- Cause a roadway segment or intersection operating at LOS D or better to operate at LOS E or worse
- Increase the average delay for a study intersection that is already operating at unacceptable LOS by 5.0 seconds or more
- Increase the volume-to-capacity ratio of a roadway segment operating at LOS E or F by 0.05 or more

Transit, Bicycle, and Pedestrian Facilities

The City of Fresno *Traffic Impact Study Report Guidelines* do not currently have thresholds for impacts on transit, bicycle, and pedestrian facilities.

For purposes of this study, the project would cause a significant impact to the transit system, bicycle network, and/or pedestrian facilities if it would:

- Disrupt or interfere with existing or planned public transit services or facilities
- Create an inconsistency with policies concerning transit systems set forth in the City of Fresno General Plan or other applicable adopted policy document

- Disrupt or interfere with existing or planned bicycle/pedestrian facilities
- Result in unsafe conditions for pedestrians, including unsafe pedestrian/bicycle or pedestrian/vehicle conflicts
- Result in unsafe conditions for bicycles, including unsafe bicycle/pedestrian or bicycle/vehicle conflicts
- Create an inconsistency with policies related to bicycle or pedestrian systems set forth in the City of Fresno General Plan, the City of Fresno Bicycle, Pedestrian, and Trails Master Plan, or other applicable adopted policy document

County of Fresno

The County of Fresno 2000 General Plan Policy TR-A.2 states that the County shall plan and design its roadway system in a manner that strives to meet LOS D on urban roadways within the spheres of influence of the cities of Fresno and Clovis and LOS C on all other roadways in the county. In no case should the County plan for worse than LOS D on rural County roadways, worse than LOS E on urban roadways within the spheres of influence of the cities of Fresno and Clovis, or in cooperation with Caltrans and the Council of Fresno County Governments, plan for worse than LOS E on State highways in the county.

A project is considered to have a significant impact if its traffic, when added to the traffic of the without-project condition, would cause any of the changes in traffic conditions described below:

<u>Roadway Segments:</u>

- Cause a roadway that is operating at an acceptable LOS to deteriorate to an unacceptable LOS
- Cause the V/C ratio (on a directional peak hour basis) to increase by more than 0.05 on a roadway that is already operating at an unacceptable LOS. It should be noted that a decrease from an unacceptable LOS to a lesser LOS (e.g. from LOS D to LOS E in County areas) is not considered an impact unless the corresponding V/C ratio increase is greater than 0.05.

<u>Signalized Intersections:</u>

- Cause an intersection that is operating at an acceptable LOS to deteriorate to an unacceptable LOS
- Cause the average delay to increase by more than 5.0 seconds at a signalized intersection that is operating at an unacceptable LOS.

<u>Unsignalized intersections (all-way stop, side-street stop, roundabouts):</u>

- Cause a movement or approach that is operating at an acceptable LOS to deteriorate to an unacceptable LOS
- Cause the average delay to increase by more than 5.0 seconds on a movement or approach that is operating at an unacceptable LOS. It should be noted that a decrease from an unacceptable LOS to a lesser LOS (e.g. from LOS D to LOS E in County areas) is not considered an impact unless the corresponding delay increase is greater than 5.0 seconds.

Table 3 summarizes the applicable level of service significance threshold for study area roadways and intersections. For each study roadway segment and intersection, **Table 3** identifies if the facility is located in the Fresno County, the City of Fresno and if it is located in the City of Fresno SOI and the corresponding significance criteria.

TABLE 3:
INTERSECTION LEVEL OF SERVICE SIGNIFICANCE CRITERIA

Facility Type	Study Facility	Jurisdiction	City of Fresno SOI?	Applicable Significance Threshold
Intersections	Jensen Ave./Cornelia Ave.	County	No	LOS C
	Jensen Ave./Brawley Ave.	County	No	LOS C
	Jensen Ave./Marks Ave.	County[1]	East Side of Intersection	LOS C/LOS D
	Jensen Ave./West Ave.	County[2]	Yes	LOS D
Roadways	Jensen Ave. – Project Access to Cornelia Ave.	County	No	LOS C
	Jensen Ave. – Cornelia Ave. to Brawley Ave.	County	No	LOS C
	Jensen Ave. – Brawley Ave. to Marks Ave.	County	No	LOS C
	Jensen Ave. – Marks Ave. to West Ave.	County/City[3]	Yes	LOS D
	Jensen Ave. – West Ave. to Fruit Ave.	County/City[4]	Yes	LOS D
	Cornelia Ave. – Church Ave. to Jensen Ave.	County	No	LOS C
	Cornelia Ave. – Jensen Ave. to North Ave.	County	No	LOS C
	Brawley Ave. – Church Ave. to Jensen Ave.	County	No	LOS C
	Brawley Ave. – Jensen Ave. to North Ave.	County	No	LOS C
	Marks Ave. – Church Ave. to Jensen Ave.	County	East Side of Roadway	LOS C/LOS D
	Marks Ave. – Jensen Ave. to North Ave.	County	East Side of Roadway	LOS C/LOS D
	West Ave. – Church Ave. to Jensen Ave.	County/City[5]	Yes	LOS D
	West Ave. – Jensen Ave. to North Ave.	City	Yes	LOS D

