

US Army Corps of Engineers® Walla Walla District

LITTLE WOOD RIVER, GOODING, IDAHO

DRAFT INTEGRATED LETTER REPORT AND ENVIRONMENTAL ASSESSMENT

APPENDIX K, GREENHOUSE GAS EMISSION EVALUATION

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1 GREENHOUSE GAS BASELINE CONDITIONS

Greenhouse gases (GHG), such as CO₂, methane (CH₄), and nitrous oxide (N₂O), contribute to climate change, including alteration of temperatures and precipitation patterns (EPA 2023a). Consistent with Executive Order 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*, the Council on Environmental Quality (CEQ) has issued interim National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. This guidance includes direction for agencies to quantify a proposed action's GHG emissions and to disclose and provide context for a proposed action's GHG emissions and climate effects.

There are no known readily available GHG emissions data for the city of Gooding, Idaho. Only facilities generating greater than 25,000 metric tons of CO₂e per year must annually report their emissions¹. In 2021, the reported emissions from 36 facilities in the state of Idaho was 5,228,325 metric tons CO₂e², and from individual emitters in Shelley/Blackfoot and Pocatello was 90,036 metric tons CO₂e (reported by Basic American Foods) and 182,816 metric tons CO₂e (118,922 reported by JR Simplot Company, 36,553 by ON Semiconductor, and 27,341 reported by Fort Hall Mine Landfill), respectively (EPA 2023c).

According to the 2023 U.S. Army Corps of Engineers (USACE) Climate Change Assessment (Appendix J), average annual temperatures are projected to increase under future climate scenarios and warmer temperatures are likely to increase evaporation and evapotranspiration and to reduce snowpack. These projected changes are expected to result in reduced water availability and streamflows. Additionally, the frequency of heat waves and extreme precipitation events is projected to increase.

2 IMPACT EVALUATION

2.1 Alternative 1: No Action Alternative

Under the No Action Alternative, GHG emissions would remain at levels similar to existing conditions. USACE would not engage in the rehabilitation of the Little Wood River Channel through the city of Gooding. The constructed river channel would continue to deteriorate, and local flood risk would be exacerbated. Localized flooding could result in periodic overbank flows to terrestrial environments (e.g., streets, parks, and lawns) with affects to businesses or residences. However, there is little risk of periodic floods measurably affecting local, regional, or global GHG emissions. Therefore, the No Action Alternative would have no effect on climate.

¹ Mandatory Reporting of Greenhouse Gases (40 CFR part 98).

² Reports by these emitters represent approximately half of total emissions for the state of Idaho since emissions are not reported by the transportation and agricultural sectors and not by facilities whose emissions are below the 25,000 metric ton Co2e reporting threshold.

Most projected consequences of climate change would have little effect on the Little Wood River Channel. However, an increase in extreme precipitation events and timing under climate change would increase the risk of minor flooding.\

2.2 Alternative 4: Proposed Action – Combination of Repair and Replacement

Carbon emissions would only be increased temporarily during the channel rehabilitation and associated bridge replacement effort from worker commute vehicles and construction equipment operations. The concrete used in construction would also generate some greenhouse gas. The CEQ has not established thresholds for determining if GHGs that would be released would constitute a significant impact, however we employ 25,000 metric tons reporting threshold as an indicator if potential significance.

Table 1, below, provides a list of all equipment and projected hours of operation proposed to implement the rehabilitation effort. Increased carbon emissions from the preferred alternative would be localized, temporary, and small (1,447.68 metric tons). Further, the manufacture of cement produces about 0.9 pounds of carbon dioxide for every pound of cement. Since cement is only a fraction of the constituents in concrete, manufacturing a cubic yard of concrete (about 3,900 lbs) is responsible for emitting about 400 lbs of carbon dioxide. The additive carbon dioxide contribution from project concrete elements is 252,000 lbs of carbon dioxide, or 114.31 metric tons. Therefore, the total greenhouse gas produced from alternative would be about 1,562 metric tons, well below the 25,000 metric tons reporting threshold.

In comparison to the total constant output of emission sources in the surrounding communities and would not be expected to have any measurable impact on local, regional, or global greenhouse gas emissions. Therefore, the Proposed Action Alternative would have no effect on climate.

