

Appendix C - Air Quality Analysis Calculations

ANNUAL EMISSIONS SUMMARY

Offroad	Tons/Year								
YEAR	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	GHG
2020	0.04	0.15	0.25	0.00	0.01	0.01	58.94	0.00	58.94
2021	1.27	5.13	7.89	0.02	0.30	0.26	2103.46	0.11	2103.46
2022	0.04	0.23	0.28	0.00	0.01	0.01	79.15	0.00	79.15

Onroad	Tons/Year								
YEAR	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	GHG
2020	0.00	0.03	0.03	0.00	0.00	0.00	12.80	0.00	12.80
2021	0.65	3.19	7.37	0.03	0.37	0.29	2642.45	0.03	2642.45
2022	0.01	0.04	0.00	0.00	0.00	0.00	12.18	0.00	12.18

TOTAL Onroad and Offroad	Tons/Year								
YEAR	VOC/ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	GHG
2020	0.04	0.18	0.27	0.00	0.01	0.01	71.74	0.00	71.74
2021	1.92	8.32	15.25	0.05	0.67	0.55	4745.91	0.14	4745.91
2022	0.05	0.27	0.29	0.00	0.01	0.01	91.33	0.00	91.33

TOTAL PROJECT									
YEAR	VOC/ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	GHG
TOTAL TONS	2.01	8.77	15.81	0.05	0.69	0.57	4908.98	0.15	4908.98
TOTAL POUNDS	4014.27	17538.28	31629.54	96.20	1385.48	1149.45	9817968.11	304.98	9817968.11
POUNDS/DAY	5.13	22.40	40.40	0.12	1.77	1.47	12538.91	0.39	12538.91

Total On-site Trips (on-road)

	Pick up trucks (onsite)	Water Trucks
2020	558	6
2021	3915	3765
2022	3915	72
TOTAL	8388	3843

Total off-site trips (on-road)

	Dump trucks	Pick up trucks (commute)
2020	325	16056
2021	79040	283
2022	16	283
TOTAL	79381	16622

2020

OFF-ROAD EMISSIONS

Clearing and Grubbing		Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
					Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
	Loader	1	8	14	9.10	38.58	49.59	0.22	1.69	1.51	19234.55	0.82
	Dozer	1	8	14	25.66	103.90	188.92	0.29	7.54	6.71	29665.72	2.32
	Chipper	1	8	13	19.26	73.75	123.02	0.38	4.32	4.14	41848.29	1.87
	Total Off Road Emissions				54.02	216.23	361.52	0.89	13.56	12.36	90748.55	5.01
Construction Access Road		Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4

2020/2021					Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
	Vibratory Roller	1	4	1	0.23	1.55	1.52	0.00	0.11	0.10	235.96	0.02
	Grader	1	4	1	0.51	1.99	3.19	0.01	0.12	0.10	917.94	0.05
	Dozer	1	4	1	0.92	3.71	6.75	0.01	0.27	0.24	1059.49	0.08
	Loader	1	4	1	0.33	1.38	1.77	0.01	0.06	0.05	686.95	0.03
	Total Off Road Emissions				1.99	8.62	13.23	0.03	0.55	0.49	2900.33	0.18
Sound Wall		Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
2020/2022					Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
	Loader	1	4	4	1.30	5.51	7.08	0.03	0.24	0.22	2747.79	0.12
	Dozer	1	4	14	12.83	51.95	94.46	0.15	3.77	3.36	14832.86	1.16
	Manlift	1	4	11	1.14	10.09	9.53	0.02	0.56	0.50	1675.16	0.10
	Total Off Road Emissions				15.27	67.55	111.08	0.20	4.57	4.07	19255.81	1.38
Geotechnical Instrumentation		Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
2020/2022					Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
	Drill, Rotary	1	8	2	1.25	8.82	4.20	0.05	0.12	0.10	4980.94	0.11
	Total Off Road Emissions				1.25	8.82	4.20	0.05	0.12	0.10	4980.94	0.11
					VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
					Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
TOTAL 2020 OFF ROAD EMISSIONS (LBS/YEAR)					72.53	301.22	490.02	1.16	18.80	17.03	117885.63	6.68
TOTAL 2020 OFF ROAD EMISSIONS (TONS/YEAR)					0.04	0.15	0.25	0.00	0.01	0.01	58.94	0.00
GHG EMISSIONS OFFROAD	58.94	using EPA GHG calculator @ https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator										
	tons CO2 e											