Notes:
[1]East side of intersection is located in City SOI.
[2]25% of intersection is in County.
[3]County segment west of Hughes Avenue alignment. Hughes Avenue alignment to West Avenue – westbound direction is County segment, eastbound direction is City segment.
[4]Westbound direction is City segment, eastbound direction is County segment.
[5]Northbound direction is City segment, Southbound direction is County segment.
Source: Fehr & Peers, 2019

CHAPTER 2. EXISTING CONDITIONS

This chapter describes the existing travel characteristics and the condition of the roadway, transit, bicycle and pedestrian systems, goods movement, and aviation in the study area. This study uses the existing conditions as the baseline to measure the potential impacts of proposed project.

TRAVEL CHARACTERISTICS

The City of Fresno is the fifth-largest city in California with a population of about 500,100 in 2011. Fresno County has a population of 940,220 people making it the tenth-largest county in the state and is expected to reach 1.1 million people by 2020 (City of Fresno 2012). Located in the California's San Joaquin Valley, Fresno is equidistance from the major population centers in Northern and Southern California with easy access to the California Central Coast and Sierra Nevada.

The 2000-2001 California Household Travel Survey provides information on residents' travel patterns including the purpose and method of travel in Fresno County. For convenience, travel survey responses are grouped into the following three general categories:

- Home-Based Work: Trips may begin or end at a residence and represent travel between a residence and place of work.
- Home-Based Other: Trips may begin or end at a residence and include school trips, shopping trips, or trips for recreation.
- Non-Home-Based: Trips do not begin or end at a residence. These trips would include a trip from work to a restaurant during lunch

According to the 2000-2001 California Household Travel Survey, Home-Based Work trips account for 20 percent of trips. In general, Home-Based Work trips occur during the morning and evening commute periods and are predominately made by automobile. There is less flexibility in the departure and arrival time for work trips, due to traditional work schedules. Other trip purposes account for about 80 percent of travel and are more evenly distributed throughout the day.

Most residents traveled from home to work by automobile (about 98 percent) with about 15 percent of those being shared ride (i.e., carpool) trips. Shared ride, transit, walk, and bike trips were significantly higher for non-work trips (Home-Based Other and Non-Home-Based purposes).

The average weekday person trip length for Home-Based Work was about 20 minutes compared to Home-Based Other trips (15 minutes), and Non-Home-Based trips (16 minutes). On average, non-work trips are about 30 percent shorter than work trips and have a higher percentage of transit walk and bike use. This is reasonable given trip purpose, trip scheduling flexibility, and proximity of trip origin and trip destination.

The 2000-2001 California Household Travel Survey also shows that about 12 percent of Fresno County households did not have access to a vehicle and therefore are dependent on transit, walking, and bicycling for mobility.

ROADWAY NETWORK

The roadway network in the city is generally a traditional grid-based network of north/south and east/west streets. Nearly every major street in the Fresno metropolitan area is regularly spaced at half-mile intervals. The grid system provides high levels of accessibility (i.e., travel choices) for travelers. The study facilities are listed below:

Intersections

- Jensen Avenue/Cornelia Avenue
- Jensen Avenue/Brawley Avenue
- Jensen Avenue/Marks Avenue
- Jensen Avenue/West Avenue

Roadway Segments

- Jensen Avenue – Project Access to Cornelia Avenue
- Jensen Avenue – Cornelia Avenue to Brawley Avenue
- Jensen Avenue – Brawley Avenue to Marks Avenue
- Jensen Avenue – Marks Avenue to West Avenue
- Jensen Avenue – West Avenue to Fruit Avenue
- Cornelia Avenue – Church Avenue to Jensen Avenue
- Cornelia Avenue – Jensen Avenue to North Avenue
- Brawley Avenue – Church Avenue to Jensen Avenue
- Brawley Avenue – Jensen Avenue to North Avenue
- Marks Avenue – Church Avenue to Jensen Avenue
- Marks Avenue – Jensen Avenue to North Avenue
- West Avenue – Church Avenue to Jensen Avenue
- West Avenue – Jensen Avenue to North Avenue