The proposed action is intended to accommodate projected Little Wood River flows under future climate conditions by improving resiliency and reducing obstruction risk. Therefore, projected changes from climate change would have no effect on the wastewater system.

Table 1. Estimated Greenhouse Gas Emissions from Construction Equipment

Emission Factors for Construction Activity/Equipment Type Est Hrs Total CO ₂ CH ₄ N ₂ O CO ₂ CH ₄ N ₂ O </th <th colspan="13">GHG Emissions Inventory</th>	GHG Emissions Inventory												
Construction Activity/Equipment Type Est Hrs Total CO2 CH4 N2O CO2 CH4 N2O CO2met Compactor Air Compressor 100 CFM 565 131 0.0051 0.336 72827.003 2.840 185.123 128064.2 Compactor 554 4.3 0.0054 0.3386 72827.003 2.840 185.123 1280647 Crane Hydraulic Mounted 88 112 0.0054 0.3458 9869.983 0.476 30.433 18951.0 Crane Hydraulic Mounted 88 112 0.0067 0.3960 1774.901 0.094 5.544 3389.32 Secavator 1.5 CY Bucket 44.000 lbs 536 2.34 0.0093 0.4014 31671.1461 12.600 543.839 479090.4 Loader 1234 42.8 0.0017 0.1384 52768.09 2.033 1883.79 10297.2 Man lift 868 38.1 0.0018 0.1697 3046.346 1.575 147.310 76983.92 Pump 712 7.	Emission Source Data	Emission Factors for Construction Equipment (lbs/Hr)			Daily GHG Emissions from Construction Activities (Ibs total)								
Air Compressor 100 CFM 480 22.3 0.0027 0.1563 10890.207 1.304 75.002 33073.4% Air Compressor 600 CFM 555 131 0.0051 0.3336 72827.003 2.840 186.123 128064.3 Compactor 554 4.3 0.0005 0.0314 2389.847 0.281 17.421 7567.66 Crane Hydraulic Mounted 88 112 0.0054 0.3458 9869.983 0.476 30.433 18951.07 Excavator 1 CY Bucket 44,000 lbs 536 234 0.0093 0.4014 125282.172 4.984 215.127 189514.7 Excavator 1.5 CY Bucket 55,000 lbs 1355 234 0.0093 0.4014 31671.461 12.60 543.839 470090.4 Loader 1234 42.8 0.0017 0.1364 52768.09 2.993 188.379 10299.7 Mani lift 868 838.1 0.0018 0.0571 5285.713 0.588 40.646 17412.9 Pump 712 7.4<	Construction Activity/Equipment	Est Hrs Total	CO2	CH₄	N ₂ O	CO ₂	CH₄	N₂O	CO _{2eq}				
Nir Compressor 600 CFM 555 131 0.0051 0.3336 72827.003 2.840 185.123 128064.5 Compactor 554 4.3 0.0005 0.0314 2398.847 0.251 17.421 7567.68 Zrane Hydraulic Mounted 88 112 0.0057 0.3458 9869.933 0.476 0.4031 1895.10 Zrane Hydraulic Mounted 88 112 0.0067 0.3980 1734.901 0.094 5.544 3389.33 Zxcavator 1 CY Bucket 55.000 lbs 5365 234 0.0093 0.4014 316711.461 12.600 543.839 47909.04 JydroSeeder 4 15.3 0.0017 0.1170 61.396 0.007 0.468 201.04 Jani Ith 868 38.1 0.0018 0.1697 33046.346 1.575 147.310 76983.92 Oampact 712 7.4 0.0002 0.2840 717.370 0.062 2.840 2.856.13 Tractor 251.300 HP 10 172 0.0062 0.2840 3434.740 0.162 5.857 5130.358	Air Compressor 100 CFM	480	22.3	0.0027	0.1563	10690.207	1.304	75.002	33073.438				
