Appendix A

CalEEMod Emissions Reports

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Fall River Valley CSD Sewer System Expansion
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	1.20
Precipitation (days)	48.8
Location	41.031036247864506, -121.419238595688
County	Shasta
City	Unincorporated
Air District	Shasta County AQMD
Air Basin	Sacramento Valley
TAZ	159
EDFZ	3
Electric Utility	Pacific Gas & Electric Company
Gas Utility	Pacific Gas & Electric

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Light Industry	1.00	1000sqft	0.02	1,000	0.00	0.00	—	—
Other Asphalt Surfaces	3.70	Acre	3.70	0.00	0.00	0.00	—	—

Other Non-Asphalt Surfaces	1.50	Acre	1.50	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-2*	Limit Heavy-Duty Diesel Vehicle Idling
Construction	C-9	Use Dust Suppressants
Construction	C-10-A	Water Exposed Surfaces
Construction	C-11	Limit Vehicle Speeds on Unpaved Roads
Construction	C-12	Sweep Paved Roads

* Qualitative or supporting measure. Emission reductions not included in the mitigated emissions results.

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	4.62	3.89	37.0	36.9	0.06	1.65	14.9	16.5	1.51	7.61	9.12	—	6,244	6,244	0.25	0.21	6,267
Mit.	4.62	3.89	37.0	36.9	0.06	1.65	5.87	7.52	1.51	2.98	4.50	—	6,244	6,244	0.25	0.21	6,267
% Reduced	—	—	—	—	—	—	60%	54%	—	61%	51%	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.66	2.23	20.4	22.0	0.04	0.86	7.64	8.50	0.79	3.56	4.35	—	4,677	4,677	0.15	0.21	4,744
Mit.	2.66	2.23	20.4	22.0	0.04	0.86	3.32	4.18	0.79	1.47	2.26	—	4,677	4,677	0.15	0.21	4,744

% Reduced	—	—	—	—	—	—	57%	51%	—	59%	48%	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.72	0.69	5.44	6.20	0.01	0.23	1.69	1.92	0.21	0.85	1.05	—	1,235	1,235	0.04	0.05	1,251
Mit.	0.72	0.69	5.44	6.20	0.01	0.23	0.74	0.97	0.21	0.34	0.54	—	1,235	1,235	0.04	0.05	1,251
% Reduced	—	—	—	—	—	—	56%	49%	—	61%	49%	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.13	0.13	0.99	1.13	< 0.005	0.04	0.31	0.35	0.04	0.16	0.19	—	204	204	0.01	0.01	207
Mit.	0.13	0.13	0.99	1.13	< 0.005	0.04	0.14	0.18	0.04	0.06	0.10	—	204	204	0.01	0.01	207
% Reduced	—	—	—	—	—	—	56%	49%	—	61%	49%	—	—	—	—	—	—
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	25.0	25.0	—	—	—	—	80.0	—	—	—	—	—	—	—	—	—
Unmit.	—	No	Yes	—	—	—	—	No	—	—	—	—	—	—	—	—	—
Mit.	—	No	Yes	—	—	—	—	No	—	—	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	25.0	25.0	—	—	—	—	80.0	—	—	—	—	—	—	—	—	—
Unmit.	—	No	No	—	—	—	—	No	—	—	—	—	—	—	—	—	—
Mit.	—	No	No	—	—	—	—	No	—	—	—	—	—	—	—	—	—
Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	25.0	25.0	—	—	—	—	25.0	—	—	—	—	—	—	—	—	—
Unmit.	—	No	No	—	—	—	—	No	—	—	—	—	—	—	—	—	—
Mit.	—	No	No	—	—	—	—	No	—	—	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	4.62	3.89	37.0	36.9	0.06	1.65	14.9	16.5	1.51	7.61	9.12	—	6,244	6,244	0.25	0.06	6,267
2025	2.68	2.25	20.3	22.3	0.04	0.86	7.64	8.50	0.79	3.56	4.35	—	4,698	4,698	0.15	0.21	4,769
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.38	1.16	10.9	12.7	0.02	0.49	< 0.005	0.49	0.45	< 0.005	0.45	—	2,353	2,353	0.10	0.02	2,361
2025	2.66	2.23	20.4	22.0	0.04	0.86	7.64	8.50	0.79	3.56	4.35	—	4,677	4,677	0.15	0.21	4,744
2026	2.51	2.10	19.0	21.4	0.04	0.77	7.64	8.41	0.71	3.56	4.27	—	4,651	4,651	0.15	0.21	4,718
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.59	0.50	4.72	4.78	0.01	0.21	1.67	1.88	0.19	0.85	1.05	—	822	822	0.03	0.01	825
2025	0.72	0.69	5.44	6.20	0.01	0.23	1.69	1.92	0.21	0.78	1.00	—	1,235	1,235	0.04	0.05	1,251
2026	0.33	0.28	2.52	2.85	0.01	0.10	1.02	1.12	0.09	0.47	0.57	—	619	619	0.02	0.03	629
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.11	0.09	0.86	0.87	< 0.005	0.04	0.30	0.34	0.04	0.16	0.19	—	136	136	0.01	< 0.005	137
2025	0.13	0.13	0.99	1.13	< 0.005	0.04	0.31	0.35	0.04	0.14	0.18	—	204	204	0.01	0.01	207
2026	0.06	0.05	0.46	0.52	< 0.005	0.02	0.19	0.20	0.02	0.09	0.10	—	103	103	< 0.005	< 0.005	104

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e

Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	4.62	3.89	37.0	36.9	0.06	1.65	5.87	7.52	1.51	2.98	4.50	—	6,244	6,244	0.25	0.06	6,267
2025	2.68	2.25	20.3	22.3	0.04	0.86	3.32	4.18	0.79	1.47	2.26	—	4,698	4,698	0.15	0.21	4,769
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.38	1.16	10.9	12.7	0.02	0.49	< 0.005	0.49	0.45	< 0.005	0.45	—	2,353	2,353	0.10	0.02	2,361
2025	2.66	2.23	20.4	22.0	0.04	0.86	3.32	4.18	0.79	1.47	2.26	—	4,677	4,677	0.15	0.21	4,744
2026	2.51	2.10	19.0	21.4	0.04	0.77	3.32	4.09	0.71	1.47	2.18	—	4,651	4,651	0.15	0.21	4,718
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.59	0.50	4.72	4.78	0.01	0.21	0.66	0.87	0.19	0.34	0.53	—	822	822	0.03	0.01	825
2025	0.72	0.69	5.44	6.20	0.01	0.23	0.74	0.97	0.21	0.33	0.54	—	1,235	1,235	0.04	0.05	1,251
2026	0.33	0.28	2.52	2.85	0.01	0.10	0.44	0.54	0.09	0.20	0.29	—	619	619	0.02	0.03	629
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.11	0.09	0.86	0.87	< 0.005	0.04	0.12	0.16	0.04	0.06	0.10	—	136	136	0.01	< 0.005	137
2025	0.13	0.13	0.99	1.13	< 0.005	0.04	0.14	0.18	0.04	0.06	0.10	—	204	204	0.01	0.01	207
2026	0.06	0.05	0.46	0.52	< 0.005	0.02	0.08	0.10	0.02	0.04	0.05	—	103	103	< 0.005	< 0.005	104

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.38	0.39	1.02	1.33	< 0.005	0.05	0.01	0.05	0.05	< 0.005	0.05	67.3	284	351	6.92	0.17	574

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.37	0.38	1.02	1.27	< 0.005	0.05	0.01	0.05	0.05	< 0.005	0.05	67.3	282	350	6.92	0.17	573
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.58	0.57	1.59	1.97	< 0.005	0.08	< 0.005	0.08	0.08	< 0.005	0.08	67.3	378	445	6.92	0.17	668
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.11	0.10	0.29	0.36	< 0.005	0.01	< 0.005	0.01	0.01	< 0.005	0.01	11.1	62.5	73.7	1.15	0.03	111

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.01	0.01	0.01	0.08	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	16.7	16.7	< 0.005	< 0.005	17.1
Area	0.01	0.05	< 0.005	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.18	0.18	< 0.005	< 0.005	0.18
Energy	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	38.4	38.4	0.01	< 0.005	38.7
Water	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Waste	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Stationary	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Total	0.38	0.39	1.02	1.33	< 0.005	0.05	0.01	0.05	0.05	< 0.005	0.05	67.3	284	351	6.92	0.17	574
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.01	0.01	0.01	0.07	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	15.3	15.3	< 0.005	< 0.005	15.6

Area	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	38.4	38.4	0.01	< 0.005	38.7
Water	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Waste	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Stationary	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Total	0.37	0.38	1.02	1.27	< 0.005	0.05	0.01	0.05	0.05	< 0.005	0.05	67.3	282	350	6.92	0.17	573
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.01	0.01	0.01	0.06	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	13.4	13.4	< 0.005	< 0.005	13.6
Area	< 0.005	0.05	< 0.005	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.09	0.09	< 0.005	< 0.005	0.09
Energy	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	38.4	38.4	0.01	< 0.005	38.7
Water	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Waste	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Stationary	0.57	0.52	1.57	1.88	< 0.005	0.08	—	0.08	0.08	—	0.08	—	265	265	0.01	< 0.005	266
Total	0.58	0.57	1.59	1.97	< 0.005	0.08	< 0.005	0.08	0.08	< 0.005	0.08	67.3	378	445	6.92	0.17	668
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.22	2.22	< 0.005	< 0.005	2.26
Area	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.01	0.01	< 0.005	< 0.005	0.01
Energy	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.36	6.36	< 0.005	< 0.005	6.41
Water	—	—	—	—	—	—	—	—	—	—	—	11.0	10.1	21.1	1.13	0.03	57.5
Waste	—	—	—	—	—	—	—	—	—	—	—	0.11	0.00	0.11	0.01	0.00	0.39
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.04
Stationary	0.10	0.09	0.29	0.34	< 0.005	0.01	—	0.01	0.01	—	0.01	—	43.9	43.9	< 0.005	< 0.005	44.0
Total	0.11	0.10	0.29	0.36	< 0.005	0.01	< 0.005	0.01	0.01	< 0.005	0.01	11.1	62.5	73.7	1.15	0.03	111

2.6. Operations Emissions by Sector, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.01	0.01	0.01	0.08	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	16.7	16.7	< 0.005	< 0.005	17.1
Area	0.01	0.05	< 0.005	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.18	0.18	< 0.005	< 0.005	0.18
Energy	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	38.4	38.4	0.01	< 0.005	38.7
Water	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Waste	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Stationary	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Total	0.38	0.39	1.02	1.33	< 0.005	0.05	0.01	0.05	0.05	< 0.005	0.05	67.3	284	351	6.92	0.17	574
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.01	0.01	0.01	0.07	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	15.3	15.3	< 0.005	< 0.005	15.6
Area	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	38.4	38.4	0.01	< 0.005	38.7
Water	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Waste	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Stationary	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Total	0.37	0.38	1.02	1.27	< 0.005	0.05	0.01	0.05	0.05	< 0.005	0.05	67.3	282	350	6.92	0.17	573
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Mobile	0.01	0.01	0.01	0.06	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	13.4	13.4	< 0.005	< 0.005	13.6
Area	< 0.005	0.05	< 0.005	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.09	0.09	< 0.005	< 0.005	0.09
Energy	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	38.4	38.4	0.01	< 0.005	38.7
Water	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Waste	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Stationary	0.57	0.52	1.57	1.88	< 0.005	0.08	—	0.08	0.08	—	0.08	—	265	265	0.01	< 0.005	266
Total	0.58	0.57	1.59	1.97	< 0.005	0.08	< 0.005	0.08	0.08	< 0.005	0.08	67.3	378	445	6.92	0.17	668
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.22	2.22	< 0.005	< 0.005	2.26
Area	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.01	0.01	< 0.005	< 0.005	0.01
Energy	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	6.36	6.36	< 0.005	< 0.005	6.41
Water	—	—	—	—	—	—	—	—	—	—	—	11.0	10.1	21.1	1.13	0.03	57.5
Waste	—	—	—	—	—	—	—	—	—	—	—	0.11	0.00	0.11	0.01	0.00	0.39
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.04
Stationary	0.10	0.09	0.29	0.34	< 0.005	0.01	—	0.01	0.01	—	0.01	—	43.9	43.9	< 0.005	< 0.005	44.0
Total	0.11	0.10	0.29	0.36	< 0.005	0.01	< 0.005	0.01	0.01	< 0.005	0.01	11.1	62.5	73.7	1.15	0.03	111

3. Construction Emissions Details

3.1. Site Preparation (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	3.15	2.65	26.1	23.3	0.03	1.16	—	1.16	1.07	—	1.07	—	3,754	3,754	0.15	0.03	3,767
Dust From Material Movement	—	—	—	—	—	—	14.7	14.7	—	7.58	7.58	—	—	—	—	—	—
Onsite truck	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.30	2.93	2.61	< 0.005	0.13	—	0.13	0.12	—	0.12	—	422	422	0.02	< 0.005	423
Dust From Material Movement	—	—	—	—	—	—	1.66	1.66	—	0.85	0.85	—	—	—	—	—	—
Onsite truck	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.53	0.48	< 0.005	0.02	—	0.02	0.02	—	0.02	—	69.8	69.8	< 0.005	< 0.005	70.1
Dust From Material Movement	—	—	—	—	—	—	0.30	0.30	—	0.16	0.16	—	—	—	—	—	—
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.05	0.94	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	137	137	0.01	0.01	139

Vendor	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
Hauling	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	13.9	13.9	< 0.005	< 0.005	14.1
Vendor	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
Hauling	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	2.29	2.29	< 0.005	< 0.005	2.33
Vendor	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
Hauling	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

3.2. Site Preparation (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	3.15	2.65	26.1	23.3	0.03	1.16	—	1.16	1.07	—	1.07	—	3,754	3,754	0.15	0.03	3,767
Dust From Material Movement	—	—	—	—	—	—	5.75	5.75	—	2.95	2.95	—	—	—	—	—	—
Onsite truck	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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.30	2.93	2.61	< 0.005	0.13	—	0.13	0.12	—	0.12	—	422	422	0.02	< 0.005	423
Dust From Material Movement	—	—	—	—	—	—	0.65	0.65	—	0.33	0.33	—	—	—	—	—	—
Onsite truck	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.53	0.48	< 0.005	0.02	—	0.02	0.02	—	0.02	—	69.8	69.8	< 0.005	< 0.005	70.1
Dust From Material Movement	—	—	—	—	—	—	0.12	0.12	—	0.06	0.06	—	—	—	—	—	—
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.05	0.94	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	137	137	0.01	0.01	139
Vendor	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
Hauling	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.01	0.01	0.01	0.08	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	13.9	13.9	< 0.005	< 0.005	14.1
Vendor	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
Hauling	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	2.29	2.29	< 0.005	< 0.005	2.33
Vendor	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
Hauling	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

3.3. Building Construction (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.38	1.15	10.9	12.7	0.02	0.49	—	0.49	0.45	—	0.45	—	2,346	2,346	0.10	0.02	2,354
Onsite truck	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.38	1.15	10.9	12.7	0.02	0.49	—	0.49	0.45	—	0.45	—	2,346	2,346	0.10	0.02	2,354
Onsite truck	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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.23	0.19	1.79	2.09	< 0.005	0.08	—	0.08	0.07	—	0.07	—	386	386	0.02	< 0.005	387

Onsite truck	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.33	0.38	< 0.005	0.01	—	0.01	0.01	—	0.01	—	63.8	63.8	< 0.005	< 0.005	64.1
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	3.82	3.82	< 0.005	< 0.005	3.89
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.72	3.72	< 0.005	< 0.005	3.89
Hauling	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	3.35	3.35	< 0.005	< 0.005	3.40
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.72	3.72	< 0.005	< 0.005	3.88
Hauling	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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.57	0.57	< 0.005	< 0.005	0.58
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.61	0.61	< 0.005	< 0.005	0.64
Hauling	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.09	0.09	< 0.005	< 0.005	0.10
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.10	0.10	< 0.005	< 0.005	0.11
Hauling	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

3.4. Building Construction (2024) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.38	1.15	10.9	12.7	0.02	0.49	—	0.49	0.45	—	0.45	—	2,346	2,346	0.10	0.02	2,354
Onsite truck	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.38	1.15	10.9	12.7	0.02	0.49	—	0.49	0.45	—	0.45	—	2,346	2,346	0.10	0.02	2,354
Onsite truck	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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.23	0.19	1.79	2.09	< 0.005	0.08	—	0.08	0.07	—	0.07	—	386	386	0.02	< 0.005	387
Onsite truck	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.04	0.03	0.33	0.38	< 0.005	0.01	—	0.01	0.01	—	0.01	—	63.8	63.8	< 0.005	< 0.005	64.1
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.03	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	3.82	3.82	< 0.005	< 0.005	3.89
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.72	3.72	< 0.005	< 0.005	3.89
Hauling	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	3.35	3.35	< 0.005	< 0.005	3.40
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.72	3.72	< 0.005	< 0.005	3.88
Hauling	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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.57	0.57	< 0.005	< 0.005	0.58
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.61	0.61	< 0.005	< 0.005	0.64
Hauling	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.09	0.09	< 0.005	< 0.005	0.10
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.10	0.10	< 0.005	< 0.005	0.11
Hauling	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

3.5. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.83	0.70	6.52	8.73	0.01	0.31	—	0.31	0.28	—	0.28	—	1,323	1,323	0.05	0.01	1,327
Paving	—	0.19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.10	0.89	1.20	< 0.005	0.04	—	0.04	0.04	—	0.04	—	181	181	0.01	< 0.005	182
Paving	—	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.16	0.22	< 0.005	0.01	—	0.01	0.01	—	0.01	—	30.0	30.0	< 0.005	< 0.005	30.1
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.05	0.88	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	134	134	0.01	0.01	136
Vendor	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
Hauling	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.01	0.01	0.01	0.09	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	16.6	16.6	< 0.005	< 0.005	16.8
Vendor	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
Hauling	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	2.74	2.74	< 0.005	< 0.005	2.79
Vendor	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
Hauling	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

3.6. Paving (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.83	0.70	6.52	8.73	0.01	0.31	—	0.31	0.28	—	0.28	—	1,323	1,323	0.05	0.01	1,327
Paving	—	0.19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.11	0.10	0.89	1.20	< 0.005	0.04	—	0.04	0.04	—	0.04	—	181	181	0.01	< 0.005	182
Paving	—	0.03	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.16	0.22	< 0.005	0.01	—	0.01	0.01	—	0.01	—	30.0	30.0	< 0.005	< 0.005	30.1
Paving	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.05	0.88	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	134	134	0.01	0.01	136
Vendor	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
Hauling	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.09	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	16.6	16.6	< 0.005	< 0.005	16.8
Vendor	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
Hauling	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	2.74	2.74	< 0.005	< 0.005	2.79
Vendor	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
Hauling	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

3.7. Architectural Coating (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	134
Architectural Coatings	—	0.70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	11.0	11.0	< 0.005	< 0.005	11.0
Architectural Coatings	—	0.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.82	1.82	< 0.005	< 0.005	1.82
Architectural Coatings	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.75	0.75	< 0.005	< 0.005	0.76

Vendor	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
Hauling	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.06	0.06	< 0.005	< 0.005	0.06
Vendor	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
Hauling	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.01	0.01	< 0.005	< 0.005	0.01
Vendor	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
Hauling	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

3.8. Architectural Coating (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	134
Architectural Coatings	—	0.70	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	11.0	11.0	< 0.005	< 0.005	11.0
Architectural Coatings	—	0.06	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.82	1.82	< 0.005	< 0.005	1.82
Architectural Coatings	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.75	0.75	< 0.005	< 0.005	0.76
Vendor	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
Hauling	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.06	0.06	< 0.005	< 0.005	0.06

Vendor	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
Hauling	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	0.01	0.01	< 0.005	< 0.005	0.01
Vendor	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
Hauling	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

3.9. Grading (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.53	2.12	18.8	20.8	0.03	0.84	—	0.84	0.77	—	0.77	—	3,374	3,374	0.14	0.03	3,386
Dust From Material Movement	—	—	—	—	—	—	7.09	7.09	—	3.43	3.43	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.09	0.09	—	0.01	0.01	—	—	—	—	—	—
Onsite truck	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.53	2.12	18.8	20.8	0.03	0.84	—	0.84	0.77	—	0.77	—	3,374	3,374	0.14	0.03	3,386

Dust From Material Movement	—	—	—	—	—	—	7.09	7.09	—	3.43	3.43	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.09	0.09	—	0.01	0.01	—	—	—	—	—	—
Onsite truck	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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.55	0.47	4.13	4.56	0.01	0.18	—	0.18	0.17	—	0.17	—	740	740	0.03	0.01	742
Dust From Material Movement	—	—	—	—	—	—	1.55	1.55	—	0.75	0.75	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.02	0.02	—	< 0.005	< 0.005	—	—	—	—	—	—
Onsite truck	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.08	0.75	0.83	< 0.005	0.03	—	0.03	0.03	—	0.03	—	122	122	< 0.005	< 0.005	123
Dust From Material Movement	—	—	—	—	—	—	0.28	0.28	—	0.14	0.14	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.11	0.10	0.07	1.17	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	178	178	0.01	0.01	181
Vendor	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
Hauling	0.04	0.02	1.40	0.29	0.01	0.02	0.09	0.11	0.02	0.03	0.05	—	1,145	1,145	0.01	0.18	1,201
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.09	0.08	0.87	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	157	157	0.01	0.01	159
Vendor	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
Hauling	0.04	0.02	1.50	0.29	0.01	0.02	0.09	0.11	0.02	0.03	0.05	—	1,146	1,146	0.01	0.18	1,200
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.19	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	35.3	35.3	< 0.005	< 0.005	35.9
Vendor	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
Hauling	0.01	< 0.005	0.32	0.06	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	251	251	< 0.005	0.04	263
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	5.85	5.85	< 0.005	< 0.005	5.94
Vendor	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
Hauling	< 0.005	< 0.005	0.06	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	41.6	41.6	< 0.005	0.01	43.6

3.10. Grading (2025) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.53	2.12	18.8	20.8	0.03	0.84	—	0.84	0.77	—	0.77	—	3,374	3,374	0.14	0.03	3,386

Dust From Material Movement	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.09	0.09	—	0.01	0.01	—	—	—	—	—	—
Onsite truck	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
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.53	2.12	18.8	20.8	0.03	0.84	—	0.84	0.77	—	0.77	—	3,374	3,374	0.14	0.03	3,386
Dust From Material Movement	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.09	0.09	—	0.01	0.01	—	—	—	—	—	—
Onsite truck	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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.55	0.47	4.13	4.56	0.01	0.18	—	0.18	0.17	—	0.17	—	740	740	0.03	0.01	742
Dust From Material Movement	—	—	—	—	—	—	0.61	0.61	—	0.29	0.29	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.02	0.02	—	< 0.005	< 0.005	—	—	—	—	—	—
Onsite truck	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.10	0.08	0.75	0.83	< 0.005	0.03	—	0.03	0.03	—	0.03	—	122	122	< 0.005	< 0.005	123
Dust From Material Movement	—	—	—	—	—	—	0.11	0.11	—	0.05	0.05	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	0.07	1.17	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	178	178	0.01	0.01	181
Vendor	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
Hauling	0.04	0.02	1.40	0.29	0.01	0.02	0.09	0.11	0.02	0.03	0.05	—	1,145	1,145	0.01	0.18	1,201
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.09	0.08	0.87	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	157	157	0.01	0.01	159
Vendor	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
Hauling	0.04	0.02	1.50	0.29	0.01	0.02	0.09	0.11	0.02	0.03	0.05	—	1,146	1,146	0.01	0.18	1,200
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.02	0.02	0.02	0.19	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	35.3	35.3	< 0.005	< 0.005	35.9
Vendor	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
Hauling	0.01	< 0.005	0.32	0.06	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	251	251	< 0.005	0.04	263
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	5.85	5.85	< 0.005	< 0.005	5.94
Vendor	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
Hauling	< 0.005	< 0.005	0.06	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	41.6	41.6	< 0.005	0.01	43.6

3.11. Grading (2026) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.38	2.00	17.5	20.3	0.03	0.75	—	0.75	0.69	—	0.69	—	3,375	3,375	0.14	0.03	3,386
Dust From Material Movement	—	—	—	—	—	—	7.09	7.09	—	3.43	3.43	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.09	0.09	—	0.01	0.01	—	—	—	—	—	—
Onsite truck	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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.32	0.27	2.32	2.70	< 0.005	0.10	—	0.10	0.09	—	0.09	—	449	449	0.02	< 0.005	451
Dust From Material Movement	—	—	—	—	—	—	0.94	0.94	—	0.46	0.46	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—
Onsite truck	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.06	0.05	0.42	0.49	< 0.005	0.02	—	0.02	0.02	—	0.02	—	74.3	74.3	< 0.005	< 0.005	74.6
Dust From Material Movement	—	—	—	—	—	—	0.17	0.17	—	0.08	0.08	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	0.80	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	154	154	0.01	0.01	156
Vendor	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
Hauling	0.04	0.02	1.46	0.29	0.01	0.02	0.09	0.11	0.02	0.03	0.05	—	1,122	1,122	0.01	0.18	1,176
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	21.0	21.0	< 0.005	< 0.005	21.4
Vendor	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
Hauling	0.01	< 0.005	0.19	0.04	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.01	—	149	149	< 0.005	0.02	157
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	3.48	3.48	< 0.005	< 0.005	3.54
Vendor	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
Hauling	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	24.7	24.7	< 0.005	< 0.005	25.9

3.12. Grading (2026) - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.38	2.00	17.5	20.3	0.03	0.75	—	0.75	0.69	—	0.69	—	3,375	3,375	0.14	0.03	3,386
Dust From Material Movement	—	—	—	—	—	—	2.76	2.76	—	1.34	1.34	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.09	0.09	—	0.01	0.01	—	—	—	—	—	—
Onsite truck	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
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.32	0.27	2.32	2.70	< 0.005	0.10	—	0.10	0.09	—	0.09	—	449	449	0.02	< 0.005	451
Dust From Material Movement	—	—	—	—	—	—	0.37	0.37	—	0.18	0.18	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—
Onsite truck	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
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.42	0.49	< 0.005	0.02	—	0.02	0.02	—	0.02	—	74.3	74.3	< 0.005	< 0.005	74.6

Dust From Material Movement	—	—	—	—	—	—	0.07	0.07	—	0.03	0.03	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—
Onsite truck	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
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.09	0.08	0.08	0.80	0.00	0.00	0.01	0.01	0.00	0.00	0.00	—	154	154	0.01	0.01	156
Vendor	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
Hauling	0.04	0.02	1.46	0.29	0.01	0.02	0.09	0.11	0.02	0.03	0.05	—	1,122	1,122	0.01	0.18	1,176
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.11	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	21.0	21.0	< 0.005	< 0.005	21.4
Vendor	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
Hauling	0.01	< 0.005	0.19	0.04	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	0.01	—	149	149	< 0.005	0.02	157
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	0.00	0.00	—	3.48	3.48	< 0.005	< 0.005	3.54
Vendor	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
Hauling	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	24.7	24.7	< 0.005	< 0.005	25.9

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.01	0.01	0.01	0.08	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	16.7	16.7	< 0.005	< 0.005	17.1
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Total	0.01	0.01	0.01	0.08	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	16.7	16.7	< 0.005	< 0.005	17.1
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.01	0.01	0.01	0.07	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	15.3	15.3	< 0.005	< 0.005	15.6
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Total	0.01	0.01	0.01	0.07	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	15.3	15.3	< 0.005	< 0.005	15.6
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.22	2.22	< 0.005	< 0.005	2.26

Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Total	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.22	2.22	< 0.005	< 0.005	2.26

4.1.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.01	0.01	0.01	0.08	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	16.7	16.7	< 0.005	< 0.005	17.1
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Total	0.01	0.01	0.01	0.08	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	16.7	16.7	< 0.005	< 0.005	17.1
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.01	0.01	0.01	0.07	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	15.3	15.3	< 0.005	< 0.005	15.6
Other Asphalt Surfaces	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

Other Non-Asphalt Surfaces	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
Total	0.01	0.01	0.01	0.07	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	15.3	15.3	< 0.005	< 0.005	15.6
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.22	2.22	< 0.005	< 0.005	2.26
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Total	< 0.005	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.22	2.22	< 0.005	< 0.005	2.26

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	25.3	25.3	< 0.005	< 0.005	25.5
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00

Total	—	—	—	—	—	—	—	—	—	—	—	—	25.3	25.3	< 0.005	< 0.005	25.5
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	25.3	25.3	< 0.005	< 0.005	25.5
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	25.3	25.3	< 0.005	< 0.005	25.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	4.18	4.18	< 0.005	< 0.005	4.22
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	4.18	4.18	< 0.005	< 0.005	4.22

4.2.2. Electricity Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	25.3	25.3	< 0.005	< 0.005	25.5
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	25.3	25.3	< 0.005	< 0.005	25.5
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	25.3	25.3	< 0.005	< 0.005	25.5
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	25.3	25.3	< 0.005	< 0.005	25.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	4.18	4.18	< 0.005	< 0.005	4.22
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	4.18	4.18	< 0.005	< 0.005	4.22

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.1	13.1	< 0.005	< 0.005	13.2
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Total	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.1	13.1	< 0.005	< 0.005	13.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.1	13.1	< 0.005	< 0.005	13.2
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Total	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.1	13.1	< 0.005	< 0.005	13.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.18	2.18	< 0.005	< 0.005	2.18

Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Total	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.18	2.18	< 0.005	< 0.005	2.18

4.2.4. Natural Gas Emissions By Land Use - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.1	13.1	< 0.005	< 0.005	13.2
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Total	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.1	13.1	< 0.005	< 0.005	13.2
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.1	13.1	< 0.005	< 0.005	13.2
Other Asphalt Surfaces	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

Other Non-Asphalt Surfaces	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
Total	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.1	13.1	< 0.005	< 0.005	13.2
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.18	2.18	< 0.005	< 0.005	2.18
Other Asphalt Surfaces	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
Other Non-Asphalt Surfaces	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
Total	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.18	2.18	< 0.005	< 0.005	2.18

4.3. Area Emissions by Source

4.3.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.01	0.01	< 0.005	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.18	0.18	< 0.005	< 0.005	0.18

Total	0.01	0.05	< 0.005	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.18	0.18	< 0.005	< 0.005	0.18
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.01	0.01	< 0.005	< 0.005	0.01
Total	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.01	0.01	< 0.005	< 0.005	0.01

