

# **Appendix B**

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## **Air Quality and Greenhouse Gas Emissions Modeling**

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# **Air Quality and Greenhouse Gas Summary**

### Castle Crags AQ Emissions Summary

Activity	Emissions Source	ROG (lb/day)	NOx (lb/day)	PM10 (lb/day)
Hand Thinning	Equipment Emissions	7.23	0.12	0.00
	Worker Trip Emissions	0.08	0.06	6.10
	<i>Activity Subtotal</i>	7.31	0.18	6.10
Mechanical Thinning	Equipment Emissions	3.02	15.33	0.55
	Worker Trip Emissions	0.08	0.06	6.10
	<i>Activity Subtotal</i>	3.10	15.39	6.64
Ongoing Vegetation Management	Equipment Emissions	0.02	0.01	0.00
	Worker Trip Emissions	0.02	0.02	1.52
	<i>Activity Subtotal</i>	0.04	0.03	1.53
Restablishment of the Emergency Access Road	<i>Activity Subtotal</i>	1.55	17.26	7.55
Prescribed Fire	Equipment Emissions	0.16	1.07	0.00
	Worker Trip Emissions	0.17	1.22	12.16
	<i>Activity Subtotal</i>	0.33	2.30	12.17
<b>Project Equipment and Worker Commute Total</b>		<b>12.34</b>	<b>35.16</b>	<b>33.98</b>

### SCAQMD Air Pollutant Emissions Thresholds

Level	ROG	NOx	PM10
Level "A" Threshold	25 lb/day	25 lb/day	80 lb/day
Level "B" Threshold	137 lb/day	137 lb/day	137 lb/day
<p><i>If Level A thresholds are exceeded by a project, then standard mitigation measures (SMMs) are required. If Level B thresholds are exceeded by a project, then best available mitigation measures (BAMMs) are required.</i></p>			

<b>Castle Crags GHG Emissions Summary</b>		
<b>Activity</b>	<b>Emissions Source</b>	<b>CO2e (MT/year)</b>
Hand Thinning	Equipment	2.5
	Worker Trips	9.1
	<i>Activity Subtotal</i>	11.7
Mechanical Thinning	Equipment	392.9
	Worker Trips	9.1
	<i>Activity Subtotal</i>	402.0
Ongoing Vegetation Management	Equipment	0.2
	Worker Trips	3.3
	<i>Activity Subtotal</i>	3.5
Restablishment of the Emergency Access Road	<i>Activity Subtotal</i>	4.4
Prescribed Fire	Equipment	11.3
	Worker Trips	9.3
	Fire	4211.7
	<i>Activity Subtotal</i>	4232.3
<b><i>Annual Project Emissions</i></b>		<b>4653.9</b>
Wildfire on Treated Stand		2640.0
<b><i>Annual Project Emissions + Wildfire on Treated Stand</i></b>		<b>7293.9</b>
Wildfire on Untreated Stand		11850.0
<b>Net Change (Project Scenario compared to No Project Scenario)</b>		<b>-4556.1</b>

## Hand Thinning

**Assumptions:** Activity would generally occur from October through Mid-March, although some activity may occur if bird surveys have been conducted and work is allowed to progress.

Weeks per year: 24

Days per week: 5

Worker Vehicles: 4

Round Trips Per Day Per Vehicle: 1

Equipment	Converted Emissions Factors (lb/hour)						
	ROG	CO	NOX	SO2	PM	N2O	CO2e
Chainsaw (15 hp)	0.24	0.44	0.00	1.18	0.00	0.00	1.55

Source: OFFROAD2007

Hand Thinning Emissions Calculations										
Equipment	Equipment Hours		AQ Pollutant Emissions (lb/day)						GHG Emissions	
	EQ #	EQ hours/day	ROG	CO	NOX	SO2	PM	N2O	CO2e (lb/year)	CO2e (MT/year)
Chainsaws	5	6	7.23	13.08	0.12	35.36	0.00	0.02	5592.13	2.54

Worker Commute							
Vehicles Used	AQ Pollutant Emissions (lb/day)					GHG Emissions	
	ROG	CO	NOX	PM 10	PM 2.5	CO2e (lb/year)	CO2e (MT/year)
Cars/Trucks Light Duty	0.08	0.73	0.06	6.10	1.51	20138.45	9.13

## Mechanical Thinning

**Assumptions:** Activity would generally occur from October through Mid-March, although some activity may occur if bird surveys have been conducted and work is allowed to progress. Equipment types based on information from [http://www.oregonloggers.org/Forest\\_Logging\\_Machines.aspx](http://www.oregonloggers.org/Forest_Logging_Machines.aspx)

Weeks per year: 24  
 Days per week: 5  
 Worker Vehicles: 4

Roundtrips Per Day Per Vehicle: 1

Equipment	Converted Emissions Factors (lb/hour)						
	ROG	CO	NOX	SO2	PM	N2O	CO2e
Shredder (175 hp)	0.03	0.34	0.31	0.00	0.01	0.00	70.23
Skidder (500 hp)	0.11	0.47	0.48	0.00	0.02	0.00	250.57
Feller/Buncher (750 hp)	0.24	1.07	1.12	0.01	0.04	0.00	581.42

Source: OFFROAD2007

Mechanical Thinning Emissions Calculations										
Equipment	Equipment Hours		AQ Pollutant Emissions (lb/day)						GHG Emissions	
	EQ #	EQ hours/day	ROG	CO	NOX	SO2	PM	N2O	CO2e (lb/year)	CO2e (MT/year)
Shredder	1	8	0.23	2.75	2.50	0.01	0.10	0.00	67416.68	30.58
Skidder	1	8	0.86	3.73	3.85	0.02	0.13	0.00	240547.37	109.11
Feller/Buncher	1	8	1.93	8.58	8.98	0.05	0.31	0.00	558162.99	253.18
Equipment Total	NA	NA	3.02	15.06	15.33	0.07	0.55	0.00	866127.04	392.87

Worker Commute							
Vehicles Used	AQ Pollutant Emissions (lb/day)					GHG Emissions	
	ROG	CO	NOX	PM 10	PM 2.5	CO2e (lb/year)	CO2e (MT/year)
Cars/Trucks Light Duty	0.08	0.73	0.06	6.10	1.51	20138.45	9.13