Roadway Characteristics

All of the study roadways outlined above are two lanes. Except for Jensen Avenue, which is classified as an arterial, all of the other study roadways are collectors with 55 mile per hour posted speed limits. Jensen Avenue has striped and paved shoulders, while Cornelia Avenue, Brawley Avenue, Marks Avenue, and West

Avenue do not. All of the study intersections have side-street stop control with Jensen Avenue being the uncontrolled facility.

TRAFFIC OPERATIONS

Table 4 summarizes existing conditions AM and PM peak hour Level of Service (LOS) for the study intersections. As shown, all of the study intersections operate acceptably at LOS C or better during both the AM and PM peak hours.

TABLE 4:
PEAK HOUR INTERSECTION LEVEL OF SERVICE – EXISTING CONDITIONS

Intersection	LOS Threshold	Traffic Control	LOS / Delay (seconds)[1]	
			AM	PM
1. Jensen Avenue/Cornelia Avenue	C	SSSC	A (B) / 3 (12)	A (B) / 4 (14)
2. Jensen Avenue/Brawley Avenue	C	SSSC	A (B) / 4 (12)	A (B) / 2 (13)
3. Jensen Avenue/Marks Avenue	C/D	SSSC	A (B) / 4 (14)	A (C) / 5 (16)
4. Jensen Avenue/West Avenue	D	SSSC	A (B) / 1 (12)	A (B) / 1 (13)

Notes: SSSC = side-street stop control
[1]For side-street stop controlled intersections, the delay and LOS for the most-delayed individual movement is shown in parentheses next to the average intersection delay and LOS. All results are rounded to the nearest second.
Source: Fehr & Peers, 2017

The AM and PM peak hour intersection turning movement traffic volumes used for the analysis presented in **Table 4** are included in the technical appendix.

Table 5 summarizes existing conditions AM and PM peak hour Level of Service (LOS) for the study roadways. As shown, all of the study roadways operate at LOS D or better during both the AM and PM peak hours. The County roadway segments of Jensen Avenue between Cornelia Avenue and Marks Avenue operate unacceptably at LOS D.

Compared to the intersection analysis results, the roadway segment analysis results in more conservative (i.e., on the high side) LOS, given that drivers perception of travel and delay while traveling along the study corridor are heavily influenced by conditions experience at the study intersections.

TABLE 5:
PEAK HOUR ROADWAY SEGMENT LEVEL OF SERVICE – EXISTING CONDITIONS

Intersection		LOS Threshold	Volume		Lanes	Existing			
			AM	PM		AM		PM	
						VC	LOS	VC	LOS
Jensen Avenue	Project Access to Cornelia Avenue	LOS C	257	337	2	0.17	C	0.23	C
	Cornelia Avenue to Brawley Avenue	LOS C	268	373	2	0.18	C	0.25	D
	Brawley Avenue to Marks Avenue	LOS C	427	468	2	0.29	D	0.32	D
	Marks Avenue to West Avenue	LOS D	405	483	2	0.27	D	0.33	D
	West Avenue to Fruit Avenue	LOS D	412	499	2	0.28	D	0.34	D
Cornelia Avenue	Church Avenue to Jensen Avenue	LOS C	84	112	2	0.06	C	0.08	C
	Jensen Avenue to North Avenue	LOS C	83	119	2	0.06	C	0.08	C
Brawley Avenue	Church Avenue to Jensen Avenue	LOS C	93	83	2	0.06	C	0.06	C
	Jensen Avenue to North Avenue	LOS C	71	39	2	0.05	C	0.03	C
Marks Avenue	Church Avenue to Jensen Avenue	LOS C/LOS D	168	201	2	0.11	C	0.14	C
	Jensen Avenue to North Avenue	LOS C/LOS D	96	127	2	0.06	C	0.09	C
West Avenue	Church Avenue to Jensen Avenue	LOS D	44	55	2	0.03	C	0.04	C
	Jensen Avenue to North Avenue	LOS D	25	41	2	0.02	C	0.03	C

Notes: SSSC = side-street stop control
Source: Fehr & Peers, 2017

Public Transportation

Public transportation in the city consists of the following services and facilities:

- Public bus service
- Express bus service
- Demand-response paratransit
- Passenger rail service

Fresno Area Express (FAX) is the predominant transit provider in the city. FAX runs 20 routes and provides over 17,000,000 annual passenger boardings, averaging about 41,000 passenger trips per day. The entire FAX system runs about 1,000 bus operations per day. Ridership trends in recent years have shown an increase in the number of people using transit, which may be attributable to poor economic conditions and the rising cost of travel.