ON-ROAD EMISSIONS

Clearing and Grubbing	Quantity	Hrs/Day	Hrs/Trip*	# Trips/Work Day/Truck	Total Work Days/Truck	Total Trips/Truck	Miles/Round Trip/Truck**	Total Miles/Truck***	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
									Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	
2020																
Water Truck	1	8			1	3	4	12	0.01	0.06	0.15	0.00	0.01	0.01	50.46	0.00
Pickup Trucks (on-site)	1	8			1	3	4	12	0.01	0.05	0.00	0.00	0.00	0.00	13.25	0.00
16 CY Dump Truck	2	8	3	3	14	45	42	1881.6	4.16	20.03	47.97	0.15	2.43	1.92	15825.81	0.20
Subtotal On Road Emissions									4.18	20.15	48.13	0.15	2.44	1.92	15889.53	0.20
Construction Access Road																
2020/2021	Quantity	Hrs/Day	Hrs/Trip*	# Trips/Work Day/Truck	Total Work Days/Truck	Total Trips/Truck	Miles/Round Trip/Truck**	Total Miles/Truck***	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
									Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	
Water Truck	1	4			1	3	4	12	0.01	0.06	0.15	0.00	0.01	0.01	50.46	0.00
16 CY Dump Truck	5	4	3	2	1	2	42	67.2	0.37	1.79	4.28	0.01	0.22	0.17	1413.02	0.02
Subtotal On Road Emissions									0.38	1.85	4.44	0.01	0.22	0.18	1463.48	0.02
Duration of Project 2020/2021/2022																
2020/2021/2022	Quantity	Hrs/Day	Hrs/Trip*	# Trips/Work Day/Truck	Total Work Days/Truck	Total Trips/Truck	Miles/Round Trip/Truck**	Total Miles/Truck***	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
									Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	
Pickup Trucks (commute)	5	3		1	57	57	20	1133	2.97	25.17	2.30	0.06	0.54	0.36	6259.18	0.25
Pickup Trucks (on-site)	5	3		1	90	90	4	360	0.94	8.00	0.73	0.02	0.17	0.11	1988.21	0.08
Subtotal On Road Emissions									3.92	33.17	3.02	0.08	0.71	0.47	8247.39	0.34
									ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4

2020 TOTAL ON-ROAD EMISSIONS (LBS/YEAR)	8.48	55.17	55.59	0.24	3.38	2.57	25600.4	0.55
2020 TOTAL ON-ROAD EMISSIONS (TONS/YEAR)	0.00	0.03	0.03	0.00	0.00	0.00	12.80	0.00
GHG EMISSIONS OFFROAD	12.80							

*For Dump Trucks, calculated by adding the amount of time for roundtrip to borrow site (1 hour) and land fill (1.5 hours)

tons
CO2 e

** For Dump Trucks, calculated by adding mileage of roundtrip to borrow site (17 miles) and landfill (25 miles); For water trucks and pick up trucks (on-site), calculated using length of project TCE (4 miles roundtrip); Pick-up trucks (commute) assume 20 miles roundtrip

*** Assumes 3 trips/day for pick up and water trucks (on-site)

2021

OFF-ROAD EMISSIONS

Excavation		Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
					Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
2021	Dozer	1	8	182	317.74	1285.57	2281.59	3.79	90.52	80.56	385654.42	28.67
	Grader	1	8	182	177.92	709.79	1035.55	3.28	37.57	33.44	334129.07	16.05
	Excavator	2	8	32	58.20	233.54	269.02	1.17	9.79	8.72	119672.51	5.25
	Total Off Road Emissions				553.86	2228.91	3586.16	8.24	137.88	122.71	839456.00	49.97