## Ongoing Vegetation Management

**Assumptions:** It is assumed that the ATV-mounted spray rig uses a typical ATV such as the Kawasaki KVF300 (4-stroke engine, 22 max HP). Herbicide application would occur between September-November for species such as Himalayan blackberry; February-March for broom, and March-June for most other species. Maintenance of these invasive species would occur on yearly intervals with treatment up to 3 times a year for heavy infestations. As a conservative assumption, it is assumed that herbicide treatment activities would occur 5 days a week during these three time periods (13 weeks Sept - Nov, 7 weeks February - March, 15 weeks March - June)

Weeks per year: 35  
 Days per week: 5  
 Activity days per year: 175  
 Worker Vehicles: 1  
 Trips Per Day Per Vehicle: 1

Equipment	Converted Emissions Factors (lb/hour)						
	ROG	CO	NOX	SO2	PM	N2O	CO2e
All Terrain Vehicles (ATVs) Active	0.00	0.06	0.00	0.25	0.00	0.00	0.26

Source: OFFROAD2007

Ongoing Vegetation Management Emissions Calculations										
Equipment	Equipment Hours		AQ Pollutant Emissions (lb/day)						GHG Emissions	
	EQ #	EQ hours/day	ROG	CO	NOX	SO2	PM	N2O	CO2e (lb/year)	CO2e (MT/year)
All Terrain Vehicles (ATVs) Active	1	8	0.02	0.51	0.01	2.03	0.00	0.00	360.18	0.16

Worker Commute							
Vehicles Used	AQ Pollutant Emissions (lb/day)					GHG Emissions	
	ROG	CO	NOX	PM 10	PM 2.5	CO2e (lb/year)	CO2e (MT/year)
Cars/Trucks Light Duty	0.02	0.18	0.02	1.52	0.38	7342.14	3.33

## Reestablishment of the Emergency Access Road

**Assumptions:**

Road Length:	1.15 miles
Road Width:	16 feet
Acres of road graded:	2.23 acres
Road fill:	50 cubic yards
Compacted rock:	25 cubic yards
Worker vehicles:	2
Worker commute length:	25 miles
Number of Haul Truck Trips:	8 trips

Culvert and Rock Wash Installation Equipment	Hours
Tractor/Loader/Backhoe	7
Excavator	7
Haul Truck	NA
Road Grading Equipment	Hours (CalEEMod Defaults)
Grader	6
Tractor/Loader/Backhoe	6
Rubber Tired Dozer	7

### Road Grading, Culvert Construction, and Worker Commute Emissions from CalEEMod

CalEEMod Results	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	CO2	CH4	CO2e
<b>Maximum Summer (lb/day)</b>	1.55	17.26	6.98	0.02	6.76	0.79	7.55	3.05	0.73	3.78	1491.95	0.46	1503.56
<b>Annual (tpy)</b>	0.00	0.05	0.03	0.00	0.02	0.00	0.03	0.01	0.00	0.01	4.76	0.00	4.80

Source: CalEEMod run "Road\_Summer", "Road\_Annual"

Conversion Factors	
5,280	ft/mile
43,560	sq ft/acre



## Prescribed Fire and Wildfire

**Assumptions:** Activity would generally occur from October through Mid-March, although some activity may occur into June if conditions allow. It is assumed that 3 burn compartments (ranging from 5 to 50 acres) would be completed per year and for each burn compartment, 1 day of active flame and 4 days of monitoring. Burn activities would typically occur for approximately 8–10 hours per day, involving approximately 1–3 acres per day, for up to 24 days per month (as permissible).

Weeks per year: 24  
 Days per week: 5  
 Worker Vehicles: 4  
 Type 3 Engines: 2  
 Type 6 Engines: 2

Trips Per Day Per Vehicle: 1

Equipment	Converted Emissions Factors (lb/hour)						
	ROG	CO	NOX	SO2	PM	N2O	CO2e
Tractor (150 hp)	0.04	0.34	0.27	51.68	0.00	0.02	51.77
Drip Torch	N/A	N/A	N/A	N/A	N/A	N/A	0.00002

Source: OFFROAD2007

Prescribed Fire Equipment Emissions Calculations										
Equipment	Equipment Hours		AQ Pollutant Emissions (lb/day)						GHG Emissions	
	EQ #	EQ hours/day	ROG	CO	NOX	SO2	PM	N2O	CO2e (lb/year)	CO2e (MT/year)
Tractor	1	4	0.16	1.36	1.07	206.73	0.00	0.06	24850.17	11.27
Drip Torch	5	5	N/A	N/A	N/A	N/A	N/A	N/A	0.06	0.00
Equipment Total	N/A	N/A	0.16	1.36	1.07	206.73	0.00	0.06	24850.23	11.27

Worker Commute							
Vehicles Used	AQ Pollutant Emissions (lb/day)					GHG Emissions	
	ROG	CO	NOX	PM 10	PM 2.5	CO2e (lb/year)	CO2e (MT/year)
Cars/Trucks Light Duty	0.08	0.73	0.06	6.10	1.51	20138.45	9.13
Two Type 3 Engines	0.04	0.37	0.03	3.05	0.75	83.91	0.04
Two Type 6 Engines	0.05	0.26	1.13	3.02	0.77	345.20	0.16
Vehicle Commute Total	0.17	1.35	1.22	12.16	3.04	20567.56	9.33

Note: Type 3 engines are similar to medium-duty trucks. Type 6 engines are built on a pickup truck frame.