Handy Ride is a demand-response service for seniors and persons with disabilities, as required by the Americans with Disabilities Act. This paratransit service serves up to 12,500 eligible individuals in the FAX service area and provided about 240,000 passenger rides in fiscal year 2010.

The Fresno County Rural Transit Agency (FCRTA) and Amtrak also provide services for regional travel outside of the Fresno-Clovis Metropolitan Area. FCRTA provides service to many of the unincorporated communities in Fresno County such as Coalinga and Mendota (FCRTA 2012). The San Joaquin Line is one of Amtrak's passenger rail services with connections between the San Joaquin Valley, the Sacramento Valley, the San Francisco Bay Area, and Los Angeles. Greyhound provides similar (more frequent) bus service to these regions.

Bicycle and Pedestrian Circulation

The city is generally flat, which provide a favorable environment for bicycling and walking as a mode of transportation. The City of Fresno ATP, which was completed in October 2016, provides regarding the City of Fresno's bicycle and pedestrian circulation system.

Except for an uncontrolled pedestrian crossing on the east leg of the Jensen Avenue/Valentine Avenue intersection, there are no designated bicycle and pedestrian facilities at the study intersections, which is consistent with the land use in the study area. A Class II bike lane is planned on Jensen Avenue and a Class I bike path is planned on Marks Avenue. In addition, sidewalks are planned on Jensen Avenue and West Avenue.

As documented in the City of Fresno Active Transportation Plan (October 2016), the study area has a low bicycle and pedestrian index. This is an indication of a low level trips being made by walking and biking, but also consistent with the intensity of land use in the study area.

Aviation

The City of Fresno manages the Fresno Yosemite International Airport (FYI). The airport is located in northeast Fresno just southwest of Clovis in between Highways 168 and 180. There are two runways, each of which is 7,205 feet long and 100 feet wide. There are 174 aircraft based at FYI with an average of 371 daily aircraft operations in 2012. In 2011, the two runways served about 1.2 million passengers and airport officials expect that number to grow in the future. There are also two other general aviation airports (i.e., Chandler and Sierra Sky Park) and four heliports, including McCarthy Ranch, Community Regional Medical Center, Valley Medical Center, and PG&E Service Center in the city (AirNav 2012).

CHAPTER 3. PROJECT ANALYSIS

This chapter presents the transportation analysis for existing plus project conditions. This scenario analyzes the impacts of the proposed project on existing conditions.

PROJECT DESCRIPTION

The proposed project includes a general plan amendment and rezone of land adjacent to the City of Fresno wastewater treatment plan to accommodate relocation of the existing Darling rendering facility, which is located at 795 W. Belgravia Avenue. The proposed project would be located approximately 4 miles west of the current facility.

The proposed project would generally be located on the southwest corner of the Jensen Avenue/Cornelia Avenue intersection and would be set back from the road approximately 1,600 feet. As proposed, the project would employ up to 70 full-time employees that would work in three shifts with a maximum of 25 employees on site per shift. The facility would typically operate 24 hours per day, up to seven days per week. The project is anticipated to generate an average of 150 truck trips per day. The project would also include up to 36 parking spaces for employee and visitor parking.

Project access is proposed on Jensen Avenue and Cornelia Avenue. The Jensen Avenue access will be for trucks and the Cornelia Avenue access will be for employees and visitors.

TRIP GENERATION

Table 6 summarizes daily, AM peak hour, and PM peak hour trip generation for the proposed project. Due to the unique characteristics of the project, we estimated trip generation based on the Darling Ingredients Inc. Operational Statement. As shown in Table 6, the proposed project is expected to generate about 273 trips per day with 36 trips occurring in the AM peak hour and 28 trips occurring in the PM peak hour. Truck trips are expected to represent about 55 percent of daily vehicle trips, 36 percent of AM peak hour trips, and 28 percent of PM peak hour trips.