Backfill		Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
					Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
2021	Dozer	2	8	150	523.74	2119.07	3760.87	6.24	149.20	132.79	635694.10	47.26
	Loader	2	8	73	89.77	400.60	445.47	2.26	15.27	13.59	200588.78	8.10
	Scrapers	2	8	128	430.46	1672.82	2916.78	6.46	108.78	96.81	658285.68	38.84
	Excavator	2	8	228	414.71	1664.00	1916.74	8.37	69.78	62.11	852666.64	37.42
	Roller	1	8	228	145.87	576.05	1070.60	3.14	36.61	32.58	279235.75	13.16
	Grader	1	8	58	56.70	226.20	330.01	1.05	11.97	10.66	106480.69	5.12
	Total Off Road Emissions				1661.25	6658.75	10440.47	27.51	391.62	348.54	2732951.64	149.89

Riprap 2021		Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
					Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
	Loader	1	8	120	73.78	329.26	366.14	1.86	12.55	11.17	164867.49	6.66
	Dozer	1	8	12	20.95	84.76	150.43	0.25	5.97	5.31	25427.76	1.89
	Roller	1	8	17	10.88	42.95	79.83	0.23	2.73	2.43	20820.21	0.98
	Grader	1	8	22	21.51	85.80	125.18	0.40	4.54	4.04	40389.23	1.94
	Excavator	1	8	144	130.96	525.47	605.29	2.64	22.04	19.61	269263.15	11.82
	Total Off Road Emissions				258.07	1068.25	1326.86	5.38	47.83	42.57	520767.84	23.29
Grouted Stone 2021		Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
					Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
	Concrete Pump	1	8	3	1.70	8.79	15.19	0.05	0.45	0.40	4832.86	0.15
	Excavator	1	8	2	1.82	7.30	8.41	0.04	0.31	0.27	3739.77	0.16
	Loader	1	8	2	1.23	5.49	6.10	0.03	0.21	0.19	2747.79	0.11
	Total Off Road Emissions				4.74	21.58	29.70	0.12	0.97	0.86	11320.42	0.43
Concrete V- Ditch 2021		Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
					Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
	Excavator	1	8	3	2.73	10.95	12.61	0.06	0.46	0.41	5609.65	0.25
	Concrete Vibrator	1	8	10	1.22	4.16	7.70	0.01	0.29	0.26	1010.23	0.11
	Grader	1	8	5	4.89	19.50	28.45	0.09	1.03	0.92	9179.37	0.44
Total Off Road Emissions				8.83	34.61	48.76	0.16	1.78	1.58	15799.25	0.80	
Concrete Ramp and Inlet Structure Access 2021/2022		Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
					Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
	Concrete Pump	1	4	1	0.28	1.46	2.53	0.01	0.07	0.07	805.48	0.03
	Concrete Vibrator	1	4	1	0.06	0.21	0.39	0.00	0.01	0.01	50.51	0.01
	Vibratory Roller	1	4	1	0.21	1.54	1.41	0.00	0.10	0.08	235.95	0.02

Grader	1	4	1	0.49	1.95	2.84	0.01	0.10	0.09	917.94	0.04
Total Off Road Emissions				1.04	5.16	7.17	0.02	0.29	0.26	2009.88	0.09