Compactor 554 4.3 0.0006 0.0314 2389.847 0.251 17.421 7587.68 Crane Hydraulic Mounted 88 112 0.0054 0.3458 9869.993 0.476 30.433 18951.00 Sinder 14 124 0.0067 0.3960 1734.901 0.094 5.544 3389.32 Excavator 1 CY Bucket 55,000 lbs 1355 234 0.0093 0.4014 12582.172 4.984 215.127 189914.7 Excavator 1.5 CY Bucket 55,000 lbs 1355 234 0.0017 0.11364 52786.099 2.093 186.379 102997.2 Jan Iff 868 38.1 0.0018 0.1697 33046.346 1.575 147.310 7983.29 Vump 712 7.4 0.0008 0.2647 824.600 0.505 3.706 1393.23 Tactor 181.250 HP 10 172 0.0062 0.2840 3434.740 0.125 6.679 5130.35 Tuck Highway 25 K lbs 81 272 0.011	Air Compressor 600 CFM	555	131	0.0051	0.3336	72827.003	2.840	185.123	128064.51				
Crane Hydraulic Mounted 88 112 0.0054 0.3458 9869.983 0.476 30.433 18951.00 Grader 14 124 0.0067 0.3960 1734.901 0.094 5.544 3389.32 Stexavator 1.5 CY Bucket 55,000 lbs 1355 234 0.0093 0.4014 316711.461 12.600 543.839 479090.4 Again III 868 38.1 0.0017 0.1170 61.396 0.007 0.468 201.04 Coader 1224 42.8 0.0017 0.1189 33046.346 1.757 147.310 70983.92 Vump 712 7.4 0.0008 0.0571 5285.713 0.588 40.646 17412.97 Oxole2 0.2840 1717.370 0.062 2.840 2.860.1 142.97 Cole2 51.300 HP 10 172 0.0062 0.2840 3434.700 0.622 5.679 5130.35 Track 34 ton 812 272 0.0116 0.5023 22135.079 4.431	Compactor	554	4.3	0.0005	0.0314	2389.847	0.251	17.421	7587.689				
Brader 14 124 0.0067 0.3960 1734.901 0.094 5.544 3389.32 Excavator 1 CY Bucket 44,000 lbs 536 234 0.0093 0.4014 12528.172 4.984 215.127 189514.7 Xxcavator 1 CY Bucket 55,000 lbs 1355 234 0.0093 0.4014 11626.171 180514.7 189514.7 Adart 1234 42.8 0.0017 0.1364 52768.099 2.031 168.379 102997.2 An lift 868 38.1 0.0018 0.1667 52768.099 2.031 168.379 102997.2 Anot 712 7.4 0.0008 0.0571 528.713 0.588 40.646 1741.29 Vump 712 7.4 0.0062 0.2840 3434.740 0.152 5.679 5130.35 Tactor 181-250 HP 10 172 0.0062 0.2840 3434.740 0.125 5.679 5130.35 Tuck Highway 25 K lbs 81 272 0.0116 0.5023	Crane Hydraulic Mounted	88	112	0.0054	0.3458	9869,983	0.476	30.433	18951.007				
Excavator 1 CY Bucket 44,000 lbs 536 234 0.0093 0.4014 125282,172 4.984 215.127 189514.7 Excavator 1.5 CY Bucket 55,000 lbs 1355 234 0.0093 0.4014 31671.1461 12.600 543.839 479090.4 Ada lat 1234 42.8 0.0017 0.1170 611.396 0.007 0.468 201.04 Ada lift 868 38.1 0.0018 0.1697 32046.346 1.575 147.310 76983.89 Vump 712 7.4 0.0008 0.0571 5285.713 0.588 40.646 17412.91 Roller Asphalt 14 58.9 0.0035 0.2647 824.600 0.050 3.706 1930.23 Tactor 251.300 HP 10 172 0.0062 0.2840 171.730 0.62 2.840 2665.171 10.4687 34207.33 Tact S13.030 HP 20 172 0.0116 0.5023 129205.879 4.658 201.427 169347.7 Tack 34 ton	Grader	14	124	0.0067	0.3960	1734.901	0.094	5.544	3389.320				
Excavator 1.5 CY Bucket 55,000 lbs 1355 234 0.0093 0.4014 316711.461 12.600 543.839 479090.4 ydroSeeder 4 15.3 0.0017 0.1170 61.366 0.007 0.468 201.04. ana lift 868 38.1 0.0018 0.1697 33046.346 1.575 147.310 76983.99 Yump 712 7.4 0.0008 0.0571 5285.713 0.588 40.646 17412.97 Soller Asphalt 14 58.9 0.0062 0.2840 1717.370 0.062 2.840 2565.17 Tractor 181-250 HP 10 172 0.0062 0.2840 3434.740 0.125 5.679 5130.35 Track 3/4 ton 812 272 0.0116 0.5023 122059.79 4.658 201.427 169347.7 Track Highway 25 K lbs 81 272 0.0116 0.5023 1289.0250 27.4.43 140.687 34207.33 Track Jighway 45 K lbs 86 272 0.0116 </td <td>Excavator 1 CY Bucket 44,000 lbs</td> <td>536</td> <td>234</td> <td>0.0093</td> <td>0.4014</td> <td>125282.172</td> <td>4.984</td> <td>215.127</td> <td>189514.74</td>	Excavator 1 CY Bucket 44,000 lbs	536	234	0.0093	0.4014	125282.172	4.984	215.127	189514.74				