TABLE 6:
PROPOSED PROJECT EMPLOYEE AND TRUCK TRIP GENERATION

User	Quantity[1]		Vehicle Occupancy [Persons/Vehicle][2]	Vehicles per Day	Trip Generation						
					Daily[3]	Peak Hour[4]					
						AM			PM		
	Trucks per Day	Employees				Total	In	Out	Total	In	Out
Employee		70	1.14	61	123	23	17	6	21	9	12
Trucks	75		1.00	75	150	13	7	6	8	5	3
			Total	136	273	36	24	12	28	14	15

Notes:
[1] Source: Darling Ingredients Inc. Operation Statement
[2] 2000/2001 California Statewide Travel Survey - Average vehicle occupancy for Home-Based-Work trips.
[3] Daily Vehicle trips were developed by multiplying total vehicles by two to account for vehicles entering and exiting the project.
[4] Percent of daily vehicles and directional distribution occurring in AM and PM peak hours based on the Manufacturing land use category (ITE 140) from Trip Generation Manual, Institute of Transportation Engineers, 9th Edition. The percent of daily truck trips and directional distribution occurring in the AM and PM peak hours based on the Fontana Truck Trip Generation Study.
Source: Fehr & Peers, 2017

TRIP DISTRIBUTION

Table 7 summarizes the expected distribution of project trips. As shown, the distribution is expected to be different for employees and trucks. All trucks will use Jensen Avenue to access the project. However, employees will not be restricted and will likely use other routes to access the project, based on the origin of their trip. The distribution of employee trips was developed based on existing counts and the output for the modified version of the FresnoCOG travel forecasting model developed for the City of Fresno General Plan.

TABLE 7:
PROJECT TRIP DISTRIBUTION

Roadway	Travel To/From Each Roadway							
	Employees				Trucks			
	North	South	East	West	North	South	East	West
Jensen Avenue	-	-	98%[2]	-	-	-	100%	100%[3]
Cornelia Avenue	1%	100% / 1%[1]	-	-	-	-	-	-
Brawley Avenue	1%	1%	-	-	-	-	-	-
Marks Avenue	2%	2%			-	-	-	-
West Avenue	1%	1%	-	-	-	-	-	-

Notes:
[1]100 % of employee trips will use Cornelia Avenue and the project access. 1% of employee trips are forecast to use Cornelia Avenue south of the project access.
[2]Repersents percentage of employee trips just east of Jensen Avenue.
[3]Represents truck trips between the project access and Cornelia Avenue.
Source: Fehr & Peers, 2017

TRAFFIC FORECASTS

Traffic volume forecasts for the project analysis scenarios under existing and cumulative conditions were developed by adding the project trip generation from **Table 6** to the existing traffic counts and cumulative no project traffic volume forecasts, using the trip distribution for employee and truck trips shown in **Table 7**.

As discussed previously, the cumulative traffic volume forecast were developed using the modified version of the Fresno COG regional travel demand forecasting (TDF) model developed for the City of Fresno General Plan Update. All traffic volume forecasts were adjusted, using the difference method, to account for the difference between existing counts and the base year model forecasts. In the study area, the General Plan includes widening of Jensen Avenue east of Marks Avenue from two to four lanes and widening of Marks Avenue from two to four lanes north of Jensen Avenue.

TRAFFIC OPERATIONS

Intersection and roadway segment traffic operation are presented below for existing and cumulative conditions with the addition of project trips.

Existing Plus Project Analysis

Table 8 summarizes existing conditions AM and PM peak hour Level of Service (LOS) for the study intersections. As shown, all of the study intersection will operate acceptably at LOS C or better during both the AM and PM peak hours with the addition of project trips.

TABLE 8:
PEAK HOUR INTERSECTION LEVEL OF SERVICE – EXISTING PLUS PROJECT CONDITIONS

Intersection	Traffic Control	LOS Threshold	LOS / Delay (seconds) [1]			
			Existing Conditions		Existing Plus Project Conditions	
			AM	PM	AM	PM
1. Jensen Avenue/Cornelia Avenue	SSSC	LOS C	A (B) / 3 (12)	A (B) / 4 (14)	A (B) / 4 (12)	A (B) / 4 (15)
2. Jensen Avenue/Brawley Avenue	SSSC	LOS C	A (B) / 4 (12)	A (B) / 2 (13)	A (B) / 3 (13)	A (B) / 2 (13)
3. Jensen Avenue/Marks Avenue	SSSC	LOS C/LOS D	A (B) / 4 (14)	A (C) / 5 (16)	A (C) / 4 (15)	A (C) / 5 (17)
4. Jensen Avenue/West Avenue	SSSC	LOS D	A (B) / 1 (12)	A (B) / 1 (13)	A (B) / 1 (12)	A (B) / 1 (14)

Notes: SSSC = side-street stop control
[1]For side-street stop controlled intersections, the delay and LOS for the most-delayed individual movement is shown in parentheses next to the average intersection delay and LOS. All results are rounded to the nearest second.
Source: Fehr & Peers, 2017

Table 9 summarizes existing plus project conditions AM and PM peak hour Level of Service (LOS) for the study roadways. As shown, all of the study roadways will operate at LOS D or better during both the AM and PM peak hours with the addition of project trips.