Catch Basins 2021/2022	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
Concrete Vibrator	1	4	4	0.24	0.83	1.54	0.00	0.06	0.05	202.05	0.02
Concrete Pump	1	4	4	1.13	5.86	10.13	0.04	0.30	0.27	3221.91	0.10
Skid Steer	1	4	4	0.33	4.27	2.46	0.01	0.08	0.07	684.19	0.03
Excavator	1	4	8	3.64	14.60	16.81	0.07	0.61	0.54	7479.53	0.33
Dozer	1	4	4	3.49	14.13	25.07	0.04	0.99	0.89	4237.96	0.32
Loader	1	4	4	1.23	5.49	6.10	0.03	0.21	0.19	2747.79	0.11
Vibratory Roller	1	4	8	1.69	12.33	11.28	0.02	0.76	0.68	1887.64	0.15
Crane	1	4	4	0.96	7.60	5.83	0.01	0.32	0.28	1285.51	0.09
Total Off Road Emissions				12.72	65.11	79.22	0.23	3.33	2.97	21746.58	1.15

Culvert, Inlet and Outlet 2021/2022	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
Loader	1	4	3	0.92	4.12	4.58	0.02	0.16	0.14	2060.84	0.08
Crane	1	4	1	0.24	1.90	1.46	0.00	0.08	0.07	321.38	0.02
Skid Steer	1	4	1	0.08	1.07	0.62	0.00	0.02	0.02	171.05	0.01
Total Off Road Emissions				1.25	7.08	6.65	0.03	0.26	0.23	2553.27	0.11

Project Access Road 2021	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
Vibratory Roller	1	8	5	2.12	15.41	14.10	0.03	0.95	0.85	2359.55	0.19
Grader	1	8	4	3.91	15.60	22.76	0.07	0.83	0.73	7343.50	0.35
Dozer	1	8	11	19.20	77.70	137.90	0.23	5.47	4.87	23308.78	1.73
Excavator	1	8	12	10.91	43.79	50.44	0.22	1.84	1.63	22438.60	0.98
Asphalt Paver	1	8	2	1.31	4.52	10.13	0.02	0.36	0.32	1956.66	0.12
Total Off Road Emissions				37.45	157.03	235.32	0.57	9.45	8.41	57407.09	3.38

Construction Access Road	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
2020/2021											
Vibratory Roller	1	4	1	0.21	1.54	1.41	0.00	0.10	0.08	235.95	0.02
Grader	1	4	1	0.49	1.95	2.84	0.01	0.10	0.09	917.94	0.04
Dozer	1	4	1	0.87	3.53	6.27	0.01	0.25	0.22	1059.49	0.08
Loader	1	4	1	0.31	1.37	1.53	0.01	0.05	0.05	686.95	0.03
Total Off Road Emissions				1.88	8.40	12.05	0.03	0.50	0.44	2900.33	0.17

	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
TOTAL 2021 OFF ROAD EMISSIONS (LBS/YEAR)	2541.10	10254.87	15772.36	42.29	593.90	528.57	4206912.30	229.28
TOTAL 2021 OFF ROAD EMISSIONS (TONS/YEAR)	1.27	5.13	7.89	0.02	0.30	0.26	2103.46	0.11

GHG
EMISSIONS
OFFROAD

2103.46 using EPA GHG calculator @ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

tons CO2 e

ON-ROAD EMISSIONS

Excavation	Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work Days/ Truck	Total Trips/ Truck	Miles/Round Trip/Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM (PM1 0)	PM2.5	CO2	CH4
									Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	
2021																
16 CY Dump Truck	20	8	3	3	288	922	42	38707	798	3900	9135	31	460	358	326298 3	37
Subtotal On Road Emissions									798	3900	9135	31	460	358	326298 3	37

Backfill	Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work	Total Trips/ Truck	Miles/Round Trip/Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM (PM1 0)	PM2.5	CO2	CH4
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2021						Days/ Truck				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
	Water Truck	1	8		3	228	684	4	2736	3	14	32	0	2	1	11532	0
	16 CY Dump Truck	20	8	3	3	172	550	42	23117	477	2329	5455	19	275	214	194872 6	22
	Subtotal On Road Emissions									479	2343	5488	19	276	215	196025 8	22

