

Air Quality Summaries

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN AIR POLLUTANT EMISSIONS CALCULATIONS - SUMMARY

SOURCE	NO ACTION ALTERNATIVE EMISSIONS (tons/year)						ALTERNATIVE 1 EMISSIONS (tons/year)						
	Criteria Pollutants					GHG	Criteria Pollutants					GHG	
	CO	NO _x	VOC	SO _x	PM ₁₀	CO _{2e}	CO	NO _x	VOC	SO _x	PM ₁₀	CO _{2e}	
Aircraft	15	31	2	7	29	14,707	9	148	1	21	64	49,521	
Ordnance	0.05	0.01			0.02		2.60	0.44			1.48		
Vehicles	1	2	0	0	0	4	61	542	14		11	369	
Total	16	33	2	7	29	14,711	73	690	15	21	76	49,890	
							Increase:	57	657	13	14	48	35,179

SOURCE	ALTERNATIVE 2 EMISSIONS (tons/year)					
	Criteria Pollutants					GHG
	CO	NO _x	VOC	SO _x	PM ₁₀	CO _{2e}
Aircraft	9	148	1	21	64	49,521
Ordnance	0.82	0.09			0.28	
Vehicles	47	121	11		5	238
Total	57	270	12	21	69	49,760
Increase:	41	237	10	14	40	35,049

Notes: GHG - greenhouse gases, CO - carbon monoxide, NO_x - nitrogen oxides, VOC - volatile organic compounds, SO_x - sulfur oxides, PM₁₀ - particulates <10 microns, CO_{2e}

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - AIRCRAFT

SOURCE INFORMATION ¹										
Platform	Activity Information by Alternative									Fuel Flow (lb/hr)
	No Action Alternative			Alternative 1			Alternative 2			
	Sorties	Flight Time (Hours)	Percent Above 3,000 ft MSL	Sorties	Flight Time (Hours)	Percent Above 3,000 ft MSL	Sorties	Flight Time (Hours)	Percent Above 3,000 ft MSL	
Fixed-Wing Aircraft										
EA-6B Prowler	448	672	25%	0	0	0%	0	0	0%	6,390
EA-18G Growler	201	302	35%	1348	2791	35%	1348	2791	35%	10,358
F-15E	60	120	35%	60	120	35%	60	120	35%	6,316
F-16C/D	5	8	35%	5	8	35%	5	8	35%	5,053
F-35	0	0	0%	64	126	35%	64	126	35%	5,053
FA-18 C/D	129	154	35%	129	154	35%	129	154	35%	6,636
AV-8	4	6	35%	0	0	0%	0	0	0	6,000
P-3/EP-3/P-8	0	0	0%	9	18	35%	9	18	35%	4,800
C-130, C-17, CH-47 or C-23	0	0	0%	12	12	50%	12	12	50%	4,500
Total	847	1,262		1,627	3,229		1,627	3,229		
Helicopters										
CH-47 Chinook	54	81	0%	65	97	0%	65	97	0%	1,100
UH-60 Blackhawk	18	27	0%	22	32	0%	22	32	0%	1,200
Total	72	108		87	129		87	129		
Unmanned Aerial Systems										
RQ-7 Shadow	52	104	85%	204	408	85%	204	408	85%	38 hp
RQ-11 Raven	13	26	85%	30	100	85%	30	100	85%	electric
SCANEAGLE	831	3754.9	85%	1475	5900	85%	1475	5900	85%	1.9 hp
Total	896	3,885		1,709	6,408		1,709	6,408		
Grand Total	1,815	5,255		3,423	9,766		3,423	9,766		

Notes: MSL - mean sea level. ¹See "Source Information" tab for additional documentation of engine type, # of engines, flight mode, fuel flow, and emissions factors.