The addition of project trips to the County roadway segments of Jensen Avenue between the project access and Cornelia Avenue will cause the LOS to worsen from acceptable LOS C to unacceptable LOS D. However, the volume-to-capacity ratio will not increase by more than 0.05. The County roadway segments of Jensen Avenue between Cornelia Avenue and Marks Avenue, will operate unacceptably at LOS D during at least one peak hour, with the addition of project trips. However, the volume-to-capacity ratio will not increase by more than 0.05.

Compared to the intersection analysis results, the roadway segment analysis results in more conservative (i.e., on the high side) LOS, given that drivers perception of travel and delay while traveling along the study corridor are heavily influenced by conditions experience at the study intersections.

TABLE 9:
PEAK HOUR ROADWAY SEGMENT LEVEL OF SERVICE – EXISTING PLUS PROJECT CONDITIONS

Intersection		LOS Threshold	Volume				Lanes	Existing Conditions				Existing Plus Project Conditions			
			Existing Conditions		Existing Plus Project Conditions			AM		PM		AM		PM	
			AM	PM	AM	PM		VC	LOS	VC	LOS	VC	LOS	VC	LOS
Jensen Avenue	Project Access to Cornelia Avenue	LOS C	257	337	288	360	2	0.17	C	0.23	C	0.19	C	0.24	D
	Cornelia Avenue to Brawley Avenue	LOS C	268	373	323	413	2	0.18	C	0.25	D	0.22	C	0.28	D
	Brawley Avenue to Marks Avenue	LOS C	427	468	481	507	2	0.29	D	0.32	D	0.32	D	0.34	D
	Marks Avenue to West Avenue	LOS D	405	483	457	521	2	0.27	D	0.33	D	0.31	D	0.35	D
	West Avenue to Fruit Avenue	LOS D	412	499	462	536	2	0.28	D	0.34	D	0.31	D	0.36	D
Cornelia Avenue	Church Avenue to Jensen Avenue	LOS C	84	112	85	112	2	0.06	C	0.08	C	0.06	C	0.08	C
	Jensen Avenue to North Avenue	LOS C	83	119	108	137	2	0.06	C	0.08	C	0.07	C	0.09	C
Brawley Avenue	Church Avenue to Jensen Avenue	LOS C	93	83	94	83	2	0.06	C	0.06	C	0.06	C	0.06	C
	Jensen Avenue to North Avenue	LOS C	71	39	72	39	2	0.05	C	0.03	C	0.05	C	0.03	C
Marks Avenue	Church Avenue to Jensen Avenue	LOS C/LOS D	168	201	169	202	2	0.11	C	0.14	C	0.11	C	0.14	C
	Jensen Avenue to North Avenue	LOS C/LOS D	96	127	97	128	2	0.06	C	0.09	C	0.07	C	0.09	C
West Avenue	Church Avenue to Jensen Avenue	LOS D	44	55	45	55	2	0.03	C	0.04	C	0.03	C	0.04	C
	Jensen Avenue to North Avenue	LOS D	25	41	26	41	2	0.02	C	0.03	C	0.02	C	0.03	C

Notes:
Source: Fehr & Peers, 2017

Cumulative Analysis

Table 10 summarizes cumulative condition AM and PM peak hour Level of Service (LOS) for the study intersections. As shown, the side street stop-controlled study intersections are forecasted to operate unacceptably (i.e., LOS E or F) during the PM peak hour under cumulative conditions. The addition of project traffic will worsen operations at these two intersections. Poor operation at this intersection is due to planned growth in the study area. The analysis assumes the planned widening of Jensen Avenue and Marks Avenue, and installation of traffic signal control at the intersections of Jensen Avenue/Marks Avenue and Jensen Avenue/West Avenue.