Fire GHG Emissions					
Type of Fire	CO2e Emissions (g/kg of fuel consumed)	Estimated Average Fuel Loading (ton/acre)	CO2e Emissions (MT/acre)	Castle Crag Acres Treated per Year	Castle Crag GHG Emissions (MT CO2e/year)
Prescribed Fire	1719.5	18	28.08	150	4212
Wildfire on Treated Stand	N/A	N/A	17.60	150	2640
Wildfire on Untreated Stand	N/A	N/A	79.00	150	11850

### Emissions Factors

#### Prescribed Fire

Equipment	Fuel	MaxHP	County	Activity (hr/day for total population)	ROG	CO	Exhaust Emissions (tons/day)						
							NOX	CO2	SO2	PM	N2O	CH4	
Tractors/Loaders/Backhoes	D	25	Shasta	6.38E+00		6.10E-05	2.08E-04	3.86E-04	5.06E-02	6.41E-07	1.46E-05	0.00E+00	5.50E-06
Tractors/Loaders/Backhoes	D	50	Shasta	3.89E+01		8.70E-04	5.43E-03	4.38E-03	5.89E-01	7.62E-06	2.00E-04	0.00E+00	7.85E-05
Tractors/Loaders/Backhoes	D	120	Shasta	5.20E+02		1.03E-02	8.87E-02	6.98E-02	1.34E+01	1.58E-04	4.01E-03	0.00E+00	9.32E-04

Source: OFFROAD2007

Drip Torch GHG Emissions	Diesel CO2 Emissions (kg/gallon)	Diesel Fuel Consumption (gallons/hour)	Diesel CO2 Emissions (g/hour)	Gasoline CO2 Emissions (kg/gallon)	Gasoline Consumption (gallons/hour)	Gasoline CO2 Emissions (g/hour)	Total CO2 Emissions (g/hour)	Total CO2 Emissions (lb/hour)
Drip Torch (70% Diesel, 30% Gasoline)	10.15	0.7	0.007105	8.81	0.3	0.002643	0.009748	0.0000215

Note: Only CO2 emissions information were available for drip torches

Source: California Climate Action Registry General Reporting Protocol Version 3.1, January 2009

Prescribed Fire GHG Emissions	Methane Emissions (g/kg of fuel consumed)*	CO2 Emissions (g/kg of fuel consumed)*	CO2e Emissions (g/kg of fuel consumed)	Estimated Average Fuel Loading (ton/acre)**
Northwest Conifer Forest	4.86	1598	1719.5	18

\*Source: Urbanski, S. 2014. Wildland fire emissions, carbon, and climate: Emission factors. Forest Ecology and Management. 317: 51-60

\*\*Source: AP 42, Fifth Edition: Compilation of Air Pollutant Emfacs (EPA)

Wildfire GHG Emissions	CO2e (MT/acre)	Castle Crags Acres Treated
GHG Emission Factors - Wildfire on Treated Stand	17.60	435.00
GHG Emission Factors - Wildfire on Untreated Stand	79.00	435.00

Source: U.S. Forest Service. 2015. Unpublished data. United States Forest Service, Region 5. Forest Vegetation Simulator modeling prepared by Nadia Tase, Acting Region 5 Co-Climate Change Coordinator, to evaluate the North Tahoe Interagency Forest Health and Bioenergy Project.

#### Hand Thinning

Equipment	Fuel	MaxHP	County	Activity (hr/day for total population)	ROG	CO	Exhaust Emissions (tons/day)						
							NOX	CO2	SO2	PM	N2O	CH4	
Chainsaw	G2	2	Shasta	2.81E+02		1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02
Chainsaw	G2	15	Shasta	1.98E+02		2.38E-02	4.31E-02	3.81E-04	1.17E-01	4.80E-06	6.79E-05	1.28E-04	1.48E-03

Source: OFFROAD2007

Mechanical Thinning													
Equipment	Fuel	MaxHP	County	Activity (hr/day for total population)			Exhaust Emissions (tons/day)						
				ROG	CO	NOX	CO2	SO2	PM	N2O	CH4		
Shredders	D	175	Shasta	5.44E-02	7.72E-07	9.34E-06	8.49E-06	1.91E-03	2.15E-08	3.34E-07	0.00E+00	6.97E-08	
Skidders	D	120	Shasta	1.78E+02	4.92E-03	5.45E-02	3.54E-02	8.41E+00	9.87E-05	1.51E-03	0.00E+00	4.44E-04	
Skidders	D	175	Shasta	2.84E+02	9.97E-03	1.14E-01	5.42E-02	1.99E+01	2.24E-04	2.49E-03	0.00E+00	9.00E-04	
Skidders	D	250	Shasta	1.05E+02	4.77E-03	2.14E-02	2.24E-02	1.10E+01	1.24E-04	7.49E-04	0.00E+00	4.30E-04	
Skidders	D	500	Shasta	5.89E+00	3.17E-04	1.37E-03	1.42E-03	7.37E-01	7.23E-06	4.96E-05	0.00E+00	2.86E-05	
Fellers/Bunchers	D	120	Shasta	3.42E+02	8.80E-03	1.00E-01	6.55E-02	1.57E+01	1.84E-04	2.79E-03	0.00E+00	7.94E-04	
Fellers/Bunchers	D	175	Shasta	4.23E+02	1.38E-02	1.61E-01	7.74E-02	2.86E+01	3.22E-04	3.56E-03	0.00E+00	1.24E-03	
Fellers/Bunchers	D	250	Shasta	2.58E+02	1.05E-02	4.83E-02	5.10E-02	2.51E+01	2.83E-04	1.70E-03	0.00E+00	9.45E-04	
Fellers/Bunchers	D	500	Shasta	7.58E+01	4.60E-03	2.05E-02	2.13E-02	1.11E+01	1.09E-04	7.43E-04	0.00E+00	4.15E-04	
Fellers/Bunchers	D	750	Shasta	5.79E+00	6.98E-04	3.10E-03	3.25E-03	1.68E+00	1.69E-05	1.13E-04	0.00E+00	6.30E-05	

Source: OFFROAD2007

Ongoing Vegetation Management													
Equipment	Fuel	MaxHP	County	Activity (hr/day for total population)			Exhaust Emissions (tons/day)						
				ROG	CO	NOX	CO2	SO2	PM	N2O	CH4		
All Terrain Vehicles (Active)	G4	25	Shasta	1.66E+04	2.38E-02	5.33E-01	1.33E-02	2.10E+00	2.87E-03	1.10E-03	6.52E-03	1.32E-03	

Source: OFFROAD2007

Worker Trip Emission Factors						
Vehicle	Emissions Factors (lb/day)					
	ROG	CO	NOX	PM 10	PM2.5	CO2e
50-mile Roundtrip (Light Duty)	0.02	0.18	0.02	1.52	0.38	41.96
50-mile Roundtrip (Medium/Heavy Duty)	0.03	0.13	0.57	1.51	0.39	172.60

Source: CalEEMod run for one round trip in Shasta County (50 miles total)