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - AIRCRAFT

SOURCE INFORMATION¹								
Platform	Fuel Use (pounds/year) <3,000 feet			Emissions Factor (pounds/1,000 pounds fuel)				
	No Action	Alt 1	Alt 2	CO	NO_x	VOC	SO_x	PM₁₀
Fixed-Wing Aircraft								
EA-6B Prowler	3,220,560	0	0	7.99	5.71	1.09	2.04	12.12
EA-18G Growler	2,033,275	18,790,966	18,790,966	0.72	14.75	0.12	2.04	6.56
F-15E	492,648	492,648	492,648	1.17	15.05	0.20	2.04	0.14
F-16C/D	26,276	26,276	26,276	3.84	11.57	0.05	2.04	0.11
F-35	0	413,841	413,841	3.84	11.57	0.05	2.04	0.11
FA-18 C/D	664,264	664,264	664,264	2.44	6.74	0.44	2.04	6.36
AV-8	23,400	0	0	8.80	6.71	0.28	2.04	7.10
P-3/EP-3/P-8	0	56,160	56,160	1.82	8.43	0.41	2.04	3.97
C-130, C-17, CH-47 or C-23	0	27,000	27,000	2.07	8.16	0.47	2.04	3.97
Total	6,460,423	20,471,154	20,471,154					
Helicopters								
CH-47 Chinook	89,100	106,700	106,700	3.20	7.30	0.40	2.04	0.50
UH-60 Blackhawk	32,400	38,400	38,400	6.25	6.40	0.55	2.04	4.20
Total	121,500	145,100	145,100					
Unmanned Aerial Systems								
RQ-7 Shadow				0.25	1.2	0.09	0.08	0.08
RQ-11 Raven								
SCANEAGLE				0.01	0.06	0.01	0.00	0.00
Total	6,581,923	20,616,254	20,616,254					

Notes: lb - pounds, yr - year, ft - foot, CO - carbon monoxide, Nox - nitrogen oxides, VOC - volatile organic compounds, SOx - sulfur oxides, PM10 - particulates <10 microns

¹See "Source Information" tab for additional documentation of engine type, # of engines, flight mode, fuel flow, and emissions factors.

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - AIRCRAFT

Platform	CRITERIA AIR POLLUTANT EMISSIONS (tons/year)									
	No-Action Alternative					Alternatives 1/2				
	CO	NO _x	VOC	SO _x	PM ₁₀	CO	NO _x	VOC	SO _x	PM ₁₀
Fixed-Wing										
EA-6B Prowler	12.9	9.2	1.8	3.3	19.5	0.0	0.0	0.0	0.0	0.0
EA-18G Growler	0.7	15.0	0.1	2.1	6.7	6.8	138.6	1.1	19.2	61.6
F-15E	0.3	3.7	0.0	0.5	0.0	0.3	3.7	0.0	0.5	0.0
F-16C/D	0.1	0.2	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0
F-35	0.0	0.0	0.0	0.0	0.0	0.8	2.4	0.0	0.4	0.0
FA-18 C/D	0.8	2.2	0.1	0.7	2.1	0.8	2.2	0.1	0.7	2.1
AV-8	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
P-3/EP-3/P-8	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0	0.1	0.1
C-130, C-17, CH-47 or C-23	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Total	14.9	30.4	2.1	6.6	28.4	8.79	147.42	1.35	20.88	63.97
Helicopters										
CH-47 Chinook	0.1	0.3	0.0	0.1	0.0	0.2	0.4	0.0	0.1	0.0
UH-60 Blackhawk	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1
Total	0.2	0.4	0.0	0.1	0.1	0.29	0.51	0.03	0.15	0.11
Unmanned Aerial Systems										
RQ-7 Shadow	0.0	0.0	0.0	0.0	0.0	0.01	0.04	0.00	0.00	0.00
RQ-11 Raven										
SCANEAGLE	0.0	0.0	0.0	0.0	0.0	0.01	0.03	0.00	0.00	0.00
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Grand Total	15.1	30.8	2.1	6.7	28.5	9.1	148.0	1.4	21.0	64.1

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Notes: CO - carbon monoxide, Nox - nitrogen oxides, VOC - volatile organic compounds, SOx - sulfur oxides, PM10 - particulate < 10 microns

Change	-6.0	117.2	-0.7	14.3	35.6
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NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - AIRCRAFT