TABLE 10:
PEAK HOUR INTERSECTION LEVEL OF SERVICE – CUMULATIVE PLUS PROJECT CONDITIONS

Intersection	Traffic Control	LOS Threshold	LOS / Delay (seconds) [1]			
			Cumulative Condition		Cumulative Plus Project Condition	
			AM	PM	AM	PM
1. Jensen Avenue/Cornelia Avenue	SSSC	LOS C	A(C) / 7(23)	**A(F) / 10(61)**	A(C) / 8(27)	**A(F) / 12(71)**
2. Jensen Avenue/Brawley Avenue	SSSC	LOS C	A(C) / 5(21)	**A(E) / 7(46)**	A(C) / 5(23)	**A(F) / 7(52)**
3. Jensen Avenue/Marks Avenue	Signal	LOS C/LOS D	C / 33	C / 26	C / 33	C / 27
4. Jensen Avenue/West Avenue	Signal	LOS D	C / 24	C / 28	C / 24	C / 28

Notes: SSSC = side-street stop control, **Bold** indicates unacceptable operations
[1]For side-street stop controlled intersections, the delay and LOS for the most-delayed individual movement is shown in parentheses next to the average intersection delay and LOS. All results are rounded to the nearest second.
Source: Fehr & Peers, 2017

Table 11 summarizes cumulative condition AM and PM peak hour Level of Service (LOS) for the study roadways. As shown, all of the study roadways will operate at LOS D or better during both the AM and PM peak hours.

The County roadway segments of Jensen Avenue between the project access and Marks Avenue and the study segments of Marks Avenue (i.e., in the County) will operate unacceptably at LOS D with and without the addition of project trips. However, the addition of project trips will not cause the volume-to-capacity ratio to increase by more than 0.05. The addition of project trip will not change the LOS of the study roadway segments, compared to cumulative no project conditions.

Compared to the intersection analysis results, the roadway segment analysis results in better LOS. Unacceptable operation of the study intersections is due to delay experienced by driver accessing Jensen Avenue from the side streets. These results indicate that improved traffic control is needed, but not additional capacity on the roadways (i.e., beyond what is planned).

TABLE 11:
PEAK HOUR ROADWAY SEGMENT LEVEL OF SERVICE – CUMULATIVE PLUS PROJECT CONDITIONS

Intersection		LOS Threshold	Volume				Lanes	Cumulative Conditions				Cumulative Plus Project Conditions			
			Cumulative		Cumulative Plus Project			AM		PM		AM		PM	
			AM	PM	AM	PM		VC	LOS	VC	LOS	VC	LOS	VC	LOS
Jensen Avenue	Project Access to Cornelia Avenue	LOS C	460	660	490	680	2	0.31	D	0.45	D	0.33	D	0.46	D
	Cornelia Avenue to Brawley Avenue	LOS C	580	980	630	1,020	2	0.39	D	0.66	D	0.43	D	0.69	D
	Brawley Avenue to Marks Avenue	LOS C	670	950	730	990	2	0.45	D	0.64	D	0.49	D	0.67	D
	Marks Avenue to West Avenue	LOS D	1,800	1,990	1,850	2,030	4	0.48	D	0.53	D	0.50	D	0.54	D
	West Avenue to Fruit Avenue	LOS D	1,620	1,900	1,670	1,940	4	0.43	D	0.51	D	0.45	D	0.52	D
Cornelia Avenue	Church Avenue to Jensen Avenue	LOS C	170	340	170	340	2	0.11	C	0.23	C	0.11	C	0.23	C
	Jensen Avenue to North Avenue	LOS C	90	190	110	200	2	0.06	C	0.13	C	0.07	C	0.14	C
Brawley Avenue	Church Avenue to Jensen Avenue	LOS C	150	260	150	260	2	0.10	C	0.18	C	0.10	C	0.18	C
	Jensen Avenue to North Avenue	LOS C	80	60	80	60	2	0.05	C	0.04	C	0.05	C	0.04	C
Marks Avenue	Church Avenue to Jensen Avenue	LOS C/LOS D	1,070	1,150	1,070	1,150	4	0.29	D	0.31	D	0.29	D	0.31	D
	Jensen Avenue to North Avenue	LOS C/LOS D	620	730	620	730	2	0.42	D	0.49	D	0.42	D	0.49	D
West Avenue	Church Avenue to Jensen Avenue	LOS D	430	580	430	580	2	0.29	D	0.39	D	0.29	D	0.39	D
	Jensen Avenue to North Avenue	LOS D	500	600	500	600	2	0.34	D	0.41	D	0.34	D	0.41	D

Notes: **Bold** indicates unacceptable operations
Source: Fehr & Peers, 2017

CHAPTER 4. MITIGATION MEASURES

This chapter summarizes the potentially significant project-specific and cumulative impacts of the proposed project on the transportation system. Each impact is followed by a recommended mitigation measure to reduce the significance of identified impacts.