2021	Riprap		Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work Days/ Truck	Total Trips/ Truck	Miles/Round Trip/Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM (PM1 0)	PM2.5	CO2	CH4
											Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
		Water Truck	1	8		3	17	51	4	204	0	1	2	0	0	0	860	0
		Subtotal On Road Emissions									0	1	2	0	0	0	860	0

2021/2022	Catch Basins		Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work Days/ Truck	Total Trips/ Truck	Miles/Round Trip/Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM (PM1 0)	PM2.5	CO2	CH4
											Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
		Water Truck	1	8		3	2	6	4	24	0	0	0	0	0	0	101	0
		16 CY Dump Truck	1	8	3	3	2	6	42	269	0	1	3	0	0	0	1133	0
Subtotal On Road Emissions									0	1	3	0	0	0	1234	0		

2021/2022	Culvert, Inlet and Outlet		Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work Days/ Truck	Total Trips/ Truck	Miles/Round Trip/Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM (PM1 0)	PM2.5	CO2	CH4
											Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
		16 CY Dump Truck	1	4	3	2	1	2	42	67	0	0	1	0	0	0	283	0
		Subtotal On Road Emissions									0	0	1	0	0	0	283	0

Project Access Road	Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work Days/ Truck	Total Trips/ Truck	Miles/Round Trip/Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM (PM1 0)	PM2.5	CO2	CH4	
									Total	Total	Total	Total	Total	Total	Total		
									lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.		
2021	Water Truck	1	8		3	3	9	4	36	0	0	0	0	0	152	0	
	16 CY Dump Truck	5	8	3	3	12	38	42	1613	8	41	95	0	5	4	33989	0
	Subtotal On Road Emissions									8	41	96	0	5	4	34141	0
Construction Access	Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work Days/ Truck	Total Trips/ Truck	Miles/Round Trip/Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM (PM1 0)	PM2.5	CO2	CH4	
									Total	Total	Total	Total	Total	Total	Total		
									lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.		
2020/2021	Water Truck	1	4		3	1	3	4	12	0	0	0	0	0	51	0	
	16 CY Dump Truck	5	4	3	2	1	2	42	67	0	2	4	0	0	1416	0	
	Subtotal On Road Emissions									0	2	4	0	0	1467	0	
For Duration of Project 2020/2021/ 2022	Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work Days/ Truck	Total Trips/ Truck	Miles/Round Trip/Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	
									Total	Total	Total	Total	Total	Total	Total		
									lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.		
	Pickup Trucks (commute)	5	3		1	57	57	20	1133	3	24	2	0	1	0	6291	0
	Pickup Trucks (on- site)	5	3		3	261	783	4	3132	8	66	6	0	2	1	17384	1
	Subtotal On Road Emissions									11	90	8	0	2	1	23675	1
									ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4	
									1298	6377	14737	51	744	579	528490	60	
									2021 TOTAL ON-ROAD EMISSIONS	1298	6377	14737	51	744	579	528490	60
									1	3	7	0	0	0	2642	0	
									2021 TOTAL ON-ROAD EMISSIONS (TONS/YEAR)	1	3	7	0	0	0	2642	0

2022

OFF-ROAD EMISSIONS

6' Chain Link Fence 2022	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
Concrete Pump	1	8	22	11.76	64.07	97.26	0.40	2.90	2.59	35441.00	1.06
Manlift	1	8	39	6.75	70.97	57.07	0.14	3.00	2.67	11878.41	0.61
Total Off Road Emissions				18.51	135.04	154.32	0.54	5.91	5.26	47319.41	1.67

Maintenance Road 2022	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
Vibratory Roller	1	8	24	9.34	73.66	62.79	0.13	3.98	3.54	11325.84	0.84
Grader	1	8	8	7.45	30.69	40.51	0.14	1.48	1.32	14687.00	0.67
Asphalt Paver	1	8	16	9.97	35.47	73.84	0.18	2.64	2.35	15653.29	0.90
Total Off Road Emissions				26.76	139.82	177.14	0.45	8.10	7.21	41666.13	2.41