Platform	No Action Alternative					
	Annual Fuel Use		Greenhouse Gas Emissions (pounds/year)			
	Pounds	Gallons	CO ₂	N ₂ O	CH ₄	CO _{2-e}
Fixed-Wing						
EA-6B Prowler	4,294,080	631,482	13,295,229	431	376	13,436,824
EA-18G Growler	3,128,116	460,017	9,685,199	314	274	9,788,346
F-15E	757,920	111,459	2,346,654	76	66	2,371,646
F-16C/D	40,424	5,945	125,160	4	4	126,493
F-35	0	0	0	0	0	0
FA-18 C/D	1,021,944	150,286	3,164,119	103	89	3,197,817
AV-8	36,000	5,294	111,462	4	3	112,649
P-3/EP-3/P-8	0	0	0	0	0	0
C-130, C-17, CH-47 or C-23	0	0	0	0	0	0
Total	9,278,484	1,364,483	28,727,824	932	812	29,033,775
Helicopters						
CH-47 Chinook	89100	13103	275869	9	8	278,807
UH-60 Blackhawk	32400	4765	100316	3	3	101,384
Total	121,500	17,868	376,185	12	11	380,192
Unmanned Aerial Systems						
RQ-7 Shadow						
RQ-11 Raven						
SCANEAGLE						
Total						
Grand Total	9,399,984	1,382,351	29,104,009	944	822	29,413,967
					Tons per Year =	14,707

Notes: CO₂ - carbon dioxide, N₂O - nitrous oxide, CH₄ - methane, CO_{2-e} - carbon dioxide equivalent

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - AIRCRAFT

Platform	Alternative 1 / 2					
	Annual Fuel Use		GHG Emissions (lb/yr)			
	Pounds	Gallons	CO ₂	N ₂ O	CH ₄	CO _{2-e}
Fixed-Wing						
EA-6B Prowler	0	0	0	0	0	0
EA-18G Growler	28,909,178	4,251,350	89,507,917	2,904	2,530	90,461,176
F-15E	757,920	111,459	2,346,654	76	66	2,371,646
F-16C/D	40,424	5,945	125,160	4	4	126,493
F-35	636,678	93,629	1,971,267	64	56	1,992,261
FA-18 C/D	1,021,944	150,286	3,164,119	103	89	3,197,817
AV-8	0	0	0	0	0	0
P-3/EP-3/P-8	86,400	12,706	267,510	9	8	270,359
C-130, C-17, CH-47 or C-23	54,000	7,941	167,194	5	5	168,974
Total	31,506,544	4,633,315	97,549,820	3,165	2,757	98,588,725
Helicopters						
CH-47 Chinook	106,700	15,691	330,362	11	9	333,880
UH-60 Blackhawk	38,400	5,647	118,893	4	3	120,159
Total	145,100	21,338	449,255	15	13	454,040
Unmanned Aerial Systems						
RQ-7 Shadow						
RQ-11 Raven						
SCANEAGLE						
Total						
Grand Total	31,651,644	4,654,654	97,999,075	3,179	2,770	99,042,765
					Tons	49,521
Increase (lb):	22,251,660	3,272,303	68,895,066	2,235	1,947	69,628,798
Increase (tons)	11,126	1,636	34,448	1	1	34,814