Conversion Factors	
Value	Unit
2000.00	lb/ton
24.00	hr/day
453.59	g/lb
25.00	GWP of CH4
2204.62	lb/MT
0.91	ton/MT
1000	g/kg
907.185	kg/ton
1000000	g/MT

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# CalEEMod Run: Annual

Castle Crags Road Reestablishment - Shasta County, Annual

**Castle Crags Road Reestablishment  
Shasta County, Annual**

**1.0 Project Characteristics**

**1.1 Land Usage**

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	0.00	Acre	0.00	0.00	0

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Rural	<b>Wind Speed (m/s)</b>	2.7	<b>Precipitation Freq (Days)</b>	82
<b>Climate Zone</b>	14			<b>Operational Year</b>	2020
<b>Utility Company</b>	Pacific Gas & Electric Company				
<b>CO2 Intensity (lb/MW hr)</b>	641.35	<b>CH4 Intensity (lb/MW hr)</b>	0.029	<b>N2O Intensity (lb/MW hr)</b>	0.006

**1.3 User Entered Comments & Non-Default Data**

Project Characteristics -

Land Use - Dummy value, construction-only impacts so land use is unimportant

Construction Phase - Road grading time does not include tree removal, which is counted under "manual and mechanical thinning". 5 days conservative estimate.

Off-road Equipment - Equipment and EQ hour assumptions based on information from the PD

Off-road Equipment - Equipment and EQ hour assumptions based on information from the PD

Grading - Total road area (1.15 mile length and 16 feet wide)

Trips and VMT - Assuming 25 mile trip length one way, 2 trips (on roundtrip for worker commute), and 8 haul truck trips

On-road Fugitive Dust - Majority of worker commute is paved. Haul trucks will travel for a short distance on unpaved emergency access road

Castle Crags Road Reestablishment - Shasta County, Annual

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	3.00
tblConstructionPhase	NumDays	0.00	5.00
tblConstructionPhase	PhaseEndDate	9/30/2019	10/10/2019
tblConstructionPhase	PhaseEndDate	9/30/2019	10/7/2019
tblConstructionPhase	PhaseStartDate	10/1/2019	10/8/2019
tblGrading	AcresOfGrading	1.88	2.23
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	4.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	1.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOnRoadDust	HaulingPercentPave	100.00	95.00
tblOnRoadDust	HaulingPercentPave	100.00	95.00
tblOnRoadDust	WorkerPercentPave	100.00	98.00
tblOnRoadDust	WorkerPercentPave	100.00	98.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripNumber	0.00	8.00

Castle Crags Road Reestablishment - Shasta County, Annual

tblTripsAndVMT	VendorTripLength	6.60	25.00
tblTripsAndVMT	VendorTripLength	6.60	25.00
tblTripsAndVMT	WorkerTripNumber	8.00	2.00
tblTripsAndVMT	WorkerTripNumber	0.00	2.00

**2.0 Emissions Summary**

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Castle Crags Road Reestablishment - Shasta County, Annual

**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	0.0000	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
Energy	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
Mobile	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
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

	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
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	Road Grading	Grading	10/1/2019	10/7/2019	5	5	
2	Rock Wash and Culvert Installation	Building Construction	10/8/2019	10/10/2019	5	3	

Castle Crags Road Reestablishment - Shasta County, Annual

**Acres of Grading (Site Preparation Phase): 0**

**Acres of Grading (Grading Phase): 0**

**Acres of Paving: 0**

**Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)**

**OffRoad Equipment**

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Road Grading	Graders	1	6.00	187	0.41
Rock Wash and Culvert Installation	Excavators	1	7.00	158	0.38
Road Grading	Concrete/Industrial Saws	0	0.00	81	0.73
Rock Wash and Culvert Installation	Cranes	0	0.00	231	0.29
Rock Wash and Culvert Installation	Forklifts	0	0.00	89	0.20
Road Grading	Rubber Tired Dozers	1	7.00	247	0.40
Rock Wash and Culvert Installation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Road Grading	Tractors/Loaders/Backhoes	1	6.00	97	0.37

**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
Road Grading	3	2.00	0.00	0.00	16.80	25.00	25.00	LD_Mix	HDT_Mix	HHDT
Rock Wash and Culvert Installation	2	2.00	0.00	8.00	16.80	25.00	25.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**

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**3.2 Road 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					0.0144	0.0000	0.0144	7.3700e-003	0.0000	7.3700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8300e-003	0.0431	0.0171	4.0000e-005		1.9800e-003	1.9800e-003		1.8200e-003	1.8200e-003	0.0000	3.3195	3.3195	1.0500e-003	0.0000	3.3457
<b>Total</b>	<b>3.8300e-003</b>	<b>0.0431</b>	<b>0.0171</b>	<b>4.0000e-005</b>	<b>0.0144</b>	<b>1.9800e-003</b>	<b>0.0163</b>	<b>7.3700e-003</b>	<b>1.8200e-003</b>	<b>9.1900e-003</b>	<b>0.0000</b>	<b>3.3195</b>	<b>3.3195</b>	<b>1.0500e-003</b>	<b>0.0000</b>	<b>3.3457</b>

**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	3.0000e-005	3.0000e-005	2.6000e-004	0.0000	1.9800e-003	0.0000	1.9800e-003	2.1000e-004	0.0000	2.1000e-004	0.0000	0.0575	0.0575	0.0000	0.0000	0.0576
<b>Total</b>	<b>3.0000e-005</b>	<b>3.0000e-005</b>	<b>2.6000e-004</b>	<b>0.0000</b>	<b>1.9800e-003</b>	<b>0.0000</b>	<b>1.9800e-003</b>	<b>2.1000e-004</b>	<b>0.0000</b>	<b>2.1000e-004</b>	<b>0.0000</b>	<b>0.0575</b>	<b>0.0575</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0576</b>