This section evaluates the significance of project impacts based on the thresholds of significance and analysis results presented in previous chapters.

Traffic Increase

Impact 1: The project would conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.

This is a Significant Impact

As outlined above, the addition of project trips would worsen unacceptable operations under cumulative conditions. Implementation of the following mitigation would result is acceptable operations:

Jensen Avenue/Cornelia Avenue

- Install all-way stop control
- A separate right-turn lane on the westbound approach

Jensen Avenue/Brawley Avenue

- Install all-way stop control

Since this impact occurs under cumulative conditions, the project would be responsible for its proportional share of the improvements identified above. At the discretion of the City of Fresno, fair share payment could occur in the form of payment of traffic impact fees, an ad-hoc fee payment, or construction of the improvement with reimbursement or fee credits. **Table 12** summarizes intersection operations under cumulative conditions with the mitigation discussed above.

TABLE 12:
PEAK HOUR INTERSECTION LEVEL OF SERVICE – CUMULATIVE PLUS PROJECT CONDITIONS (MITIGATED)

Jensen Avenue Intersection	LOS Threshold	LOS / Delay (seconds) [1]					
		Cumulative Plus Project Condition			Cumulative Plus Project Condition (Mitigated)		
		Traffic Control	AM	PM	Traffic Control	AM	PM
1. Cornelia Avenue	LOS C	SSSC	A(C) / 8(27)	**A(F) / 12(71)**	AWSC	B / 14	C / 18
2. Brawley Avenue	LOS C	SSSC	A(C) / 5(23)	**A(F) / 7(52)**	AWSC	B / 14	C / 24

Notes: SSSC = side-street stop control, AWSC= All way stop control, **Bold** indicates unacceptable operations
[1]For side-street stop controlled intersections, the delay and LOS for the most-delayed individual movement is shown in parentheses next to the average intersection delay and LOS. All results are rounded to the nearest second.
Source: Fehr & Peers, 2017

Residual Significance: Less than Significant

Congestion Management Program

Impact 2 The project would not conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.

The passage of California Assembly Bill 2419 in 1996 allowed counties to "opt out" of the California Congestion Management Program, reference above, if a majority of local governments elected to exempt themselves from California's congestion management plans. On September 25, 1997, the Fresno COG Policy Board rescinded the Fresno County Congestion Management Program at the request of the local member agencies. Therefore, this impact criteria is not applicable and this impact is less than significant.

Residual Significance: Less than Significant

Air Traffic Patterns

Impact 3 The project would not result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.

The closest airport, Fresno Chandler Executive airport, is located 3.5 miles northeast of the project site. The project includes large equipment, including two new 60-foot protein storage silos. These are not tall enough to affect air traffic at the nearest airport. The project is an industrial use and would not substantially increase demand for air travel. Therefore, the project should not result in any safety risks due to altered air traffic patterns.

Residual Significance: Less than Significant

Hazards

Impact 4 The project would not substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

Implementation of the project under existing conditions would not impact study roadway or intersection operation, based on established significance criteria. In addition, the mitigation discussed under Impact 1, would improve operations for non-project traffic under cumulative conditions. The project includes separate access points for employees/visitors and trucks; therefore, the ingress/egress is designed to avoid conflicts between truck and employee vehicle traffic. Furthermore, final site design will require review and approval by the City Public Works department, which will verify that all access points, driveways, and parking areas meet City standards.

Residual Significance: Less than Significant

Emergency Access

Impact 5 The project would not result in inadequate emergency access

The project includes two access locations. One access on Jensen Avenue for trucks and one access on Cornelia Avenue for employees and visitors. In addition, the project will be constructed based on prevailing design standards related to roadway infrastructure.

Residual Significance: Less than Significant

Conflict with Alternative Transportation

Impact 6 The project would not conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

As described above under "Environmental Setting," the project vicinity has almost no existing or planned bicycle and pedestrian facilities, which is consistent with the rural agricultural setting. As indicated in the City's Active Transportation Plan, the area has low bicycle and pedestrian index, which indicates a low level of trips being made by walking and biking. Given the remote location of the project site, it is not likely that employees would walk or bicycle to work. Therefore, the proposed project would not disrupt existing or planned bicycle or pedestrian facilities or create any policy inconsistencies related to bicycle- or pedestrian-related policies.

In addition, there are no current or planned bus lines in the vicinity. Therefore, relocation of the proposed rendering plant would not place additional demand on transit and would not conflict with transit policies for the area.

Residual Significance: Less than Significant

TECHNICAL APPENDIX