tydroSeeder 4 15.3 0.0017 0.1170 61.396 0.007 0.468 201.043 coader 1234 42.8 0.0017 0.1364 52786.099 2.093 168.379 102997.2 Jan lift 868 38.1 0.0018 0.1697 32046.346 1.575 147.310 76983.98 Pump 712 7.4 0.0008 0.0571 5285.713 0.588 40.646 17412.97 Stactor 181.250 HP 10 172 0.0062 0.2840 1371.370 0.062 2.840 2.865.17 Tactor 251.300 HP 20 172 0.0062 0.2840 3434.470 0.125 5.679 5130.35 Tuck Highway 25 K lbs 81 272 0.0116 0.5023 20195.043 0.941 40.687 34207.35 Tuck Highway 25 K lbs 401 272 0.0116 0.5023 109205.879 4.658 201.427 169347.7 Tuck Highway 45 K lbs 86 272 0.0116 0.5023 109205.879 4.658 201.427 169347.7 Tuck Highway 4	Excavator 1.5 CY Bucket 55,000 lbs	1355	234	0.0093	0.4014	316711.461	12.600	543.839	479090.45				
Doader 1234 42.8 0.0017 0.1364 52768.099 2.093 168.379 10297.2 Aan lift 866 38.1 0.0018 0.1697 33046.346 1.575 147.310 76983.89 Winp 712 7.4 0.0008 0.0571 5285.713 0.588 40.646 17121.93 Roller Asphalt 14 58.9 0.0035 0.2647 824.600 0.050 3.706 1930.23 Tactor 251-300 HP 10 172 0.0062 0.2840 171.7370 0.062 2.840 2656.17 Tuck Highway 25 K Ibs 811 272 0.0116 0.5023 22095.043 0.941 40.687 34207.33 Tuck Highway 45 K Ibs 86 272 0.0116 0.5023 1209205.879 4.658 201.427 169947.7 Tuck Highway 45 K Ibs 86 272 0.0116 0.5023 20490.35 0.046 2.01427 169947.7 Tuck Highway 45 K Ibs 86 272 0.0116	lydroSeeder	4	15.3	0.0017	0.1170	61.396	0.007	0.468	201.042				
Atan lift 868 38.1 0.0018 0.1697 33046.346 1.575 147.310 76983.93 Pump 712 7.4 0.0008 0.0571 5285.713 0.588 40.646 17412.93 Soller Asphalt 14 58.9 0.0035 0.2647 824.600 0.050 3.706 1930.23 Tractor 181-250 HP 10 172 0.0062 0.2840 171.370 0.062 2.840 256.79 5130.35 Track Jighway 25 K Ibs 811 272 0.0116 0.5023 221135.097 9.431 407.878 34207.33 Track Highway 25 K Ibs 811 272 0.0116 0.5023 109205.879 4.658 201.427 169347.7 Track Highway 45 K Ibs 86 272 0.0116 0.5023 109205.879 4.658 201.427 169347.7 Dump Track 75 K Ibs 2361 272 0.0116 0.5023 1089.335 0.046 2.009 1689.25 Dump Track 75 K Ibs 2361 277 0.0116 0.5023 1689.35 0.442 2337.92	oader	1234	42.8	0.0017	0.1364	52768.099	2.093	168.379	102997.27				
Pump 712 7.4 0.0008 0.0571 5285.713 0.588 40.646 17412.97 Koller Asphalt 14 58.9 0.0035 0.2647 824.600 0.050 3.706 1930.23 ractor 181-250 HP 10 172 0.0062 0.2840 1717.370 0.062 2.840 2565.17 ractor 251-300 HP 20 172 0.0016 0.5023 221135.097 9.431 407.878 342918.5 Tuck Highway 25 K Ibs 401 272 0.0116 0.5023 22059.043 0.941 40.687 34207.33 Tuck Highway 55 K Ibs 401 272 0.0116 0.5023 1242.0.712 0.999 43.199 36318.92 Tuck Highway 45 K Ibs 86 272 0.0116 0.5023 1249.205.207.423 1185.961 997082.1 Supplat Paver 5 194 0.0109 0.8488 971.860 0.055 4.244 2237.92 Concrete Pump 27 7.4 0.00054 0.3458 <td>/lan lift</td> <td>868</td> <td>38.1</td> <td>0.0018</td> <td>0.1697</td> <td>33046.346</td> <td>1.575</td> <td>147.310</td> <td>76983.959</td>	/lan lift	868	38.1	0.0018	0.1697	33046.346	1.575	147.310	76983.959				