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**3.2 Road Grading - 2019**

**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					0.0144	0.0000	0.0144	7.3700e-003	0.0000	7.3700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.8300e-003	0.0431	0.0171	4.0000e-005		1.9800e-003	1.9800e-003		1.8200e-003	1.8200e-003	0.0000	3.3195	3.3195	1.0500e-003	0.0000	3.3457
<b>Total</b>	<b>3.8300e-003</b>	<b>0.0431</b>	<b>0.0171</b>	<b>4.0000e-005</b>	<b>0.0144</b>	<b>1.9800e-003</b>	<b>0.0163</b>	<b>7.3700e-003</b>	<b>1.8200e-003</b>	<b>9.1900e-003</b>	<b>0.0000</b>	<b>3.3195</b>	<b>3.3195</b>	<b>1.0500e-003</b>	<b>0.0000</b>	<b>3.3457</b>

**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	3.0000e-005	3.0000e-005	2.6000e-004	0.0000	1.9800e-003	0.0000	1.9800e-003	2.1000e-004	0.0000	2.1000e-004	0.0000	0.0575	0.0575	0.0000	0.0000	0.0576
<b>Total</b>	<b>3.0000e-005</b>	<b>3.0000e-005</b>	<b>2.6000e-004</b>	<b>0.0000</b>	<b>1.9800e-003</b>	<b>0.0000</b>	<b>1.9800e-003</b>	<b>2.1000e-004</b>	<b>0.0000</b>	<b>2.1000e-004</b>	<b>0.0000</b>	<b>0.0575</b>	<b>0.0575</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0576</b>

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**3.3 Rock Wash and Culvert Installation - 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	6.5000e-004	6.5900e-003	7.3100e-003	1.0000e-005		3.7000e-004	3.7000e-004		3.4000e-004	3.4000e-004	0.0000	0.9748	0.9748	3.1000e-004	0.0000	0.9825
<b>Total</b>	<b>6.5000e-004</b>	<b>6.5900e-003</b>	<b>7.3100e-003</b>	<b>1.0000e-005</b>		<b>3.7000e-004</b>	<b>3.7000e-004</b>		<b>3.4000e-004</b>	<b>3.4000e-004</b>	<b>0.0000</b>	<b>0.9748</b>	<b>0.9748</b>	<b>3.1000e-004</b>	<b>0.0000</b>	<b>0.9825</b>

**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	4.0000e-005	1.4200e-003	2.0000e-004	0.0000	5.7900e-003	1.0000e-005	5.7900e-003	5.9000e-004	1.0000e-005	6.0000e-004	0.0000	0.3746	0.3746	2.0000e-005	0.0000	0.3751
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	2.0000e-005	2.0000e-005	1.6000e-004	0.0000	1.1900e-003	0.0000	1.1900e-003	1.2000e-004	0.0000	1.2000e-004	0.0000	0.0345	0.0345	0.0000	0.0000	0.0346
<b>Total</b>	<b>6.0000e-005</b>	<b>1.4400e-003</b>	<b>3.6000e-004</b>	<b>0.0000</b>	<b>6.9800e-003</b>	<b>1.0000e-005</b>	<b>6.9800e-003</b>	<b>7.1000e-004</b>	<b>1.0000e-005</b>	<b>7.2000e-004</b>	<b>0.0000</b>	<b>0.4091</b>	<b>0.4091</b>	<b>2.0000e-005</b>	<b>0.0000</b>	<b>0.4096</b>

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**3.3 Rock Wash and Culvert Installation - 2019**

**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	6.5000e-004	6.5900e-003	7.3100e-003	1.0000e-005		3.7000e-004	3.7000e-004		3.4000e-004	3.4000e-004	0.0000	0.9748	0.9748	3.1000e-004	0.0000	0.9825
<b>Total</b>	<b>6.5000e-004</b>	<b>6.5900e-003</b>	<b>7.3100e-003</b>	<b>1.0000e-005</b>		<b>3.7000e-004</b>	<b>3.7000e-004</b>		<b>3.4000e-004</b>	<b>3.4000e-004</b>	<b>0.0000</b>	<b>0.9748</b>	<b>0.9748</b>	<b>3.1000e-004</b>	<b>0.0000</b>	<b>0.9825</b>

**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	4.0000e-005	1.4200e-003	2.0000e-004	0.0000	5.7900e-003	1.0000e-005	5.7900e-003	5.9000e-004	1.0000e-005	6.0000e-004	0.0000	0.3746	0.3746	2.0000e-005	0.0000	0.3751
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	2.0000e-005	2.0000e-005	1.6000e-004	0.0000	1.1900e-003	0.0000	1.1900e-003	1.2000e-004	0.0000	1.2000e-004	0.0000	0.0345	0.0345	0.0000	0.0000	0.0346
<b>Total</b>	<b>6.0000e-005</b>	<b>1.4400e-003</b>	<b>3.6000e-004</b>	<b>0.0000</b>	<b>6.9800e-003</b>	<b>1.0000e-005</b>	<b>6.9800e-003</b>	<b>7.1000e-004</b>	<b>1.0000e-005</b>	<b>7.2000e-004</b>	<b>0.0000</b>	<b>0.4091</b>	<b>0.4091</b>	<b>2.0000e-005</b>	<b>0.0000</b>	<b>0.4096</b>

**4.0 Operational Detail - Mobile**

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**4.1 Mitigation Measures Mobile**

	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	0.0000	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
Unmitigated	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

**4.2 Trip Summary Information**

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

**4.3 Trip Type Information**

Land Use	Miles			Trip %			Trip Purpose %		
	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
City Park	14.70	6.60	6.60	33.00	48.00	19.00	66	28	6

**4.4 Fleet Mix**

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.504118	0.034156	0.184227	0.115679	0.038681	0.007500	0.013254	0.090536	0.001365	0.001353	0.006129	0.001330	0.001672



Castle Crags Road Reestablishment - Shasta County, Annual

**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	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	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
NaturalGas Unmitigated	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



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**5.3 Energy by Land Use - Electricity**

**Unmitigated**

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**Mitigated**

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**6.0 Area Detail**

**6.1 Mitigation Measures Area**



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**6.2 Area by SubCategory**

**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	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	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
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**7.0 Water Detail**

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**7.1 Mitigation Measures Water**

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	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

**7.2 Water by Land Use**

**Unmitigated**

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

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**7.2 Water by Land Use**

**Mitigated**

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**8.0 Waste Detail**

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**8.1 Mitigation Measures Waste**

**Category/Year**

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

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**8.2 Waste by Land Use**

**Unmitigated**

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**Mitigated**

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**9.0 Operational Offroad**

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Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
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Castle Crags Road Reestablishment - Shasta County, Annual