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - ORDNANCE

SOURCE INFORMATION							EMISSION FACTOR (pound/ pound)				
Ordnance Type	Filler Type	NAA	Alt 1	Alt 2	NEW (lb)	CO	NO _x	PM ₁₀	PM _{2.5}	Lead	
Non-Explosive Practice Bombs	MK-76	inert - spotting charge	392	392	392	3	0.026	0.008	0.026	0.019	0.0002
	MK-82	inert - spotting charge	10	10	10	3	0.026	0.008	0.026	0.019	0.0002
	MK-83	inert - spotting charge	3	3	3	3	0.026	0.008	0.026	0.019	0.0002
	MK-84	inert - spotting charge	2	2	2	3	0.026	0.008	0.026	0.019	0.0002
	LGTR	inert - no spotting charge	20	20	20	0	0.026	0.008	0.026	0.019	0.0002
Mortar Rounds	M224 60mm	explosive	0	0	1,440	0.8	0.030	0.004	0.032	0.017	0.0002
		propellant	0	0	1,440	1	0.026	0.008	0.026	0.019	0.0002
Tank Cannon Rounds	120 mm	explosive	0	3,000	0	6.5	0.026	0.008	0.026	0.019	0.0002
		propellant	0	3,000	0	17.6	0.026	0.008	0.026	0.019	0.0002
Missiles	TOW Missile (non-explosive)	explosive	0	35	0	8.6	0.026	0.008	0.026	0.019	0.0002
		propellant	0	35	0	1.2	0.026	0.008	0.026	0.019	0.0002
Small and Medium Caliber Rounds	5.56 mm		18,000	469,500	269,500	0.004	3.50E-01	1.60E-02	1.20E-02	8.40E-03	5.10E-06
	7.62 mm		12,000	813,000	333,000	0.006	3.60E-01	1.50E-02	8.10E-03	6.10E-03	4.90E-06
	20 mm		26,000	88,800	88,800	0.08	0.007	0.0016	0.0066	0.013	NA
	25 mm	M115 percussion primer	0	20,000	0	0.214	0.007	0.0016	0.0066	0.013	NA
	40 mm		250	58,500	10,500	0.1	6.00E-02	1.30E-02	1.10E-01	5.60E-02	7.30E-05
	0.50-caliber		1000	252,000	102,000	0.033	1.10E-02	1.20E-03	3.10E-04	1.90E-04	1.30E-05
Explosives	HE Charge	RDX	0	50	50	200	2.60E-02	7.90E-03	2.60E-02	1.90E-02	1.70E-04

Notes: NAA - No Action Alternative, Alt - Alternative, NEW - net explosive weight, lb - pound, LGTR - Laser-Guided Training Round, HE - high explosive, TOW - tube-launched, optically tracked, wire-guided, RDX - Research Demolition Explosive, CO - carbon monoxide, NO_x - nitrogen oxides, PM10 - particulates <10 microns, PM2.5 - particulates <2.5 microns

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - ORDNANCE

ORDNANCE TYPE		CRITERIA POLLUTANTS - NO ACTION ALTERNATIVE EMISSIONS (lb/year)				
		CO	NO _x	PM ₁₀	PM _{2.5}	Lead
Non-Explosive Practice Bombs	MK-76	30.58	9.29	30.58	22.34	0.20
	MK-82	0.78	0.24	0.78	0.57	0.01
	MK-83	0.23	0.07	0.23	0.17	0.00
	MK-84	0.16	0.05	0.16	0.11	0.00
	LGTR	0.00	0.00	0.00	0.00	0.00
Mortar Rounds	M224 60mm	0.00	0.00	0.00	0.00	0.00
		0	0	0	0	0
Tank Cannon Rounds	120 mm	0.00	0.00	0.00	0.00	0.00
		0	0	0	0	0
Missiles	TOW Missile (non-explosive)	0	0	0	0	0
		0	0	0	0	0
Small and Medium Caliber Rounds	5.56 mm	25.20	1.15	0.86	0.60	0.00
	7.62 mm	27.22	1.13	0.61	0.46	0.00
	20 mm	14.56	3.33	13.73	27.04	0.00
	25 mm	0.00	0.00	0.00	0.00	0.00
	40 mm	1.50	0.33	2.75	1.40	0.00
	0.50-caliber	0.36	0.04	0.01	0.01	0.00
Explosives	HE Charge	0.00	0.00	0.00	0.00	0.00
	Total (lb)	100.6	15.6	49.7	52.7	0.2
	Total (tons)	0.05	0.01	0.02	0.03	0.0001

Notes: lb - pound, LGTR - Laser-Guided Training Round, HE - high explosive,
TOW - tube-launched, optically tracked, wire-guided, CO - carbon monoxide, NO_x - nitrogen oxides,
PM10 - particulates <10 microns, PM2.5 - particulates <2.5 microns