Roller Asphalt 14 58.9 0.0035 0.2647 824.600 0.050 3.706 1930.23 ractor 181-250 HP 10 172 0.0062 0.2840 1717.370 0.062 2.840 2565.17 ractor 251-300 HP 20 172 0.0062 0.2840 3434.740 0.162 2.840 2565.17 ruck Highway 25 K lbs 81 272 0.0116 0.5023 22059.043 0.941 40.687 34207.33 ruck Highway 25 K lbs 81 272 0.0116 0.5023 109205.879 4.658 201.427 169347.3 ruck Highway 45 K lbs 86 272 0.0116 0.5023 $10299.43.199$ 36318.97 ruck 50.00 4 272 0.0116 0.5023 1089.335 0.046 2.009 1689.25 Dump Tuck 75 K lbs 2361 272 0.0116 0.5023 1089.335 0.046 2.009 1689.25 Dump tuck 75 K lbs 2361 272 0.0116 0.5023 1089.335 0.0	Pump	712	7.4	0.0008	0.0571	5285.713	0.588	40.646	17412.970				
Tractor 181-250 HP101720.00620.28401717.3700.0622.840256.517Tractor 251-300 HP201720.00620.2840343.7400.1255.6795130.35Truck Jighway 25 K lbs8112720.01160.5023221135.0979.431407.878342918.5Truck Highway 25 K lbs8112720.01160.5023109205.8794.658201.427169347.7Truck Highway 45 K lbs862720.01160.5023109205.8794.658201.427169347.7Truck 50,00042720.01160.50231089.3350.0462.0091689.25Jump Truck 75 K lbs23612720.01160.50231042980.25027.4231185.96197082.1Saphalt Paver51940.01090.8488971.8600.0554.2442237.92Concrete Pump277.40.00080.0571200.4410.0221.541660.322Concrete Saw1616.50.00180.1256263.6440.0292.101863.293Crane 65 ton21131120.00540.345823691.76111.433730.745455039.5Crane 25 ton801120.00540.34588972.7120.43327.66717228.13Scavator Concrete Pulverizer581120.00540.34586505.2160.31420.05812490.43Crane 55 ton801120.0054 <td< td=""><td>Roller Asphalt</td><td>14</td><td>58.9</td><td>0.0035</td><td>0.2647</td><td>824.600</td><td>0.050</td><td>3.706</td><td>1930.233</td></td<>	Roller Asphalt	14	58.9	0.0035	0.2647	824.600	0.050	3.706	1930.233				
Tractor 251-300 HP 20 172 0.0062 0.2840 3434.740 0.125 5.679 5130.35 Truck X/4 ton 812 272 0.0116 0.5023 221135.097 9.431 407.878 342918.5 Truck Highway 25 K lbs 81 272 0.0116 0.5023 22059.043 0.941 40.687 342918.5 Truck Highway 55 K lbs 401 272 0.0116 0.5023 109205.879 4.658 201.427 169347.7 Truck Highway 45 K lbs 86 272 0.0116 0.5023 109205.879 4.658 201.427 169347.7 Stopp 2361 272 0.0116 0.5023 1089.335 0.046 2.009 1689.25 Dump Truck 75 K lbs 2361 277 0.0116 0.5023 642980.250 27.423 1185.961 997082.1 Songpacter 27 4.3 0.0005 0.0314 116.473 0.012 0.849 369.793 Concrete Pump 27 7.4 0.0008 0.0571 200.441 0.022 1.541 660.323 <	ractor 181-250 HP	10	172	0.0062	0.2840	1717.370	0.062	2.840	2565.177				