4.3.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Architectural	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	0.01	0.01	< 0.005	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.18	0.18	< 0.005	< 0.005	0.18
Total	0.01	0.05	< 0.005	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.18	0.18	< 0.005	< 0.005	0.18
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	—	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	—	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.01	0.01	< 0.005	< 0.005	0.01
Total	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.01	0.01	< 0.005	< 0.005	0.01

4.4. Water Emissions by Land Use

4.4.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	11.0	10.1	21.1	1.13	0.03	57.5
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	11.0	10.1	21.1	1.13	0.03	57.5

4.4.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	66.6	60.8	127	6.84	0.16	347

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	11.0	10.1	21.1	1.13	0.03	57.5
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	11.0	10.1	21.1	1.13	0.03	57.5

4.5. Waste Emissions by Land Use

4.5.2. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.11	0.00	0.11	0.01	0.00	0.39
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.11	0.00	0.11	0.01	0.00	0.39

4.5.1. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00

Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.67	0.00	0.67	0.07	0.00	2.34
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.11	0.00	0.11	0.01	0.00	0.39
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.11	0.00	0.11	0.01	0.00	0.39

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.04
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.04

4.6.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.26
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.04
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.04

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.7.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Total	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Emergency Generator	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Total	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.10	0.09	0.29	0.34	< 0.005	0.01	—	0.01	0.01	—	0.01	—	43.9	43.9	< 0.005	< 0.005	44.0
Total	0.10	0.09	0.29	0.34	< 0.005	0.01	—	0.01	0.01	—	0.01	—	43.9	43.9	< 0.005	< 0.005	44.0

4.8.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Total	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Total	0.36	0.33	0.99	1.19	< 0.005	0.05	—	0.05	0.05	—	0.05	—	168	168	0.01	< 0.005	168
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Emergency Generato	0.10	0.09	0.29	0.34	< 0.005	0.01	—	0.01	0.01	—	0.01	—	43.9	43.9	< 0.005	< 0.005	44.0
Total	0.10	0.09	0.29	0.34	< 0.005	0.01	—	0.01	0.01	—	0.01	—	43.9	43.9	< 0.005	< 0.005	44.0

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.9.2. Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.4. Soil Carbon Accumulation By Vegetation Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.5. Above and Belowground Carbon Accumulation by Land Use Type - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.6. Avoided and Sequestered Emissions by Species - Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Sequeste	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Site Preparation	Site Preparation	6/30/2024	8/26/2024	5.00	41.0	—
Building Construction	Building Construction	8/13/2024	11/4/2024	5.00	60.0	—
Paving	Paving	7/2/2025	9/9/2025	5.00	50.0	—
Architectural Coating	Architectural Coating	7/31/2025	9/10/2025	5.00	30.0	—
Grading	Grading	9/11/2025	3/9/2026	5.00	400	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	6.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	3.00	6.00	84.0	0.37
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Building Construction	Welders	Diesel	Average	1.00	6.00	46.0	0.45
Paving	Pavers	Diesel	Average	2.00	7.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	7.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	7.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48
Grading	Trenchers	Diesel	Average	2.00	8.00	40.0	0.50
Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40

5.2.2. Mitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Site Preparation	Rubber Tired Dozers	Diesel	Average	3.00	6.00	367	0.40
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	3.00	6.00	84.0	0.37
Building Construction	Forklifts	Diesel	Average	3.00	8.00	82.0	0.20

Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	3.00	7.00	84.0	0.37
Building Construction	Welders	Diesel	Average	1.00	6.00	46.0	0.45
Paving	Pavers	Diesel	Average	2.00	7.00	81.0	0.42
Paving	Paving Equipment	Diesel	Average	2.00	7.00	89.0	0.36
Paving	Rollers	Diesel	Average	2.00	7.00	36.0	0.38
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48
Grading	Trenchers	Diesel	Average	2.00	8.00	40.0	0.50
Grading	Excavators	Diesel	Average	1.00	8.00	36.0	0.38
Grading	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37
Building Construction	Cranes	Diesel	Average	1.00	7.00	367	0.29
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	15.0	11.1	LDA,LDT1,LDT2
Site Preparation	Vendor	—	6.95	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	11.1	LDA,LDT1,LDT2
Grading	Vendor	—	6.95	HHDT,MHDT

Grading	Hauling	16.4	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	0.42	11.1	LDA,LDT1,LDT2
Building Construction	Vendor	0.16	6.95	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	11.1	LDA,LDT1,LDT2
Paving	Vendor	—	6.95	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	0.08	11.1	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	6.95	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.3.2. Mitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Site Preparation	—	—	—	—
Site Preparation	Worker	15.0	11.1	LDA,LDT1,LDT2
Site Preparation	Vendor	—	6.95	HHDT,MHDT
Site Preparation	Hauling	0.00	20.0	HHDT
Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	20.0	11.1	LDA,LDT1,LDT2

Grading	Vendor	—	6.95	HHDT,MHDT
Grading	Hauling	16.4	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	0.42	11.1	LDA,LDT1,LDT2
Building Construction	Vendor	0.16	6.95	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	15.0	11.1	LDA,LDT1,LDT2
Paving	Vendor	—	6.95	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	0.08	11.1	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	6.95	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	1,500	500	0.00

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Ton of Debris)	Acres Paved (acres)
Site Preparation	0.00	0.00	5.00	0.00	—
Paving	0.00	0.00	0.00	0.00	3.70
Grading	47,000	47,000	46.1	2,800	—

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Demolished Area	2	36%	36%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
General Light Industry	0.00	0%
Other Asphalt Surfaces	3.70	100%
Other Non-Asphalt Surfaces	0.00	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	204	0.03	< 0.005
2025	0.00	204	0.03	< 0.005
2026	0.00	204	0.03	< 0.005

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
General Light Industry	1.99	1.99	0.00	623	18.2	18.2	0.00	5,682
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.9.2. Mitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
General Light Industry	1.99	1.99	0.00	623	18.2	18.2	0.00	5,682
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.1.2. Mitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	1,500	500	0.00

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.10.4. Landscape Equipment - Mitigated

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
General Light Industry	45,201	204	0.0330	0.0040	41,014
Other Asphalt Surfaces	0.00	204	0.0330	0.0040	0.00
Other Non-Asphalt Surfaces	0.00	204	0.0330	0.0040	0.00

5.11.2. Mitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
General Light Industry	45,201	204	0.0330	0.0040	41,014

Other Asphalt Surfaces	0.00	204	0.0330	0.0040	0.00
Other Non-Asphalt Surfaces	0.00	204	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
General Light Industry	34,766,250	0.00
Other Asphalt Surfaces	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00

5.12.2. Mitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)
General Light Industry	34,766,250	0.00
Other Asphalt Surfaces	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
General Light Industry	1.24	0.00
Other Asphalt Surfaces	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00

5.13.2. Mitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
General Light Industry	1.24	0.00
Other Asphalt Surfaces	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
General Light Industry	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0

5.14.2. Mitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
General Light Industry	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.15.2. Mitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor
Emergency Generator	Diesel	2.00	0.50	288	100	0.73

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type
—	—

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1.2. Mitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

Appendix B

Biological Study Report
Fall River Valley Community Services District
Wastewater System Expansion Project

BIOLOGICAL STUDY REPORT

Fall River Valley CSD
Wastewater System Expansion Project

Shasta County, California

Prepared for:

PACE Engineering, Inc.

February 2023

032-80

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APPENDICES

1. INTRODUCTION

The Fall River Valley Community Services District (FRVCSD) is proposing to extend its wastewater collection system to the community of McArthur, the Country Club Subdivision, the Sierra Center Subdivision, and properties along State Route 299 (SR 299). In addition to installation of new sewer lines, the project would include construction of two new lift stations, improvements to three existing lift stations, and improvements to the Wastewater Treatment Plant (WWTP). The purpose of this biological study report (BSR) is to identify and characterize sensitive biological resources that may occur in the proposed work areas or that may be adversely affected by implementation of the proposed project. This BSR is intended to serve as a baseline study to assist in the preparation of subsequent environmental documentation.

ENPLAN is an environmental consulting firm with over 40 years of experience with projects throughout northern California. All work associated with this project was performed by Donald Burk, Environmental Services Manager with ENPLAN, and Allison Loveless, Environmental Scientist with ENPLAN. Resumes for the biologists are provided in **Appendix A**.

Mr. Burk received his Master of Science degree in Botany, and Bachelor of Arts degree in Chemistry and Biological Sciences, from California State University, Chico. Having worked in the environmental consulting field since 1981, he has an in-depth background in a broad spectrum of environmental studies. His experience includes managing the preparation of CEQA/NEPA environmental compliance documents, environmental site assessments, wildlife and botanical studies, wetland delineations, permit assistance, and compliance monitoring. Don was responsible for the botanical surveys for this project and for final review of this BSR.

Allison Loveless received her Master of Science degree in Zoology from Oklahoma State University, Stillwater, and Bachelor of Arts degree in Geography (Environmental Studies) from University of California, Los Angeles. Allison has five years of experience working in environmental services throughout northern California. Her experience includes general wildlife surveys, endangered species surveys, and nesting bird surveys; preparing technical environmental documentation for environmental impact reports; and preparing biological study reports, wetland delineations, biological assessments, and associated GIS mapping. Allison was responsible for the wildlife surveys for this project as well as report preparation.

2. PROJECT LOCATION

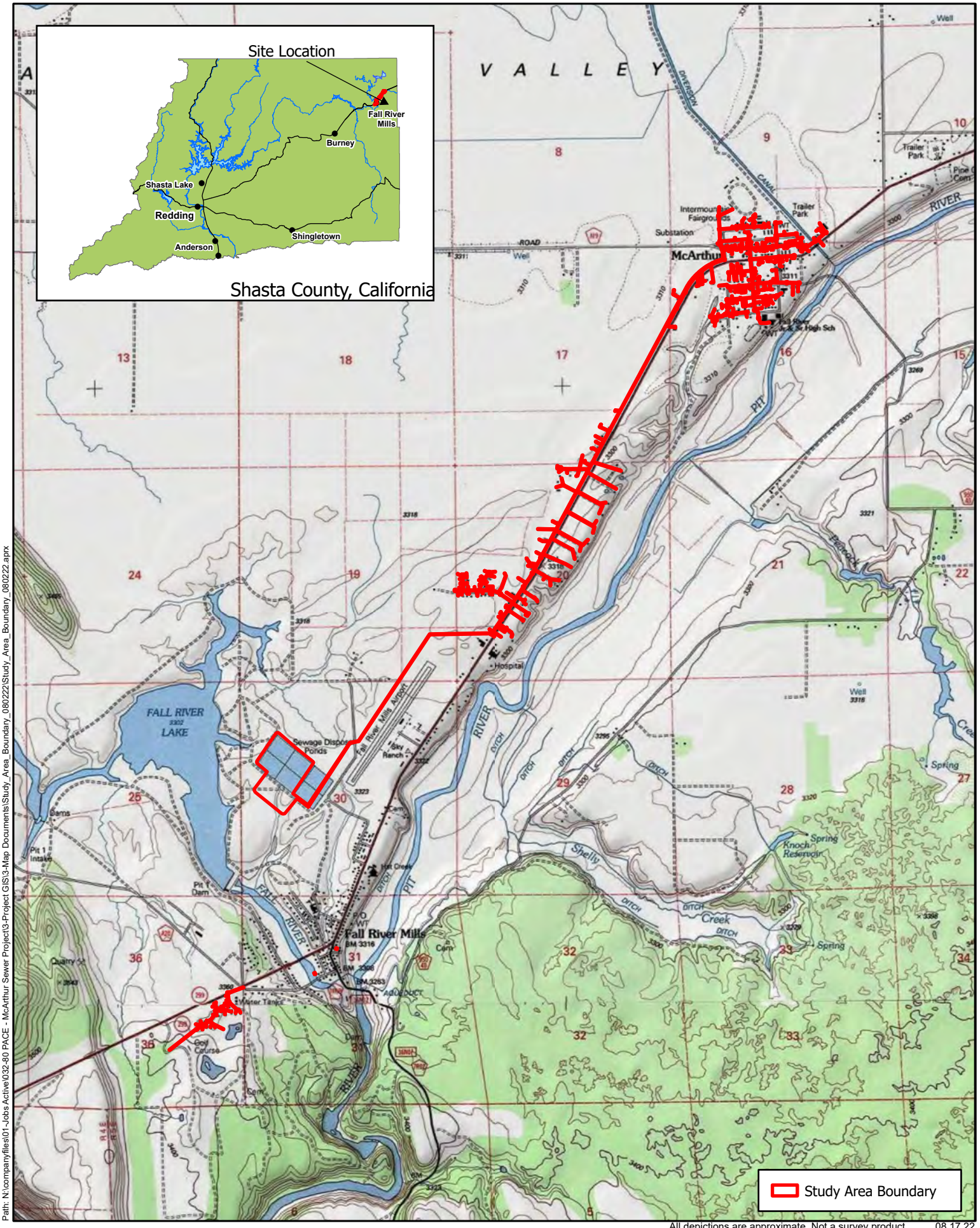
As shown in **Figure 1**, the proposed project is located in the unincorporated communities of Fall River Mills and McArthur, Shasta County, California, in Section 36, Township 37N, Range 4E,, of the U.S. Geological Survey's (USGS) Fall River Mills and Hogback Ridge 7.5-minute quadrangles; and Sections 9, 16, 17, 19, 20, 30, and 31, Township 37N, Range 5E, of the USGS Fall River Mills 7.5-minute quadrangle (USGS, 1998).

The project study area is located about 14 miles northeast of the unincorporated community of Burney and 14 miles west of the unincorporated community of Bieber. As shown in **Figures 2 through 5**, improvements would occur throughout the majority of the community of McArthur, north and south of State Route 299 (SR 299); along and adjacent to the SR 299 corridor, at the FRVCSD WWTP; within the Sierra Center Subdivision and Country Club Subdivision; and at existing Lift Stations 1, 2, and 3.

The majority of sewer line improvements would occur in the public road right-of-way (ROW). Laterals would be installed on private property. Temporary staging of construction materials and equipment would occur on the WWTP site. Staging would also occur in the affected road ROW throughout the project area. No physical improvements are needed to establish the staging areas.

3. PROJECT DESCRIPTION

In 1980, FRVCSD constructed a sewage collection system to serve the residents of Fall River Mills and some businesses east of the town. The Country Club Estates Subdivision is the only neighborhood in Fall River Mills not served by the collection system. Residents along SR 299, including those in the Sierra Center Subdivision and the community of McArthur, currently treat their wastewater via private septic tank/leach field systems. The Intermountain Fairground in McArthur includes a wastewater collection and treatment system owned by Shasta County; this system also serves the 60-unit Intermountain Fair RV park.



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All depictions are approximate. Not a survey product. 08.17.22

0 3,000 Feet

Figure 1

Project Location and Vicinity

ENPLAN

INTERMOUNTAIN FAIRGROUNDS
(NORTH OF A ST & WEST OF MAIN ST)

MCARTHUR MOBILE HOME & RV PARK

MCARTHUR RD

(N) MCARTHUR MAIN LIFT STATION

A ST

MAIN ST

GROVE ST

OAK ST

HWY 299

(N) MANHOLE, TYP

FRVCSD SERVICE AREA

CEDAR ST

PIT RIVER

(N) GRAVITY LAT, TYP

6" FM FROM MCARTHUR MAIN LIFT STATION

(N) 4" FM

WALNUT ST

(N) WALNUT LIFT STATION

MCCATCH HALLOW RD

FALL RIVER JR/SR HIGH SCHOOL

LINE LEGEND

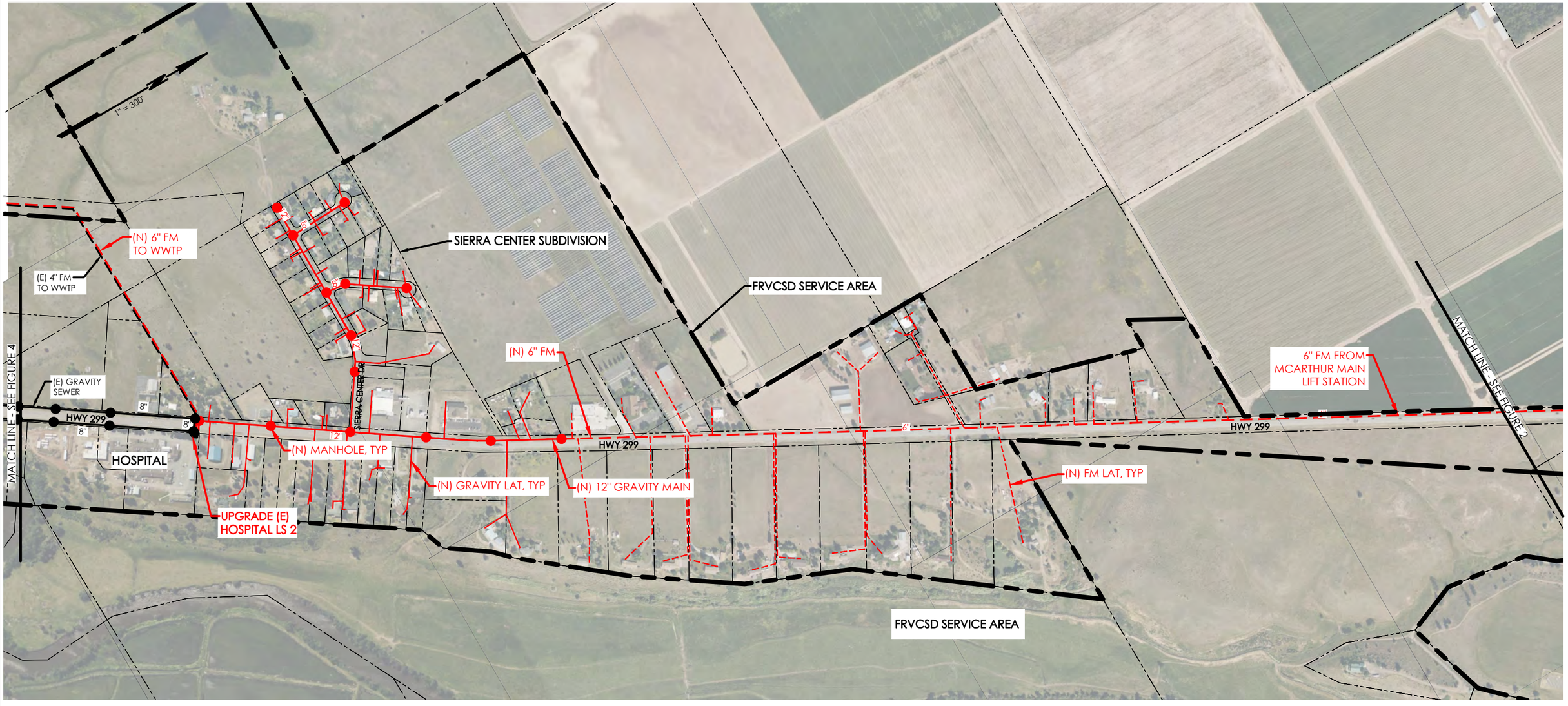
- NEW GRAVITY SEWER MAIN
- NEW GRAVITY SEWER LATERAL
- NEW FORCE MAIN
- NEW FORCE MAIN LATERAL

MATCH LINE - SEE FIGURE 3

Figure 2

McArthur Area Improvements

Plot Date: February 08, 2022 - 1:59 pm Login Name: jrentz
File Name: M:\Land Projects\226307 Wastewater System Expansion Project\Sewer Figures\Avg Layout Figure 1



LINE LEGEND

- NEW GRAVITY SEWER MAIN
- NEW GRAVITY SEWER LATERAL
- NEW FORCE MAIN
- NEW FORCE MAIN LATERAL
- EXISTING GRAVITY SEWER MAIN
- EXISTING FORCE MAIN

Figure 3

SR 299 Corridor, Sierra Center Subdivision, and Existing Lift Station 2

Plot Date: February 03, 2022 - 2:00 pm Login Name: jramtz
File Name: M:\Land Projects\226807 Wastewater System Expansion Project\Sewer Figures\Avg Layout Figure 2

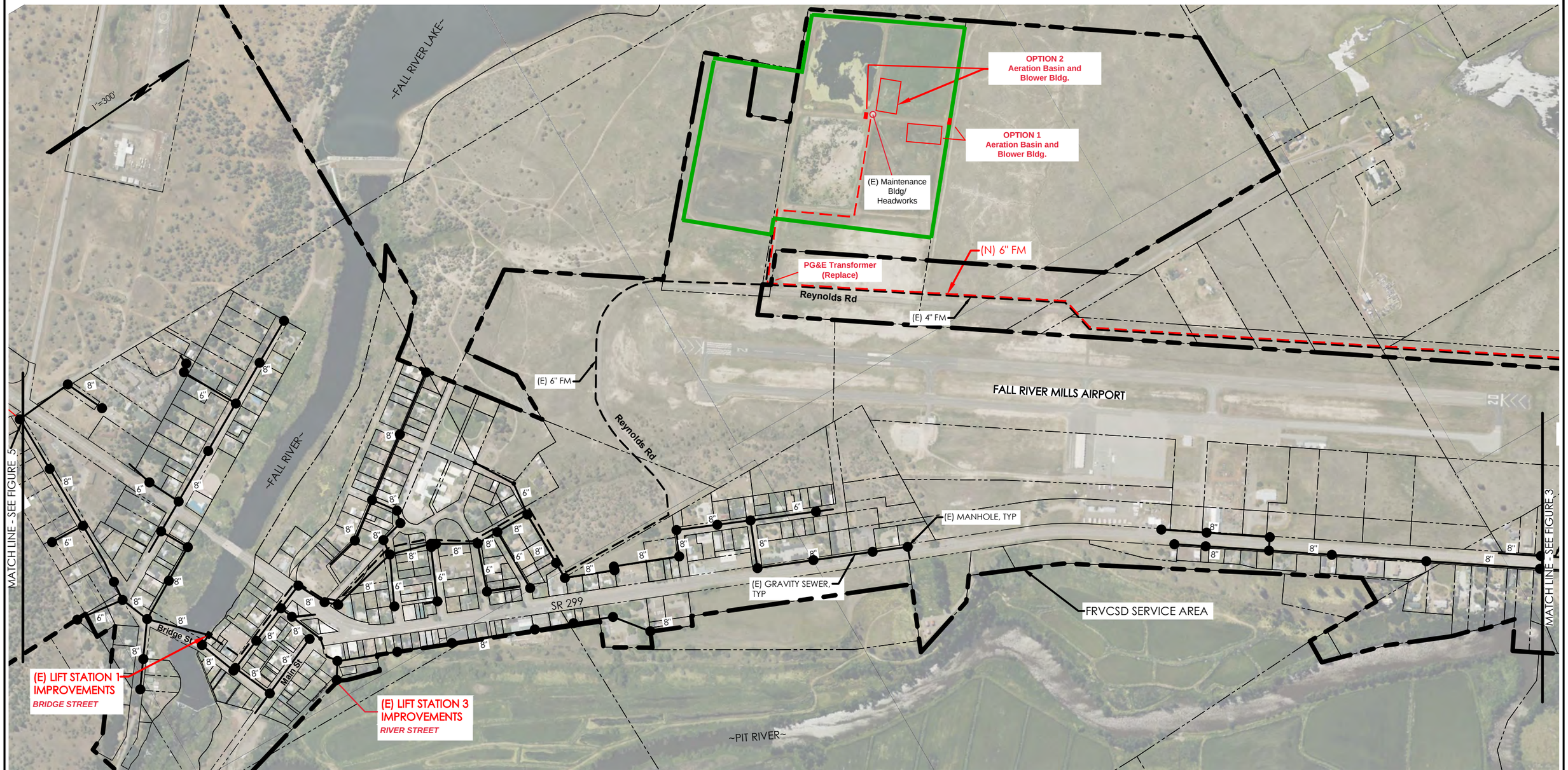


Figure 4

Wastewater Treatment Plant and Existing Lift Stations 1 and 3

Plot Date: February 09, 2022 - 2:00 pm Login Name: jkrantz
File Name: M:\Land Projects\229307 Wastewater System Expansion Project\Sewer Figures\svg Layout: Figure 3

1"=100'

HWY 299

HWY 299

COUNTRY CLUB DR

COUNTRY CLUB DR

LITTLE LAKE DR

8"

8"

8"

8"

8"

6"

(N) GRAVITY LAT, TYP

(N) MANHOLE, TYP

(N) FM LAT, TYP

(N) GRAVITY SEWER, TYP

(E) GRAVITY SEWER

MATCH LINE - SEE FIGURE 4

Fall River Valley Golf and Country Club

LINE LEGEND

- NEW GRAVITY SEWER MAIN
- NEW GRAVITY SEWER LATERAL
- NEW FORCE MAIN
- NEW FORCE MAIN LATERAL
- EXISTING GRAVITY SEWER MAIN
- EXISTING FORCE MAIN

Plot Date: February 08, 2022 - 2:01 pm Login Name: jkretz
File Name: M:\Land Projects\226807 Wastewater System Expansion Project\Sewer Figures\dwg Layout Figure 4

Figure 5
Country Club Subdivision

The existing wastewater system within Fall River Mills consists of three lift stations, ~6,000 linear feet of 4- and 6- inch pressurized force mains, ~25,000 linear feet of 6- and 8-inch gravity-fed effluent collection mainlines, and a wastewater treatment plant (WWTP) utilizing a total containment treatment lagoon system. The WWTP consists of six five-acre clay-lined oxidation/evaporation ponds. In 2010, the two southeastern ponds were relocated to provide further separation from the Fall River Mills Airport. The relocated ponds are approximately five and a half acres each when operating at half capacity.

According to the FRVCSD Wastewater Master Plan 2020 Update, the existing collection system piping within Fall River Mills is relatively young and in good condition. However, Lift Stations 1 and 3 are almost 40 years old and are in need of replacement. Lift Station 2 (Hospital Lift Station) is also in need of replacement. In addition, the WWTP utilizes a sodium hypochlorite injection system at the lagoons to treat wastewater; however, this system is not effective at controlling odors, which then affect the community of Fall River Mills. The Wastewater Management Plan recommends employing aeration at the WWTP to control these odors, as well as replacing equipment at the WWTP to reduce the trash load from flowing into the lagoons and provide a more reliable flow measurement system.

The purpose of the proposed project is to extend sewer service to areas currently served by private septic systems, replace aging infrastructure, protect surface water and groundwater quality, improve the treatment process, and provide reliable sewer service in the FRVCSD's service area.

The proposed project includes improvements and extension of the FRVCSD sewer system. Improvements associated with the extension of service include installing several thousand feet of force main and gravity sewer main; constructing two new lift stations; installing sewer lines, laterals, and appurtenant improvements throughout the study area; connecting existing structures to the new sewer collection system; and abandoning existing septic systems. Existing equipment at Lift Stations 1, 2, and 3 would be replaced. Back-up level controls and supervisory control and data acquisition (SCADA) equipment would be installed at both LS 1 and LS 3.

Improvements at the wastewater treatment plant (WWTP) include constructing a new aeration pond inside one of the existing ponds, constructing a new blower building to house the aeration system equipment, installing a new self-cleaning mechanical screen within the existing concrete headworks structure, and replacing electronic sensors in the headworks to tie in to the SCADA system. An existing Pacific Gas and Electric Company (PG&E) transformer adjacent to Reynolds Road would be replaced, and electrical conduit and conductors would be installed underground from the transformer to the WWTP.

4. AREA CHARACTERISTICS

The terrain in the study area is generally flat, and the overall topographical gradient slopes gradually south/southeast toward the Pit and Fall Rivers. Elevations in the study area range from approximately 3,300 to 3,400 feet above mean sea level. Land uses within the communities of Fall River Mills and McArthur are primarily low- and medium-density residential and commercial. Land uses along SR 299 and surrounding the Sierra Center Subdivision include farmland and low-density single-family residential with agricultural uses. Land uses surrounding the WWTP include open space and agriculture to the west, north, and northeast; and the Fall River Mills Airport to the south/southeast. Land uses surrounding the Country Club Subdivision include recreational uses such as a golf course and open space.

The climate of the project area is Mediterranean, with hot, dry summers and cool, wet winters. Temperatures range between an average low of 20.7 degrees Fahrenheit (°F) in January and an average high of 87.6 °F in July. Annual precipitation averages ~18.15 inches of rainfall within the community of Fall River Mills, which reasonably approximates conditions on the study sites (WRCC, 2022).

Five soil types are located within the project area: Dudgen-Graven complex, 0 to 5 percent slopes; Esperanza loam, 0 to 2 percent slopes; Jellycamp Ollierivas complex, 2 to 9 percent slopes; Pittville sandy loam, 0 to 5 percent slopes; and Pittville sandy loam, 15 to 30 percent slopes. None of the soils are considered hydric, however depressions and terraces within the Pittville sandy loam, 0 to 5 percent slopes, are considered hydric inclusions (NRCS, 2022).

As a result of the field evaluation, five vegetation communities were identified in the study area: annual grassland, barren, sagebrush, stream/riverine, and urban/residential. Each of these communities is briefly described in Section 6. Representative photographs of the project study area are provided in **Appendix B.**

5. RECORDS REVIEW AND FIELD RECONNAISSANCE

5.1. Records Review

Records reviewed for this evaluation consisted of the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) records for special-status plants, animals, and natural communities within a 5-mile radius of the study area; California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants for special-status plants in the Fall River Mills and Hogback Ridge 7.5-minute quadrangles; and U.S. Fish and Wildlife Service (USFWS) records for federally listed, proposed, and candidate plant and animal species with potential to occur in the study area (see **Appendix C**). The National Marine Fisheries Service (NMFS) does not maintain species lists for the project quadrangles because Shasta Dam and Keswick Dam prevent anadromous salmonids in the Sacramento River from accessing spawning/rearing habitat in the Pit River.

5.2. Field Reconnaissance

To determine the presence/absence of special-status species, wetlands, and other waters of the State and United States, field surveys were conducted by ENPLAN biologists on June 17, 2020, and April 6, May 19, June 23, and July 23, 2022. Biological field observations extended up to approximately 100 feet beyond the project site boundaries; these off-site areas were inspected where accessible to evaluate potential indirect impacts to special-status species and their habitats. It should be noted that the locations of sewer laterals on private properties have not been specifically identified. For most of the study area, this limitation is not significant as the affected properties could be viewed from the road rights-of-way, and are primarily developed or significantly disturbed. However, some of the service laterals will extend roughly 500 feet from the nearest public road; these locations will need to be addressed at a later date, once the service lateral locations are better defined. **Mitigation Measure (MM) 1**

has been included to ensure that additional surveys are completed once the service laterals are defined. **Appendix D** includes maps showing areas that were surveyed by the biologists.