**10.0 Stationary Equipment**

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**Fire Pumps and Emergency Generators**

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

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
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**User Defined Equipment**

Equipment Type	Number
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**11.0 Vegetation**

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# **CalEEMod Run: Summer**

Castle Crags Road Reestablishment - Shasta County, Summer

**Castle Crags Road Reestablishment**  
**Shasta County, Summer**

**1.0 Project Characteristics**

**1.1 Land Usage**

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	0.00	Acre	0.00	0.00	0

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Rural	<b>Wind Speed (m/s)</b>	2.7	<b>Precipitation Freq (Days)</b>	82
<b>Climate Zone</b>	14			<b>Operational Year</b>	2020
<b>Utility Company</b>	Pacific Gas & Electric Company				
<b>CO2 Intensity (lb/MW hr)</b>	641.35	<b>CH4 Intensity (lb/MW hr)</b>	0.029	<b>N2O Intensity (lb/MW hr)</b>	0.006

**1.3 User Entered Comments & Non-Default Data**

Project Characteristics -

Land Use - Dummy value, construction-only impacts so land use is unimportant

Construction Phase - Road grading time does not include tree removal, which is counted under "manual and mechanical thinning". 5 days conservative estimate.

Off-road Equipment - Equipment and EQ hour assumptions based on information from the PD

Off-road Equipment - Equipment and EQ hour assumptions based on information from the PD

Grading - Total road area (1.15 mile length and 16 feet wide)

Trips and VMT - Assuming 25 mile trip length one way, 2 trips (on roundtrip for worker commute), and 8 haul truck trips

On-road Fugitive Dust - Majority of worker commute is paved. Haul trucks will travel for a short distance on unpaved emergency access road

Castle Crags Road Reestablishment - Shasta County, Summer

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	3.00
tblConstructionPhase	NumDays	0.00	5.00
tblConstructionPhase	PhaseEndDate	9/30/2019	10/10/2019
tblConstructionPhase	PhaseEndDate	9/30/2019	10/7/2019
tblConstructionPhase	PhaseStartDate	10/1/2019	10/8/2019
tblGrading	AcresOfGrading	1.88	2.23
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	4.00	0.00
tblOffRoadEquipment	UsageHours	6.00	0.00
tblOffRoadEquipment	UsageHours	1.00	7.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblOnRoadDust	HaulingPercentPave	100.00	95.00
tblOnRoadDust	HaulingPercentPave	100.00	95.00
tblOnRoadDust	WorkerPercentPave	100.00	98.00
tblOnRoadDust	WorkerPercentPave	100.00	98.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripLength	20.00	25.00
tblTripsAndVMT	HaulingTripNumber	0.00	8.00

Castle Crag Road Reestablishment - Shasta County, Summer

tblTripsAndVMT	VendorTripLength	6.60	25.00
tblTripsAndVMT	VendorTripLength	6.60	25.00
tblTripsAndVMT	WorkerTripNumber	8.00	2.00
tblTripsAndVMT	WorkerTripNumber	0.00	2.00

**2.0 Emissions Summary**

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Castle Crag Road Reestablishment - Shasta County, Summer

**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	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	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
Mobile	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
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**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	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	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
Mobile	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
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

Castle Crags Road Reestablishment - Shasta County, Summer

	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
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	Road Grading	Grading	10/1/2019	10/7/2019	5	5	
2	Rock Wash and Culvert Installation	Building Construction	10/8/2019	10/10/2019	5	3	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

#### OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Road Grading	Graders	1	6.00	187	0.41
Rock Wash and Culvert Installation	Excavators	1	7.00	158	0.38
Road Grading	Concrete/Industrial Saws	0	0.00	81	0.73
Rock Wash and Culvert Installation	Cranes	0	0.00	231	0.29
Rock Wash and Culvert Installation	Forklifts	0	0.00	89	0.20
Road Grading	Rubber Tired Dozers	1	7.00	247	0.40
Rock Wash and Culvert Installation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Road Grading	Tractors/Loaders/Backhoes	1	6.00	97	0.37



Castle Crags Road Reestablishment - Shasta County, Summer

**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
Road Grading	3	2.00	0.00	0.00	16.80	25.00	25.00	LD_Mix	HDT_Mix	HHDT
Rock Wash and Culvert Installation	2	2.00	0.00	8.00	16.80	25.00	25.00	LD_Mix	HDT_Mix	HHDT

**3.1 Mitigation Measures Construction**

**3.2 Road 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					5.7423	0.0000	5.7423	2.9475	0.0000	2.9475			0.0000			0.0000
Off-Road	1.5324	17.2528	6.8541	0.0148		0.7906	0.7906		0.7273	0.7273		1,463.6267	1,463.6267	0.4631		1,475.2036
<b>Total</b>	<b>1.5324</b>	<b>17.2528</b>	<b>6.8541</b>	<b>0.0148</b>	<b>5.7423</b>	<b>0.7906</b>	<b>6.5329</b>	<b>2.9475</b>	<b>0.7273</b>	<b>3.6748</b>		<b>1,463.6267</b>	<b>1,463.6267</b>	<b>0.4631</b>		<b>1,475.2036</b>

Castle Crag Road Reestablishment - Shasta County, Summer

**3.2 Road 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	0.0150	0.0105	0.1269	2.8000e-004	1.0141	1.8000e-004	1.0143	0.1054	1.7000e-004	0.1055		28.3273	28.3273	1.1100e-003		28.3551
<b>Total</b>	<b>0.0150</b>	<b>0.0105</b>	<b>0.1269</b>	<b>2.8000e-004</b>	<b>1.0141</b>	<b>1.8000e-004</b>	<b>1.0143</b>	<b>0.1054</b>	<b>1.7000e-004</b>	<b>0.1055</b>		<b>28.3273</b>	<b>28.3273</b>	<b>1.1100e-003</b>		<b>28.3551</b>