Truck 3/4 ton 812 272 0.0116 0.5023 221135.097 9.431 407.878 342918.5 Truck Highway 25 K lbs 81 272 0.0116 0.5023 22059.043 0.941 40.687 34207.32 Truck Highway 55 K lbs 401 272 0.0116 0.5023 109205.879 4.658 201.427 169347.7 Truck S0,000 4 272 0.0116 0.5023 1089.335 0.046 2.009 1689.25 Dump Truck 75 K lbs 2361 272 0.0116 0.5023 642980.250 27.423 1185.961 997082.1 Sophalt Paver 5 194 0.1009 0.8488 971.860 0.055 4.244 2237.92 Compacter 27 7.4 0.0005 0.0314 116.473 0.012 0.849 369.793 Concrete Pump 27 7.4 0.0005 0.0314 116.473 0.012 0.849 369.793 Concrete Saw 16 16.5 0.0018 0.1256 263.644 0.029 2.010 863.293 Crane 90 ton <td>ractor 251-300 HP</td> <td>20</td> <td>172</td> <td>0.0062</td> <td>0.2840</td> <td>3434.740</td> <td>0.125</td> <td>5.679</td> <td>5130.355</td>	ractor 251-300 HP	20	172	0.0062	0.2840	3434.740	0.125	5.679	5130.355				
Truck Highway 25 K lbs812720.01160.502322059.0430.94140.68734207.33Truck Highway 55 K lbs4012720.01160.5023109205.8794.658201.427169347.7Truck Highway 45 K lbs862720.01160.502323420.7120.99943.19936318.93Truck 500042720.01160.50231098.0350.9462.0091689.25Dump Truck 75 K lbs23612720.01160.5023642980.25027.4231185.961997082.1Sphalt Paver51940.01090.8488971.8600.0554.2442237.92Compacter274.30.00050.0314116.4730.0120.849369.979Concrete Pump277.40.00080.0571200.4140.0221.541660.322Concrete Saw1616.50.00180.1256263.6440.0292.010863.293Crane 65 ton21131120.00540.3458236991.76111.433730.745455039.5Crane 90 ton261800.00850.50134682.6330.22013.3038572.52Crane 25 ton801120.00540.34586505.2160.31420.05812490.43Craceator material bucket581120.00540.34586505.2160.31420.05812490.43Scavator Concrete Pulverizer5842.80.00170.1364	ruck 3/4 ton	812	272	0.0116	0.5023	221135.097	9.431	407.878	342918.54				
Truck Highway 55 K lbs 401 272 0.0116 0.5023 109205.879 4.658 201.427 169347.7 Truck Highway 45 K lbs 86 272 0.0116 0.5023 23420.712 0.999 43.199 36318.99 Truck 50,000 4 272 0.0116 0.5023 1089.335 0.046 2.009 1689.25 Dump Truck 75 K lbs 2361 272 0.0116 0.5023 642980.250 27.423 1185.961 997082.1 Sphalt Paver 5 194 0.0109 0.8488 971.860 0.055 4.244 2237.92 Compacter 27 4.3 0.0005 0.0314 116.473 0.012 0.849 369.797 Concrete Pump 27 7.4 0.0008 0.0571 200.441 0.022 1.541 660.322 Concrete Saw 16 16.5 0.0018 0.1256 263.644 0.029 2.010 863.295.25 Crane 65 ton 2113 112 0.0054 0.3458 8972.712 0.433 27.667 17228.18 Drill	ruck Highway 25 K lbs	81	272	0.0116	0.5023	22059.043	0.941	40.687	34207.391				
Truck Highway 45 K lbs862720.01160.502323420.7120.99943.19936318.92Truck 50,00042720.01160.50231089.3350.0462.0091689.25Dump Truck 75 K lbs23612720.01160.5023642980.25027.4231185.961997082.1Asphalt Paver51940.01090.8488971.8600.0554.2442237.92Compacter274.30.00050.0314116.4730.0120.849369.79Concrete Pump277.40.00080.0571200.4410.0221.541660.32Concrete Saw1616.50.00180.1256263.6440.0292.010863.297Crane 65 ton21131120.00540.3458236991.76111.433730.745455039.5Crane 25 ton801120.00540.34588972.7120.43327.66717228.14Scavator Concrete Pulverizer581120.00540.34586505.2160.31420.05812490.43Acavator Concrete Pulverizer5842.80.00170.13642480.1860.0987.9144841.03Oader backhoe5842.80.00170.13642480.1860.0987.9144841.03Oader backhoe5842.80.00170.13642480.1860.0291.496654.52Orch1500.00060.0466262.2140.020 <td>ruck Highway 55 K lbs</td> <td>401</td> <td>272</td> <td>0.0116</td> <td>0.5023</td> <td>109205.879</td> <td>4.658</td> <td>201.427</td> <td>169347.70</td>	ruck Highway 55 K lbs	401	272	0.0116	0.5023	109205.879	4.658	201.427	169347.70				