The special-status plant species potentially occurring in the survey area would have been identifiable at the time the botanical field evaluation was completed, while some of the special-status animal species potentially occurring in the survey area would not have been evident at the time the fieldwork was conducted. However, determination of the potential presence of the species that would not have been detectable at the time of the field surveys could readily be determined based on observed habitat characteristics.

Based on the results of the intensive field studies, as well as review of aerial imagery, the wildlife study is expected to have been sufficient to identify the potential for special-status wildlife species to be affected by project implementation. With respect to botanical resources, the study confirmed that there is a very low potential for special-status plant species to be encountered in the study corridor; however, subsequent evaluation will be needed once the service lateral locations are selected. With respect to wetlands and other waters, several additional features are expected to occur within the unsurveyed service lateral corridors on private properties. Further field evaluation will be required to ensure complete survey coverage prior to project implementation.

6. NATURAL COMMUNITIES

CNDDB records do not identify any sensitive natural communities within a five-mile radius of the project area. The USFWS does not identify designated critical habitat for federally listed species in the study area or vicinity. As outlined above, the principal natural communities in the study area are annual grassland, barren, sagebrush, stream/riverine, and urban/residential; each habitat type is described below in further detail.

6.1. Habitat Types

Annual grassland. Annual grassland habitat consists largely of non-native annual species. Non-native grasses often outcompete native plant populations. Species composition is largely the result of geographic location and weather. A variety

of animals use annual grassland for foraging and nesting. Such species include the western fence lizard (*Sceloprous occidentalis*), common garter snake (*Thamnophis sirtalis*), western rattlesnake (*Crotalus viridis*), black-tailed jackrabbit (*Lepus californicus*), California vole (*Microtus californicus*), coyote (*Canus latrans*), short-eared owl (*Asio flammeus*), horned lark (*Eremophila alpestris*), northern harrier (*Circus hudsonius*), and American kestrel (*Falco sparverius*).

In the study area, annual grassland is present along roadsides, in previously disturbed areas, and on various residential properties. Species observed in the on-site annual grassland include Shasta popcorn-flower (*Plagiobothrys shastensis*), common dandelion (*Taraxacum officinale*), bindweed (*Convolvulus arvensis*), foxtail chess (*Bromus madritensis*), annual ryegrass (*Festuca perennis*), medusahead (*Elymus caput-medusae*), and western buttercup (*Ranunculus occidentalis*). This community most closely resembles the *Elymus caput-medusae* alliance (42.020.03) described in the CDFW California Natural Communities List, which is not identified as a sensitive natural community.

Barren. Barren habitat is defined by sparse or absent vegetation. The value of barren habitat for wildlife is highly dependent upon structure, substrate, and topography. Many avian species such as killdeer rely on rocks and pebbles to create nests and camouflage their eggs. Cormorants and some hawks use rock ledges as nesting sites, and bank swallows use vertical cliffs to create cavity nests. Similarly, rock crevices provide roosting habitat for many species of bats. Reptiles and ground-dwelling mammals create burrows for protection from prey and for nesting.

In the project site, barren habitat occurs as roadways and along some road shoulders. No wildlife was observed using this habitat type and barren habitat is not considered a sensitive natural community.

Sagebrush. Sagebrush habitat generally occurs on elevated arid plains in areas with cold, harsh winters and hot, dry summers. Sagebrush provides habitat for a variety of terrestrial species including burrowing owl (*Athene cunicularia*), rock wren (*Salpinctes obsoletus*), sage grouse (*Centrocercus urophasianus*), pronghorn (*Antilocapra americana*), and mule deer (*Odocoileus hemionus*).

In the study area, sagebrush habitat primarily occurs surrounding and within the WWTP and north of the Fall River Mills Airport. Species observed includes low sagebrush (*Artemisia arbuscula*), rabbitbrush (*Chrysothamnus* sp.), buckbrush (*Ceanothus cuneatus*), and western juniper (*Juniperus occidentalis*). This community most closely resembles the *Artemisia arbuscula* ssp. *arbuscula* alliance (35.120.07) described in the CDFW California Natural Communities List, which is not identified as a sensitive natural community.

Stream/Riverine. Stream/riverine habitat may be utilized by a variety of fish and wildlife species. Pools and backwater areas also provide breeding habitat for amphibians. Waterfowl forage for aquatic plants and invertebrates in slow-moving sections of riverine habitat. Small mammals such as beaver (*Castor canadensis*), river otter (*Lontra canadensis*), and muskrat (*Ondantra zibethicus*) may build nests in or along riverine habitat. Riverine systems may also provide spawning and rearing habitat for various fish species. Numerous species of macroinvertebrates occur in riverine habitats, often beneath submerged rocks (e.g., stoneflies, mayflies, and caddisflies), in mud (e.g., clams and mussels), or at the water surface (e.g., water striders, backswimmers, water boatmen, and mosquito larvae). Stream habitats are often further enriched by the presence of vegetation along their banks. Overhanging trees and shrubs provide shade and contribute to a decrease in water temperatures. Additionally, roots from trees and fallen vegetation within the stream increase habitat complexity and bank stability, and provide shelter for rearing fish, amphibians, and invertebrates.

In the study area, stream/riverine habitat occurs as an irrigation canal, an intermittent stream, and roadside and constructed ditches. The irrigation canal and intermittent stream flow southwest from where they transect the project area at SR 299 and ultimately discharge to the Pit River. The canal, intermittent stream and roadside ditches are not expected to support fish. Intermittent stream habitat is generally considered to be a sensitive natural community.

Urban/Residential. Urban/Residential habitat is characterized as natural habitat that has been converted to facilitate development or has been substantially altered by planting non-native vegetation. The urban/residential habitat in the study area includes

developed residential properties, the golf course, and miscellaneous commercial/light industrial uses.

This habitat type consists primarily of grasses, horticultural shrubs, and ornamental tree species including pine and spruce. Horticultural vegetation species are interspersed with native and non-native species creating a mosaic of planted and naturally occurring species. This habitat type is of moderate value to wildlife, and is often used by nesting migratory birds, various reptiles, and small mammals. Urban/residential habitat is not considered a sensitive natural community.

6.2 Impacts to Natural Communities

As described above, sensitive natural communities in the project area include an intermittent stream, wetland swale, and a seasonal wetland. **Appendix E** includes maps identifying potential wetlands and other waters of the U.S. and/or State in the study area. Impacts to these features may result from trenching to install sewer pipeline, or sedimentation and erosion due to construction activities adjacent to the features. As such, there is potential for a temporary direct and indirect impacts to these features.

No permanent impacts to sensitive natural communities are anticipated. To the extent feasible, the final design of the improvements will avoid direct impacts to wetlands and other waters. **MM 2** calls for installation of temporary construction fencing or other markers along the outer edge of the construction zone adjacent to wetlands and other sensitive resources to ensure that off-site sensitive resources are not inadvertently affected during project construction. **MM 3** is included to require that a storm water pollution prevention plan (SWPPP) is prepared for the project to reduce impacts to water quality to less than significant.

During the development of final project plans, additional surveys will be required to determine if sensitive natural communities (e.g., wetlands) are present on the private property portions of the study area. **MM 1** has been included to ensure full survey coverage of the final project footprint. The use of BMPs for spill prevention and erosion control, and implementation of **MM 3** would reduce the project's potential impact on sensitive natural communities to a less-than-significant level.

7. SPECIAL-STATUS SPECIES

7.1. Special-Status Plant Species

Review of the U.S. Fish and Wildlife Service (USFWS) species lists (see **Appendix C**) for the project area did not identify any special-status species as having the potential to be affected by the proposed project. The project site does not contain designated critical habitat for federally listed plant species.

Review of California Natural Diversity Database (CNDDB) records (**Table 1**) showed that one special-status plant species have previously been reported in the project area: tufted loosestrife. Eleven additional special-status plants have been mapped within a five-mile radius of the study area: Boggs Lake hedge-hyssop, bristly sedge, eel-grass pondweed, hairy marsh hedge-nettle, Howell's thelypodium, Lemmon's milk-vetch, marsh skullcap, northern slender pondweed, Tracy's eriastrum, watershield, and water star-grass. Additionally, two non-status species have been identified in the search radius: profuse-flowered pogogyne and woolly meadowfoam.

The CNPS Inventory (**Table 2**) for the Fall River Mills and Hogsback Ridge quadrangle identified one additional special-status plant: long-leaved starwort. Four additional non-status species have been recorded in the Fall River Mills and Hogback Ridge quadrangle by CNPS.

Botanical field surveys identified two populations of silvery false lupine (*Thermopsis californica* var. *argentata*) adjacent to the project site near the WWTP northwest of the Fall River Mills Airport. Although silvery false lupine is not considered a special-status species, it is native to California and of a limited distribution (California Rare Plant Rank 4). No mitigation to protect these populations is needed; however, they should be avoided to the extent feasible. **Figure 6** shows the locations of the populations of silvery false lupine.

The majority of the special-status plant species identified by records searches as having potential to be present in the project area are associated with wetland habitats. The project area contains very few locations with suitable habitat for these species; the wetland features that are present are highly disturbed creating a low potential for any special-status plants to be present.

Path: N:\companyfiles\01-Jobs Active\032-80 PACE - McArthur Sewer Project\3-Project GIS\3-Map Documents\Map Sessions\Biological\Figure 2 110822.aprx

All depictions are approximate. Not a survey product. 02.13.23

0 200 Feet

Figure 6

Silvery False Lupine

ENPLAN

Following final project plans, additional surveys are required to determine the presence/absence of special-status plants on private properties within the study area. **MM 1** has been included to ensure that the extended project area is appropriately surveyed for special-status plants. The potential for each of the special-status plant species to occur on the project site is evaluated in **Table 3.** As documented, none of these or any other special-status plant species were observed during the botanical field survey. Included as **Appendix F** is a list of vascular plants observed during the botanical surveys.

7.2. Special-Status Wildlife Species

Review of the USFWS species list for the project area (see **Appendix C**) identified the following federally listed animal species as potentially being affected by the proposed project: monarch butterfly, delta smelt, Shasta crayfish, and northern spotted owl. The USFWS does not identify designated critical habitat in the study area for any federally listed animal species.

Review of CNDDB records showed that four special-status animal species have been previously reported on the proposed project site: bank swallow, American badger, Oregon spotted frog, and western pond turtle. Twelve additional special-status animals have been reported within a five-mile radius of the study area: bald eagle, bigeye marbled sculpin, greater sandhill crane, hardhead, Oregon snowshoe hare, prairie falcon, rough sculpin, Shasta crayfish, Sierra Nevada red fox, Townsend's big-eared bat, tricolored blackbird, and wolverine. Additionally, 13 non-status species have been reported within the search radius: Archimedes pyrg, Great Basin rams-horn, great blue heron, kneecap lanx, montane peaclam, North American porcupine, nugget pebblesnail, osprey, scalloped juga, Sucker Springs pyrg, topaz juga, western pearlshell, and western ridged mussel.

When the locations of private property laterals have been determined, additional surveys will be required to ensure full coverage of the extended project area. **MM** 1 has been included to ensure that the extended project area is appropriately surveyed for special-status animals. The potential for each of the above special-status animal species to occur on the project site is further evaluated in **Table 3**. As documented in

Table 3, three special-status wildlife species have potential to be present in the project site: tricolored blackbird, western pond turtle, and Townsend's big-eared bat.

Tricolored blackbird (*Agelaius tricolor*), Federal Bird of Conservation Concern, State Threatened, and State Species of Special Concern

Fresh emergent and riparian vegetation along the banks of the Fall River at the location of Lift Station 1 provides suitable nesting habitat for tricolored blackbird. Although this habitat is not directly within the project boundary and no riparian vegetation removal is anticipated, the project boundary is adjacent to suitable habitat. Because the lift station improvements are limited to within the existing building, there is no potential for impacts to this species due to project implementation and therefore, no mitigation is warranted.

Western pond turtle (*Emys marmorata*), State Species of Special Concern

Western pond turtle is known to occur in the Fall and Pit Rivers and may nest and/or overwinter along the bank of the rivers. Neither river is expected to be impacted by project implementation, and although Lift Station 1 is located adjacent to the Fall River, construction will be entirely within the existing building and there is a negligible potential for impacts to this species.

Western pond turtles could also potentially be present in the wastewater treatment ponds. Work in and adjacent to the treatment ponds would consist of creating a new aeration basin within one of the existing ponds, and constructing a ~600 square-foot building to house the aeration equipment and controls. The pond would be dewatered prior to construction of the aeration basin and any turtles present would migrate to an active pond. Although no in-water work would occur, there is some potential that turtles could be present on the earthen berms between the ponds or elsewhere in the work area. As called for in **MM 4**, if turtles are observed in the work area, work in the immediate vicinity of the turtle shall be halted until a qualified biologist can move the turtle to a safe location.

Townsend's big-eared bat (*Corynorhinus townsendii*), State Species of Special Concern

Although the project area has low quality roosting habitat for the Townsend's big-eared bat, structures and trees present directly adjacent to the project area could potentially provide roosting and maternity habitat for the bat. This species may forage throughout the project area. Although no roosting habitat would be removed, indirect effects could occur if bats are roosting adjacent to the project area and construction noise causes abandonment of maternity colonies. However, given the proximity of the project area to busy roadways, and residential and commercial land uses, the potential for indirect impacts is less than significant and no mitigation is warranted.

7.3. Migratory Wildlife

In addition to potential impacts to special-status species there is also the potential impacts to wildlife migratory corridors. The majority of work would occur in and adjacent to paved or graveled areas within road ROWs that have minimal potential to serve as wildlife migration corridors. Further, the project does not include installation of fencing or other permanent structures that could impede the movement of wildlife. Temporary impacts to wildlife could occur due to increased human activity, increased noise levels, and temporary loss of vegetation that may provide food and shelter.

Daytime movement of terrestrial wildlife species throughout the study area may be temporarily affected during construction activities; however, this impact is not significant because it would be temporary and wildlife species would be able to alter their routes to move around the construction areas. There is a slight possibility that wildlife could become trapped in open trenches and pipes during construction. **MM 5** is included to prevent the inadvertent entrapment of wildlife, reducing the potential impact to less than significant.

8. NESTING BIRDS

Under the Migratory Bird Treaty Act (MBTA) of 1918, migratory bird species, their nests, and their eggs are protected from injury or death, and any project-related disturbances during the nesting period. In addition, California Fish and Game Code §3503 provides regulatory protection to resident and migratory birds and all birds of prey within the State.

The USFWS identified the following migratory Birds of Conservation Concern as potentially affected by the proposed project: bald eagle, black tern, California Gull, Cassin's finch, Clark's grebe, evening grosbeak, Franklin's gull, lesser yellowlegs, Lewis's woodpecker, rufous hummingbird, and willet.

The project is located within the Pacific Flyway, and it is possible that birds could nest in or adjacent to the study area. Nesting birds, if present, could be directly or indirectly affected by construction activities. Direct effects could include mortality resulting from tree removal and/or construction equipment operating in an area with an active nest with eggs or chicks. Indirect effects could include nest abandonment by adults in response to loud noise levels or human encroachment, or a reduction in the amount of food available to young birds due to changes in feeding behavior by adults.

Construction activities that occur in surfaced roadways and graveled roadways would not directly affect nesting birds because no nesting habitat would be affected. Indirect effects to nearby nesting habitats may include nest abandonment by adults in response to loud noise levels and other human-induced disturbances. In the local area, most birds nest between February 1 and August 31. As required by **MM 6,** the potential for adversely affecting nesting birds can be greatly minimized by removing vegetation and conducting construction activities either before February 1 or after August 31. If this is not possible, a nesting survey shall be conducted within one week prior to removal of vegetation and/or the start of construction.

If active nests are found on the project site, the District shall implement measures to comply with the Migratory Bird Treaty Act and California Fish and Game Code. Compliance measures may include, but are not limited to, exclusion buffers, sound-attenuation measures, seasonal work closures, and biological monitoring.

9. NOXIOUS WEEDS

The introduction and spread of noxious weeds during construction activities has the potential to impact natural habitats. A noxious weed is a plant that has been defined as a pest by federal or state law. In California, the California Department of Food and Agriculture (CDFA, 2021) maintains a list of plants that are considered threats to the well-being of the state. Each noxious weed identified by the CDFA receives a rating that reflects the importance of the pest, the likelihood that eradication or control efforts would be successful, and the present distribution of the pest within the state. Below is a description of ratings categories applied by CDFA:

> **Category A**. A pest of known economic or environmental detriment that is either not known to be established in California or it is present in a limited distribution that allows for the possibility of eradication or successful containment. A-rated pests are prohibited from entering the state because they have been determined to be detrimental to agriculture.
>
> **Category B**. A pest of known economic or environmental detriment and, if present in California, is of limited distribution. B-rated pests are eligible to enter the state if the receiving county has agreed to accept them.
>
> **Category C.** A pest of known economic or environmental detriment and, if present in California, it is usually widespread. C-rated organisms are eligible to enter the state as long as the commodities with which they are associated conform to pest cleanliness standards when found in nursery stock shipments.

According to California Invasive Plant Council (Cal-IPC) records, one of the plant species, downy brome, observed in the project area during the botanical survey has a California Department of Food and Agriculture weed ranking (in Category C). An additional 19 observed plant species were listed with Cal-IPC ratings between “limited” (invasive species with minor ecological impacts on a statewide level or species does not have enough information to justify a higher score) and “high.” As called for in **MM 7**, the potential for introduction and spread of noxious weeds can be avoided/minimized by using only certified weed-free erosion control materials, mulch, and seed; limiting any import or export of fill material to material that is known to be weed free; and requiring the construction contractor to thoroughly wash all equipment at a commercial wash facility prior to entering and upon leaving the job site.

10. CONCLUSIONS AND RECOMMENDATIONS

Based on the records search results, field observations, and the above analyses, we find that the proposed project would temporarily impact wetlands and other waters, has the potential to affect nesting birds (if present), could result in the introduction and spread of noxious weeds, and could result in entrapment of wildlife in open trenches or pipes during project construction. Additionally, there is a low potential that additional sensitive biological resources could be identified during subsequent biological surveys conducted concurrently with preparation of final plans. However, implementation of conditions of regulatory agency permits, use of BMPs for spill prevention and erosion control, and implementation of the following mitigation measures would reduce the proposed project's potential impacts on biological resources to a less-than-significant level.

Mitigation Measure 1: Conduct Additional Field Surveys

In conjunction with preparation of improvement plans for the project, the project engineer shall identify all improvements that would occur outside of the area that was surveyed for special-status plants, special-status animals, and wetlands and waters of the U.S. and State (refer to Appendix D, Survey Coverage Maps, of this Biological Study Report).

All areas within the project footprint that were not previously surveyed shall be surveyed by a qualified biologist. The biologist shall consult with the U.S. Army Corps of Engineers, Central Valley Regional Water Quality Control Board, California Department of Fish and Wildlife, and other applicable agencies to determine required resource agency permits and permit conditions. Any mitigation requirements shall be satisfied prior to commencement of earth-disturbing activities or as otherwise specified in applicable resource agency permits.

Mitigation Measure 2: Avoid Impacts to Wetlands and Other Waters

High-visibility fencing, flagging, or other markers shall be installed along the outer edge of the construction zone adjacent to wetlands and other sensitive biological resources designated for avoidance. The fencing location shall be determined by a qualified biologist in consultation with the project engineer and the Fall River Valley Community Services District. No construction activities (e.g., clearing, grading, trenching, etc.), including vehicle parking and materials stockpiling, shall occur within the fenced area. The exclusionary fencing shall be periodically inspected during construction activities to ensure that the fencing is properly maintained. The fencing shall be removed upon completion of work.

Mitigation Measure 3: Avoid Indirect Impacts to Downstream Waters

Best Management Practices for soil stabilization, sediment control, and spill prevention shall be implemented throughout the duration of the project to ensure that sediment/pollutant transport into streams is minimized, which will in turn minimize the potential for adverse impacts to water quality. These BMPs shall be specified in the storm water pollution prevention plan to be prepared for the project. Other erosion control and spill prevention measures required by the California Department of Fish and Wildlife, U.S. Army Corps of Engineers, and/or the Regional Water Quality Control Board shall also be implemented.

Mitigation Measure 4: Avoid Western Pond Turtles

If a western pond turtle is observed in the work area, a qualified biologist shall be contacted and construction activities shall be halted within 25 feet of the turtle until the turtle is confirmed to have left the project area or is relocated by a qualified biologist.

Mitigation Measure 5: Avoid Wildlife Entrapment

To prevent the inadvertent entrapment of wildlife, the construction contractor shall ensure that, at the end of each workday, trenches and other excavations that are over one foot deep have been backfilled or covered with plywood or other hard material. If backfilling or covering is not feasible, one or more wildlife escape ramps constructed of earth fill or wooden planks shall be installed in the open trench. Pipes shall be inspected for wildlife prior to capping, moving, or placing backfill over the pipes to ensure that animals have not been trapped. If animals have been trapped, they shall be allowed to leave the area unharmed.

Mitigation Measure 6: Avoid Effects to Nesting Birds

In order to avoid impacts to nesting birds and raptors protected under the federal Migratory Bird Treaty Act and California Fish and Game Code §3503 and §3503.5, including their nests and eggs, one of the following shall be implemented:

- Vegetation removal and other ground-disturbance activities associated with construction shall occur between September 1 and January 31 when birds are not nesting; or
- If vegetation removal or ground disturbance activities occur during the nesting season, a pre-construction nesting survey shall be conducted by a qualified biologist to identify active nests in and adjacent to the work area.

  The survey shall take into account acoustic impacts and line-of-sight disturbances occurring as a result of the project in order to determine a sufficient survey radius to avoid nesting birds. At a minimum, the survey report shall include a description of the area surveyed, date and time of the survey, ambient conditions, bird species observed in the area, a description of any active nests observed, any evidence of breeding behaviors (e.g., courtship, carrying nest materials or food, etc.), and a description of any outstanding conditions that may

have impacted the survey results (e.g., weather conditions, excess noise, the presence of predators, etc.).

The results of the survey shall be submitted to the California Department of Fish and Wildlife upon completion. The survey shall be conducted no more than one week prior to the initiation of construction. If construction activities are delayed or suspended for more than one week after the pre-construction survey, the site shall be resurveyed.

If active nests are found, appropriate actions shall be implemented to ensure compliance with the Migratory Bird Treaty Act and California Fish and Game Code. Compliance measures may include, but are not limited to, exclusion buffers, sound-attenuation measures, seasonal work closures based on the known biology and life history of the species identified in the survey, as well as ongoing monitoring by biologists.

Mitigation Measure 7: Minimize the Introduction and Spread of Noxious Weeds

The potential for introduction and spread of noxious weeds shall be avoided/minimized by:

a. Using only certified weed-free erosion control materials, mulch, and seed;
b. Limiting any import or export of fill material to material that is known to be weed free; and
c. Requiring the construction contractor to thoroughly wash all equipment at a commercial wash facility prior to entering the job site and upon leaving the job site.

11. REFERENCES CITED

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TABLES

TABLE 1
CNDDB Report Summary
FRVCSD Wastewater System Expansion Project; Five-Mile Radius of Project Area
February 2023

Listed Element	Quadrangle						Status [2]
	CA	CM	DA	FRM	HR	PI	
ANIMALS							
American badger				●			SSSC
Archimedes pyrg	●			●			None
Bald eagle	●		●	●	●		FBCC, FD, SE, SFP
Bank swallow				●			ST
Bigeye marbled sculpin				●			SSSC
Great Basin rams-horn			●	●			None
Great blue heron				●			None
Greater sandhill crane				●		●	SFP, ST
Hardhead				●	●		SSSC
Kneecap lanx	●			●	●		None
Montane peaclam				●	●		None
North American porcupine						●	None
Nugget pebblesnail				●	●		None
Oregon snowshoe hare					●		SSSC
Oregon spotted frog				●			FT, SSSC
Osprey	●				●		WL
Prairie falcon		●					WL
Rough sculpin	●			●			SFP, ST
Scalloped juga	●				●		None
Shasta crayfish	●			●	●		FE, SE
Sierra Nevada red fox						●	ST
Sucker Springs pyrg	●						None
Topaz juga			●				None
Townsend's big-eared bat	●						SSSC
Tricolored blackbird			●	●			SSSC, ST
Western pearlshell	●				●		None
Western pond turtle	●			●	●		SSSC
Western ridged mussel	●			●	●		None
Wolverine				●			FPT, SFP, ST

Listed Element	Quadrangle						Status [2]
	CA	CM	DA	FRM	HR	PI	
PLANTS							
Boggs Lake hedge-hyssop		●				●	SE, 1B.2
Bristly sedge				●			2B.1
Eel-grass pondweed	●						2B.2
Hairy marsh hedge-nettle				●			2B.3
Howell's thelypodium						●	1B.2
Lemmon's milk-vetch				●			1B.2
Marsh skullcap				●			2B.2
Northern slender pondweed	●						2B.2
Profuse-flowered pogogyne				●			4.2
Tracy's eriastrum					●		SR, 3.2
Tufted loosestrife				●			2B.3
Water star-grass				●			2B.2
Watershield				●			2B.3
Woolly meadowfoam			●				4.2

Highlighting denotes the quadrangle in which the project site is located
*Denotes species on the project site

[1]QUADRANGLE CODE

FRM	Fall River Mills	DA	Dana
HR	Hogback Ridge	PI	Pittville
CM	Coble Mountain	CA	Cassel

[2]STATUS CODES

Federal

FE	Federally Listed – Endangered
FT	Federally Listed – Threatened
FC	Federal Candidate Species
FP	Federal Proposed Species
FD	Federally Delisted
FSC	Federal Species of Concern
FBCC	Federal Bird of Conservation Concern

State

SFP	State Fully Protected
SR	State Rare
SE	State Listed – Endangered
ST	State Listed – Threatened
SC	State Candidate Species
SD	State Delisted
SSSC	State Species of Special Concern
WL	Watch List

Rare Plant Rank

1A	Plants Presumed Extinct in California
1B	Plants Rare, Threatened or Endangered in California and Elsewhere
2	Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere
3	Plants About Which We Need More Information *(A Review List)* (generally not considered special-status, unless unusual circumstances warrant)
4	Plants of Limited Distribution *(A Watch List)* (generally not considered special-status, unless unusual circumstances warrant)

Rare Plant Threat Ranks

0.1 Seriously Threatened in California

0.2 Fairly Threatened in California

0.3 Not Very Threatened in California

TABLE 2
California Native Plant Society
Inventory of Rare and Endangered Plants
U.S. Geological Survey's Fall River Mills and Hogback Ridge 7.5-minute Quadrangles

Common Name	Scientific Name	CA Rare Plant Rank	Blooming Period	State Listing Status	Federal Listing Status
Baker cypress	*Hesperocyparis bakeri*	4.2	–	None	None
Bristly sedge	*Carex comosa*	2B.1	May- Sep	None	None
Castlegar hawthorne	*Crataegus castlegarensis*	3	May-Jun (Jul)	None	None
Hairy marsh hedge-nettle	*Stachys pilosa*	2B.3	Jun-Aug	None	None
Lemmon's milk-vetch	*Astragalus lemmonii*	1B.2	May-Aug (Sep)	None	None
Long-leaved starwort	*Stellaria longifolia*	2B.2	May-Aug	None	None
Marsh skullcap	*Scutellaria galericulata*	2B.2	Jun-Sep	None	None
Northern slender pondweed	*Stuckenia filiformis* ssp. *alpine*	2B.2	May-Jul	None	None
Profuse-flowered pogogyne	*Pogogyne floribunda*	4.2	May-Sep (Oct)	None	None
Susanville milk-vetch	*Astragalus inversus*	4.3	May-Sep	None	None
Tehama navarretia	*Navarretia heterandra*	4.3	Apr-Jun	None	None
Tracy's eriastrum	*Eriastrum tracyi*	3.2	May-Jul	Rare	None
Tufted loosestrife	*Lysimachia thyrsiflora*	2B.3	May-Aug	None	None
Water star-grass	*Heteranthera dubia*	2B.2	Jul-Oct	None	None
Watershield	*Brasenia schreberi*	2B.3	Jun-Sep	None	None

Rare Plant Rank	
1A	Plants Presumed Extinct in California
1B	Plants Rare, Threatened or Endangered in California and Elsewhere
2	Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere
3	Plants About Which We Need More Information – A Review List (generally not considered special-status, unless unusual circumstances warrant)
4	Plants of Limited Distribution – A Watch List (generally not considered special-status, unless unusual circumstances warrant)
Rare Plant Threat Rank	
0.1	Seriously Threatened in California
0.2	Fairly Threatened in California
0.3	Not Very Threatened in California

Source: *California Native Plant Society, Rare Plant Program. 2023. Inventory of Rare and Endangered Plants of California (online edition, v9.5). http://www.rareplants.cnps.org. Accessed February 2023.*

TABLE 3
Potential for Special-Status Species to Occur on the Project Site
FRVCSD Wastewater System Expansion Project
February 2023

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	GENERAL HABITAT DESCRIPTION	HABITAT PRESENT (Y/N)	CRITICAL HABITAT PRESENT (Y/N)	SPECIES PRESENT (Y/N/POT.)	RATIONALE/COMMENTS
PLANTS							
Boggs Lake hedge-hyssop	*Gratiola heterosepala*	SE, 1B.2	Boggs Lake hedge-hyssop is an annual herb that occurs in vernal pools, along marshes and swamps, and in mudflats with wet clay soil. This species is reported from 30 to 7,800 feet in elevation. The flowering period is April through August.	No	No	No	Suitable habitat for Boggs Lake hedge-hyssop is not present in or adjacent to the project area, and the species was not observed during the botanical surveys; therefore, the species is not expected to be present in the project site.
Bristly sedge	*Carex comosa*	2B.1	Bristly sedge is a perennial rhizomatous herb that occurs in coastal prairie, marshes and swamps, or valley and foothill grassland. This species is reported from sea level to 3,300 feet in elevation. The flowering period is May through September.	No	No	No	Suitable habitat for bristly sedge is not present in or adjacent to the project area, and the species was not observed during the botanical surveys; therefore, the species is not expected to be present in the project site.
Eel-grass pondweed	*Potamogeton zosteriformis*	2B.2	Eel-grass pondweed is an aquatic annual herb that occurs in ponds, lakes, and streams. This species is reported from sea level to 7,000 feet in elevation. The flowering period is June through July.	No	No	No	Suitable habitat for eel-grass pondweed is not present in or adjacent to the project area, and the species was not observed during the botanical surveys; therefore, the species is not expected to be present in the project site.
Hairy marsh hedge-nettle	*Stachys pilosa*	2B.3	Hairy marsh hedge-nettle is a perennial rhizomatous herb that occurs in mesic sites within meadow/seep and Great Basin scrub habitats. This species is reported between 3,900 and 5,800 feet in elevation. The flowering period is June through August.	No	No	No	Suitable habitat for hairy marsh hedge-nettle is not present in or adjacent to the project area, and the species was not observed during the botanical surveys; therefore, the species is not expected to be present in the project site.