**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					5.7423	0.0000	5.7423	2.9475	0.0000	2.9475			0.0000			0.0000
Off-Road	1.5324	17.2528	6.8541	0.0148		0.7906	0.7906		0.7273	0.7273	0.0000	1,463.6267	1,463.6267	0.4631		1,475,2036
<b>Total</b>	<b>1.5324</b>	<b>17.2528</b>	<b>6.8541</b>	<b>0.0148</b>	<b>5.7423</b>	<b>0.7906</b>	<b>6.5329</b>	<b>2.9475</b>	<b>0.7273</b>	<b>3.6748</b>	<b>0.0000</b>	<b>1,463.6267</b>	<b>1,463.6267</b>	<b>0.4631</b>		<b>1,475,2036</b>

Castle Crags Road Reestablishment - Shasta County, Summer

**3.2 Road 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	0.0150	0.0105	0.1269	2.8000e-004	1.0141	1.8000e-004	1.0143	0.1054	1.7000e-004	0.1055		28.3273	28.3273	1.1100e-003		28.3551
<b>Total</b>	<b>0.0150</b>	<b>0.0105</b>	<b>0.1269</b>	<b>2.8000e-004</b>	<b>1.0141</b>	<b>1.8000e-004</b>	<b>1.0143</b>	<b>0.1054</b>	<b>1.7000e-004</b>	<b>0.1055</b>		<b>28.3273</b>	<b>28.3273</b>	<b>1.1100e-003</b>		<b>28.3551</b>

**3.3 Rock Wash and Culvert Installation - 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	0.4318	4.3918	4.8702	7.2400e-003		0.2497	0.2497		0.2297	0.2297		716.3340	716.3340	0.2266		722.0000
<b>Total</b>	<b>0.4318</b>	<b>4.3918</b>	<b>4.8702</b>	<b>7.2400e-003</b>		<b>0.2497</b>	<b>0.2497</b>		<b>0.2297</b>	<b>0.2297</b>		<b>716.3340</b>	<b>716.3340</b>	<b>0.2266</b>		<b>722.0000</b>

Castle Crags Road Reestablishment - Shasta County, Summer

**3.3 Rock Wash and Culvert Installation - 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	0.0280	0.9161	0.1303	2.6500e-003	4.9618	4.7900e-003	4.9666	0.5050	4.5900e-003	0.5096		277.5035	277.5035	0.0131		277.8298
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	0.0150	0.0105	0.1269	2.8000e-004	1.0141	1.8000e-004	1.0143	0.1054	1.7000e-004	0.1055		28.3273	28.3273	1.1100e-003		28.3551
<b>Total</b>	<b>0.0429</b>	<b>0.9266</b>	<b>0.2572</b>	<b>2.9300e-003</b>	<b>5.9758</b>	<b>4.9700e-003</b>	<b>5.9808</b>	<b>0.6103</b>	<b>4.7600e-003</b>	<b>0.6151</b>		<b>305.8308</b>	<b>305.8308</b>	<b>0.0142</b>		<b>306.1849</b>

**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	0.4318	4.3918	4.8702	7.2400e-003		0.2497	0.2497		0.2297	0.2297	0.0000	716.3340	716.3340	0.2266		722.0000
<b>Total</b>	<b>0.4318</b>	<b>4.3918</b>	<b>4.8702</b>	<b>7.2400e-003</b>		<b>0.2497</b>	<b>0.2497</b>		<b>0.2297</b>	<b>0.2297</b>	<b>0.0000</b>	<b>716.3340</b>	<b>716.3340</b>	<b>0.2266</b>		<b>722.0000</b>

Castle Crags Road Reestablishment - Shasta County, Summer

**3.3 Rock Wash and Culvert Installation - 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	0.0280	0.9161	0.1303	2.6500e-003	4.9618	4.7900e-003	4.9666	0.5050	4.5900e-003	0.5096		277.5035	277.5035	0.0131		277.8298
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	0.0150	0.0105	0.1269	2.8000e-004	1.0141	1.8000e-004	1.0143	0.1054	1.7000e-004	0.1055		28.3273	28.3273	1.1100e-003		28.3551
<b>Total</b>	<b>0.0429</b>	<b>0.9266</b>	<b>0.2572</b>	<b>2.9300e-003</b>	<b>5.9758</b>	<b>4.9700e-003</b>	<b>5.9808</b>	<b>0.6103</b>	<b>4.7600e-003</b>	<b>0.6151</b>		<b>305.8308</b>	<b>305.8308</b>	<b>0.0142</b>		<b>306.1849</b>

**4.0 Operational Detail - Mobile**

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**4.1 Mitigation Measures Mobile**

Castle Crags Road Reestablishment - Shasta County, Summer

	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	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
Unmitigated	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

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	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
City Park	14.70	6.60	6.60	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.504118	0.034156	0.184227	0.115679	0.038681	0.007500	0.013254	0.090536	0.001365	0.001353	0.006129	0.001330	0.001672

5.0 Energy Detail

Historical Energy Use: N

Castle Crag Road Reestablishment - Shasta County, Summer

**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	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	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

**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					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	

Castle Crags Road Reestablishment - Shasta County, Summer

**5.2 Energy by Land Use - Natural Gas**

**Mitigated**

	Natural Gas 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					
City Park	0	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
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**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	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000



Castle Crag Road Reestablishment - Shasta County, Summer

**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	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>

**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	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>

**7.0 Water Detail**

Castle Crags Road Reestablishment - Shasta County, Summer

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**7.1 Mitigation Measures Water**

**8.0 Waste Detail**

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**8.1 Mitigation Measures Waste**

**9.0 Operational Offroad**

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

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**Fire Pumps and Emergency Generators**

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

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
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**User Defined Equipment**

Equipment Type	Number
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**11.0 Vegetation**

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## **CalEEMod Run: Commute**

Castle Crags Worker Commute - Shasta County, Summer

**Castle Crags Worker Commute**  
**Shasta County, Summer**

**1.0 Project Characteristics**

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**1.1 Land Usage**

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	0.00	Acre	0.00	0.00	0

**1.2 Other Project Characteristics**

<b>Urbanization</b>	Rural	<b>Wind Speed (m/s)</b>	2.7	<b>Precipitation Freq (Days)</b>	82
<b>Climate Zone</b>	14			<b>Operational Year</b>	2020
<b>Utility Company</b>	Pacific Gas & Electric Company				
<b>CO2 Intensity (lb/MW hr)</b>	641.35	<b>CH4 Intensity (lb/MW hr)</b>	0.029	<b>N2O Intensity (lb/MW hr)</b>	0.006