Inuck 50,00042720.01160.50231089.3350.0462.0091689.25Dump Truck 75 K lbs23612720.01160.5023642980.25027.4231185.961997082.1Asphalt Paver51940.01090.8488971.8600.0554.2442237.92Compacter274.30.00050.0314116.4730.0120.849369.793Concrete Pump277.40.00080.0571200.4410.0221.541660.322Concrete Saw1616.50.00180.1256263.6440.0292.010863.293Crane 65 ton21131120.00540.3458236991.76111.433730.745455039.53Crane 90 ton261800.00850.50134682.6330.22013.0358572.52Crane 25 ton801120.00540.34588972.7120.43327.66717228.13Crane 25 ton801120.00540.34586505.2160.31420.05812490.43Excavator Concrete Pulverizer581120.00540.34586505.2160.31420.05812490.43Ouder front end5842.80.00170.13642480.1860.0987.9144841.03Oader front end5842.80.00170.13642480.1860.0987.9144841.03Ouder backhoe5842.80.00170.13642480.1860.098 <td< td=""><td>Truck Highway 45 K lbs</td><td>86</td><td>272</td><td>0.0116</td><td>0.5023</td><td>23420.712</td><td>0.999</td><td>43.199</td><td>36318.959</td></td<>	Truck Highway 45 K lbs	86	272	0.0116	0.5023	23420.712	0.999	43.199	36318.959				
Dump Truck 75 K lbs 2361 272 0.0116 0.5023 642980.250 27.423 1185.961 997082.1 Asphalt Paver 5 194 0.0109 0.8488 971.860 0.055 4.244 2237.92 Compacter 27 4.3 0.0005 0.0314 116.473 0.012 0.849 369.79 Concrete Pump 27 7.4 0.0008 0.0571 200.441 0.022 1.541 660.32 Concrete Saw 16 16.5 0.0018 0.1256 263.644 0.029 2.010 863.297 Crane 65 ton 2113 112 0.0054 0.3458 236991.761 11.433 730.745 455039.5 Crane 90 ton 26 180 0.0085 0.5013 4682.633 0.220 13.035 8572.52 Crane 25 ton 80 112 0.0054 0.3458 8972.712 0.433 27.667 17228.18 Orill 475 6.4 0.0006 0.0466 3037.845 0.284 22.145 9644.19 xccavator Concrete Pulverizer 5	ruck 50,000	4	272	0.0116	0.5023	1089.335	0.046	2.009	1689.254				
Asphalt Paver 5 194 0.0109 0.8488 971.860 0.055 4.244 2237.92 Compacter 27 4.3 0.0005 0.0314 116.473 0.012 0.849 369.79 Concrete Pump 27 7.4 0.0008 0.0571 200.441 0.022 1.541 660.32 Concrete Saw 16 16.5 0.0018 0.1256 263.644 0.029 2.010 863.295 Crane 65 ton 2113 112 0.0054 0.3458 236991.761 11.433 730.745 455039.55 Crane 90 ton 26 180 0.0085 0.5013 4682.633 0.220 13.035 8572.52 Crane 25 ton 80 112 0.0054 0.3458 8972.712 0.433 27.667 17228.16 Onill 475 6.4 0.0006 0.0466 3037.845 0.284 22.145 9644.19 Excavator Concrete Pulverizer 58 112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 coader font end 58	Dump Truck 75 K lbs	2361	272	0.0116	0.5023	642980.250	27.423	1185.961	997082.11				
Compacter 27 4.3 0.0005 0.0314 116.473 0.012 0.849 369.793 Concrete Pump 27 7.4 0.0008 0.0571 200.441 0.022 1.541 660.323 Concrete Saw 16 16.5 0.0018 0.1256 263.644 0.029 2.010 863.293 Crane 65 ton 2113 112 0.0054 0.3458 236991.761 11.433 730.745 455039.5 Crane 90 ton 26 180 0.0085 0.5013 4682.633 0.220 13.035 8572.52 Crane 25 ton 80 112 0.0054 0.3458 8972.712 0.433 27.667 17228.149 Crane 25 ton 80 112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Cracator material bucket 58 112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Coader front end 58 42.8 0.0017 0.1364	Asphalt Paver	5	194	0.0109	0.8488	971.860	0.055	4.244	2237.923				