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FRVCSD Wastewater System Expansion Project
February 2023

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	GENERAL HABITAT DESCRIPTION	HABITAT PRESENT (Y/N)	CRITICAL HABITAT PRESENT (Y/N)	SPECIES PRESENT (Y/N/POT.)	RATIONALE/COMMENTS
Howell's thelypodium	*Thelypodium howellii* ssp. *howellii*	1B.2	Howell's thelypodium is a perennial herb that occurs in seeps and moist alkaline meadows within Great Basin scrub habitat. This species is reported between 3,900 and 6,000 feet in elevation. The flowering period is May through July.	No	No	No	Suitable habitat for Howell's thelypodium is not present in the project area, and the species was not observed during the botanical surveys; therefore, the species is not expected to be present in or adjacent to the project site.
Lemmon's milk-vetch	*Astragalus lemmonii*	1B.2	Lemmon's milk-vetch is a perennial herb that occurs in meadows, marshes, swamps, and seeps within Great Basin scrub habitats between 3,300 and 7,200 feet in elevation. The flowering period is May through August.	No	No	No	Suitable habitat for Lemmon's milk-vetch is not present in the project area, and the species was not observed during the botanical surveys; therefore, the species is not expected to be present in or adjacent to the project site.
Long-leaved starwort	*Stellaria longifolia*	2B.2	Long-leaved starwort is a perennial rhizomatous herb that occurs in bogs and fens, meadows and seeps, riparian woodland, and upper montane coniferous forest. The species is reported between 3,000 and 6,000 feet in elevation. The flowering period is May through August.	No	No	No	Suitable habitat for long-leaved starwort is not present in the project area, and the species was not observed during the botanical surveys; therefore, the species is not expected to be present in or adjacent to the project site.
Marsh skullcap	*Scutellaria galericulata*	2B.2	Marsh skullcap is a perennial rhizomatous herb that occurs in wetlands within meadow/seep, lower montane coniferous forest, and marsh/swamp habitats. The species is reported from sea level to 7,000 feet. The flowering period is June through September.	No	No	No	Suitable habitat for marsh skullcap is not present in the project area, and the species was not observed during the botanical surveys; therefore, the species is not expected to be present in or adjacent to the project site.

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FRVCSD Wastewater System Expansion Project
February 2023

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	GENERAL HABITAT DESCRIPTION	HABITAT PRESENT (Y/N)	CRITICAL HABITAT PRESENT (Y/N)	SPECIES PRESENT (Y/N/POT.)	RATIONALE/COMMENTS
Northern slender pondweed	*Stuckenia filiformis* ssp. *alpina*	2B.2	The northern slender pondweed is an aquatic perennial rhizomatous herb that occurs in lakes, ponds, streams, and drainages. The species is reported between 900 and 7,100 feet in elevation. The flowering period is May through July.	No	No	No	Suitable habitat for northern slender pondweed is not present in the project area, and the species was not observed during the botanical surveys; therefore, the species is not expected to be present in or adjacent to the project site.
Tracy's eriastrum	*Eriastrum tracyi*	SR, 3.2	Tracy's eriastrum is an annual herb that occurs in in chaparral, cismontane woodland, and valley grassland habitats. The species is reported between 1,000 and 5,900 feet in elevation. The flowering period is primarily in May through July.	Yes	No	No	Suitable habitat for Tracy's eriastrum is present in the project area; however, this species was not observed during the botanical surveys and would not be present in the project site.
Tufted loosestrife	*Lysimachia thyrsiflora*	2B.3	Tufted loosestrife is a perennial herb that occurs on lake margins, streamsides, and in wet meadows. The species is reported between 3,200 and 5,500 feet in elevation. The flowering period is May through August.	No	No	No	Suitable habitat for tufted loosestrife is not present in the project area, and the species was not observed during the botanical surveys; therefore, tufted loosestrife is not expected to be present in or adjacent to the project site.
Water star-grass	*Heteranthera dubia*	2B.2	Water star-grass is an aquatic perennial herb that occurs in still or slow-moving water with a water PH of 7 or greater. The species is reported between 100 and 5,000 feet in elevation. The flowering period is July through October.	No	No	No	Suitable habitat for water star-grass is not present in the project area, and the species was not observed during the botanical surveys; therefore, water star-grass is not expected to be present in or adjacent to the project site.

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FRVCSD Wastewater System Expansion Project
February 2023

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	GENERAL HABITAT DESCRIPTION	HABITAT PRESENT (Y/N)	CRITICAL HABITAT PRESENT (Y/N)	SPECIES PRESENT (Y/N/POT.)	RATIONALE/COMMENTS
Watershield	*Brasenia schreberi*	2B.3	Watershield is an aquatic perennial rhizomatous herb that occurs in lakes and ponds. The species is reported between sea level and 7,300 feet in elevation. The flowering period is June through September.	No	No	No	Suitable habitat for watershield is not present in the project area, and the species was not observed during the botanical surveys; therefore, watershield is not expected to be present in or adjacent to the project site.
CRUSTACEANS							
Shasta crayfish	*Pacifastacus fortis*	FE, SE	Shasta crayfish inhabit sections of the Pit River, Fall River, Hat Creek, and tributary streams and springs that are characterized by cool, clear water, low gradient, and a substrate consisting of volcanic rubble on sand and/or gravel.	No	No	No	No suitable habitat for Shasta crayfish is present in the project site. Therefore, Shasta crayfish would not be present.
BIRDS							
Bald eagle	*Haliaeetus leucocephalus*	FBCC, FD, SE, SFP	Bald eagles nest in large, old-growth trees or snags in mixed stands near open bodies of water. Adults tend to use the same breeding areas year after year and often use the same nest, though a breeding area may include one or more alternate nests. Bald eagles usually do not begin nesting if human disturbance is evident. In California, the bald eagle nesting season is from February through July.	No	No	No	No suitable nesting habitat for bald eagles is present in the project site and no nests were observed during the biological field survey. Thus, bald eagles are not expected to nest in or adjacent to the project site.
Bank swallow	*Riparia riparia*	ST	Bank swallows require vertical banks and cliffs with fine-textured or sandy soils near streams, rivers, ponds, lakes, or the ocean for nesting. In California, the bank swallow nesting season is from February through August.	No	No	No	The project area does not contain vertical cliffs essential for bank swallow nesting. Therefore, there is no potential for this species to nest in or adjacent to the project site.

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FRVCSD Wastewater System Expansion Project
February 2023

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Greater sandhill crane	*Antigone canadensis tabida*	SFP, ST	Greater sandhill cranes nest in wetland habitats near grain fields in northeastern California. Nests generally consist of large mounds of vegetation in shallow water. Shallow islands bordered by tules and cattails are ideal nesting sites; natural hummocks or muskrat houses may also be used as nest sites.	No	No	No	The project site is not located near wetlands providing nesting habitat for greater sandhill cranes. Therefore, this species is not expected to nest in or adjacent to the project site.
Northern spotted owl	*Strix occidentalis caurina*	FT, ST	Northern spotted owls inhabit dense, old-growth, multi-layered mixed conifer, redwood, and Douglas-fir forests from sea level to approximately 7,600 feet in elevation. Northern spotted owls typically nest in tree cavities, the broken tops of trees, or in snags. The nesting season is March through June.	No	No	No	No old-growth forest or potentially suitable nesting trees/snags are present in the project area. Thus, the spotted owl would not nest in or adjacent to the project site.
Tricolored blackbird	*Agelaius tricolor*	SSSC, ST	Tricolored blackbirds are colonial nesters and generally nest near open water. Nesting areas must be large enough to support a minimum colony of about 50 pairs. Tricolored blackbirds generally construct nests in dense cattails or tules, although they can also nest in thickets of willow, blackberry, wild rose, and tall herbs. The breeding season is March 15 to August 10.	Yes	No	Pot.	Fresh emergent and riparian vegetation along the banks of the Fall River adjacent to Lift Station 1 provide suitable nesting habitat for tricolored blackbirds; however, improvements at Lift Station 1 are limited to replacing equipment within the existing building. Even if nesting tricolored blackbirds are present, they would not be adversely affected by project implementation.

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FRVCSD Wastewater System Expansion Project
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AMPHIBIANS							
Oregon spotted frog	*Rana pretiosa*	FT, SSSC	Oregon spotted frogs are typically found in or near a perennial body of water that includes zones of shallow water and abundant emergent or floating aquatic plants, which the frogs use as basking sites and for escape cover. The frog prefers large, warm marshes (approximate minimum size of 9 acres), and is thought to be extirpated from California.	No	No	No	The Oregon spotted frog is presumed extirpated from California with the exception of potential isolated populations in the Warner Mountains in Modoc County. The Oregon spotted frog would thus not be present.
REPTILES							
Western pond turtle	*Emys marmorata*	SSSC	The western pond turtle associates with permanent or nearly permanent water in a variety of habitats. This turtle is typically found in quiet water environments. Pond turtles require basking sites such as partially submerged logs, rocks, or open mud banks, and suitable (sandy banks or grassy open fields) upland habitat for egg-laying. Nesting and courtship occur during spring. Nests are generally constructed within 500 feet of a waterbody, but some nests have been found up to 1,200 feet away. Pond turtles leave aquatic sites in the fall and overwinter in uplands nearby. Pond turtles return to aquatic sites in spring.	Yes	No	Pot.	Western pond turtles are known to occur in the Fall and Pit Rivers and may be present in the wastewater treatment ponds. Although no in-water work would occur, it is possible that migrating or nesting turtles could be encountered in uplands, particularly near the wastewater treatment ponds. If turtles are observed in the work area, all work in the vicinity should be halted until a qualified biologist can relocate the turtle to a safe location outside the work area.

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February 2023

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INSECTS							
Monarch butterfly	*Danaus plexippus*	FC	The western population of monarch butterflies overwinters on the California Coast, Baja California, and to some extent the central Mexico mountains. The butterflies leave their winter habitats in February and March, and reach the northern limits of their range in California, Oregon, Washington, Idaho, and Nevada, in early to mid-June. Eggs are laid singly on milkweed plants within their breeding range. Once hatched, larva reach the adult stage in 20 to 35 days; most adults live 2 to 5 weeks. Several generations can be produced within one season, with the last generation beginning migration to their overwintering range in August and September, where they live between 6 and 9 months before migrating north.	No	No	Pot.	Monarch butterflies rely on milkweed plants for reproduction, and on various flowering species for nectar as adults. No milkweeds were observed in the project area during the botanical survey, nor does the project site possess an abundance of floral resources. Although monarch butterflies may migrate through the area, they would not be affected by project implementation.
FISH							
Bigeye marbled sculpin	*Cottus klmathensis macrops*	SSSC	Bigeye marbled sculpins generally inhabit large, clear, cold, spring-fed streams in the Pit River and Fall River basins, and are occasionally found in reservoirs. Bigeye marbled sculpins are often found in areas with aquatic vegetation and coarse substrates.	No	No	No	No suitable habitat for bigeye marbled sculpin is present in or adjacent to the project site. Thus, this species would not be adversely affected by project implementation.
Delta smelt	*Hypomesus transpacificus*	ST	Delta smelt primarily inhabit the brackish waters of Sacramento-San Joaquin River Delta, typically with temperatures below 25 degrees Celsius. Most spawning occurs in shallow, fresh, or slightly brackish backwater sloughs and channel edgewaters with good water quality.	No	No	No	The project site is well outside the range for Delta smelt. The Delta smelt would thus not be present.

TABLE 3
Potential for Special-Status Species to Occur on the Project Site
FRVCSD Wastewater System Expansion Project
February 2023

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Hardhead	*Mylopharodon conocephalus*	SSSC	Hardhead inhabit low to mid-elevation streams in the Sacramento River, San Joaquin River, and Russian River watersheds. Hardhead spawn in clear, deep pools, with rock substrate and low water flow.	No	No	No	No suitable habitat for hardhead is present in or adjacent to the project site. Thus, this species would not be adversely affected by project implementation.
Rough sculpin	*Cottus asperrimus*	FT, SFP	Rough sculpins are restricted to the Hat Creek and Fall River drainages, as well as the Pit River, from Lake Britton to just downstream of the Pit 1 Powerhouse. Rough sculpins are generally found in large spring-fed streams where water is cool, deep, rapidly flowing, and clear. This sculpin is often found in areas with gravel or sand bottoms and beds of aquatic vegetation. Nests are constructed in a variety of habitats, including riffles, pools, and in the vicinity of springs.	No	No	No	No suitable habitat for rough sculpin is present in or adjacent to the project site. Thus, this species would not be adversely affected by project implementation.
MAMMALS							
American badger	*Taxidea taxus*	SSSC	American badgers are most commonly found in grassland, shrubsteppe, desert, dry forest, parkland, and agricultural areas. Badgers dig burrows in dry, sandy soil, usually in areas with sparse overstory.	No	No	No	The project area has a high level of human activity, which minimizes the potential for American badgers to be present. Additionally, a field survey did not detect any evidence of the species' presence. Therefore, American badgers are not expected to occur in or adjacent to the project site.

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FRVCSD Wastewater System Expansion Project
February 2023

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	GENERAL HABITAT DESCRIPTION	HABITAT PRESENT (Y/N)	CRITICAL HABITAT PRESENT (Y/N)	SPECIES PRESENT (Y/N/POT.)	RATIONALE/COMMENTS
Oregon snowshoe hare	*Lepus americanus klamathensis*	SSSC	Oregon snowshoe hares primarily inhabit boreal forests and upper montane forests, typically favoring dense shrub layers. The species has also been found to inhabit mature conifers, immature conifers, cedar swamps, and brush patches of dense shrub.	No	No	No	The project area does not contain suitable habitat for the Oregon snowshoe hare; therefore, this species is not expected to be present in or adjacent to the study area.
Sierra Nevada red fox	*Vulpes vulpes necator*	ST	The Sierra Nevada red fox inhabits remote mountainous areas where encounters with humans are rare. Preferred habitat appears to be red fir and lodgepole pine forests in the subalpine and alpine zones of the Sierra Nevada. This species may hunt in forest openings, meadows, and barren rocky areas associated with its high elevation habitats.	No	No	No	The project area does not contain suitable habitat for the Sierra Nevada red fox; therefore, this species is not expected to be present in or adjacent to the study area.
Townsend's big-eared bat	*Corynorhinus townsendii*	SSSC	Townsend's big-eared bat is found in a variety of habitats from sea level to upper montane coniferous forest and may be found in any season. The species is most abundant in mesic habitats. The bat requires caves, mines, tunnels, buildings, or other cave-like human-made structures for roosting. This bat is especially sensitive to disturbance of roosting sites, and a single disturbance event may result in abandonment of the roost site.	No	No	Pot.	Although Townsend's big-eared bats may forage in the project area, no suitable roosting habitat is present. Townsend's big-eared bat would not be adversely affected by project implementation.

TABLE 3
Potential for Special-Status Species to Occur on the Project Site
FRVCSD Wastewater System Expansion Project
February 2023

COMMON NAME	SCIENTIFIC NAME	STATUS[1]	GENERAL HABITAT DESCRIPTION	HABITAT PRESENT (Y/N)	CRITICAL HABITAT PRESENT (Y/N)	SPECIES PRESENT (Y/N/POT.)	RATIONALE/COMMENTS
Wolverine	*Gulo gulo*	FPT, SFP, ST	Wolverines are dependent on areas in high mountains, near the tree-line, where conditions are cold year-round and snow cover persists well into May. Females use birthing dens that are excavated in snow. Persistent, stable snow greater than 1.5 meters deep appears to be a requirement for birthing dens. Birthing dens may occur on rocky sites, such as north-facing boulder talus or subalpine cirques. Wolverines are very sensitive to human activities and often abandon den sites in response to human disturbance.	No	No	No	Due to environmental conditions and the high level of human activity in the project area, the wolverine is not expected to be present in the project area.

[1] Status Codes

Federal:

FE	Federally Listed – Endangered
FT	Federally Listed – Threatened
FC	Federal Candidate Species
FP	Federal Proposed Species
FD	Federal Delisted
FBCC	Federal Bird of Conservation Concern

State:

SFP	State Fully Protected
SR	State Rare
SE	State Listed - Endangered
ST	State Listed - Threatened
SC	State Candidate Species
SCE	State Candidate Endangered
SSSC	State Species of Special Concern

Rare Plant Rank

1A	Plants Presumed Extinct in California
1B	Plants Rare, Threatened or Endangered in California and Elsewhere
2A	Presumed Extirpated in California, but More Common Elsewhere
2B	Rare or Endangered in California, but More Common Elsewhere

Rare Plant Threat Rank

0.1	Seriously Threatened in California
0.2	Fairly Threatened in California
0.3	Not Very Threatened in California

TABLE 4

Potential to Occur: Migratory Birds of Conservation Concern Identified by the U.S. Fish and Wildlife Service

FRVCSD Wastewater System Expansion Project – February 2023

Common Name	Scientific Name	General Habitat Description	Nesting Habitat Present (Y/N)?	Species Present (Y/N/POT.)	Rationale/Comments
American White Pelican	*Pelecanus erythrorhynchos*	American white pelicans are colonial nesters on large interior lakes, which provide safe roosting and breeding places in the form of well-sequestered islets.	No	No	Although eBird records show that American white pelicans have been sighted on several occasions near Fall River Lake, there is no suitable nesting habitat in the project site. Therefore, they are not expected to nest within the project area.
Bald Eagle	*Haliaeetus leucocephalus*	Bald eagles nest in large, old-growth trees or snags in mixed stands near open bodies of water. Adults tend to use the same breeding areas year after year and often use the same nest, though a breeding area may include one or more alternate nests. Bald eagles usually do not begin nesting if human disturbance is evident. In California, the bald eagle nesting season is from February through July.	No	No	The project site does not support old growth forests near open bodies of water. Although eBird records show that bald eagles have been sighted in the project vicinity on numerous occasions, they are not expected to nest in the project area.
Black Tern	*Chlidonias niger*	Black terns nest primarily in freshwater wetlands on the Modoc Plateau, although some nesting occurs in the Central Valley. Black terns breed from May through August. Nests are built atop loose mats of dead plant stems, anchored to standing vegetation, or floating on the water surface. Black terns may also nest in abandoned muskrat dens or waterfowl nests.	Yes	Pot.	eBird records show that black terns are infrequently sighted and are known to nest in Fall River Mills. Because freshwater wetlands are present at the Fall River Mills WWTP in the project area, black terns have a low potential to nest on the project site.
California Gull	*Larus californicus*	California gulls primarily breed on sparsely vegetated islands and levees in inland lakes and rivers, and also in salt ponds in the San Francisco Bay Area. Breeding colonies range in elevation from sea level to 9,000 feet and are usually surrounded by water to prevent predators from reaching the nests. They tend to avoid heavily forested areas. In the winter, they forage along the Pacific Coast, using mudflats, rocky shorelines, beaches, estuaries, and river deltas.	No	Pot.	Although eBird records show that the California gull has been sighted on several occasions around Fall River Mills and McArthur, this area is outside of the nesting range for the California gull. Therefore, they are not expected to nest within the project area.

TABLE 4

Potential to Occur: Migratory Birds of Conservation Concern Identified by the U.S. Fish and Wildlife Service

FRVCSD Wastewater System Expansion Project – February 2023

Common Name	Scientific Name	General Habitat Description	Nesting Habitat Present (Y/N)?	Species Present (Y/N/POT.)	Rationale/Comments
Cassin's Finch	*Carpodacus cassinii*	Habitats include conifers in high mountains as well as lower levels in winter. Cassin's finches breed mostly in montane forests of conifers, especially spruce and fir, also in pine and Douglas-fir in some areas and sometimes in pinon-juniper woods. They are found at very high elevations, near the tree line in mountains. They spend winters in montane forests of conifers and sometimes in open woods of lower valleys. The breeding season is May 15 to July 15.	No	No	Although eBird records show that Cassin's finches have been sighted within the total project vicinity, no suitable nesting habitat is present in the project site. Therefore, they are not expected to nest within the project area.
Clark's Grebe	*Aechmophorus clarkii*	Clark's grebes inhabit lakes, marshes, and bays. During the winter, they also occur along seacoasts. Clark's grebes nest on large inland lakes over shallow water on floating platforms of vegetation. The breeding season is January 1 to December 31.	No	No	eBird records show that Clark's grebes have been sighted within the Fall River Valley, however the project site does not contain nesting habitat for this species. Therefore, the Clark's grebe is not expected to nest on the project site.
Evening Grosbeak	*Coccothraustes vespertinus*	Evening grosbeaks breed and forage mostly in mixed conifer and red fir habitats, and usually nest in dense, mature conifer forests dominated by firs. The evening grosbeak breeding season lasts from early June into late August, with a peak in July; however, they are highly unpredictable in distribution and abundance, even in the breeding season.	No	Pot.	eBird records show that evening grosbeaks have occasionally been observed in the Fall River Mills area. Because the project site does not contain dense, mature conifer forests, evening grosbeaks are not expected to nest in the project site.
Franklin's Gull	*Leucophaeus pipixcan*	Franklin's gulls nest in freshwater marshes, bays, and other wetlands. During breeding season, the species forages primarily for insects and small amounts of vegetation.	No	No	There are no sightings of Franklin's gulls and there is no suitable nesting habitat within the project vicinity. They are not expected to nest within the project area.
Lesser Yellowlegs	*Tringa flavipes*	Lesser yellowlegs breed in Alaska and northern Canada in open woodland clearings or burned-over areas, usually close to grassy wetlands. During migration, the species travels to the outer California coast and adjacent coastal lowlands, the Central Valley, Great Basin, and Salton Sea. The species forages along shallow lacustrine, wet meadow, and estuarine mudflat habitats.	No	Pot.	Although eBird records show that lesser yellowlegs are infrequently sighted in Fall River Mills, the project site is located outside the known breeding range for this species. Therefore, there is no potential for the lesser yellowlegs to nest in the project area.

TABLE 4

Potential to Occur: Migratory Birds of Conservation Concern Identified by the U.S. Fish and Wildlife Service

FRVCSD Wastewater System Expansion Project – February 2023

Common Name	Scientific Name	General Habitat Description	Nesting Habitat Present (Y/N)?	Species Present (Y/N/POT.)	Rationale/Comments
Lewis's Woodpecker	*Melanerpes lewis*	Habitats for Lewis's woodpeckers include open ponderosa pine forest, pinyon-juniper forest, open riparian woodland dominated by cottonwood, and logged or burned pine forest. The woodpeckers' breeding distribution is widely associated with ponderosa pine distribution in western North America. The breeding season for the Lewis's woodpecker is April 20 to September 30.	Yes	Pot.	eBird records show that Lewis's woodpeckers are occasionally observed in the Fall River Valley. Nesting habitat on the project site includes holes and crevices in dead/decaying trees or other wooden structures. Therefore, Lewis's woodpeckers have potential to nest in the project site.
Rufous Hummingbird	*Selasphorus rufus*	Rufous hummingbirds typically breed in open or shrubby areas in mountain meadows up to 12,600 feet in elevation. They put their nests up to 30 feet high in coniferous or deciduous trees, hidden in drooping branches. Throughout migration, they pass through mountain meadows where nectar-rich, tubular flowers are blooming. The breeding season is April 15 to July 15.	No	Pot.	Although eBird records show that rufus hummingbirds have been sighted in McArthur and Fall River Mills, the project site is outside of the known breeding range for this species.
Western Grebe	*Aechmophorus occidentalis*	Western grebes breed on freshwater lakes and marshes with extensive open water bordered by emergent vegetation. The nest is most often built on floating vegetation hidden among emergent plants; Western grebes occasionally nest in the open and rarely on land.	No	No	eBird records show that western grebes are occasionally observed in the Fall River Valley, however, there is no nesting habitat on the project site. Therefore, western grebes are not expected to nest in the project site.
Willet	*Tringa semipalmata*	Habitats for the willet include marshes, wet meadows, mudflats, and beaches. In California, willets nest inland, around freshwater marshes in open country, especially in native grasslands. Nesting occurs on islands and edges of alkali lakes in the Great Basin. In migration and winter, willets may be found on mudflats, tidal estuaries, and sandy beaches. The breeding season is April 20 to August 5.	No	Pot.	eBird records show that willets are occasionally observed in the project vicinity; however, the project site is located outside of the known breeding range of this species. Therefore, there is no potential for this species to nest on the project site.

Sources:

U.S. Fish and Wildlife Service, Environmental Conservation Online System (ECOS)

The Cornell Lab of Ornithology, *All About Birds*. 2022. https://www.allaboutbirds.org/guide/search/

Audubon and The Cornell Lab of Ornithology, eBird Species Maps. 2022. http://ebird.org/ebird/map/

California Natural Diversity Database (CNDDB), RareFind 5 and BIOS Viewer

Wintu Audubon Society, *Birds of Shasta County*. 2005. https://www.wintuaudubon.org/Bird_Lists/pdf_2005%20Shasta%20Co%20Bird%20List.pdf

APPENDIX A

RESUMES

Donald Burk, Environmental Services Manager

Allison Loveless, Wildlife Biologist

DONALD M. BURK

Environmental Services Manager

Education

M.S. Botany
California State University, Chico

B.A. Chemistry and Biological Sciences
California State University, Chico

Professional Affiliations and Certifications

Society of Wetland Scientists
California Botanical Society
California Native Plant Society
Association of Environmental Professionals

Donald Burk has an in-depth background in a broad spectrum of environmental studies. His academic background includes graduate studies in environmental analysis methodology, biological sciences, and community planning. He has continued his professional development through completion of specialized courses in wetland delineation; wetland impacts and mitigations; vernal pool restoration and creation; noise assessments; Surface Mining and Reclamation Act regulations; erosion control practices; and hazardous materials evaluation and remediation. As environmental services manager with ENPLAN, Mr. Burk is instrumental in the preparation of environmental documents such as site assessment reports, environmental impact reports, biological studies, and noise evaluations. His responsibilities include project team management, key decision-making, coordination with applicable agencies, and final review of environmental documents. Having worked in the environmental consulting field since 1981, Mr. Burk has the skills and experience to manage studies to achieve reliable data and concise, effective documentation in a timely and cost-efficient manner.

While attending CSU, Chico, Mr. Burk was recognized as “Outstanding Organic Chemist of the Year,” received an award of merit from the American Botanical Society, and delivered the valedictory address for the School of Natural Sciences. His Master’s thesis was granted the first annual “Outstanding Thesis Award” by CSU, Chico.

Representative Experience

- *CEQA/NEPA Compliance.* Prepared environmental impact reports, environmental impact statements, and other environmental compliance documentation for a multitude of projects, including 516- and 1,244-acre industrial parks; public facilities projects including several sewage treatment plants, a 90-foot-high earthen dam and 15-acre reservoir, a 6-mile-long, 8-lane roadway, other new road corridors, and water supply projects; shopping centers and highway commercial developments; a 10,000-seat church; a 475-acre recreation ranch; ski areas; a softball park; four new schools; a 1-million cubic yard reservoir dredging project; numerous residential developments and many other projects.

- *Environmental Site Assessments.* Managed preparation of Phase I, II and III site investigations for a number of commercial and industrial facilities. Investigations have addressed wood-products manufacturing facilities, a major clothing manufacturing operation, dry cleaners, a medical clinic, ranches, a regional transmission transformer site, automotive shops and service stations, abandoned sewage treatment ponds, office buildings, shopping centers, and other uses.
- *Biological Studies.* Managed preparation of technical field studies, including wildlife and botanical studies for a 1,016-acre site in Sacramento County; fisheries, aquatic macroinvertebrate, and riparian vegetation studies for a 38-mile reach of the North Fork Feather River; botanical surveys for 175-mile and 265-mile underground telephone cable corridors; botanical surveys for over 2,400 acres on Mount Shasta proposed for ski area development; biological surveys for a 200-acre park site; spotted owl surveys; vernal pool fairy/tadpole shrimp and valley elderberry longhorn beetle assessments; and numerous other projects.
- *Wetland Delineations.* Managed preparation of wetland delineations and/or U.S. Army Corps of Engineers permit applications for a 1,016-acre site east of Sacramento, a 200-acre site in north Redding, a 580-acre site in the City of Weed, a 100-acre site near the Redding Municipal Airport, a transmission corridor project in east Redding, a 78-acre industrial parcel in the City of Benicia, and many other parcels throughout northern California.
- *Noise Studies.* Prepared noise studies for a variety of projects, including numerous traffic corridors; large industrial facilities such as a co-generation plant, food processing plant, and a regional scrap metal recycling facility; recreation facilities such as a new ski area and a community sports complex; many new residential developments; schools; and other facilities. Testified as an expert witness in a court case involving noise generated by electric- and diesel-powered water well pumps.
- *Reclamation Plans/Stream Restoration Projects.* Prepared mine reclamation plans and/or technical studies for projects including an aggregate pit adjacent to Cow Creek in Shasta County, a pumice quarry in Napa County, and underground gold mines in Shasta and Trinity Counties. Managed preparation of a stream restoration project for a reach of the Susan River, which involved hydraulic analysis, preparation of an earth-work plan, supervision of all on-site construction activities, preparation of a revegetation/erosion control plan and supervision of its implementation, and preparation of a monitoring program. Developed a plan, and obtained all agency approvals, for creation of 10 acres of riparian forest habitat along the Sacramento River to mitigate losses on a nearby parcel.

Publications

Burk, Donald et al. (29 contributing authors). Technical Editors Gary Nakamura, UC Cooperative Extension Service and Julie Kierstead Nelson, USDA Forest Service, Shasta-Trinity National Forest. 2001. *Illustrated Field Guide to Selected Rare Plants of Northern California.* University of California, Agriculture and Natural Resources. Publication 3395.

Luper, J. and D. Burk. 2014. Noteworthy collections: *Froelichia gracilis* (Amaranthaceae). Madrono 61(4):413-413.

ALLISON LOVELESS

Environmental Scientist/Wildlife Biologist

Education

M.S. Zoology
Oklahoma State University, Stillwater

B.S. Geography (Environmental Studies)
University of California, Los Angeles

Prior to her career in the environmental services sector, Allison Loveless conducted field surveys for listed plants species with Sierra Pacific Industries, conducted morphological and geospatial research on mammals while at Oklahoma State University, and participated in genetic research on gray wolves during an internship with the Wyoming Fish and Game Wildlife Forensic Laboratory. Additionally, Allison has experience conducting genetic and morphological based research on isolated reptile and amphibian species, and in developing range predictions and assessments using both field and environmental modeling techniques.