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - ORDNANCE

ORDNANCE TYPE		CRITERIA POLLUTANTS - ALTERNATIVE 1 EMISSIONS (lb/year)				
		CO	NO _x	PM ₁₀	PM _{2.5}	Lead
Non-Explosive Practice Bombs	MK-76	31	9.29	30.58	22.34	0.20
	MK-82	1	0.24	0.78	0.57	0.01
	MK-83	0	0.07	0.23	0.17	0.00
	MK-84	0	0.05	0.16	0.11	0.00
	LGTR	0	0.00	0.00	0.00	0.00
Mortar Rounds	M224 60mm	0	0.00	0.00	0.00	0.00
		0	0.00	0.00	0.00	0.00
Tank Cannon Rounds	120 mm	507	154.05	507.00	370.50	3.32
		1,373	417.12	1,372.80	1,003.20	8.98
Missiles	TOW Missile (non-explosive)	8	2.38	7.83	5.72	0.05
		1	0.33	1.09	0.80	0.01
Small and Medium Caliber Rounds	5.56 mm	657	30.05	22.54	15.78	0.01
	7.62 mm	1,844	76.83	41.49	31.24	0.03
	20 mm	50	11.37	46.89	92.35	0.00
	25 mm	30	6.85	28.25	55.64	0.00
	40 mm	351	76.05	643.50	327.60	0.43
	0.50-caliber	91	9.98	2.58	1.58	0.11
Explosives	HE Charge	260	79.00	260.00	190.00	1.70
	Total (lb)	5,203.8	873.6	2,965.7	2,117.6	14.8
	Total (tons)	2.60	0.44	1.48	1.06	0.01
	NAA (tons)	0.05	0.01	0.02	0.03	0.00
	Change	2.55	0.43	1.46	1.03	0.01

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - ORDNANCE

ORDNANCE TYPE		CRITERIA POLLUTANTS - ALTERNATIVE 2 EMISSIONS (lb/year)				
		CO	NO _x	PM ₁₀	PM _{2.5}	Lead
Non-Explosive Practice Bombs	MK-76	31	9.29	30.58	22.34	0.20
	MK-82	1	0.24	0.78	0.57	0.01
	MK-83	0	0.07	0.23	0.17	0.00
	MK-84	0	0.05	0.16	0.11	0.00
	LGTR	0	0.00	0.00	0.00	0.00
Mortar Rounds	M224 60mm	35	4.84	36.86	19.58	0.26
		37	11.38	37.44	27.36	0.24
Tank Cannon Rounds	120 mm	0	0.00	0.00	0.00	0.00
		0	0.00	0.00	0.00	0.00
Missiles	TOW Missile (non-explosive)	0	0.00	0.00	0.00	0.00
		0	0.00	0.00	0.00	0.00
Small and Medium Caliber Rounds	5.56 mm	377	17.25	12.94	9.06	0.01
	7.62 mm	755	31.47	16.99	12.80	0.01
	20 mm	50	11.37	46.89	92.35	0.00
	25 mm	0	0.00	0.00	0.00	0.00
	40 mm	63	13.65	115.50	58.80	0.08
	0.50-caliber	37	4.04	1.04	0.64	0.04
Explosives	HE Charge	260	79.00	260.00	190.00	1.70
	Total (lb)	1,646.0	182.6	559.4	433.8	2.6
	Total (tons)	0.82	0.09	0.28	0.22	0.001
	NAA (tons)	0.05	0.01	0.02	0.03	0.00
	Change	0.77	0.08	0.25	0.19	0.00