Borrow Area Restoration 2022	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
Grader	1	8	10	9.32	38.36	50.63	0.18	1.85	1.64	18358.75	0.84
Total Off Road Emissions				9.32	38.36	50.63	0.18	1.85	1.64	18358.75	0.84

Landscape, Irrigation and Maintenance 2022	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
				Tractor	1	8	1	0.26	2.71	1.69	0.00
Total Off Road Emissions				0.26	2.71	1.69	0.00	0.07	0.06	413.82	0.02

Concrete Ramp and Inlet Structure Access 2021/2022	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
				Concrete Pump	1	4	1	0.27	1.46	2.21	0.01
Concrete Vibrator	1	4	1	0.06	0.21	0.39	0.00	0.01	0.01	50.51	0.01
Vibratory Roller	1	4	1	0.19	1.53	1.31	0.00	0.08	0.07	235.95	0.02
Grader	1	4	1	0.47	1.92	2.53	0.01	0.09	0.08	917.94	0.04
Total Off Road Emissions				0.99	5.12	6.44	0.02	0.26	0.23	2009.88	0.09

Catch Basins 2021/2022	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
				Concrete Vibrator	1	4	4	0.24	0.83	1.54	0.00
Concrete Pump	1	4	4	1.07	5.82	8.84	0.04	0.26	0.24	3221.91	0.10
Skid Steer	1	4	4	0.31	4.27	2.31	0.01	0.07	0.06	684.19	0.03
Excavator	1	4	8	3.46	14.53	14.67	0.07	0.53	0.47	7479.53	0.31
Dozer	1	4	4	3.33	13.49	23.27	0.04	0.92	0.82	4237.96	0.30
Loader	1	4	4	1.17	5.47	5.26	0.03	0.18	0.16	2747.79	0.11
Vibratory Roller	1	4	8	1.56	12.28	10.47	0.02	0.66	0.59	1887.64	0.14
Crane	1	4	4	0.89	7.60	5.20	0.01	0.28	0.25	1285.51	0.08
Total Off Road Emissions				12.03	64.28	71.55	0.23	2.96	2.64	21746.58	1.09

Culvert, Inlet and Outlet 2021/2022	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.

Loader	1	4	3	0.87	4.10	3.94	0.02	0.14	0.12	2060.84	0.08
Crane	1	4	1	0.22	1.90	1.30	0.00	0.07	0.06	321.38	0.02
Skid Steer	1	4	1	0.08	1.07	0.58	0.00	0.02	0.02	171.05	0.01
Total Off Road Emissions				1.18	7.07	5.82	0.03	0.22	0.20	2553.27	0.11

Sound Wall 2020/2022	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
Loader	1	4	4	1.17	5.47	5.26	0.03	0.18	0.16	2747.79	0.11
Dozer	1	4	14	11.65	47.21	81.43	0.15	3.21	2.86	14832.86	1.05
Manlift	1	4	11	0.95	10.01	8.05	0.02	0.42	0.38	1675.16	0.09
Total Off Road Emissions				13.77	62.69	94.74	0.20	3.82	3.40	19255.81	1.24

Geotechnical Instrumentation 2020/2022	Qty	Hrs/Day	Total Day	VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
Drill, Rotary	1	8	2	1.17	8.82	3.09	0.05	0.10	0.09	4980.94	0.11
Total Off Road Emissions				1.17	8.82	3.09	0.05	0.10	0.09	4980.94	0.11

				VOC	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
				Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
TOTAL 2022 OFF ROAD EMISSIONS				83.98	463.91	565.42	1.70	23.29	20.73	158304.59	7.58
TOTAL 2022 OFF ROAD EMISSIONS (TONS/YEAR)				0.04	0.23	0.28	0.00	0.01	0.01	79.15	0.00