Allison now has over three years of experience working in environmental services throughout northern California. Her projects have included biological studies such as endangered species surveys and nesting bird surveys, delivering on-site environmental trainings and monitoring, as well as delivering products by preparation of technical environmental documents including environmental impact reports, biological study reports, wetland delineations, biological assessments, and figure and map creation.

Representative Experience

- *Biological Studies*. Experience conducting habitat assessments, general wildlife surveys with an emphasis on species of concern, and pre-construction nesting bird surveys.
- *Wildlife Surveys.* Performed habitat assessments and general wildlife surveys, with an emphasis on species of concern. Such work has typically included pre-field review of available records including the California Natural Diversity Data Base (CNDDB), the U.S. Fish and Wildlife Service IPAC reports, and other available data sources.
- *Wetland Studies*. Performed wetland delineations and report preparation in compliance with the standards as defined by the U.S. Army Corps of Engineers.
- *GIS Mapping and Data Collection*. Skilled field data collection using GPS and Trimble units, map construction, managing, querying, and analyzing data within ArcGIS.
- *CEQA/NEPA Documentation*. Responsible for drafting environmental compliance documentation including biological study reports, natural environment studies, and biological sections of environmental impact reports and environmental impact statements.

Publications

Loveless, A.M. and K. McBee. 2017. *Nyctimene robinsoni* (Chiroptera: Pteropodidae). Mammalian Species 49 (949): 68-75.

Loveless, A.M., M. Papeş, D.M. Reding, and P.M. Kapfer. 2016. *Combining ecological niche modeling and morphology to assess the range-wide population genetic structure of bobcats (Lynx rufus).* The Biological Journal of the Linnean Society 117: 842-857.

APPENDIX B

REPRESENTATIVE PHOTOGRAPHS

Fall River Valley CSD Wastewater System Expansion Project
Representative Photos—April 6, May 19, and June 23, 2022

Image of the WWTP. View toward the north.

Image of sagebrush habitat located just east of the WWTP. View toward the east.

Fall River Valley CSD Wastewater System Expansion Project
Representative Photos—April 6, May 19, and June 23, 2022

Seasonal wetland located north of the airport. View toward the northwest.

Image of wet swale located within the golf course. View toward the southeast.

Fall River Valley CSD Wastewater System Expansion Project
Representative Photos—April 6, May 19, and June 23, 2022

Image of an intermittent stream culverted beneath State Route 299 and connected on both sides by roadside ditches. View toward the northeast.

Image of the barren roadway and road shoulder habitat. View toward the southwest.

Fall River Valley CSD Wastewater System Expansion Project
Representative Photos—April 6, May 19, and June 23, 2022

Image of Lift Station 1 (Bridge Street) showing perennial stream (Fall River) and barren habitats. View toward the northwest.

Image of urban/residential area. View toward the north.

APPENDIX C

U.S. FISH AND WILDLIFE SERVICE SPECIES LIST

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: February 13, 2023
Project Code: 2023-0045008
Project Name: FRVCSD Wastewater System Expansion Project

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)

(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Project Code: 2023-0045008
Project Name: FRVCSD Wastewater System Expansion Project
Project Type: Wastewater Pipeline - New Constr - Above Ground
Project Description: Expand the existing wastewater collection system and improve the wastewater treatment plant.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@41.0019249,-121.44004927941177,14z

Counties: Shasta County, California

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Northern Spotted Owl *Strix occidentalis caurina* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/1123	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Crustaceans

NAME	STATUS
Shasta Crayfish *Pacifastacus fortis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8284	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

IPaC User Contact Information

Agency: ENPLAN
Name: Carla Thompson
Address: 3179 Bechelli Ln
City: Redding
State: CA
Zip: 96002
Email cthompson@enplan.com
Phone: 5302210440

APPENDIX D

BIOLOGICAL FIELD SURVEY COVERAGE MAPS

B St
Oak St
A St
Main St
McArthur Rd
State Route 299
Main St
Jim Day Rd
Cedar St
Grove St
Oak St
Walnut St

Project Boundary
Field Survey Coverage
Match Line

Path: N:\companyfiles\01-Jobs Active\032-80 PACE - McArthur Sewer Project\13-Project GIS\3-Map Documents\Map Sessions\IS MND\Bio and Cultural Survey Coverage.aprx

All depictions are approximate. Not a survey product. 02.09.23

0 300 Feet

Figure 1

Biological Field Survey Coverage

ENPLAN

Path: N:\company\files\01-Jobs Active\032-80 PACE - McArthur Sewer Project\3-Project GIS\3-Map Documents\Map Sessions\IS MND\Bio and Cultural Survey Coverage.aprx

All depictions are approximate. Not a survey product. 02.09.23

Feet
0 300

Figure 2
Biological Field Survey Coverage

ENPLAN

Path: N:\companyfiles\01-Jobs Active\032-80 PACE - McArthur Sewer Project\3-Project GIS\3-Map Documents\Map Sessions\IS MND\Bio and Cultural Survey Coverage.aprx

All depictions are approximate. Not a survey product. 02.09.23

0 300 Feet

Figure 3

Biological Field Survey Coverage

ENPLAN

Sierra Center Subdivision

Fall River Mills Airport

State Route 299

Project Boundary
Field Survey Coverage
Match Line

Path: N:\companyfiles\01-Jobs Active\032-80 PACE - McArthur Sewer Project\3-Project GIS\3-Map Documents\Map Sessions\IS_MND\Bio and Cultural Survey Coverage.aprx

All depictions are approximate. Not a survey product. 02.09.23

0 300 Feet

Figure 4

Biological Field Survey Coverage

ENPLAN

Path: N:\companyfiles\01-Jobs Active\032-80 PACE - McArthur Sewer Project\3-Project GIS\3-Map Documents\Map Sessions\S MND\Bio and Cultural Survey Coverage.aprx

All depictions are approximate. Not a survey product. 02.09.23

0 300 Feet

Figure 5

Biological Field Survey Coverage

ENPLAN

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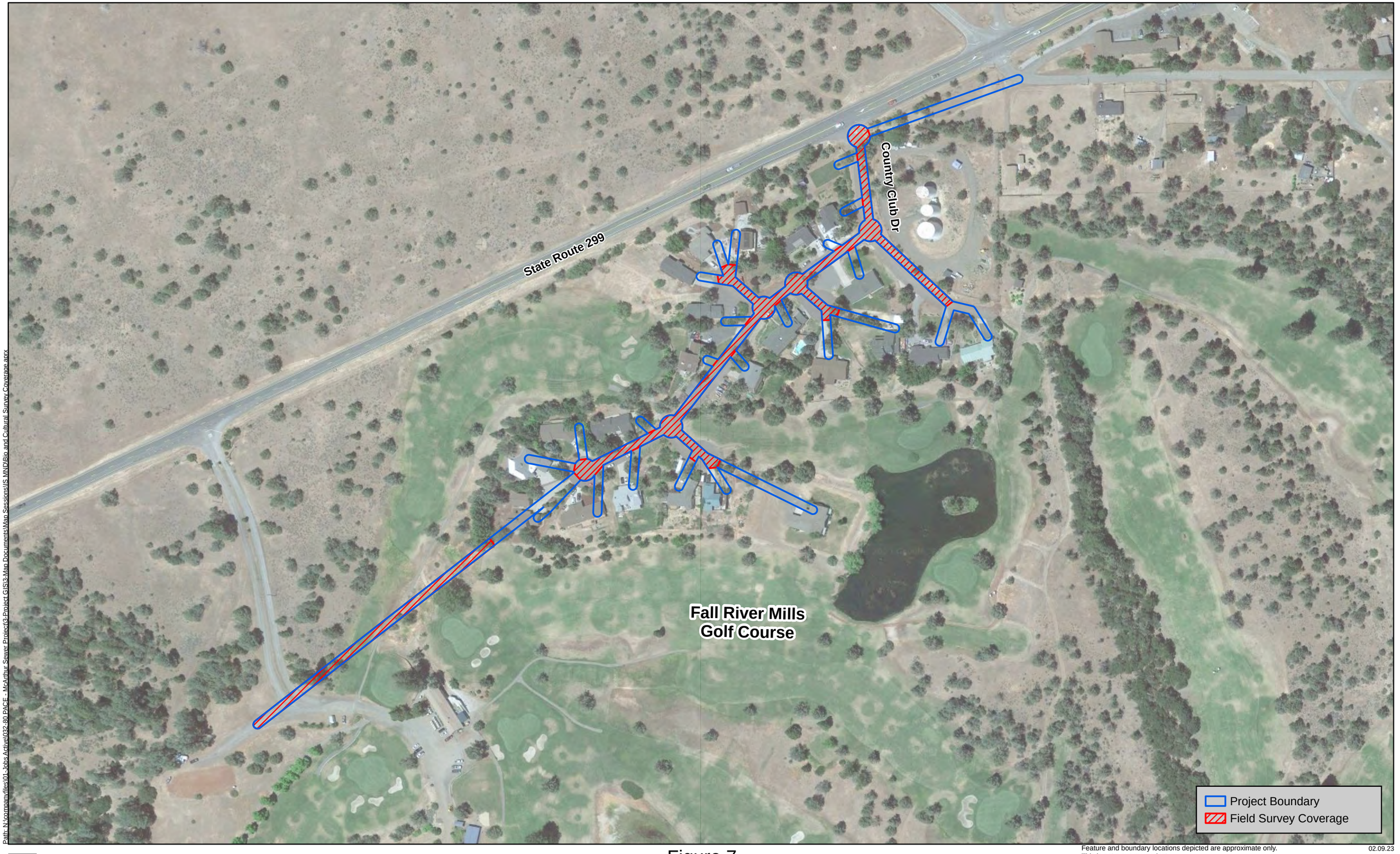
All depictions are approximate. Not a survey product. 02.09.23

0 100 Feet

Figure 6

Biological Field Survey Coverage

ENPLAN



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Feature and boundary locations depicted are approximate only.
This is not a survey product.

02.09.23

ENPLAN

0 200 Feet

Figure 7

Biological Field Survey Coverage

APPENDIX E

POTENTIAL WETLANDS AND OTHER WATERS OF THE U.S. AND STATE

Figure 1

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product. All features are considered preliminary pending U.S. Army Corps of Engineers determination.

02.09.23

ENPLAN

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1" = 300'
0 300 Feet

Figure 2

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product. All features are considered preliminary pending U.S. Army Corps of Engineers determination.

02.09.23

ENPLAN

Figure 3

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product. 02.09.23
All features are considered preliminary pending U.S. Army Corps of Engineers determination.

ENPLAN

DP 3
DP 4
DP 3
DP 4
State Route 299
Data Point
Project Area Boundary
Seasonal Wetland
Constructed Ditches and Other Surface Water Features Located Outside of the Project Area
Constructed Ditch
Match Line
2-Foot Contours
Flow Direction
1" = 300'
0
300
Feet
Feature and boundary locations depicted are approximate only. This is not a survey product. All features are considered preliminary pending U.S. Army Corps of Engineers determination.
02.09.23
Figure 4
Aquatic Resources Delineation Results
ENPLAN
Path: N:\company\files\01-Jobs Active\032-80 PACE - McArthur Sewer Project\3-Project GIS\3-Map Documents\Map Sessions\Delineation\Delineation Map Session.aprx

Reynolds Road

Project Area Boundary
Constructed Pond (Wastewater Treatment Ponds)
Constructed Ditch
Constructed Ditches and Other Surface Water Features Located Outside of the Project Area
Match Line
2-Foot Contours
Flow Direction

1" = 300'
0 300 Feet

Figure 5

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product. All features are considered preliminary pending U.S. Army Corps of Engineers determination.

02.09.23

ENPLAN

Path: N:\company\files\01-Jobs Active\032-80 PACE - McArthur Sewer Project\3-Project GIS\3-Map Documents\Map Sessions\Delineation\Delineation Map Session.aprx

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1" = 100'
0 100 Feet

Figure 6

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product. All features are considered preliminary pending U.S. Army Corps of Engineers determination.

02.09.23

ENPLAN

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1" = 200'
0 200 Feet

Figure 7

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product.
All features are considered preliminary pending U.S. Army Corps of Engineers determination.

ENPLAN

APPENDIX F

LIST OF VASCULAR PLANT SPECIES OBSERVED

LIST OF VASCULAR PLANT SPECIES OBSERVED
FRVCSD Wastewater System Expansion Project
June 15, 2020, and April 6, May 19, June 23, and July 23, 2022

Amaranthaceae	**Amaranth Family**
Amaranthus albus	Tumbleweed
Apiaceae	**Carrot Family**
Lomatium biocolor var. *leptocarpum*	Slender fruited lomatium
Lomatium macrocarpum	Large-fruited lomatium
Lomatium nudicaule	Pestle lomatium
Perideridia oregana (?)	Oregon yampah
Asteraceae	**Sunflower Family**
Achillea millefolium	Common yarrow
Achyrachaena mollis	Blow-wives
Agoseris heterophylla	Mountain dandelion
Antennaria dimorpha	Gray cushion pussytoes
Artemisia arbuscula subsp. *arbuscula*	Low sagebrush
Artemisia douglasiana	Mugwort
Balsamorhiza deltoidea	Deltoid balsamroot
Balsamorhiza hookeri	Hooker's balsam root
Blepharipappus scaber	Blepharipappus
Calycadenia fremontii	Fremont's calycadenia
Centaurea cyanus	Bachelor's button
Centaurea solstitialis	Yellow star thistle
Chrysothamnus sp.	Rabbitbrush
Cirsium sp.	Thistle
Crepis sp.	Hawksbeard
Crocidium multicaule	Common spring-gold
Ericameria nauseosa	Rubber rabbitbrush
Grindelia nana	Idaho gumweed
Helianthus annuus	Hairy leaved sunflower
Lactuca serriola	Prickly lettuce
Lagophylla ramosissima	Common hareleaf
Madia elegans	Common madia
Matricaria discoidea	Pineapple weed
Taraxacum officinale	Common dandelion
Tragopogon dubius	Yellow salsify
Wyethia angustifolia	Narrow leaved mule ears
Wyethia mollis	Woolly mule ears
Berberidaceae	**Barberry Family**
Berberis aquifolium var. *repens*	Dwarf barberry
Betulaceae	**Birch Family**
Betula pendula	Eurpoean white birch

LIST OF VASCULAR PLANT SPECIES OBSERVED
FRVCSD Wastewater System Expansion Project

Boraginaceae	**Borage Family**
Amsinckia menziesii	Small-flowered fiddleneck
Amsinckia retrorsa	Rigid fiddleneck
Myosotis discolor	Yellow scorpion-grass
Nemophila pedunculata	Meadow nemophila
Plagiobothrys leptocladus	Alkali popcorn-flower
Plagiobothrys shastensis	Shasta popcorn-flower
Brassicaceae	**Mustard Family**
Alyssum desertorum	Alyssum
Capsella bursa-pastoris	Shepherd's purse
Descurainia sophia	Flixweed
Draba verna	Whitlow grass
Isatis tinctoria	Dyer's-woad
Lepidium appelianum	Hairy whitetop
Lepidium campestre	English peppergrass
Lepidium perfoliatum	Round-leaved peppergrass
Phoenicaulis cheiranthoides	Phoenicaulis
Sisymbrium altissimum	Tumble-mustard
Caprifoliaceae	**Honeysuckle Family**
Lonicera interrupta	Chaparral honeysuckle
Caryophyllaceae	**Pink Family**
Holosteum umbellatum subsp. *umbellatum*	Jagged chickweed
Scleranthus annuus subsp. *annuus*	German knotgrass
Spergularia rubra	Ruby sand spurry
Chenopodiaceae	**Goosefoot Family**
Chenopodium sp.	Goosefoot
Convolvulaceae	**Morning Glory Family**
Convolvulus arvensis	Bindweed
Cupressaceae	**Cypress Family**
Calocedrus decurrens	Incense-cedar
Juniperus occidentalis	Western juniper
Cyperaceae	**Sedge Family**
Carex douglasii	Douglas' sedge
Eleocharis sp.	Spikerush
Ericaceae	**Heath Family**
Arctostaphylos patula	Green-leaved manzanita
Euphorbiaceae	**Spurge Family**
Chamaesyce maculata	Spotted spurge
Chamaesyce serpyllifolia subsp. *serpyllifolia*	Thymeleaf sandmat
Croton setigerus	Dove weed

LIST OF VASCULAR PLANT SPECIES OBSERVED
FRVCSD Wastewater System Expansion Project

Fabaceae	**Legume Family**
Acmispon americanus	Spanish lotus
Astragalus curvicarpus	Curvepod milkvetch
Astragalus filipes	Basalt milkvetch
Astragalus purshii	Milkvetch
Cercis occidentalis	Western redbud
Lathyrus nevadensis var. *nevadensis* (?)	Sierra pea
Lupinus argenteus var. *argenteus*	Silvery lupine
Lupinus bicolor	Bicolored lupine
Lupinus microcarpus var. *microcarpus*	Chick lupine
Medicago lupulina	Black medick
Medicago sativa	Alfalfa
Thermopsis californica var. *argentata*	Silvery false-lupine
Trifolium dubium	Little hop clover
Trifolium hirtum	Rose clover
Trifolium repens	White clover
Vicia sp.	Vetch
Fagaceae	**Oak Family**
Quercus garryana	Oregon oak
Geraniaceae	**Geranium Family**
Erodium cicutarium	Red-stemmed filaree
Lamiaceae	**Mint Family**
Lamium amplexicaule	Giraffe heads
Salvia aethiopis	
Liliaceae	**Lily Family**
Fritillaria pudica	Yellow fritillary
Linaceae	**Flax Family**
Linum lewisii var. *lewisii*	Western blue flax
Malvaceae	**Mallow Family**
Sidalcea oregana subsp. *oregana*	Oregon checkerbloom
Molluginaceae	**Carpet-weed Family**
Mollugo verticillata	Green carpetweed
Montiaceae	**Miner's Lettuce Family**
Claytonia rubra subsp. *rubra*	Red-stemmed miner's lettuce
Montia linearis	Linear-leaved montia
Oleaceae	**Olive Family**
Fraxinus latifolia	Oregon ash
Onagraceae	**Evening-Primrose Family**
Camissonia contorta	Contorted sun cup

LIST OF VASCULAR PLANT SPECIES OBSERVED
FRVCSD Wastewater System Expansion Project

Orobanchaceae	**Broom-rape Family**
Castilleja lacera	Cut-leaved owl clover
Paeoniaceae	**Peony Family**
Paeonia brownii	Brown's peony
Papaveraceae	**Poppy Family**
Eschscholzia californica	California poppy
Pinaceae	**Pine Family**
Picea sp.	Spruce (horticultural)
Pinus sp.	Pine (horticultual)
Pinus ponderosa	Ponderosa pine
Plantaginaceae	**Plantain Family**
Collinsia sp.	Collinsia
Plantago lanceolata	English plantain
Veronica peregrina subsp. *xalapensis*	Purslane speedwell
Poaceae	**Grass Family**
Aegilops cylindrica	Jointed goatgrass
Alopecurus geniculatus	Marsh foxtail
Bromus commutatus	Meadow brome
Bromus diandrus	Ripgut grass
Bromus hordeaceus	Soft chess
Bromus madritensis	Foxtail chess
Bromus sitchensis var. *carinatus*	California brome
Bromus tectorum	Downy brome
Dactylis glomerata	Orchard grass
Elymus sp.	Squirreltail
Elymus caput-medusae	Medusahead
Festuca arundinacea	Tall fescue
Festuca myuros	Foxtail fescue
Festuca perennis	Annual ryegrass
Hordeum marinum subsp. *gussoneanum*	Mediterranean barley
Hordeum murinum	Foxtail barley
Phleum pratense	Cultivated timothy
Poa bulbosa	Bulbous bluegrass
Poa compressa	Canadian bluegrass
Secale cereale	Rye
Polemoniaceae	**Phlox Family**
Leptosiphon bolanderi	Bolander's linanthus
Microsteris gracilis	Slender phlox
Navarretia sp.	Navarretia

LIST OF VASCULAR PLANT SPECIES OBSERVED
FRVCSD Wastewater System Expansion Project

Polygonaceae	**Buckwheat Family**
Eriogonum nudum	Naked buckwheat
Eriogonum sphaerocephalum var. *halimioides*	Halium-leaved buckwheat
Eriogonum vimineum (?)	Wicker buckwheat
Rumex crispus	Curly dock
Rumex obtusifolius	Bitter dock
Rumex salicifolius	Willow dock
Ranunculaceae	**Buttercup Family**
Myosurus minimus	Common mousetail
Ranunculus occidentalis	Western buttercup
Rhamnaceae	**Buckthorn Family**
Ceanothus cuneatus var. *cuneatus*	Buckbrush
Rosaceae	**Rose Family**
Rubus armeniacus	Himalayan blackberry
Rubiaceae	**Madder Family**
Galium aparine	Cleavers
Salicaceae	**Willow Family**
Populus sp. (horticultural)	Cottonwood
Salix sp.	Willow
Saxifragaceae	**Saxifrage Family**
Lithophragma sp.	Woodland-star
Scrophulariaceae	**Snapdragon Family**
Verbascum blattaria	Moth mullein
Themidaceae	**Brodiaea Family**
Dipterostemon capitatus subsp. *capitatus*	Blue dicks
Typhaceae	**Cattail Family**
Typha sp.	Cattail
Ulmaceae	**Elm Family**
Ulmus sp.	Elm
Violaceae	**Violet Family**
Viola beckwithii	Beckwith's violet
Viola purpurea	Goosefoot violet
Viscaceae	**Mistletoe Family**
Phoradendron bolleanum	Dense mistletoe
Zygophyllaceae	**Caltrop Family**
Tribulus terrestris	Puncture vine

Appendix C

Field Survey Coverage Maps
Biological and Cultural Resources

B St
Oak St
A St
Main St
McArthur Rd
State Route 299
Main St
Jim Day Rd
Cedar St
Grove St
Oak St
Walnut St

Project Boundary
Field Survey Coverage
Match Line

Path: N:\companyfiles\01-Jobs Active\032-80 PACE - McArthur Sewer Project\13-Project GIS\3-Map Documents\Map Sessions\IS MND\Bio and Cultural Survey Coverage.aprx

All depictions are approximate. Not a survey product. 02.09.23

0 300 Feet

Figure 1

Biological and Cultural Field Survey Coverage

ENPLAN

Path: N:\company\files\01-Jobs Active\032-80 PACE - McArthur Sewer Project\3-Project GIS\3-Map Documents\Map Sessions\IS MND\Bio and Cultural Survey Coverage.aprx

All depictions are approximate. Not a survey product. 02.09.23

0 300 Feet

Figure 2

Biological and Cultural Field Survey Coverage

ENPLAN

Path: N:\companyfiles\01-Jobs Active\032-80 PACE - McArthur Sewer Project\3-Project GIS\3-Map Documents\Map Sessions\IS MND\Bio and Cultural Survey Coverage.aprx

All depictions are approximate. Not a survey product. 02.09.23

0 300 Feet

Figure 3

Biological and Cultural Field Survey Coverage

ENPLAN

Sierra Center Subdivision

Fall River Mills Airport

State Route 299

Project Boundary
Field Survey Coverage
Match Line

Path: N:\companyfiles\01-Jobs Active\032-80 PACE - McArthur Sewer Project\3-Project GIS\3-Map Documents\Map Sessions\IS_MND\Bio and Cultural Survey Coverage.aprx

All depictions are approximate. Not a survey product. 02.09.23

0 300 Feet

Figure 4

Biological and Cultural Field Survey Coverage

ENPLAN

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All depictions are approximate. Not a survey product. 02.09.23

0 300 Feet

Figure 5

Biological and Cultural Field Survey Coverage

ENPLAN

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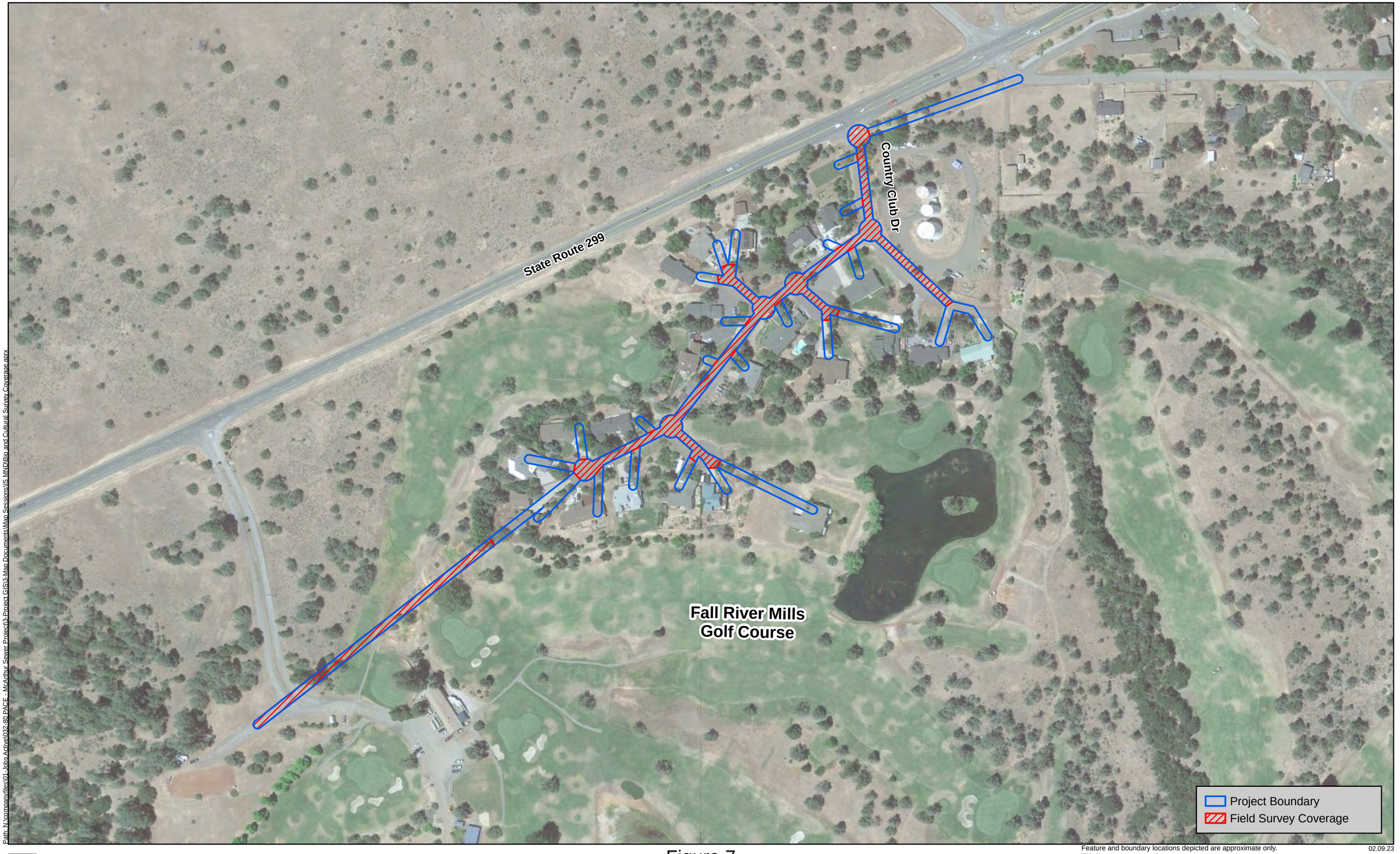
All depictions are approximate. Not a survey product. 02.09.23

0 100 Feet

Figure 6

Biological and Cultural Field Survey Coverage

ENPLAN



Path: N:\company\files\01 Jobs Active\032-80 PACE - McArthur Sewer Project\3 Project GIS\3 Map Documents\Map Sessions\S MND\Bio and Cultural Survey Coverage.aprx

Feature and boundary locations depicted are approximate only.
This is not a survey product.

02.09.23

ENPLAN

0 200 Feet

Figure 7

Biological and Cultural Field Survey Coverage

Appendix D

Wetlands and Other Waters of the U.S. and/or State (Map Exhibits)

Figure 1

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product. All features are considered preliminary pending U.S. Army Corps of Engineers determination.

02.09.23

ENPLAN

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1" = 300'
0 300 Feet

Figure 2

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product. All features are considered preliminary pending U.S. Army Corps of Engineers determination.

02.09.23

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Figure 3

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product. 02.09.23
All features are considered preliminary pending U.S. Army Corps of Engineers determination.

ENPLAN

DP 3
DP 4
DP 3
DP 4
State Route 299
Data Point
Project Area Boundary
Seasonal Wetland
Constructed Ditches and Other Surface Water Features Located Outside of the Project Area
Constructed Ditch
Match Line
2-Foot Contours
Flow Direction
1" = 300'
0
300
Feet
Feature and boundary locations depicted are approximate only. This is not a survey product. All features are considered preliminary pending U.S. Army Corps of Engineers determination.
02.09.23
Figure 4
Aquatic Resources Delineation Results
ENPLAN
Path: N:\company\files\01-Jobs Active\032-80 PACE - McArthur Sewer Project\3-Project GIS\3-Map Documents\Map Sessions\Delineation\Delineation Map Session.aprx

Reynolds Road

Project Area Boundary
Constructed Pond (Wastewater Treatment Ponds)
Constructed Ditch
Constructed Ditches and Other Surface Water Features Located Outside of the Project Area
Match Line
2-Foot Contours
Flow Direction

1" = 300'
0 300 Feet

Figure 5

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product. All features are considered preliminary pending U.S. Army Corps of Engineers determination.

02.09.23

ENPLAN

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1" = 100'
0 100 Feet

Figure 6

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product. All features are considered preliminary pending U.S. Army Corps of Engineers determination.

02.09.23

ENPLAN

Path: N:\Companyfiles\01-Jobs Active\092-80 PACE - McArthur Sewer Project\Project GIS\Map Documents\Map Sessions\Delineation\Delineation Map Session.aprx

1" = 200'
0 200 Feet

Figure 7

Aquatic Resources Delineation Results

Feature and boundary locations depicted are approximate only. This is not a survey product.
All features are considered preliminary pending U.S. Army Corps of Engineers determination.