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - VEHICLES ALTERNATIVE 1

SOURCE INFORMATION											
Vehicle	Miles Per Year		miles per gallon	Gallons / Year by Alternative			Emission Factor (pounds per gallon)				
	No Action	Alt 1		No Action	1		CO	NO _x	VOC	PM ₁₀	PM _{2.5}
ASV	0	242	1	0	242		4.2	10.84	0.95	0.41	0.41
Bus	0	4676	1	0	4,676		4.2	10.84	0.95	0.41	0.41
GSA P/U	354	1382	1	354	1,382		4.2	10.84	0.95	0.41	0.41
HEMTT	0	39	1	0	39		4.2	10.84	0.95	0.41	0.41
HMMWV	435	53593	14	31	3,828		4.4	10.84	0.94	0.43	0.43
LMTV	0	6514	1	0	6,514		4.2	10.84	0.95	0.41	0.41
M1068	0	391	1	0	391		4.2	10.84	0.95	0.41	0.41
M113	0	713	1	0	713		4.2	10.84	0.95	0.41	0.41
M1A2 Tank	0	3936	0.6	0	6,560		0.45	118.8	0.06	1.56	1.52
M2A3	0	5480	1.7	0	3,224		4.2	10.84	0.95	0.41	0.41
M3A3	0	753	1.7	0	443		4.2	10.84	0.95	0.41	0.41
M7 BFIST	0	783	1.7	0	461		4.2	10.84	0.95	0.41	0.41
M88 Wrecker	0	321	0.7	0	459		4.2	10.84	0.95	0.41	0.41
MTV	0	5725	1	0	5,725		4.2	10.84	0.95	0.41	0.41

Notes: CO - carbon monoxide, NO_x - nitrogen oxides, VOC - volatile organic compounds, PM₁₀ - particulates <10 microns, PM_{2.5} - particulates <2.5 microns

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - VEHICLES ALTERNATIVE 1

Vehicle	CRITERIA AIR POLLUTANT EMISSIONS									
	No Action Alternative Emissions (pounds/year)					Alternative 1 Emissions (pounds/year)				
	CO	NO _x	VOC	PM ₁₀	PM _{2.5}	CO	NO _x	VOC	PM ₁₀	PM _{2.5}
ASV	0	0	0	0	0	1,016	2,623	230	99	99
Bus	0	0	0	0	0	19,639	50,688	4,442	1,917	1,917
GSA P/U	1,487	3,837	336	145	145	5,804	14,981	1,313	567	567
HEMTT	0	0	0	0	0	164	423	37	16	16
HMMWV	137	337	29	13	13	16,844	41,496	3,598	1,646	1,646
LMTV	0	0	0	0	0	27,359	70,612	6,188	2,671	2,671
M1068	0	0	0	0	0	1,642	4,238	371	160	160
M113	0	0	0	0	0	2,995	7,729	677	292	292
M1A2 Tank	0	0	0	0	0	2,952	779,328	394	10,234	9,971
M2A3	0	0	0	0	0	13,539	34,943	3,062	1,322	1,322
M3A3	0	0	0	0	0	1,860	4,801	421	182	182
M7 BFIST	0	0	0	0	0	1,934	4,993	438	189	189
M88 Wrecker	0	0	0	0	0	1,926	4,971	436	188	188
MTV	0	0	0	0	0	24,045	62,059	5,439	2,347	2,347
Total (pounds)	1,624	4,174	366	159	159	121,720	1,083,885	27,046	21,829	21,567
Total (tons)	0.8	2.1	0.2	0.1	0.1	61	542	14	11	11
					NAA (tons):	0.8	2.1	0.2	0.1	0.1
					Change:	60	540	13	11	11

Notes: CO - carbon monoxide, NO_x - nitrogen oxides, VOC - volatile organic compounds, PM₁₀ - particulates <10 microns, PM_{2.5} - particulates <2.5 microns

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - VEHICLES ALTERNATIVE 1

Vehicle	GREENHOUSE GAS EMISSIONS (pounds / year)							
	No Action Alternative				Alternative 1			
	CO ₂	N ₂ O	CH ₄	CO _{2-e}	CO ₂	N ₂ O	CH ₄	CO _{2-e}
ASV	0	0	0	0	5,095	0	0	5,149
Bus	0	0	0	0	98,449	3	3	99,497
GSA P/U	7,453	0	0	7,532	29,097	1	1	29,407
HEMTT	0	0	0	0	821	0	0	830
HMMWV	654	0	0	661	80,596	3	2	81,455
LMTV	0	0	0	0	137,146	4	4	138,606
M1068	0	0	0	0	8,232	0	0	8,320
M113	0	0	0	0	15,012	0	0	15,171
M1A2 Tank	0	0	0	0	138,114	4	4	139,585
M2A3	0	0	0	0	67,868	2	2	68,591
M3A3	0	0	0	0	9,326	0	0	9,425
M7 BFIST	0	0	0	0	9,697	0	0	9,801
M88 Wrecker	0	0	0	0	9,655	0	0	9,758
MTV	0	0	0	0	120,534	4	3	121,818
Total (pounds)				8,194				737,412
Total (tons)				4				369
						Increase (tons)		365