**1.3 User Entered Comments & Non-Default Data**

Project Characteristics -

Land Use - CalEEMod run for vehicle commute emissions only, all other info is just dummy info

Trips and VMT - Need emissions for a 50 roundtrip pickup truck and 50 mile roundtrip medium or heavy duty truck

On-road Fugitive Dust - Majority of trip will be on paved roads

Construction Phase - One day (CalEEMod run just for vehicle emissions)

## Castle Crags Worker Commute - Shasta County, Summer

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	1.00
tblConstructionPhase	PhaseEndDate	9/30/2019	10/1/2019
tblOnRoadDust	VendorPercentPave	100.00	98.00
tblOnRoadDust	WorkerPercentPave	100.00	98.00
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripLength	6.60	25.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripLength	16.80	25.00
tblTripsAndVMT	WorkerTripNumber	10.00	2.00

## 2.0 Emissions Summary

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Castle Crags Worker Commute - Shasta County, Summer

**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	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	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
Mobile	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
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**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	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	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
Mobile	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
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

Castle Crags Worker Commute - Shasta County, Summer

	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
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	Demolition	Demolition	10/1/2019	10/1/2019	5	1	
2	Site Preparation	Site Preparation	10/1/2019	9/30/2019	5	0	
3	Grading	Grading	10/1/2019	9/30/2019	5	0	
4	Building Construction	Building Construction	10/1/2019	9/30/2019	5	0	
5	Paving	Paving	10/1/2019	9/30/2019	5	0	
6	Architectural Coating	Architectural Coating	10/1/2019	9/30/2019	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

#### OffRoad Equipment



Castle Crags Worker Commute - Shasta County, Summer

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	4	6.00	9	0.56
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Concrete/Industrial Saws	1	8.00	81	0.73
Building Construction	Cranes	1	4.00	231	0.29
Building Construction	Forklifts	2	6.00	89	0.20
Site Preparation	Graders	1	8.00	187	0.41
Paving	Pavers	1	7.00	130	0.42
Paving	Rollers	1	7.00	80	0.38
Demolition	Rubber Tired Dozers	1	1.00	247	0.40
Grading	Rubber Tired Dozers	1	1.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Grading	Tractors/Loaders/Backhoes	2	6.00	97	0.37
Paving	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	97	0.37

**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
Demolition	4	2.00	2.00	0.00	25.00	25.00	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	2	5.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Grading	4	10.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	5	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Paving	7	18.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	0.00	0.00	0.00	16.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

Castle Crags Worker Commute - Shasta County, Summer

**3.1 Mitigation Measures Construction**

**3.2 Demolition - 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	0.9530	8.6039	7.6917	0.0120		0.5371	0.5371		0.5125	0.5125		1,159.6570	1,159.6570	0.2211		1,165.1847
<b>Total</b>	<b>0.9530</b>	<b>8.6039</b>	<b>7.6917</b>	<b>0.0120</b>		<b>0.5371</b>	<b>0.5371</b>		<b>0.5125</b>	<b>0.5125</b>		<b>1,159.6570</b>	<b>1,159.6570</b>	<b>0.2211</b>		<b>1,165.1847</b>

Castle Crags Worker Commute - Shasta County, Summer

**3.2 Demolition - 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	0.0269	0.5654	0.1284	1.6500e-003	1.5173	6.8100e-003	1.5241	0.1600	6.5200e-003	0.1665		172.4495	172.4495	6.1000e-003		172.6020
Worker	0.0200	0.0151	0.1826	4.2000e-004	1.5090	2.6000e-004	1.5093	0.1568	2.4000e-004	0.1570		41.9146	41.9146	1.6200e-003		41.9551
<b>Total</b>	<b>0.0469</b>	<b>0.5805</b>	<b>0.3110</b>	<b>2.0700e-003</b>	<b>3.0263</b>	<b>7.0700e-003</b>	<b>3.0334</b>	<b>0.3168</b>	<b>6.7600e-003</b>	<b>0.3235</b>		<b>214.3641</b>	<b>214.3641</b>	<b>7.7200e-003</b>		<b>214.5571</b>

**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	0.9530	8.6039	7.6917	0.0120		0.5371	0.5371		0.5125	0.5125	0.0000	1,159.6570	1,159.6570	0.2211		1,165.1847
<b>Total</b>	<b>0.9530</b>	<b>8.6039</b>	<b>7.6917</b>	<b>0.0120</b>		<b>0.5371</b>	<b>0.5371</b>		<b>0.5125</b>	<b>0.5125</b>	<b>0.0000</b>	<b>1,159.6570</b>	<b>1,159.6570</b>	<b>0.2211</b>		<b>1,165.1847</b>























Castle Crags Worker Commute - Shasta County, Summer

**3.7 Architectural Coating - 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	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	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
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**4.0 Operational Detail - Mobile**

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**4.1 Mitigation Measures Mobile**

Castle Crags Worker Commute - Shasta County, Summer

	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	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
Unmitigated	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

4.2 Trip Summary Information

Land Use	Average Daily Trip Rate			Unmitigated	Mitigated
	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

Land Use	Miles			Trip %			Trip Purpose %		
	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
City Park	14.70	6.60	6.60	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.504118	0.034156	0.184227	0.115679	0.038681	0.007500	0.013254	0.090536	0.001365	0.001353	0.006129	0.001330	0.001672

5.0 Energy Detail

Historical Energy Use: N

Castle Crags Worker Commute - Shasta County, Summer

**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	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	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

**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					
City Park	0	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
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>



Castle Crags Worker Commute - Shasta County, Summer

**5.2 Energy by Land Use - Natural Gas**

**Mitigated**

	Natural Gas 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					
City Park	0	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
<b>Total</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>

**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	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Castle Crags Worker Commute - Shasta County, Summer

**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	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>

**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	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
<b>Total</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>	<b>0.0000</b>	<b>0.0000</b>		<b>0.0000</b>

**7.0 Water Detail**

Castle Crags Worker Commute - Shasta County, Summer

**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
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**10.0 Stationary Equipment**

**Fire Pumps and Emergency Generators**

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

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type
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**User Defined Equipment**

Equipment Type	Number
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**11.0 Vegetation**