ENPLAN

Appendix E

Letter from Federal Aviation Administration to Shawn Ankeny, Fall River Mills Airport Manager, November 16, 2022

U.S. Department of Transportation
Federal Aviation Administration

Western-Pacific Region
San Francisco Airports District Office

1000 Marina Blvd., Suite 220
Brisbane, CA 94005-1835

November 16, 2022

Shawn Ankeny, Airport Manager
Fall River Mills Airport
1855 Placer St.
Redding, CA 96001

Subject: Fall River Valley Community Services District, Wastewater Treatment Improvements Project

Dear Mr. Ankeny:

On July 22, 2022, the Federal Aviation Administration (FAA) received a request for comments on the Fall River Valley Community Services District's Wastewater Treatment Improvements Project. In ENPLAN's letter dated August 1, 2022, they state that the project proposal is to provide an extension of service including wastewater treatment ponds which are adjacent to the Fall River Mills Airport. The project description states that the extension of the collection system would result in an increase of water in the ponds by ±40 percent and that "surface water would always be present in two ponds and would be intermittently present in a third pond." Furthermore, the project description states that the water surface area for the new aeration basin would be approximately ±36,000 square feet (0.82 acres) and constructed deeper than the existing ponds. This equates to a net reduction in water surface area for potential use by waterfowl when compared to the existing condition.

As a land use, wastewater ponds are not a consistent use with airport operations and have the potential to create a wildlife hazard to airport flight operations. The land use of the wastewater ponds does not conform to the separation distances illustrated in Figure 1 within FAA Advisory Circular (AC) 150/5200-33C, Hazardous Wildlife Attractants on or near Airports. The distances from the runway edge to the nearest wastewater pond is, approximately, 850 feet which is not outside of the advised separation distance of 10,000 feet from the nearest operations area provided in the AC for airports serving turbine-powered aircraft.

In a meeting between FAA, the Fall River Mills Airport Sponsor (Sponsor), ENPLAN consultants, and the Fall River Valley Community Services District (District) on November 3, it was discussed that there have been no known bird strikes reported in the last 50 years. However, the District stated that, while small groupings of waterfowl have utilized the current wastewater treatment ponds in the past, waterfowl primarily use the nearby natural water features. FAA discussed in the meeting that the Sponsor should consider developing a monitoring approach in order to identify any future wildlife hazard issues should they emerge. During that meeting, the Sponsor mentioned communication with pilots to encourage self-reporting of near misses or strikes or other reporting of wildlife hazards. The FAA supports the sponsor's suggested approach of informing pilots on methods to self-

report wildlife hazards (i.e., reporting strikes, near misses, or other observation of wildlife hazards).

The FAA makes available an online reporting system at the Airport Wildlife Hazard Mitigation website (http://www.faa.gov/go/wildlife) or via mobile devices at http://www.faa.gov/mobile. Anyone reporting a strike can also print the FAA's Bird/Other Wildlife Strike Report Form 5200-7 (https://www.faa.gov/forms/index.cfm/go/document.information/documentID/185872). The sponsor is welcomed to distribute the above hyperlinks to pilots within their network of communication.

Your attention to these comments is appreciated. Please let us know if we can further assist you in addressing wildlife hazards at Fall River Mills Airport. If you have any questions, I am available via cell phone at (307) 461-2884.

Sincerely,

Christopher D. Jones

Christopher D. Jones, Ph.D.
Environmental Protection Specialist

Enclosures:
Advisory Circular (AC) 150/5200-33C
FAA Form 5200-7

U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: Hazardous Wildlife Attractants on or near Airports	**Date:** 02/21/2020	**AC No:** 150/5200-33C
	Initiated By: AAS-300	**Change:**

1 **Purpose.**

This Advisory Circular (AC) provides guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports. It also discusses airport development projects (including airport construction, expansion, and renovation) affecting aircraft movement near hazardous wildlife attractants. Appendix 1 provides definitions of terms used in this AC.

2 **Cancellation.**

This AC cancels AC 150/5200-33B, *Hazardous Wildlife Attractants on or near Airports,* dated August 28, 2007.

3 **Application.**

The Federal Aviation Administration recommends the guidance in this AC for land uses that have the potential to attract hazardous wildlife on or near public-use airports. This AC does not constitute a regulation, is not mandatory, and is not legally binding in its own right. It will not be relied upon as a separate basis by the FAA for affirmative enforcement action or other administrative penalty. Conformity with this AC is voluntary, and nonconformity will not affect rights and obligations under existing statutes and regulations, except as follows:

1. Airports that hold Airport Operating Certificates issued under Title 14, Code of Federal Regulations (CFR), Part 139, Certification of Airports, Subpart D, may use the standards, practices and recommendations contained in this AC as one, but not the only, acceptable means of compliance with the wildlife hazard management requirements of Part 139.
2. The FAA recommends the guidance in this AC for airports that receive funding under Federal grant assistance programs, including the Airport Improvement Program. See Grant Assurance #34.

3. The FAA recommends the guidance in this AC for projects funded by the Passenger Facility Charge program. See PFC Assurance #9.
4. The FAA recommends the guidance in this AC for land-use planners and developers of projects, facilities, and activities on or near airports.

4 Principal Changes.

Changes are marked with vertical bars in the margin. Change in this AC include:

1. Clarification by the FAA that non-certificated airports are recommended to conduct a Wildlife Hazard Assessment (Assessment) or a Wildlife Hazard Site Visit (Site Visit);
2. Table 1, Ranking of Hazardous Species, has been moved to Advisory Circular 150/5200-32, *Reporting Wildlife Aircraft Strikes* (5/31/2013);
3. Consolidation and reorganization of discussion on land uses of concern; and updated procedures for evaluation and mitigation. Discussion addresses off-airport hazardous wildlife attractants, followed by discussion of on-airport attractants. It also clarifies language regarding the applicability of the AC.

5 Background.

1. Information about the risks posed to aircraft by certain wildlife species has increased a great deal in recent years. Improved reporting, studies, documentation, and statistics clearly show that aircraft collisions with birds and other wildlife are a serious economic and public safety problem. While many species of wildlife can pose a risk[1] to aircraft safety, they are not equally hazardous[2]. These hazard rankings can help focus hazardous wildlife management efforts on those species or groups that represent the greatest risk to safe air and ground operations in the airport environment. Used in conjunction with a site-specific Assessment that will determine the relative abundance and use patterns of wildlife species, these rankings combined with a systematic risk analysis can help airport operators better understand the general threat level (and consequences) of certain wildlife species. Also, the rankings can assist with the creation of a "high risk" list of hazardous species that warrant immediate attention.
2. Most public-use airports have large tracts of open, undeveloped land that provide added margins of safety and noise mitigation. These areas can also present potential hazards to aviation if they encourage wildlife to enter an airport's approach or departure airspace or aircraft operations area. Constructed or natural areas— such as

[1] Risk is the relationship between the severity and probability of a threat. It is the product of hazard level and abundance in the critical airspace, and is thus defined as the probability of a damaging strike with a given species.
[2] Hazardous wildlife are species of wildlife (birds, mammals, reptiles), including feral and domesticated animals, not under control that may pose a direct hazard to aviation (i.e., strike risk to aircraft) or an indirect hazard such as an attractant to other wildlife that pose a strike hazard or are causing structural damage to airport facilities (e.g., burrowing, nesting, perching).

poorly drained locations, detention/retention ponds, roosting habitats on buildings, landscaping, odor-causing rotting organic matter (putrescible waste) disposal operations, wastewater treatment plants, agricultural or aquaculture activities, surface mining, wetlands, or some conservation-based land uses — can provide wildlife with ideal locations for feeding, loafing, reproduction, and escape. Even small facilities, such as fast food restaurants, taxicab staging areas, rental car facilities, aircraft viewing areas, and public parks, can produce substantial attractions for hazardous wildlife.

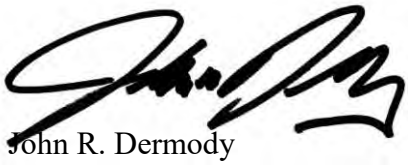
3. During the past century, wildlife-aircraft strikes have resulted in the loss of hundreds of lives worldwide, as well as billions of dollars in aircraft damage. Hazardous wildlife attractants on and near airports can jeopardize future airport expansion, making proper community land-use planning essential. This AC provides airport operators and those parties with whom they cooperate with the guidance they need to assess and address potentially hazardous wildlife attractants when locating new facilities and implementing certain land-use practices on or near public-use airports.

6 Memorandum of Agreement Between Federal Resource Agencies.

The FAA, the U.S. Air Force, the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture - Wildlife Services signed a Memorandum of Agreement (MOA) to acknowledge their respective missions in protecting aviation from wildlife hazards. Through the MOA, the agencies established procedures necessary to coordinate their missions to address more effectively existing and future environmental conditions contributing to collisions between wildlife and aircraft (wildlife strikes) throughout the United States. These efforts are intended to minimize wildlife risks to aviation and human safety while protecting the Nation’s valuable environmental resources.

7 Feedback on this AC.

If you have suggestions for improving this AC, you may use the Advisory Circular Feedback form at the end of this AC.



John R. Dermody
Director of Airport Safety and Standards

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CHAPTER 1. GENERAL SEPARATION CRITERIA FOR HAZARDOUS WILDLIFE ATTRACTANTS ON OR NEAR AIRPORTS

1.1 Introduction.

1.1.1 Airport operators should maintain an appropriate environment for the safe and efficient operation of aircraft, which entails mitigating wildlife strike hazards by fencing, modifying the landscape in order to deter wildlife or by hazing or removing wildlife hazardous to aircraft from congregating on airports. When considering proposed land uses, operators and sponsors of airports certificated under Part 139, local planners, and developers must take into account whether the proposed land uses, including new development projects, will increase wildlife hazards. Land-use practices that attract or sustain hazardous wildlife populations on or near airports, specifically those listed in Chapter 2, can significantly increase the potential for wildlife strikes.

1.1.2 The FAA urges regulatory agencies and planning and zoning agencies to evaluate proposed new land uses within the separation criteria and prevent the creation of land uses that attract or sustain hazardous wildlife within the separation distances.

1.1.3 The FAA recommends the use of minimum separation criteria outlined below for land-use practices that attract hazardous wildlife to the vicinity of airports. Please note that FAA criteria include land uses that cause movement of hazardous wildlife onto, into, or across the airport's approach or departure airspace or aircraft operations area. (See the discussion of the synergistic effects of surrounding land uses in Paragraph 2.8 of this AC.). For the purpose of evaluating distance criteria, the delineation of the aircraft operations area may also consider future airport development plans depicted on the Airport Layout Plan (e.g., planned runway extension).

1.1.4 The separation distances are based on (1) flight patterns and performance criteria of piston-powered aircraft and turbine-powered aircraft, (2) the altitude at which most strikes happen (78 percent occur under 1,000 feet and 90 percent occur under 3,000 feet above ground level), and (3) National Transportation Safety Board recommendations.

1.2 Airports Serving Piston-Powered Aircraft.

Airports that do not sell Jet-A fuel normally serve piston-powered aircraft. Notwithstanding more stringent requirements for specific land uses, the FAA recommends a separation distance of 5,000 feet from these airports for any of the hazardous wildlife attractants discussed in Chapter 2 or for new airport development projects meant to accommodate aircraft movement. This distance is to be maintained between the closest point of the airport's aircraft operations area and the hazardous wildlife attractant. Figure 1 depicts an example of the 5,000-foot separation distance measured from the nearest aircraft operations area.

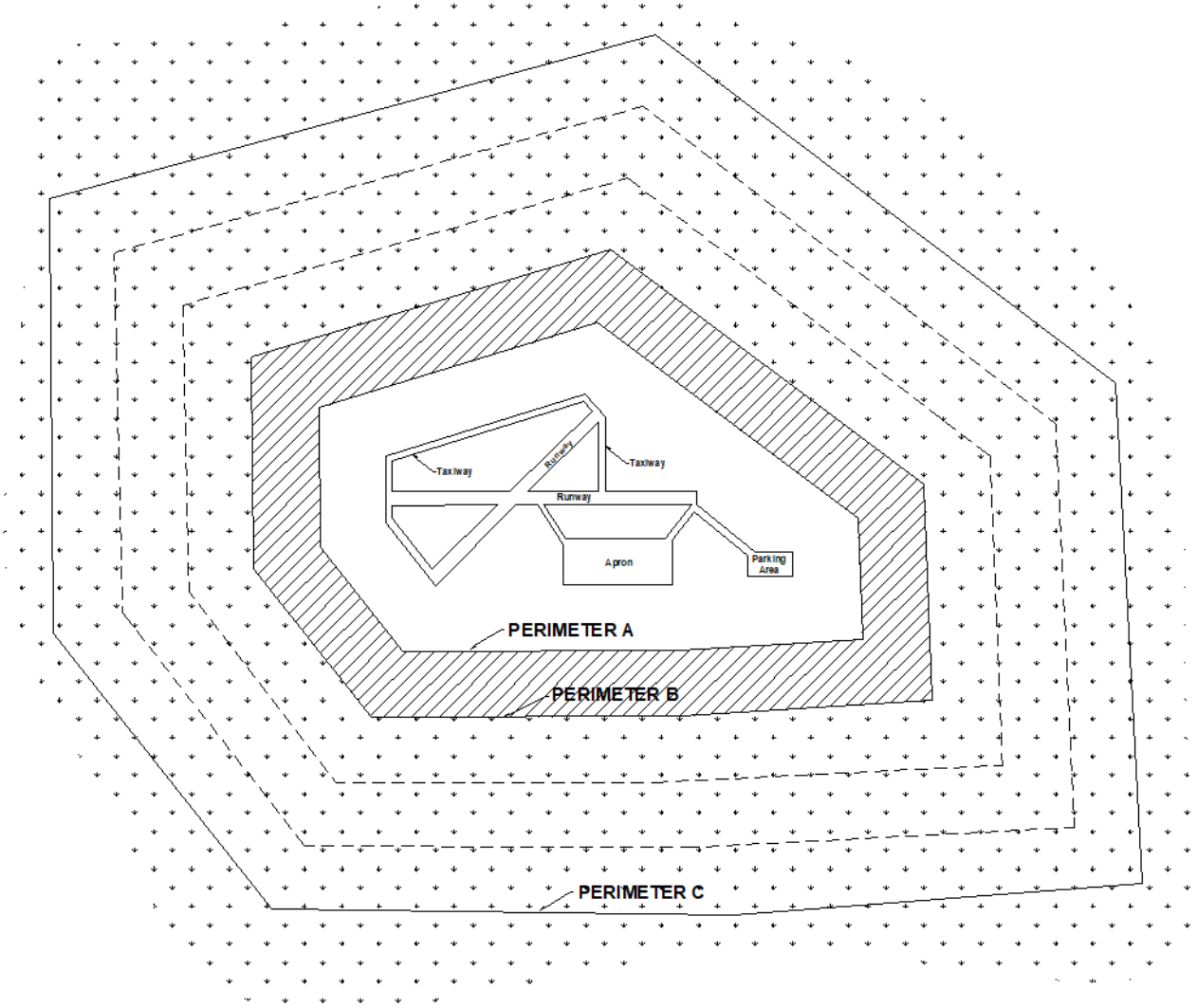
1.3 Airports Serving Turbine-Powered Aircraft.

For airports serving turbine-powered aircraft, the FAA recommends a separation distance of 10,000 feet from these airports for any of the hazardous wildlife attractants discussed in Chapter 2 or for new airport development projects meant to accommodate aircraft movement. This distance is to be maintained between the closest point of the airport's aircraft operations area and the hazardous wildlife attractant. Figure 1 depicts an example of the 10,000-foot separation distance from the nearest aircraft movement areas.

1.4 Protection of Approach, Departure, and Circling Airspace.

For all airports, the FAA recommends a distance of 5 miles between the closest point of the airport's aircraft operations area and the hazardous wildlife attractant. Special attention should be given to hazardous wildlife attractants that could cause hazardous wildlife movement into or across the approach or departure airspace. Figure 1 depicts an example of the 5-mile separation distance measured from the nearest aircraft operations area.

Figure 1. Example of recommended separation distances described in Chapter 1 within which hazardous wildlife attractants should be avoided, eliminated, or mitigated.



PERIMETER A: For airports serving piston-powered aircraft, it is recommended hazardous wildlife attractants be 5,000 feet from the nearest aircraft operations area.

PERIMETER B: For airports serving turbine-powered aircraft, it is recommended hazardous wildlife attractants be 10,000 feet from the nearest aircraft operations area.

PERIMETER C: Recommended for all airports, 5-mile range to protect approach, departure and circling airspace.

CHAPTER 2. LAND-USE PRACTICES ON OR NEAR AIRPORTS THAT POTENTIALLY ATTRACT HAZARDOUS WILDLIFE

2.1 General.

2.1.1 Many types of vegetation, habitats and land use practices can provide an attractant to animals that pose a risk to aviation safety. Hazardous wildlife use the natural or artificial habitats on or near an airport for food, water or cover. The wildlife species and the size of the populations attracted to the airport environment vary considerably, depending on several factors, including land-use practices on or near the airport. In addition to the specific considerations outlined below, airport operators should refer to *Wildlife Hazard Management at Airports* manual, prepared by FAA and U.S. Department of Agriculture (USDA) staff. (This manual is available in English, Spanish, and French). This manual, as well as other helpful resources can be viewed and downloaded free of charge from the Wildlife Strike Resources section of the FAA's wildlife hazard mitigation web site: http://www.FAA.gov/airports/airport_safety/wildlife).

2.1.1.1 The USDA / Animal and Plant Health Inspection Service (APHIS) / Wildlife Services developed a new publication series on wildlife damage management and is available online. The Wildlife Damage Management Technical Series highlights wildlife species or groups of wildlife species that cause damage to agriculture, property and natural resources, and/or impact aviation and human health and safety. The publications can be found at: https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/sa_reports/ct_wildlife+damage+management+technical+series.

2.1.1.2 Additional resources have been provided by the USDA / APHIS / Wildlife Services National Wildlife Research Center (NWRC) at: https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/programs/nwrc/sa_publications/ct_research_gateway. The NWRC Research Gateway contains research articles, reports, factsheets, technical notes, data and other materials on wildlife hazard mitigation, risk reduction, animal ecology, habitats, and advanced technologies and methodologies.

2.1.2 This section discusses land-use practices having the potential to attract hazardous wildlife and threaten aviation safety. The FAA has determined that the land uses listed below are generally not compatible with safe airport operations when they are located within the separation distances provided in Paragraphs 1.2 through 1.4.

2.1.3 As a reminder, these types of land uses or facilities often require permits from the appropriate permitting agency. The FAA may work with the permitting agency to include conditions for monitoring and mitigation measures, if necessary. Ultimately, the permittee is responsible for compliance to these conditions and the permitting agency is responsible for tracking compliance.

2.2 Waste Disposal Operations.

Municipal solid waste landfills (municipal landfills) are known to attract large numbers of hazardous wildlife, particularly birds. Because of this, these operations, when located within the separations identified in the siting criteria in Paragraphs 1.2 through 1.4, are considered incompatible with safe airport operations.

2.2.1 Siting for New Municipal Solid Waste Landfills Subject to AIR 21.

2.2.1.1 Section 503 of the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (P. L. 106-181) (AIR 21), 49 U.S.C. § 44718(d), prohibits the construction or establishment of a new municipal landfill within 6 miles of certain public-use airports. Before these prohibitions apply, both the airport and the landfill must meet the very specific conditions described below. These restrictions do not apply to airports or landfills located within the state of Alaska.

2.2.1.2 The airport must (1) have received a Federal grant(s) under 49 U.S.C. § 47101, et. seq.; (2) be under control of a public agency; (3) serve some scheduled air carrier operations conducted in aircraft with less than 60 seats; and (4) have total annual enplanements consisting of at least 51 percent of scheduled air carrier enplanements conducted in aircraft with less than 60 passenger seats.

2.2.1.3 The proposed municipal landfill must (1) be within 6 miles of the airport, as measured from airport property line to the landfill property line, and (2) have started construction or establishment on or after April 5, 2001. Section 44718(d) only limits the construction or establishment of some new landfills. It does not limit the expansion, either vertical or horizontal, of existing landfills.

2.2.1.4 Regarding existing municipal landfills and lateral expansions of landfills, 40 CFR § 258.10 requires owners or operators of a landfill units located within the separation distances provided in Paragraphs 1.2 through 1.4 to demonstrate that the unit is designed and operated so that it does not pose a bird hazard to aircraft. To accomplish this, follow the instructions provided in Paragraphs 3.2 and 3.3, document the wildlife monitoring and mitigation procedures that are cooperatively developed, and place this documentation in the operating permit of the facility.

2.2.2 Siting for New Municipal Landfills Not Subject to AIR 21.

If an airport and a municipal landfill do not meet the criteria of § 44718(d), then FAA recommends against locating the landfill within the separation distances identified in Paragraphs 1.2 through 1.4. In determining this distance separation, measurements should be made from the closest point of the airport property boundary to the closest point of the landfill property boundary.

2.2.3 Considerations for Existing Waste Disposal Facilities Within the Limits of Separation Criteria.

The FAA recommends against airport development projects that would increase the number of aircraft operations or accommodate larger or faster aircraft near landfill operations located within the separations identified in Paragraphs 1.2 through 1.4. In addition, in accordance with 40 CFR § 258.10, owners or operators of existing landfill units that are located within the separations listed in Paragraphs 1.2 through 1.4 must demonstrate that the unit is designed and operated so it does not pose a bird hazard to aircraft. (See Paragraph 4.3.2 of this AC for a discussion of this demonstration requirement.)

2.2.4 Enclosed Trash Transfer Stations.

Enclosed waste-handling facilities that receive garbage behind closed doors; process it via compaction, incineration, or similar manner; and remove all residue by enclosed vehicles generally are compatible with safe airport operations, provided they are constructed and operated properly and are not located on airport property or within the Runway Protection Zone. These facilities should not handle or store putrescible waste outside or in a partially enclosed structure accessible to hazardous wildlife. Trash transfer facilities that are open on one or more sides; or store uncovered quantities of municipal solid waste outside, even if only for a short time; or use semi-trailers that leak or have trash clinging to the outside; or do not control odors by ventilation and filtration systems (odor masking is not acceptable) do not meet the FAA's definition of fully enclosed trash transfer stations. The FAA considers fully enclosed waste-handling facilities constructed or operated incorrectly incompatible with safe airport operations if they are located closer than the separation distances specified in Paragraphs 1.2 through 1.4.

2.2.5 Composting Operations on or near Airport Property.

Composting operations that accept only yard waste (e.g., leaves, lawn clippings, or branches) generally do not attract hazardous wildlife. Sewage sludge, woodchips, and similar material are not municipal solid wastes and may be used as compost bulking agents. The compost, however, must never include food or other municipal solid waste. Composting operations should not be located on airport property unless effective, risk-reducing mitigations are in place. Off-airport property composting operations should be located no closer than the greater of the following distances: 1,200 feet from any aircraft operations area or the distance called for by airport design requirements (see AC 150/5300-13, *Airport Design*). This spacing should prevent material, personnel, or equipment from penetrating any Object Free Area, Obstacle Free Zone, Threshold Siting Surface, or Clearway. Airport operators should monitor composting operations located in proximity to the airport to ensure that steam or thermal rise does not adversely affect air traffic.

2.2.6 Underwater Waste Discharges.

The FAA recommends against the underwater discharge of any food waste (e.g., fish processing offal) within the separations identified in Paragraphs 1.2 through 1.4 because it could attract scavenging hazardous wildlife.

2.2.7 Recycling Centers.

Recycling centers that accept previously sorted non-food items, such as glass, newspaper, cardboard, aluminum, electronic, and household wastes such as paint, batteries, and oil, are, in most cases, not attractive to hazardous wildlife and are acceptable.

2.2.8 Construction and Demolition Debris Facilities.

2.2.8.1 Construction and demolition landfills generally do not attract hazardous wildlife and are acceptable if maintained in an orderly manner, admit no putrescible waste, and are not co-located with other waste disposal operations. However, construction and demolition landfills have similar visual and operational characteristics to putrescible waste disposal sites. When co-located with putrescible waste disposal operations, construction and demolition landfills are more likely to attract hazardous wildlife because of the similarities between these disposal facilities.

2.2.8.2 Therefore, a construction and demolition landfill co-located with another waste disposal operation should be located outside of the separations identified in Paragraphs 1.2 through 1.4.

2.2.8.3 Airport operators should be aware that on-site storage of construction and maintenance debris, as well as out-of-service aircraft or aircraft components, may provide an attractant for hazardous species (e.g., nesting or perching locations). The FAA recommends these on-site areas be monitored and/or mitigated, if necessary.

2.2.9 Fly Ash Disposal.

2.2.9.1 The incinerated residue from resource recovery power/heat-generating facilities that are fired by municipal solid waste, coal, or wood is generally not a wildlife attractant because it no longer contains putrescible matter. Landfills accepting only fly ash are generally not considered to be wildlife attractants and are acceptable as long as they admit no putrescible waste of any kind, and are not co-located with other disposal operations that attract hazardous wildlife.

2.2.9.2 Since varying degrees of waste consumption are associated with general incineration (not resource recovery power/heat-generating facilities), the FAA considers the ash from general incinerators a regular waste disposal by-product and, therefore, a hazardous wildlife attractant if disposed of within the separation criteria outlined in Paragraphs 1.2 through 1.4.

2.3 Water Management Facilities.

Drinking water intake and treatment facilities, storm water and wastewater treatment facilities, associated retention and settling ponds, ponds built for recreational use, ponds

and fountains for ornamental purposes, and ponds that result from mining activities often attract large numbers of potentially hazardous wildlife. Development of new open water facilities within the separation criteria identified in Paragraphs 1.2 through 1.4 should be avoided to prevent wildlife attractants. If necessary, land-use developers and airport operators may need to develop management plans, in compliance with local and state regulations, to support the operation of storm water management facilities on or near all public-use airports to ensure a safe airport environment. The FAA recommends these plans be developed in consultation with a Qualified Airport Wildlife Biologist[3], to minimize hazardous wildlife attractants.

2.3.1 Existing Stormwater Management Facilities.

2.3.1.1 On-airport stormwater management facilities allow the quick removal of surface water, including discharges related to aircraft deicing, from impervious surfaces, such as pavement and terminal/hangar building roofs. Existing on-airport detention ponds collect stormwater, protect water quality, and control runoff. Because they slowly release water after storms, they may create standing bodies of water that can attract hazardous wildlife. Where the airport has developed a Wildlife Hazard Management Plan, Part 139 regulations require the immediate correction of any wildlife hazards arising from existing stormwater facilities located on or near airports using appropriate wildlife hazard mitigation techniques. Airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a Qualified Airport Wildlife Biologist.

2.3.1.2 Where possible, airport operators should modify stormwater detention ponds to allow a maximum 48-hour detention period for the design storm. The combination of open water and vegetation is particularly attractive to waterfowl and other hazardous wildlife. Water management facilities holding water longer than 48 hours should be maintained in a manner that keeps them free of both emergent and submergent vegetation. The FAA recommends that airport operators avoid or remove retention ponds and detention ponds featuring dead storage to eliminate standing water. Detention basins should remain totally dry between rainfalls. Where constant flow of water is anticipated through the basin, or where any portion of the basin bottom may remain wet, the detention facility should include a concrete or paved pad and/or ditch/swale in the bottom to prevent vegetation that may provide nesting habitat. Drainage basins with a concrete or paved pad should be maintained to prevent or remove any sediment build-up to prevent vegetation growth.

2.3.1.3 When it is not possible to drain a large detention pond completely, airport operators may use physical barriers, such as bird balls, wire grids, pillows,

[3] See Advisory Circular 150/5200-36, *Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports.*

or netting, to deter birds and other hazardous wildlife. When physical barriers are proposed, airport operators must evaluate their use, effectiveness and maintenance requirements. Airport operators must also ensure physical barriers will not adversely affect water rescue. Before installing any physical barriers over detention ponds on Part 139 airports, airport operators must get approval from the appropriate FAA Regional Airports Division Office.

2.3.1.4 The FAA recommends that airport operators encourage off-airport stormwater treatment facility operators to incorporate appropriate wildlife hazard mitigation techniques into stormwater treatment facility operating practices when their facility is located within the separation criteria specified in Paragraphs 1.2 through 1.4.

2.3.2 New Stormwater Management Facilities.

The FAA recommends that storm water management systems located within the separations identified in Paragraphs 1.2 through 1.4 be designed and operated so as not to create above-ground standing water. Stormwater detention ponds should be designed, engineered, constructed, and maintained for a maximum 48–hour detention period after the design storm and to remain completely dry between storms. To facilitate the control of hazardous wildlife, the FAA recommends the use of steep-sided, rip-rap or concrete lined, narrow, linear-shaped water detention basins. When it is not possible to place these ponds away from an airport's aircraft operations area (but still on airport property), airport operators may use physical barriers, such as bird balls, wire grids, floating covers, vegetation barriers (bottom liners), or netting, to prevent access of hazardous wildlife to open water and minimize aircraft-wildlife interactions. Caution is advised when nets or wire grids are used for deterring birds from attractants. Mesh size should be < 5 cm (2") to avoid entangling and killing birds and should not be made of a monofilament material. Grids installed above and across water to deter hazardous birds (e.g., waterfowl, cormorants, etc.) are different than using a small mesh covering but also provides an effective deterrent. Grid material, size, pattern and height above water may differ on a case-by-case basis. When physical barriers are used, airport operators must evaluate their use and ensure they will not adversely affect water rescue. Before installing any physical barriers over detention ponds on Part 139 airports, a review by a Qualified Airport Wildlife Biologist should be conducted, prior to approval from the appropriate FAA Regional Airports Division Office. All vegetation in or around detention basins that provide food or cover for hazardous wildlife should be eliminated. If soil conditions and other requirements allow, the FAA encourages the use of underground storm water infiltration systems because they are less attractive to wildlife.

2.3.3 Existing Wastewater Treatment Facilities.

2.3.3.1 The FAA recommends that airport operators immediately correct any wildlife hazards arising from existing wastewater treatment facilities located on or near the airport.

2.3.3.2 Where required, a wildlife management plan will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should encourage wastewater treatment facility operators to incorporate measures, developed in consultation with a Qualified Airport Wildlife Biologist, to minimize hazardous wildlife attractants. Airport operators should also encourage those wastewater treatment facility operators to incorporate these mitigation techniques into their standard operating practices. In addition, airport operators should consider the existence of wastewater treatment facilities when evaluating proposed sites for new airport development projects and avoid such sites when practicable.

2.3.4 New Wastewater Treatment Facilities.

The FAA recommends against the construction of new wastewater treatment facilities or associated settling ponds within the separations identified in Paragraphs 1.2 through 1.4. Appendix 1 defines wastewater treatment facility as "any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes." The definition includes any pretreatment involving the reduction or elimination of pollutants prior to introducing such pollutants into a treatment facility. When a wastewater treatment facility is proposed within the separation criteria, the airport operator, project proponent, and local jurisdiction should discuss the proposed project location with regard to its location near the airport and the separation distances identified in Paragraphs 1.2 through 1.4. If possible, a more suitable location for the proposed facility should be identified. If no other suitable location exists, FAA recommends that the proposed facility plans be reviewed by a Qualified Airport Wildlife Biologist to identify measures to avoid or reduce the facility's potential to attract hazardous wildlife. If appropriate measures cannot be incorporated to reduce potential wildlife hazards, airport operators should document their opposition in a letter to the local jurisdiction.