Notes: CO - carbon monoxide, NO_x - nitrogen oxides, VOC - volatile organic compounds, PM₁₀ - particulates <10 microns, PM_{2.5} - particulates <2.5 microns

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - VEHICLES ALTERNATIVE 2

SOURCE INFORMATION										
Vehicle	Miles Per Year		miles per gallon	Gallons / Year by Alternative		Emission Factor (pounds per gallon)				
	No Action	Alt 2		No Action	2	CO	NO _x	VOC	PM ₁₀	PM _{2.5}
ASV	0	242	1	0	242	4.2	10.84	0.95	0.41	0.41
Bus	0	4676	1	0	4,676	4.2	10.84	0.95	0.41	0.41
GSA P/U	354	1382	1	354	1,382	4.2	10.84	0.95	0.41	0.41
HEMTT	0	39	1	0	39	4.2	10.84	0.95	0.41	0.41
HMMWV	435	53593	14	31	3,828	4.4	10.84	0.94	0.43	0.43
LMTV	0	6514	1	0	6,514	4.2	10.84	0.95	0.41	0.41
M1068	0	0	1	0	0	4.2	10.84	0.95	0.41	0.41
M113	0	0	1	0	0	4.2	10.84	0.95	0.41	0.41
M1A2 Tank	0	0	0.6	0	0	0.45	118.8	0.06	1.56	1.52
M2A3	0	0	1.7	0	0	4.2	10.84	0.95	0.41	0.41
M3A3	0	0	1.7	0	0	4.2	10.84	0.95	0.41	0.41
M7 BFIST	0	0	1.7	0	0	4.2	10.84	0.95	0.41	0.41
M88 Wrecker	0	0	0.7	0	0	4.2	10.84	0.95	0.41	0.41
MTV	0	5725	1	0	5,725	4.2	10.84	0.95	0.41	0.41

Notes: CO - carbon monoxide, NO_x - nitrogen oxides, VOC - volatile organic compounds, PM₁₀ - particulates <10 microns, PM_{2.5} - particulates <2.5 microns

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - VEHICLES ALTERNATIVE 2

Vehicle	CRITERIA AIR POLLUTANT EMISSIONS									
	No Action Alternative Emissions (pounds/year)					Alternative 2 Emissions (pounds/year)				
	CO	NO _x	VOC	PM ₁₀	PM _{2.5}	CO	NO _x	VOC	PM ₁₀	PM _{2.5}
ASV	0	0	0	0	0	1,016	2,623	230	99	99
Bus	0	0	0	0	0	19,639	50,688	4,442	1,917	1,917
GSA P/U	1,487	3,837	336	145	145	5,804	14,981	1,313	567	567
HEMTT	0	0	0	0	0	164	423	37	16	16
HMMWV	137	337	29	13	13	16,844	41,496	3,598	1,646	1,646
LMTV	0	0	0	0	0	27,359	70,612	6,188	2,671	2,671
M1068	0	0	0	0	0	0	0	0	0	0
M113	0	0	0	0	0	0	0	0	0	0
M1A2 Tank	0	0	0	0	0	0	0	0	0	0
M2A3	0	0	0	0	0	0	0	0	0	0
M3A3	0	0	0	0	0	0	0	0	0	0
M7 BFIST	0	0	0	0	0	0	0	0	0	0
M88 Wrecker	0	0	0	0	0	0	0	0	0	0
MTV	0	0	0	0	0	24,045	62,059	5,439	2,347	2,347
Total (pounds)	1,624	4,174	366	159	159	94,871	242,882	21,247	9,263	9,263
Total (tons)	0.8	2.1	0.2	0.1	0.1	47	121	11	4.6	5
					NAA (tons):	0.8	2.1	0.2	0.1	0.1
					Change:	47	119	10	5	5