GHG EMISSIONS
OFFROAD

79.15 using EPA GHG calculator @ <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>

tons CO2 e

ON-ROAD EMISSIONS

Maintenance Road																	
2022	Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work Days/Truck	Total Trips/Truck	Miles/ Round Trip/ Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM (PM1 0)	PM2. 5	CO2	CH4	
									Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.		
Water Truck	1	8		3	5	15	4	60	0.06	0.29	0.66	0.00	0.03	0.03	252.9	1	0.00
Subtotal On Road Emissions									0.06	0.29	0.66	0.00	0.03	0.03	252.9	1	0.00
Landscape, Irrigation and Maintenance																	
2022	Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work Days/Truck	Total Trips/Truck	Miles/ Round Trip/ Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM (PM1 0)	PM2. 5	CO2	CH4	
									Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.		
Water Truck	1	8		3	1	3	4	12	0.01	0.06	0.13	0.00	0.01	0.01	50.58	0.00	
Subtotal On Road Emissions									0.01	0.06	0.13	0.00	0.01	0.01	50.58	0.00	
Catch Basins																	
2021/2022	Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work Days/Truck	Total Trips/Truck	Miles/ Round Trip/ Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM (PM1 0)	PM2. 5	CO2	CH4	
									Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.		
Water Truck	1	8		3	2	6	4	24	0.02	0.11	0.26	0.00	0.01	0.01	101.1	6	0.00
16 CY Dump Truck	1	8	2.5	3	2	6	42	268.8	0.26	1.29	2.95	0.01	0.15	0.11	1133.05	0.01	
Subtotal On Road Emissions									0.02	0.11	0.26	0.00	0.01	0.01	101.1	6	0.00
Culvert, Inlet and Outlet																	
2021/2022	Quantity	Hrs/Day	Hrs/Trip*	# Trips/ Work Day/Truck	Total Work Days/Truck	Total Trips/Truck	Miles/ Round Trip/ Truck**	Total Miles/ Truck***	ROG	CO	NOX	SOX	PM (PM1 0)	PM2. 5	CO2	CH4	
									Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.		

16 CY Dump Truck	1	4	2.5	2	1	2	42	67	0.06	0.32	0.74	0.00	0.04	0.03	283.26	0.00
Subtotal On Road Emissions									0.06	0.32	0.74	0.00	0.04	0.03	283.26	0.00

For Duration of Project		Quantity	Hrs/Day	Hrs/Trip*	# Trips/Work Day/Truck	Total Work Days/Truck	Total Trips/Truck	Miles/Round Trip/Truck**	Total Miles/Truck***	ROG	CO	NOX	SOX	PM (PM10)	PM2.5	CO2	CH4
										Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.	Total lbs.
2020/2021/2022	Pickup Trucks (commute)	5	3		1	57	57	20	1133	2.76	22.55	1.99	0.06	0.55	0.36	6291.13	0.23
	Pickup Trucks (on-site)	5	3		3	261	783	4	3132	7.62	62.31	5.50	0.17	1.51	1.00	17385.72	0.65
	Subtotal On Road Emissions									10.38	84.85	7.50	0.23	2.06	1.36	23676.85	0.88

										ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
2022 TOTAL ON-ROAD EMISSIONS										10.53	85.63	9.29	0.24	2.15	1.43	24364.77	0.89
2022 TOTAL ON-ROAD EMISSIONS (TONS/YEAR)										0.01	0.04	0.00	0.00	0.00	0.00	12.18	0.00
GHG EMISSIONS OFFROAD										12.18							

*For Dump Trucks, calculated by adding the amount of time for roundtrip to borrow site (1 hour) and land fill (1.5 hours)

** For Dump Trucks, calculated by adding mileage of roundtrip to borrow site (17 miles) and landfill (25 miles); For water trucks and pick up trucks (on-site), calculated using length of project TCE (4 miles roundtrip); Pick-up trucks (commute) assume 20 miles roundtrip

*** Assumes 3 trips/day for pick up and water trucks (on-site)