2.3.5 Artificial Marshes.

In warmer climates, wastewater treatment facilities sometimes employ artificial marshes and use submergent and emergent aquatic vegetation as natural filters. These artificial marshes may be used by some species of flocking birds, such as blackbirds and waterfowl, for breeding or roosting activities. The FAA recommends against establishing artificial marshes within the separations identified in Paragraphs 1.2 through 1.4.

2.3.6 Wastewater Discharge and Sludge Disposal.

The FAA recommends careful consideration regarding the discharge of wastewater or biosolids (i.e., secondarily treated sewage sludge) on airport property. Such discharges might improve soil moisture and quality on unpaved areas and lead to improved turf growth. Depending on the airfield plant communities and habitats present, this can be an attractive food source for many species of animals or, conversely, could result in limited attractiveness to hazardous wildlife. Also, improved turf requires more frequent mowing and could attract geese. Airports should improve their turf with the goal of a monoculture of turf that is least attractive to wildlife. Wastewater or biosolids

applications might assist in achieving this goal. Caution should be exercised when discharges saturate airfield areas adjacent to paved surfaces. The resultant soft, muddy conditions could restrict or prevent emergency vehicles from reaching accident sites in a timely manner.

2.4 Wetlands.

Wetlands provide a variety of functions and can be regulated by local, state, and Federal laws. Wetlands can be attractive to many types of wildlife, including many which rank high on the list of hazardous wildlife species (Table 1 - AC 150/5200-32). Some types of wetlands are not as attractive to wildlife as others and they should be reviewed on a case-by-case basis to determine the likelihood of proposed wetlands increasing the numbers of hazardous wildlife at the airport. Factors such as size, shape, location, canopy cover and vegetative composition among other things should be considered when determining compatibility.

Note: If questions exist as to whether an area qualifies as a wetland, contact the District Office of the U.S. Army Corps of Engineers, the Natural Resources Conservation Service, or a wetland consultant qualified to delineate wetlands.

2.4.1 Existing Wetlands on or near Airport Property.

If wetlands are located on or near airport property, airport operators should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations. At public-use airports, the FAA recommends immediately correcting, in cooperation with local, state, and Federal regulatory agencies, any wildlife hazards arising from existing wetlands located on or near airports within 5 miles of the aircraft operations area. Where required, a wildlife management plan will outline appropriate wildlife hazard mitigation techniques. Accordingly, airport operators should develop measures to minimize hazardous wildlife attraction in consultation with a FAA Qualified Airport Wildlife Biologist.

2.4.2 New Airport Development.

Whenever possible, the FAA recommends locating new airports using the separations from wetlands identified in Paragraphs 1.2 through 1.4. Where alternative sites are not practicable, or when airport operators are expanding an existing airport into or near wetlands, a Qualified Airport Wildlife Biologist, in coordination with the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, and the state wildlife management agency should evaluate the wildlife hazards and prepare a wildlife management plan that indicates methods of minimizing the hazards.

2.4.3 Mitigation for Wetland Impacts from Airport Projects.

Wetland mitigation may be necessary when unavoidable wetland disturbances result from new airport development projects or projects required to correct wildlife hazards from wetlands. Wetland mitigation must be designed so it does not create a wildlife hazard. The FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in Paragraphs 1.2 through 1.4.

2.4.3.1 **Onsite Mitigation of Wetland Functions.**

Wetland mitigation/conservation easements must not inhibit the airport operator's ability to effectively control hazardous wildlife on or near the mitigation site or effectively maintain other aspects of safe airport operations. Enhancing such mitigation areas to attract hazardous wildlife must be avoided. The FAA will review any onsite mitigation proposals to determine compatibility with safe airport operations and grant assurance compliance. Early coordination with the FAA is encouraged for any proposal to use airport land for wetland mitigation. A Qualified Airport Wildlife Biologist should evaluate any wetland mitigation projects that are needed to protect unique wetland functions and that must be located in the separation criteria in Paragraphs 1.2 through 1.4 before the mitigation is implemented. A wildlife management plan should be developed to reduce the wildlife hazards.

2.4.3.2 **Offsite Mitigation of Wetland Functions.**

2.4.3.2.1 The FAA recommends that wetland mitigation projects that may attract hazardous wildlife be sited outside of the separations identified in Paragraphs 1.2 through 1.4 unless they provide unique functions that must remain onsite (see 2.4.3.1). Agencies that regulate impacts to or around wetlands recognize that it may be necessary to split wetland functions in mitigation schemes. Therefore, regulatory agencies may, under certain circumstances, allow portions of mitigation to take place in different locations.

2.4.3.2.2 The FAA encourages landowners or communities supporting the restoration or enhancement of wetlands to do so only after critically analyzing how those activities would affect aviation safety. To do so, landowners or communities should contact the affected airport sponsor, FAA, and/or a Qualified Airport Wildlife Biologist.

2.4.3.2.3 Those parties should work cooperatively to develop restoration or enhancement plans that would not worsen existing wildlife hazards or create such hazards. See Paragraphs 4.1.1 – 4.1.3 for land-use modifications evaluation criteria.

2.4.3.2.4 If parties develop a mutually acceptable restoration or enhancement plan, the landowner or community proposing the restoration or enhancement must monitor the restored or enhanced site. This monitoring must verify that efforts have not worsened or created hazardous wildlife attraction or activity. If such attraction or activity occurs, the landowner or community should work with the airport sponsor, or a Qualified Airport Wildlife Biologist to reduce the hazard to aviation.

2.4.3.3 **Mitigation Banking.**

Wetland mitigation banking is the creation or restoration of wetlands in order to provide mitigation credits that can be used to offset permitted wetland losses. Mitigation banking benefits wetland resources by providing advance replacement for permitted wetland losses; consolidating small projects into larger, better-designed and managed units; and encouraging integration of wetland mitigation projects with watershed planning. This last benefit is most helpful for airport projects, as wetland impacts mitigated outside of the separations identified in Paragraphs 1.2 through 1.4 can still be located within the same watershed. Wetland mitigation banks meeting the separation criteria offer an ecologically sound approach to mitigation in these situations. Airport operators should work with local watershed management agencies or organizations to develop mitigation banking for wetland impacts on airport property.

2.5 Dredge Spoil Containment Areas.

The FAA recommends against locating dredge spoil containment areas (also known as Confined Disposal Facilities) within the separations identified in Paragraphs 1.2 through 1.4 if the containment area or the spoils contain material that would attract hazardous wildlife. Proposals for new dredge spoil containment areas located within the separation distances should be reviewed on a case-by-case basis to determine the likelihood of resulting in an increase in hazardous wildlife. The FAA recommends that airport sponsors work with a Qualified Airport Wildlife Biologist and/or the FAA to review proposals for dredge spoil containment areas located within separation criteria.

2.6 Agricultural Activities.

Many agricultural crops can attract hazardous wildlife and should not be planted within the separations identified in Paragraphs 1.2 through 1.4. Corn, wheat, and other small grains in particular should be avoided. If the airport has no financial alternative to agricultural crops to produce the income necessary to maintain the viability of the airport, then the airport should consider growing crops that hold little food value for hazardous wildlife, such as grass hay. Attractiveness to hazardous wildlife species during all phases of production, from planting through harvest and fallow periods, should be considered when contemplating the use of airport property for agricultural production. Where agriculture is present, crop residue (e.g., waste grain) should not be left in the field following harvest. Also, airports should consult AC 150/5300-13, *Airport Design,* to ensure that agricultural crops do not create airfield obstructions or other safety hazards. Before planning or initiating any agricultural practices on airport property, operators should get approval from the appropriate FAA regional Airports Division Office and demonstrate that the additional cost of wildlife control and potential accidents is offset by revenue generated by agricultural leases. Annual review of the Airport Certification Manual by the Certification Inspector does not constitute approval and is insufficient to meet this requirement.

2.6.1 Livestock Production.

Confined livestock operations (i.e., feedlots, dairy operations, hog or chicken production facilities, or egg laying operations) often attract flocking birds, such as blackbirds, starlings, or pigeons that pose a hazard to aviation. Therefore, the FAA recommends against such facilities within the separations identified in Paragraphs 1.2 through 1.4. The airport operator should be aware of any wildlife hazards that appear to be attracted to off-site livestock operations and consider working with a Qualified Airport Wildlife Biologist to identify reasonable and feasible measures that may be proposed to landowners to reduce the attractiveness of the site to the potentially hazardous wildlife species.

2.6.1.1 In exceptional circumstances, and following FAA review and approval, livestock may be grazed on airport property as long as they are off the airfield and separated behind fencing where they cannot pose a hazard to aircraft. The livestock should be fed and watered as far away from the airfield and approach/departure space as possible because the feed and water may attract birds. The wildlife management plan should include monitoring and wildlife mitigation for any areas where the livestock and their feed/water is located in case a wildlife hazard is detected. Airports without wildlife management plans should equally consider monitoring and mitigation protocols to identify and address any wildlife hazards associated with livestock and their feeding operations.

2.6.2 Alternative Uses of Agricultural Land.

2.6.2.1 Habitat modification both on and surrounding an airfield is one of the best and most economical long term mitigation strategies to decrease risk that wildlife pose to flight safety. Alternative land uses (e.g., solar and biofuel) at airports could help mitigate many of the challenges for the airport operator, developers, and conservationists. However, careful planning must first determine that proposed alternative energy production at airports does not create wildlife attractants or other hazards.

2.6.2.2 Some airports are surrounded by vast areas of farmed land within the distances specified in Paragraphs 1.2 through 1.4. Seasonal uses of agricultural land for activities such as hunting can create a hazardous wildlife situation. In some areas, farmers will rent their land for hunting purposes. Rice farmers, among others, flood their land to attract waterfowl or for conservation efforts. This is often done during waterfowl hunting season to obtain additional revenue by renting out duck blinds.

2.6.2.3 The waterfowl hunters then use decoys and call in hundreds, if not thousands, of birds, creating a threat to aircraft safety. It is recommended that a Qualified Airport Wildlife Biologist review, in coordination with local farmers and producers, these types of seasonal land uses and incorporate mitigating measures into the wildlife management plan, when possible.

2.7 Aquaculture.

Aquaculture is the breeding, rearing, and harvesting of fish, shellfish, and plants in all types of water environments including ponds, rivers, lakes, and the ocean. Aquaculture is used to produce food fish, sport fish, bait fish, ornamental fish, and to support restoration activities. Aquacultured species are grown in a range of facilities including tanks, cages, ponds, and raceways. When an aquaculture facility is proposed within the separation criteria, the airport operator, project proponent, and local jurisdiction should discuss the proposed project location with regard to its attraction to hazardous species, location near the airport and the separation distances identified in Paragraphs 1.2 through 1.4. If a facility is identified as a possible significant attraction, a more suitable location for the proposed facility should be identified. If no other suitable location exists, it is recommended that the proposed facility plans be reviewed by a Qualified Airport Wildlife Biologist to identify measures to avoid or reduce the facility's potential to attract hazardous wildlife.

2.7.1 Freshwater Aquaculture.

2.7.1.1 Freshwater aquaculture activities (e.g., catfish, tilapia, trout or bass production) are typically conducted outside of fully enclosed buildings in constructed ponds or tanks and are inherently attractive to a wide variety of birds and therefore pose a significant risk to airport safety when within the separation distances specified in Paragraphs 1.2 through 1.4. Freshwater aquaculture should only be considered if extensive mitigation measures have been incorporated to eliminate attraction to hazardous birds. Examples of such mitigation include:

1. Netting or other material to exclude hazardous birds (e.g., eagles, osprey, gulls, cormorants);
2. Acoustic hazing including pyrotechnics, propane cannons, directional sonic/hailing devices and other similar technologies;
3. Feeding procedure cleanliness, exclusion techniques prohibiting birds from perching or accessing food; efficiency of feeding operation procedures that reduce fish food attraction to hazardous birds;
4. Operation procedure efficiency transferring live fish to and from enclosures or removal of dead fish; maintenance and upkeep of facility;
5. Monitoring, mitigation and communication protocols with nearby airports as a proactive safety feature in response to specific hazardous species in the event they are identified at the facility in unacceptable numbers.

2.7.2 Marine Aquaculture.

Marine aquaculture (Mariculture) refers to the culturing of species that live in the ocean. When appropriately managed and mitigated as necessary, mariculture facilities do not pose a significant risk to airport safety.

2.7.2.1 **Finfish Mariculture.**

2.7.2.1.1 U.S. finfish mariculture primarily produces salmon and steelhead trout as well as lesser amounts of cod, moi, yellowtail, barramundi, seabass, and seabream. Maricultures use rigid and non-rigid enclosures (e.g., cages) at the surface or submerged in the water column. These enclosures may be fully enclosed, or be open at the top or covered with netted material to negate losses from depredation by birds or other predators. Different facilities employ different designs and operational protocols.

2.7.2.1.2 While mariculture operations typically do not pose a significant attractant to hazardous birds, design and operational features can be incorporated as permit conditions to mitigate attraction and effectively reduce this risk. Examples of such mitigation include:

1. Fully enclosed cages using netting or other material to exclude hazardous birds (e.g., gulls, cormorants, pelicans) and to insure retention of fish;
2. Submerged enclosures to reduce attraction to hazardous birds;
3. Feed barge cleanliness, exclusion techniques prohibiting birds from perching or accessing food; efficiency of feeding operation procedures that reduce fish food attraction to hazardous birds;
4. Operation procedure efficiency transferring live fish to and from enclosures or removal of dead fish; maintenance and upkeep of facility;
5. Monitoring, mitigation and communication protocols with nearby airports as a proactive safety feature in response to specific hazardous species in the event they are identified at the facility in unacceptable numbers.

2.7.2.2 **Shellfish Mariculture.**

U.S. shellfish mariculture primarily produces oysters, clams, mussels, lobster and shrimp. Shellfish may be grown directly on the bottom, in submerged cages or bags, or on suspended lines. These types of mariculture operations do not typically present a significant attractant to hazardous birds. For those operations that are found to pose a significant risk, design and operation features that diminish possible attraction to hazardous bird species (e.g., reducing areas for perching or feeding) can effectively reduce this risk.

2.7.2.3 **Plant Mariculture.**

2.7.2.3.1 Microalgae, also referred to as phytoplankton, microphytes, or planktonic algae constitute the majority of cultivated algae. Macroalgae, commonly known as seaweed, also have many commercial and industrial uses.

2.7.2.3.2 While few commercial seaweed farms exist, the sector is growing. These types of mariculture operations do not typically present an attractant to hazardous birds.

2.8 Golf Courses, Landscaping, Structures and Other Land-Use Considerations.

2.8.1 Golf Courses.

The large grassy areas and open water found on most golf courses are attractive to hazardous wildlife, particularly Canada geese and some species of gulls. These species can pose a threat to aviation safety. If golf courses are located on or near airport property, airport operators should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations. Accordingly, airport operators should develop, at a minimum, onsite measures to minimize hazardous wildlife attraction in consultation with a Qualified Airport Wildlife Biologist. Existing golf courses located within these separations that have been documented to attract hazardous wildlife are encouraged to develop a program to reduce the attractiveness of the sites to species that are hazardous to aviation safety. The FAA recommends against construction of new golf courses within the separations identified in Paragraphs 1.2 through 1.4 if determined that the new facility would create a significant wildlife hazard attractant by a Qualified Airport Wildlife Biologist. Airport operators should ensure these golf courses are monitored on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be immediately implemented.

2.8.2 Landscaping and Landscape Maintenance.

2.8.2.1 Depending on its geographic location, landscaping can attract hazardous wildlife. The FAA recommends that airport operators approach landscaping with caution and confine it to airport areas not associated with aircraft movements. Vegetation that produces seeds, fruits, or berries, or that provides dense roosting or nesting cover should not be used. Airports should develop a landscape plan to include approved and prohibited plants. The landscape plan should consider the watering needs of mature plants. A Qualified Airport Wildlife Biologist should review all landscaping plans. Airport operators should also monitor all landscaped areas on a continuing basis for the presence of hazardous wildlife. If hazardous wildlife is detected, corrective actions should be immediately implemented.

2.8.2.2 Turf grass areas on airports have the potential to be highly attractive to a variety of hazardous wildlife species. Research conducted by the USDA Wildlife Services' National Wildlife Research Center has shown that no one airfield vegetation management regimen will deter all species of hazardous wildlife in all situations. The composition and height of airfield grasslands should be properly managed to reduce their attractiveness to hazardous wildlife. In many situations, an intermediate height, monoculture turf grass might be most favorable. In cooperation with a

Qualified Airport Wildlife Biologist, airport operators should develop airport turf grass management plans on a prescription basis, including cultivar selection during reseeding efforts, that is specific to the airport's geographic location, climatic conditions, and the type of hazardous wildlife likely to frequent the airport.

2.8.2.3 Airport operators should ensure that plant varieties attractive to hazardous wildlife are not used on the airport. Disturbed areas or areas in need of re-vegetating should not be planted with seed mixtures containing millet or any other large-seed producing grass. For airport property already planted with seed mixtures containing millet, rye grass, or other large-seed producing grasses, the FAA recommends disking, plowing, or another suitable agricultural practice to prevent plant maturation and seed head production. Plantings should follow the specific recommendations for grass management and seed and plant selection made by the State University Cooperative Extension Service, the local office of Wildlife Services, or a Qualified Airport Wildlife Biologist. Airport operators should also consider developing and implementing a preferred/prohibited plant species list, reviewed by a Qualified Airport Wildlife Biologist, which has been designed for the geographic location to reduce the attractiveness to hazardous wildlife for landscaping airport property.

2.8.3 Structures.

2.8.3.1 Certain structures attract birds for loafing and nesting. Flat rooftops can be attractive to many species of gulls for nesting, hangars provide roosting / nesting opportunities for rock doves, towers, light posts and navigation aids can provide loafing / hunting perches for raptors and aircraft can provide loafing / nesting sites for European starlings, blackbirds and other species. These structures should be monitored and mitigated, if located on-site. Off-site structural attractions may require additional coordination to effectively mitigate their use by hazardous species.

2.8.3.2 Cellular communications towers are becoming increasingly more attractive to large birds (e.g., osprey, eagles, herons, vultures) for nesting and rearing their young. This problem is a growing concern because once the young fledge from nests built on manmade structures they are more likely to return to these kinds of sites to reproduce in future years.

2.8.4 Other Hazardous Wildlife Attractants.

Other land uses (e.g., conservation easements, parks, wildlife management areas) or activities not addressed in this AC may have the potential to attract hazardous wildlife. Regardless of the source of the attraction, when hazardous wildlife is noted on a public-use airport, each certificate holder must take prompt remedial action(s) to protect aviation safety and all non-certificated airports should take prompt remedial action(s) to protect aviation safety.

2.9 Habitat for State and Federally Listed Species on Airports.

An airport's air operations area is an artificial environment that has been created and maintained for aircraft operations. Because an aircraft operations area can be markedly different from the surrounding native landscapes, it may attract wildlife species that do not normally occur, or that occur only in low numbers in the area. Some of the grassland species attracted to an airport's aircraft operations area are at the edge of their natural ranges, but are attracted to habitat features found in the airport environment. Also, some wildlife species may occur on the airport in higher numbers than occur naturally in the region because the airport offers habitat features the species prefer. Some of these wildlife species are Federal or state-listed threatened and endangered species or have been designated by state resource agencies as species of special concern.

2.9.1 State-Listed Species Habitat Concerns.

2.9.1.1 Many state wildlife agencies have requested that airport operators facilitate and encourage habitat on airports for state-listed threatened and endangered species or species of special concern. Airport operators should exercise caution in adopting new management techniques because they may increase wildlife hazards and be inconsistent with safe airport operations. Managing the on-airport environment to facilitate or encourage the presence of hazardous wildlife species can create conditions that are incompatible with, or pose a threat to, aviation safety.

2.9.1.2 Not all state-listed threatened and endangered species or species of concern pose a direct threat to aviation safety. However, these species may pose an indirect threat and be hazardous because they attract other wildlife species or support prey species attractive to other species that are directly hazardous. Also, the habitat management practices that benefit these state-listed threatened and endangered species and species of special concern may attract other hazardous wildlife species. On-airport habitat and wildlife management practices designed to benefit wildlife that directly or indirectly create safety hazard where none existed before are incompatible with safe airport operations.

2.9.2 Federally Listed Species Habitat Concerns.

2.9.2.1 The FAA supports efforts to protect threatened and endangered species, as a matter of principle and consistent with the Endangered Species Act of 1973. The FAA must balance these requirements with our requirements and mission to maintain a safe and efficient airport system. Requests to enhance or create habitat for threatened and endangered species often conflict with the safety of the traveling public and may place the protected species at risk of mortality by aircraft collisions. The FAA does not support the creation, conservation or enhancement of habitat or refuges to attract endangered species on airports. If endangered species are present on an airport, specific obligations may apply under the Endangered

Species Act, 16 U.S.C. § 1531 et seq. and the airport operator should contact the Airports District Office Environmental Protection Specialist.

2.9.2.2 The designation of critical habitat for listed species under the Endangered Species Act on airport lands may be an incompatible land use in conflict with the intended and dedicated purpose of airport lands and may limit or preclude the ability of the airport to develop new infrastructure and growth capacity to meet future air carrier service demand. In addition, depending on the listed species (primarily but not limited to avian species), the designation of critical habitat within the separation distances provided in paragraphs 1.2 - 1.4 can represent a hazardous wildlife attractant in conflict with 14 CFR Part 139.337.

2.10 Synergistic Effects of Surrounding Land Uses.

There may be circumstances where two or more different land uses would not, by themselves, be considered hazardous wildlife attractants or are located outside of the separations identified in Paragraphs 1.2 through 1.4 but collectively may create a wildlife corridor directly through the airport and/or surrounding airspace. An example involves a lake located outside of the separation criteria on the east side of an airport and a large hayfield on the west side of an airport. These two land uses, taken together, could create a flyway for Canada geese directly across the airspace of the airport. Airport operators must consider the entire surrounding landscape and community when developing the wildlife management plan.

CHAPTER 3. PROCEDURES FOR WILDLIFE HAZARD MANAGEMENT BY OPERATORS OF PUBLIC-USE AIRPORTS AND CONDITIONS FOR NON-CERTIFICATED AIRPORTS TO CONDUCT WILDLIFE HAZARD ASSESSMENTS AND WILDLIFE HAZARD SITE VISITS

3.1 Introduction.

In recognition of the increased risk of serious aircraft damage or the loss of human life that can result from a wildlife strike, the FAA recommends all airports conduct a Wildlife Hazard Site Visit or Wildlife Hazard Assessment unless otherwise mandated after an initial triggering events defined in Part 139 Section 139.337. After the airport has completed the site visit or assessment and implemented a wildlife management plan, investigations should be conducted following subsequent triggering events to determine if the original assessment and plan adequately address the situation or if conditions have changed that would warrant an update to the plan. In this section, airports that are certificated under 14 C.F.R. § 139.337 are referred to as "certificated airports" and all others are referred to as "non-certificated airports." When a statement refers to both certificated and non-certificated airports, "airport" or "all airports" is used.

3.2 Coordination with Qualified Airport Wildlife Biologists.

Hazardous wildlife management is a complex discipline and conditions vary widely across the United States. Therefore, only airport wildlife biologists meeting the qualification requirements in Advisory Circular 150/5200-36, *Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports,* can conduct Site Visits and Assessments. Airports must maintain documentation that the Qualified Airport Wildlife Biologist meets the qualification requirements in Advisory Circular 150/5200-36.

3.3 Wildlife Hazard Management at Airports: A Manual For Airport Personnel.

3.3.1 The Wildlife Hazard Management at Airports manual, prepared by FAA and USDA Wildlife Services staff, contains a compilation of information to assist airport personnel in the development, implementation, and evaluation of wildlife management plans at airports. The manual includes specific information on the nature of wildlife strikes, legal authority, regulations, wildlife management techniques, Assessments, Plans, and sources of help and information. The manual is available in three languages: English, Spanish, and French. It can be viewed and downloaded free of charge from the FAA's wildlife hazard mitigation web site: https://www.faa.gov/airports/airport_safety/wildlife. This manual only provides a starting point for addressing wildlife hazard issues at airports. FAA recommends that airports consult with a Qualified Airport Wildlife Biologists to assist with development of a wildlife management plan and the implementation of management actions by airport personnel.

3.3.2 There are many other resources complementary to this manual for use in developing and implementing wildlife management plans. Several are listed in the manual's bibliography or on the FAA Wildlife Mitigation website: https://www.faa.gov/airports/airport_safety/wildlife

3.4 Wildlife Hazard Site Visits and Wildlife Hazard Assessments.

3.4.1 Operators of certificated airports are encouraged to conduct an initial assessment regardless of whether the airport has experienced one of the triggering events. Doing so would allow the airport to take proactive action and mitigate the wildlife risk before experiencing an incident. All other airports are encouraged to conduct an assessment or site visit (as defined in FAA Advisory Circular 150/5200-38) conducted by a Qualified Airport Wildlife Biologist (as defined in FAA Advisory Circular 150/5200-36). Part 139 certificated airports are currently required to ensure that an assessment is conducted consistent with 14 C.F.R. § 139.337.

3.4.2 The intent of a site visit is to provide an abbreviated analysis of an airport's wildlife hazards and to provide timely information that allows the airport to expedite the mitigation of these hazards. The FAA also recommends that airports conduct an assessment or site visit as soon as practicable in order to identify any immediate wildlife hazards and/or mitigation measures.

3.4.3 Non-certificated airports should submit the results of the site visit or assessment to the FAA for review. The FAA will review the submitted site visit or assessment and make a recommendation regarding the development of a wildlife management plan. A wildlife management plan can be developed based on a site visit and will be required if the non-certificated airport is going to request federal grants for the purpose of mitigating wildlife hazards.

3.5 Wildlife Hazard Management Plan.

3.5.1 The FAA will consider the results of the assessment, along with the aeronautical activity at the airport and the views of the airport operator and airport users, in determining whether a wildlife management plan is needed for certificated airports, or recommended for non-certificated airports.

3.5.2 If the FAA determines that a wildlife management plan is needed for a certificated airport, the airport operator must formulate a plan, using the assessment as its basis and submit to the FAA for approval. If the FAA recommends that a non-certificated airport develop a plan, either an assessment or a site visit can be used as the basis for the wildlife management plan. Airports should consult AC 150/5200-38, *Protocol for the Conduct and Review of Wildlife Hazard Site Visits, Wildlife Hazard Assessments, and Wildlife Hazard Management Plans,* for further information on preparation and implementation requirements for their wildlife management plan.

3.5.3 The goal of an airport's wildlife management plan is to minimize the risk to aviation safety, airport structures or equipment, or human health posed by populations of hazardous wildlife on and around the airport. For wildlife management plans to effectively reduce wildlife hazards on and near airports, accurate and consistent wildlife strike reporting is essential. Airports should consult AC 150/5200-32, *Reporting Wildlife Aircraft Strikes,* for further information on responsibilities and recommendations concerning wildlife strikes.

3.5.4 The wildlife management plan must identify hazardous wildlife attractants on or near the airport and the appropriate wildlife management techniques to minimize the wildlife hazard. It must also prioritize the management measures.

3.6 Local Coordination.

The FAA recommends establishing a Wildlife Hazards Working Group to facilitate the communication, cooperation, and coordination of the airport and its surrounding community necessary to ensure the effectiveness of the wildlife management plan. The cooperation of the airport community is essential to prevent incompatible development in the airport vicinity. Whether on or off the airport, input from all involved parties must be considered when a potentially hazardous wildlife attractant is being proposed. Based on available resources, airport operators should undertake public education activities with the local planning agencies because some activities in the vicinity of an airport, while harmless under normal conditions, can attract wildlife and present a danger to aircraft (see Paragraphs 4.5 to 4.8). For example, if public trails are planned near wetlands or in parks adjoining airport property, the public should know that feeding birds and other wildlife in the area may pose a risk to aircraft.

3.7 Operational Notifications of Wildlife Hazards.

3.7.1 Operational notifications include active correspondence addressing wildlife issues on or near an airport, notifications and alerts. If an existing land-use practice creates a wildlife hazard and the land-use practice or wildlife hazard cannot be immediately eliminated, airport operators must issue a Notice to Airmen (NOTAM) and encourage the land owner or manager to take steps to control the wildlife hazard and minimize further attraction. Permanent attractions that cannot be eliminated or mitigated may be noted in the Airport/Facility Directory. NOTAMS and Airport/Facility Directory notifications are not appropriate for short-term or immediate advisories that can be relayed via Pilot Reports, direct air traffic control voice communications, or temporary Automated Terminal Advisory System alerts. Care should be given to avoid the continual broadcast of general warnings for extended periods of time. General warnings such as "birds in the vicinity of the aerodrome" offer little timely information to aid pilots and eventually may be ignored if not updated.

3.7.2 The Automated Terminal Advisory System (ATIS) is a continuous broadcast of recorded aeronautical information for aerodromes and their immediate surroundings. ATIS broadcasts contain essential information, such as current weather information,

active runways, available approaches, wildlife hazards and any other information required by the pilots. They indicate significant (moderate or severe) wildlife activity, as reported by an approved agency that presents temporary hazards on the ATIS broadcast. Pilots take notice of available ATIS broadcasts before contacting the local control unit, which reduces the controllers' workload and relieves frequency congestion. The recording is updated in fixed intervals or when there is a significant change in the information. Although ATIS broadcasts involving wildlife should be timely and specific, pilots do not need to know species-specific information. General descriptive information detailing size and number of animals, locations and timing of occurrence provides useful, actionable information for pilots.

3.7.3 A pilot report (PIREP) is reported by a pilot to indicate encounters of hazardous weather (e.g., icing or turbulence) and hazardous wildlife. Pilot reports are short-lived warnings providing immediate information on pilot observations that are transmitted in real-time to air traffic control. Large animals near active surfaces, soaring vultures and raptors within approach/ departure corridors and waterfowl such as geese feeding in grassy areas next to runways are all examples of pilot reports generated by pilots.