Notes: CO - carbon monoxide, NO_x - nitrogen oxides, VOC - volatile organic compounds, PM₁₀ - particulates <10 microns, PM_{2.5} - particulates <2.5 microns

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - VEHICLES ALTERNATIVE 2

Vehicle	GREENHOUSE GAS EMISSIONS (pounds / year)							
	No Action Alternative				Alternative 2			
	CO ₂	N ₂ O	CH ₄	CO _{2-e}	CO ₂	N ₂ O	CH ₄	CO _{2-e}
ASV	0	0	0	0	5,095	0	0	5,149
Bus	0	0	0	0	98,449	3	3	99,497
GSA P/U	7,453	0	0	7,532	29,097	1	1	29,407
HEMTT	0	0	0	0	821	0	0	830
HMMWV	654	0	0	661	80,596	3	2	81,455
LMTV	0	0	0	0	137,146	4	4	138,606
M1068	0	0	0	0	0	0	0	0
M113	0	0	0	0	0	0	0	0
M1A2 Tank	0	0	0	0	0	0	0	0
M2A3	0	0	0	0	0	0	0	0
M3A3	0	0	0	0	0	0	0	0
M7 BFIST	0	0	0	0	0	0	0	0
M88 Wrecker	0	0	0	0	0	0	0	0
MTV	0	0	0	0	120,534	4	3	121,818
Total (pounds)				8,194				476,761
Total (tons)				4				238
						Increase (tons)		234

Notes: CO - carbon monoxide, NO_x - nitrogen oxides, VOC - volatile organic compounds, PM₁₀ - particulates <10 microns, PM_{2.5} - particulates <2.5 microns

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDMAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS - SOURCE INFORMATION

Platform	Engine	# Engines	Flight Mode	Fuel Flow/Engine (pounds per hour)	References for Fuel Flow and Emissions Factors
Fixed-Wing Aircraft					
EA-6B Prowler	J52-P-408A	2	circle	3195	AESO Memorandum Report No. 9941, Revision B, December 2009.
EA-18G Growler	F414-GE-400	2	approach	5179	AESO Memorandum Report No. 9933, Revision D, March 2011.
F-15E	F100-PW-229	2	approach	3158	Air Force Center for Engineering and the Environment, December 2009.
F-16C/D	F110-GE-129	1	approach	5053	Air Force Center for Engineering and the Environment, December 2009.
F-35	F135-PW-400	1	approach	5053	F-16 info used as a surrogate aircraft.
FA-18C/D	F404-GE-400	2	approach	3318	AESO Memorandum Report No. 9933, Revision D, March 2011.
AV-8B	F402-RR-408	1	approach	6000	AESO Memorandum Report No. 9963, Revision C, November 2009.
P-3EP-3/P-8	T56-A-14	4	ASUW	1200	AESO Memorandum Report No. 9948, Revision C, March 2010.
C-130, C-17, CH-47 or C-23	T56-A-16 Turboprop	4	circle	1125	AESO Memorandum Report No. 2000-10B, January 2001.
Helicopters					
CH-47 Chinook	T55-L-712	2	-	550	U.S. Army Forces Command, 1997 (fuel flow rate not reported - estimated).
UH-60 Blackhawk	T700-GE-401C	2	approach	600	AESO Memorandum Report No. 9953 Revision B, June 2011.
Unmanned Aerial Systems					
RQ-7 Shadow	Wankel UAV Engine 741	1		38 hp	Horsepower from manufacturer's fact sheet. AP-42 emissions factors used to estimate emissions based on horsepower.
RQ-11 Raven	Aveox 27/26/7-AV electric motor	1		electric	Information from Aerovironment Fact Sheet. Assume no emissions.
SCANEAGLE	3W 2-stroke piston engine; 1.5 hp	1		1.9 hp	Horsepower from Boeing fact sheet. AP-42 emissions factors used to estimate emissions based on horsepower.

NAVAL WEAPONS SYSTEMS TRAINING FACILITY BOARDAN EIS AIR POLLUTANT EMISSIONS CALCULATIONS – SOURCE INFORMATION

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