3.8 Federal and State Depredation Permits.

The FAA recommends that airports maintain federal and state depredation permits to allow mitigation and/ or removal of hazardous species. All protected species require special permits for lethal mitigation or capture and relocation procedures. Similarly, endangered or threatened species mitigation also requires special permits. The FAA recommends that airports work closely with a Qualified Airport Wildlife Biologist during the U.S. Fish and Wildlife Service consultation and permitting process. The following Orders can help airports reduce risks from hazardous species by allowing private citizens to control hazardous species off airport properties without the need for a Federal depredation permit.

3.8.1 Standing Depredation Orders.

3.8.1.1 Federal law allows people to protect themselves and their property from damage caused by migratory birds. Provided no effort is made to kill or capture the birds, a depredation permit is not required to merely scare or herd depredating migratory birds other than endangered or threatened species or bald or golden eagles (50 CFR 21.41).

3.8.1.2 In addition, certain species of migratory birds may be mitigated without a federal permit under specific circumstances, many of which relate to agricultural situations. The following Standing Depredation Orders have applicability near airports:

- 50 CFR § 21.49- Control Order for Resident Canada Geese at Airports and Military Airfields.
- 50 CFR § 21.50- Depredation Order for Resident Canada Geese Nests and Eggs.

- 50 CFR § 21.43 - Depredation Order for Blackbirds, Cowbirds, Crows, Grackles, and Magpies.
- 50 CFR § 21.54 - Control Order for Muscovy Ducks in the United States.
- 50 CFR § 21.55 - Control Order for Invasive Migratory Birds in Hawaii.

CHAPTER 4. RECOMMENDED PROCEDURES FOR THE FAA, AIRPORT OPERATORS AND OTHER GOVERNMENT ENTITIES REGARDING OFF-AIRPORT ATTRACTANTS

4.1 FAA Notification and Review of Proposed Land-Use Practice Changes in the Vicinity of Public-Use Airports.

4.1.1 For projects that are located within 5 miles of the airport's aircraft operations area, the FAA may review development plans, proposed land-use changes, operational changes, major federal actions or wetland mitigation plans to determine if such changes increase risk to airport safety by attracting hazardous wildlife on and around airports. The FAA is not a permitting agency for land use modifications that occur off airport properties, therefore, such reviews are typically initiated by state or federal permitting agencies seeking FAA input on new or revised permits. Each of the land uses listed in Chapter 2 of this AC has the potential to pose a risk to airport operations when they are located within the separation distances provided in Paragraphs 1.2 through 1.4.

4.1.2 Off-site land use modifications near airports may include an assessment of risk for facilities and land-use changes and, if necessary, mitigation strategies that may reduce risk to an acceptable level. However, the FAA recognizes that individual facilities or land-use modifications may present a range of attractants to different species, resulting in varying levels of risk. Therefore, the FAA considers each proposal on a case-by-case basis.

4.1.3 The FAA analyzes each land-use modification or new facility proposal prior to its establishment or any significant planned changes to design or operations that may increase the risk level. As part of a review, the FAA considers several factors that include, but are not limited to:

1. Type of attractant;
2. Size of attractant;
3. Location/distance of attractant from airport;
4. Design (e.g., construction, material, mitigation techniques employed into design);
5. Operation (e.g., cleanliness, constancy/ volume of use, seasonality, time of day);
6. Monitoring protocols (e.g., frequency, documentation, evaluation, species identification and number thresholds that trigger actions of communication or mitigation, baseline wildlife data);
7. Mitigation protocols (e.g., responsibilities, methods, intensity, pre-determined objectives, documentation, evaluation); and
8. Communication protocols to airport and/ or air traffic control tower;

4.1.4 The review of these factors may result in FAA recommended additions or modifications to a conditional use permit that allows the permitting agency to track compliance with the permittee obligations. Such conditions placed within a permit

may involve a comprehensive outline and recognition of individuals responsible for monitoring, communication, and mitigation measures if certain action thresholds are met. Action thresholds are defined in this instance as those pre-determined parameters (e.g., number, location, behavior, time of day) of specific hazardous species that would trigger a mitigation response. Additionally, baseline data should be used to determine the effect, if any, on wildlife populations at the proposed off-site location and/or at the airport.

4.1.5 Baseline data may need to be collected, depending on the existence of useful data and timeline for site modification. If, after taking into account the factors above, FAA determines that a facility poses a significant risk to airport safety, FAA will object to its establishment or renewal.

4.1.6 For projects that are located within 5 miles of the airport's aircraft operations area, the FAA Airport District Office may review development plans, proposed land-use changes, operational changes, major federal actions or wetland mitigation plans to determine if such changes present potential wildlife hazards to aircraft operations. The FAA considers sensitive airport areas as those that lie under or next to approach or departure airspace. This brief examination should indicate if further investigation is warranted.

4.1.7 Where a Qualified Airport Wildlife Biologist has conducted a further study to evaluate a site's compatibility with airport operations, the FAA may use the study results to make a determination.

4.2 Waste Management Facilities.

4.2.1 Notification of New/Expanded Project Proposal.

4.2.1.1 49 U.S.C. § 44718(d), prohibits the construction or establishment of new municipal landfills within 6 miles of certain public-use airports, when both the airport and the landfill meet specific conditions. See Paragraph 2.2 of this guidance for a more detailed discussion of these restrictions.

4.2.1.2 The Environmental Protection Agency (EPA) requires any landfill operator proposing a new or expanded waste disposal operation within 5 miles of a runway end to notify the appropriate FAA Regional Airports Division Office and the airport operator of the proposal. See 40 CFR § 258, *Criteria for Municipal Solid Waste Landfills,* Section 258.10, *Airport Safety*. The EPA also requires owners or operators of new landfill units, or lateral expansions of existing MSWLF landfill units, that are located within 10,000 feet of any airport runway end used by turbine-powered aircraft, or within 5,000 feet of any airport runway end used only by piston-type aircraft, to demonstrate successfully that such units are not hazards to aircraft. (See 4.3.2 below.)

4.2.1.3 When new or expanded municipal landfills are being proposed near airports, landfill operators must notify the airport operator and the FAA of the proposal as early as possible pursuant to 40 CFR § 258.

4.2.1.4 The FAA discourages the development of waste disposal and other facilities, discussed in Chapter 2, located within the separation criteria specified in Paragraphs 1.2 through 1.4. To show that a waste-handling facility sited within the separations identified in Paragraphs 1.2 through 1.4 does not attract hazardous wildlife and does not threaten aviation, the developer must establish the facility will not handle putrescible material other than that as outlined in 2.2.4. The FAA recommends against any facility other than those outlined in 2.2.4 (enclosed transfer stations). The FAA will use this information to determine if the facility will be a hazard to aviation.

4.3 Other Land-Use Practice Changes.

4.3.1 The FAA encourages operators of public-use airports who become aware of proposed land use practice changes that may attract hazardous wildlife within 5 miles of their airports to notify their assigned Airport Certification Safety Inspector or Airports District Office Program Manager. The FAA also encourages proponents of such land use changes to notify the FAA as early in the planning process as possible. Advanced notice affords the FAA an opportunity (1) to evaluate the effect of a particular land-use change on aviation safety and (2) to support efforts by the airport sponsor to restrict the use of land next to or near the airport to uses that are compatible with the airport.

4.3.2 The airport operator, project proponent, or land-use operator may use FAA Form 7460-1, Notice of Proposed Construction or Alteration, or other suitable documents similar to FAA Form 7460-1 to notify the appropriate FAA Regional Airports Division Office. Project proponents can contact the appropriate FAA Regional Airports Division Office for assistance with the notification process prior to submitting Form 7460-1.

4.3.3 It is helpful if the notification includes a 15-minute quadrangle map of the area identifying the location of the proposed activity. The land-use operator or project proponent should also forward specific details of the proposed land-use change or operational change or expansion. In the case of solid waste landfills, the information should include the type of waste to be handled, how the waste will be processed, and final disposal methods.

4.3.4 Airports that have Received Federal Assistance.

Airports that have received Federal assistance are required under their grant assurances to take appropriate actions to restrict the use of land next to or near the airport to uses that are compatible with normal airport operations. See Grant Assurance 21. The FAA recommends that airport operators oppose off-airport land-use changes or practices, to

the extent practicable, within the separations identified in Paragraphs 1.2 through 1.4, which may attract hazardous wildlife. Failure to do so may lead to noncompliance with applicable grant assurances. The FAA will not approve the placement of airport development projects pertaining to aircraft movement in the vicinity of hazardous wildlife attractants without appropriate mitigating measures. Increasing the intensity of wildlife control efforts is not a substitute for preventing, eliminating or reducing a proposed wildlife hazard. Airport operators should identify hazardous wildlife attractants and any associated wildlife hazards during any planning process for airport development projects.

4.4 Coordination to Prevent Creation of New Off-Airport Hazardous Wildlife Attractants.

Airport operators should work with local and regional planning and zoning boards to be aware of proposed land-use changes, or modification of existing land uses, that could create hazardous wildlife attractants within the separations identified in Paragraphs 1.2 through 1.4. Pay particular attention to proposed land uses involving creation or expansion of wastewater treatment facilities, development of wetland mitigation sites, or development or expansion of dredge spoil containment areas. At the very least, it is recommended that airport operators are on the notification list of the local planning board or equivalent review entity for all communities located within 5 miles of the airport, so they will receive notification of any proposed project and have the opportunity to review it for attractiveness to hazardous wildlife. This may be accomplished through one or more of the following:

4.4.1 Site-specific Criteria.

The airport should establish site-specific criteria for assessment of land uses attractive to hazardous wildlife and locations that would be of concern based on wildlife strikes and on wildlife abundance and activity at the airport and in the local area. These criteria may be more selective, but should not be less restrictive than this guidance.

4.4.2 Outreach.

Airports should actively seek to provide educational information and/ or provide input regarding local development, natural resource modification or wildlife-related concerns that affect wildlife hazards and safe air travel.

4.4.2.1 **External Outreach.**

Airport operators and a Qualified Airport Wildlife Biologist should consider outreach to local planning and zoning organizations on land uses of concern or to local organizations responsible for natural resource management (including wildlife, wetlands, and parks.) Airports should also consider developing and distributing position letters and educational materials on airport-specific concerns regarding wildlife hazards, wildlife activity and attraction. Finally, airports should provide formal comments on local procedures, laws, ordinances, plans, and regulatory actions such as permits related to land uses of concern.

4.4.2.2 **Internal Outreach.**

Airports should consider developing and distributing position letters and educational materials on airport-specific concerns regarding species identification and mitigation procedures, wildlife hazards, wildlife activity and attraction to employees and personnel with access to the aircraft operations area.

4.5 Coordination on Existing Off-Airport Hazardous Wildlife Attractants.

Airports are encouraged to work with landowners and managers to cooperatively develop procedures to monitor and manage hazardous wildlife attraction. If applicable, these procedures may include:

1. Conducting a wildlife hazard site visit by a wildlife biologist meeting the qualification requirements of Advisory Circular 150/5200-36, *Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports*
2. Conducting regular, standardized, wildlife monitoring surveys;[4]
3. Establishing threshold numbers of wildlife which would trigger certain actions and/or communications;
4. Establishment of procedures to deter or remove hazardous wildlife.

4.6 Prompt Remedial Action.

For attractants found on and off airport property, and with landowner or manager cooperation, Part 139 certificated airports must take immediate action in accordance with their Airport Certification Manual and the requirements of Part 139.337, to alleviate wildlife hazards whenever they are detected. It is also recommended that non-certificated airports take immediate action to alleviate wildlife hazards whenever they are detected. In addition, airports should take prompt action to identify the source of attraction and cooperatively develop procedures to mitigate and monitor the attractant. **For Part 139 Certificated airports, immediate actions are required in accordance with 139.337(a).**

4.7 FAA Assistance.

If there is a question on the implementation of any of the guidance in this section, contact the FAA Regional Airports Division for assistance.

[4] Recommended survey protocols can be found in AC 150/5200-38, *Protocol for the Conduct and Review of Wildlife Hazard Site Visits, Wildlife Hazard Assessments, and Wildlife Hazard Management Plans,* and DeVault, T.L., B.F. Blackwell, and J.L. Belant, eds. 2013. *Wildlife in Airport Environments: Preventing Animal–Aircraft Collisions through Science-Based Management.* Johns Hopkins University Press, Baltimore, MD, USA. 181 pp.

4.7.1 Airport Documentation Procedures.

Airports should document on-site and off-site wildlife attractants as part of their "Wildlife Hazard Management Plan Annual Review," "Wildlife Hazard Management Plan Review Following a Triggering Event," and the airport's Continual Monitoring Annual Report (as outlined in FAA Advisory Circular 150/5200-38). As a best management practice, airports may choose to keep a log to track contacts from landowners or managers, permitting agencies, or other entities concerning land uses near the airport.

APPENDIX A. DEFINITIONS OF TERMS USED IN THIS ADVISORY CIRCULAR

A.1 **General.**

This appendix provides definitions of terms used throughout this AC.

1. **Air operations area.** Any area of an airport used or intended to be used for landing, takeoff, or surface maneuvering of aircraft. An air operations area includes such paved areas or unpaved areas that are used or intended to be used for the unobstructed movement of aircraft in addition to its associated runway, taxiways, or apron.
2. **Airport operator.** The operator (private or public) or sponsor of a public-use airport.
3. **Approach or departure airspace.** The airspace, within 5 statute miles of an airport, through which aircraft move during landing or takeoff.
4. **Bird balls.** High-density plastic floating balls that can be used to cover ponds and prevent birds from using the sites.
5. **Certificate holder.** The holder of an Airport Operating Certificate issued under 14 C.F.R. Part 139.
6. **Construct a new municipal landfill.** To begin to excavate, grade land, or raise structures to prepare a municipal solid waste landfill as permitted by the appropriate regulatory or permitting agency.
7. **Detention ponds.** Storm water management ponds that hold storm water for short periods of time, a few hours to a few days.
8. **Establish a new municipal landfill.** When the first load of putrescible waste is received on-site for placement in a prepared municipal solid waste landfill.
9. **Fly ash.** The fine, sand-like residue resulting from the complete incineration of an organic fuel source. Fly ash typically results from the combustion of coal or waste used to operate a power generating plant.
10. **General aviation aircraft.** Any civil aviation aircraft operating under 14 CFR Part 91.
11. **Hazardous wildlife.** Species of wildlife (birds, mammals, reptiles), including feral and domesticated animals, not under control that may pose a direct hazard to aviation (i.e., strike risk to aircraft) or an indirect hazard such as an attractant to other wildlife that pose a strike hazard or are causing structural damage to airport facilities (e.g., burrowing, nesting, perching).
12. **Municipal Landfill.** A publicly or privately owned discrete area of land or an excavation that receives household waste and that is not a land application unit, surface impoundment, injection well, or waste pile, as those terms are defined under 40 CFR § 257.2. A municipal landfill may receive other types wastes, such as commercial solid waste, non-hazardous sludge, small-quantity generator waste, and

industrial solid waste, as defined under 40 CFR § 258.2. A municipal landfill can consist of either a stand-alone unit or several cells that receive household waste.

13. **New municipal landfill.** A municipal solid waste landfill that was established or constructed after April 5, 2001.
14. **Piston-powered aircraft.** Fixed-wing aircraft powered by piston engines.
15. **Piston-use airport.** Any airport that does not sell Jet-A fuel for fixed-wing turbine-powered aircraft, and primarily serves fixed-wing, piston-powered aircraft. Incidental use of the airport by turbine-powered, fixed-wing aircraft would not affect this designation. However, such aircraft should not be based at the airport.
16. **Public agency.** A state or political subdivision of a state, a tax-supported organization, or an Indian tribe or pueblo (49 U.S.C. § 47102(19)).
17. **Public airport.** An airport used or intended to be used for public purposes that is under the control of a public agency; and of which the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft is publicly owned (49 U.S.C. § 47102(20)).
18. **Public-use airport.** An airport used or intended to be used for public purposes where the area used or intended to be used for landing, taking off, or surface maneuvering of aircraft may be under the control of a public agency or privately owned and used for public purposes (49 U.S.C. § 47102(21)).
19. **Putrescible waste.** Solid waste that contains organic matter capable of being decomposed by micro-organisms and of such a character and proportion as to be capable of attracting or providing food for birds (40 CFR §257.3-8).
20. **Putrescible-waste disposal operation.** Landfills, garbage dumps, underwater waste discharges, or similar facilities where activities include processing, burying, storing, or otherwise disposing of putrescible material, trash, and refuse.
21. **Retention ponds.** Storm water management ponds that hold water for more than 48 hours.
22. **Risk**. Risk is the relationship between the severity and probability of a threat. It is the product of hazard level and abundance in the critical airspace, and is thus defined as the probability of a damaging strike with a given species.
23. **Runway protection zone.** An area off the runway end to enhance the protection of people and property on the ground (see AC 150/5300-13). The dimensions of this zone vary with the airport design, aircraft, type of operation, and visibility minimum.
24. **Scheduled air carrier operation.** Any common carriage passenger-carrying operation for compensation or hire conducted by an air carrier or commercial operator for which the air carrier, commercial operator, or their representative offers in advance the departure location, departure time, and arrival location. It does not include any operation that is conducted as a supplemental operation under 14 CFR Part 119 or as a public charter operation under 14 CFR Part 380 (14 CFR § 119.3).

25. **Sewage sludge.** Any solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works. (40 CFR § 257.2)

26. **Sludge.** Any solid, semi-solid, or liquid waste generated form a municipal, commercial or industrial wastewater treatment plant, water supply treatment plant, or air pollution control facility or any other such waste having similar characteristics and effect. (40 CFR § 257.2).

27. **Solid waste.** Any garbage, refuse, sludge, from a waste treatment plant, water supply treatment plant or air pollution control facility and other discarded material, including, solid liquid, semisolid, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations, and from community activities, but does not include solid or dissolved materials in domestic sewage, or solid or dissolved material in irrigation return flows or industrial discharges which are point sources subject to permits under section 402 of the Clean Water Act, or source, special nuclear, or by product material as defined by the Atomic Energy Act of 1954.(40 CFR § 257.2).

28. **Turbine-powered aircraft.** Aircraft powered by turbine engines including turbojets and turboprops but excluding turbo-shaft rotary-wing aircraft.

29. **Turbine-use airport.** Any airport that sells fuel for fixed-wing turbine-powered aircraft.

30. **Wastewater treatment facility.** Any devices and/or systems used to store, treat, recycle, or reclaim municipal sewage or liquid industrial wastes, including publicly owned treatment works, as defined by Section 212 of the Clean Water Act. This definition includes any pretreatment involving the reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a publicly owned treatment system. (See 40 CFR § 403.3 (q), (r), & (s)).

31. **Wildlife.** Any wild animal, including without limitation any wild mammal, bird, reptile, fish, amphibian, mollusk, crustacean, arthropod, coelenterate, or other invertebrate, including any part, product, egg, or offspring thereof. 50 CFR § 10.12. As used in this AC, wildlife includes feral animals and domestic animals out of the control of their owners (14 CFR Part 139, Certification of Airports).

32. **Wildlife attractants.** Any human-made structure, land-use practice, or human-made or natural geographic feature that can attract or sustain hazardous wildlife within the landing or departure airspace or the airport's aircraft operations area. These attractants can include architectural features, landscaping, waste disposal sites, wastewater treatment facilities, agricultural or aquaculture activities, surface mining, or wetlands.

33. **Wildlife hazard.** A potential for a damaging aircraft collision with wildlife on or near an airport.

34. **Wildlife strike.** A wildlife strike is deemed to have occurred when:

    a. A strike between wildlife and aircraft has been witnessed;

    b. Evidence or damage from a strike has been identified on an aircraft;

    c. Bird or other wildlife remains, whether in whole or in part, are found:

        i. Within 250 feet of a runway centerline or within 1,000 feet of a runway end unless another reason for the animal's death is identified or suspected, unless another reason for the animal's death is identified or;

        ii. On a taxiway or anywhere else on or off airport that there is reason to believe was the result of a strike with an aircraft.

    d. The presence of birds or other wildlife on or off the airport had a significant negative effect on a flight (i.e., aborted takeoff, aborted landing, high-speed emergency stop, aircraft left pavement area to avoid collision with animal).

APPENDIX B. ADDITIONAL RESOURCES

B.1 Regulations

- 14 CFR § 139.337, *Wildlife Hazard Management*
- 40 CFR § 258, *Criteria for Municipal Solid Waste Landfills*

B.2 Advisory Circulars

- AC 150/5200-32, *Reporting Wildlife Aircraft Strikes*
- AC 150/5200-33, *Hazard Wildlife Attractants on or Near Airports*
- AC 150/5200-34, *Construction or Establishment of New Landfills Near Public Airports*
- AC 150/5200-36, *Qualifications for Wildlife Biologist Conducting Wildlife Hazard Assessments and Training Curriculums for Airport Personnel Involved in Controlling Wildlife Hazards on Airports*
- AC 150/5200-38, *Protocol for the Conduct and Review of Wildlife Hazard Site Visits, Wildlife Hazard Assessments, and Wildlife Hazard Management Plans*
- AC 150/5220-25, *Airport Avian Radar Systems*
- AC 150/5210-24, *Airport Foreign Object Debris (FOD) Management*

B.3 Certification Alerts

- Certalert No. 97-09, *Wildlife Hazard Management Plan Outline* (11/17/1997)
- Certalert No. 98-05, *Grasses Attractive To Hazardous Wildlife* (9/21/1998)
- Certalert No. 06-07, *Requests by State Wildlife Agencies to Facilitate and Encourage Habitat for State Listed Threatened and Endangered Species and Species of Special Concern on Airports* (11/21/2006)
- Certalert No. 13-01, *Federal and State Depredation Permit Assistance* (1/30/2013)
- Certalert No.14-01, *Seasonal Mitigation of Hazardous Species at Airports: Attention to Snowy Owls* (2/26/2014)
- Certalert No. 16-03, *Recommended Wildlife Exclusion Fencing* (8/2016)

B.4 Airport Cooperative Research Program Reports

These, and other wildlife / aviation reports, are available from the Transportation Research Board of the National Academies (TRB) at http://www.trb.org/Publications/Publications.aspx.

- ACRP Research Report 198: Wetland Mitigation, Volume 2, A Guidebook for Airports (2019)
- ACRP Synthesis 92: Airport Waste Management and Recycling Practices (2018)
- ACRP Research Report 174: Guidebook and Primer (2018)
- ACRP Report 122: Innovative Airport Responses to Threatened / Endangered Species (2015)
- ACRP Report 125: Balancing Airport Stormwater and Bird Hazard Management (2015)
- ACRP Report 145: Applying an SMS Approach to Wildlife Hazard Management (2015)
- ACRP Synthesis 39 Report: Airport Wildlife Population Management (2013)
- ACRP Synthesis 52 Report: Habitat Management to Deter Wildlife at Airports (2014)
- ACRP Synthesis 23 Report: Bird Harassment, Repellent, and Deterrent Techniques for Use on and Near Airports (2011)
- ACRP Report 32: Guidebook for Addressing Aircraft/Wildlife Hazards at General Aviation Airports (2010)

B.5 Manuals

- Wildlife Hazard Management at Airports - A Manual for Airport Personnel (2005)

B.6 Orders

- 50 CFR § 21.49, Control Order for Resident Canada Geese at Airports and Military Airfields
- 50 CFR § 21.50, Depredation Order for Resident Canada Geese Nests and Eggs
- 50 CFR § 21.43, Depredation Order for Blackbirds, Cowbirds, Crows, Grackles, and Magpies
- 50 CFR § 21.54, Control Order for Muscovy Ducks in the United States
- 50 CFR § 21.55, Control Order for Invasive Migratory Birds in Hawaii

Advisory Circular Feedback

If you find an error in this AC, have recommendations for improving it, or have suggestions for new items/subjects to be added, you may let us know by (1) mailing this form to Manager, Airport Safety and Operations Division, Federal Aviation Administration ATTN: AAS-300, 800 Independence Avenue SW, Washington DC 20591 or (2) faxing it to the attention of AAS-300 at (202) 267-5257.

Subject: AC 150/5200-33C Date: _____

Please check all appropriate line items:

☐ An error (procedural or typographical) has been noted in paragraph _____ on page _____.

☐ Recommend paragraph _____ on page _____ be changed as follows:

_____
_____
_____

☐ In a future change to this AC, please cover the following subject:
(Briefly describe what you want added.)

_____
_____
_____

☐ Other comments:

_____
_____
_____

☐ I would like to discuss the above. Please contact me at (phone number, email address).

Submitted by: _____ Date: _____

Form Approved OMB NO. 2120-0045
3/31/2010

BIRD / OTHER WILDLIFE STRIKE REPORT

U S. Department of Transportation
Federal Aviation Administration

1. Name of Operator	2. Aircraft Make/Model	3. Engine Make/Model

4. Aircraft Registration	5. Date of Incident	6. Local Time of Incident
	____/____/____ Month Day Year	☐ Dawn ☐ Dusk ___ HR ___ MIN ☐ Day ☐ Night ☐ AM ☐ PM

7. Airport Name	8. Runway Used	9. Location if En Route (Nearest Town/Reference & State)

10. Height (AGL)	11. Speed (IAS)

12. Phase of Flight

- ☐ A. Parked
- ☐ B. Taxi
- ☐ C. Take-off Run
- ☐ D. Climb
- ☐ E. En Route
- ☐ F. Descent
- ☐ G. Approach
- ☐ H. Landing Roll

13. Part(s) of Aircraft Struck or Damaged

	Struck	Damaged		Struck	Damaged
A. Radome	☐	☐	H. Propeller	☐	☐
B. Windshield	☐	☐	I. Wing/Rotor	☐	☐
C. Nose	☐	☐	J. Fuselage	☐	☐
D. Engine No. 1	☐	☐	K. Landing Gear	☐	☐
E. Engine No. 2	☐	☐	L. Tail	☐	☐
F. Engine No. 3	☐	☐	M. Lights	☐	☐
G. Engine No. 4	☐	☐	N. Other: (Specify)	☐	☐

14. Effect on Flight

- ☐ None
- ☐ Aborted Take-Off
- ☐ Precautionary Landing
- ☐ Engines Shut Down
- ☐ Other: (Specify)

15. Sky Condition

- ☐ No Cloud
- ☐ Some Cloud
- ☐ Overcast

16. Precipitation

- ☐ Fog
- ☐ Rain
- ☐ Snow
- ☐ None

17. Bird/Other Wildlife Species

18. Number of birds seen and/or struck

Number of Birds	Seen	Struck
1	☐	☐
2-10	☐	☐
11-100	☐	☐
more than 100	☐	☐

19. Size of Bird(s)

- ☐ Small
- ☐ Medium
- ☐ Large

20. Pilot Warned of Birds ☐ Yes ☐ No

21. Remarks *(Describe damage, injuries and other pertinent information)*

DAMAGE / COST INFORMATION

22. Aircraft time out of service:	23. Estimated cost of repairs or replacement (U.S. $):	24. Estimated other Cost *(U.S. $) (e.g. loss of revenue, fuel, hotels):*
_____ hours	$	$

Reported by *(Optional)*	Title	Date

Paperwork Reduction Act Statement: The information collected on this form is necessary to allow the Federal Aviation Administration to assess the magnitude and severity of the wildlife-aircraft strike problem in the U.S. The information is used in determining the best management practices for reducing the hazard to aviation safety caused by wildlife-aircraft strikes. We estimate that it will take approximately 6 minutes to complete the form. The information collected is voluntary. Please note that an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control number associated with this collection is 2120-0045. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at: 800 Independence Ave SW, Washington, DC 20591, Attn: Information Collection Clearance Officer, ABA-20

U.S. Department
of Transportation

Federal Aviation Administration

800 Independence Ave. S.W.
Washington, D.C. 20561

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Office of Airport Safety and Standards, AAS-310
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WASHINGTON, DC 20591

FOLD AND TAPE HERE

Directions for FAA Form 5200-7
Bird/Other Wildlife Strike Report

1. Name of Operator - This can be an airline (abbreviations okay - UAL, AAL, etc.), business (Coca Cola), government agency (Police Dept., FAA) or if a private pilot, his/her name.
2. Aircraft Make/Model - Abbreviations are okay, but to include the model (e.g. B737-200).
3. Engine Make/Model - Abbreviations are allowed (e.g., PW 4060, GECT7, LYC 580).
4. Aircraft Registration - This means the N# (for USA registered aircraft).
5. Date of Incident - Give the local date, not the ZULU or GMT date.
6. Local Time of Incident - Check the appropriate light conditions and fill in the hour and minute local time and check AM or PM or use the 24 clock and skip AM/PM.
7. Airport Name - Use the airport name or 3 letter code if a US airport. If a foreign airport, use the full name or 3 letter code and location (city/country).
8. Runway used - Self explanatory.
9. Location if En Route - Put the name of the nearest city and state.
10. Height AGL - Put the feet above ground level at the time of the strike (if you don't know, use MSL and indicate this). For take-off run and landing roll, it must be 0.
11. Speed (IAS) - Speed at which the aircraft was traveling when the strike occurred.
12. Phase of Flight - Phase of flight during which the strike occurred. Take-off run and landing roll should both be 0 AGL.
13. Part(s) of Aircraft Struck or Damaged - Check which parts were struck and damaged. If a part was damaged but not struck indicate this with a check on the damaged column only and indicate in comments (#21) why this happened (e.g., the landing gear might be damaged by deer strike, causing the aircraft to flip over and damage parts not struck by deer).
14. Effect on Flight - You can check more than one and if you check (Other", please explain in Comments (#21).
15. Sky condition - Check the one that applies.
16. Precipitation - You may check more than one.
17. Bird/Other Wildlife Species - Try to be accurate. If you don't know, put unknown and some description. Collect feathers or remains for identification for damaging strikes.
18. Number of birds seen and/or struck - check the box in the Seen column with the correct number if you saw the birds/other wildlife before the strike and check the box in the Struck column to show how many were hit. The exact number, can be written next to the box.
19. Size of Bird(s) - Check what you think is the correct size (e.g. sparrow = small, gull = medium and geese = large).
20. Pilot Warned of Birds - Check the correct box (even if it was an ATIS warning or NOTAM).
21. Remarks - Be as specific as you can. Include information about the extent of the damage, injuries, anything you think would be helpful to know. (e.g., number of birds ingested).
22. Aircraft time out of service - Record how many hours the aircraft was out of service.
23. Estimated cost of repairs or replacement - This may not be known immediately, but the data can be sent at a later date or put down a contact name and number for this data.
24. Estimated other cost - Include loss of revenue, fuel, hotels, etc. (see directions for #23).
25. Reported by - Although this is optional, it is helpful if questions arise about the information on the form (a phone number could also be included).
26. Title - This can be Pilot, Tower, Airport Operations, Airline Operations, Flight Safety, etc.
27. Date - Date the form was filled out.