Concrete Pump277.40.00080.0571200.4410.0221.541660.323Concrete Saw1616.50.00180.1256263.6440.0292.010863.293Crane 65 ton21131120.00540.3458236991.76111.433730.745455039.5Crane 90 ton261800.00850.50134682.6330.22013.0358572.52Crane 25 ton801120.00540.34588972.7120.43327.66717228.16Drill4756.40.00060.04663037.8450.28422.1459644.19Excavator material bucket581120.00540.34586505.2160.31420.05812490.43Excavator Concrete Pulverizer581120.00540.34586505.2160.31420.05812490.43Loader front end5842.80.00170.13642480.1860.0987.9144841.03Loader backhoe5842.80.00170.13642480.1860.0987.9144841.03Outer static 13 Ton559.00.00410.3039294.9440.0201.520748.288Coller static 2.7 Ton826.00.00360.1870207.8650.0291.496654.52*Corch1500.00000.00000.00000.0000.0000.00000.0000.000Concrete Vibrator416.40.00060.0466	Compacter	27	4.3	0.0005	0.0314	116.473	0.012	0.849	369.797				
Concrete Saw1616.5 0.0018 0.1256 263.644 0.029 2.010 863.291 Crane 65 ton2113112 0.0054 0.3458 236991.761 11.433 730.745 455039.55 Crane 90 ton26180 0.0085 0.5013 4682.633 0.220 13.035 8572.52 Crane 25 ton80112 0.0054 0.3458 8972.712 0.433 27.667 17228.160 Drill4756.4 0.0006 0.0466 3037.845 0.284 22.145 9644.19 Excavator material bucket58112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Excavator Concrete Pulverizer58112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Loader font end5842.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Loader backhoe5842.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Loader backhoe5842.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Loader backhoe5842.8 0.0017 0.1364 2480.186 0.092 1.520 748.28 Coller static 13 Ton559.0 0.0041 0.3039 294.944 0.025 1.520 748.28 Coller static 2.7 Ton8 26.0 0.0036 0.1870 207.865	Concrete Pump	27	7.4	0.0008	0.0571	200.441	0.022	1.541	660.323				
Crane 65 ton2113112 0.0054 0.3458 236991.761 11.433 730.745 455039.55 Crane 90 ton26180 0.0085 0.5013 4682.633 0.220 13.035 8572.52 Crane 25 ton80112 0.0054 0.3458 8972.712 0.433 27.667 17228.16 Drill4756.4 0.0006 0.0466 3037.845 0.284 22.145 9644.19 Excavator material bucket58112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Excavator Concrete Pulverizer58112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Loader front end5842.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Ocader backhoe5842.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Pump475 7.4 0.0008 0.0571 3526.283 0.392 27.116 11616.79 Roller static 13 Ton559.0 0.0041 0.3039 294.944 0.020 1.520 748.286 Corch150 0.0000 0.000 0.000 0.000 0.000 0.000 0.000 Concrete Vibrator41 6.4 0.0006 0.466 262.214 0.025 1.911 832.446 Total (metric tons) 877.264 0.038 1.911 $1,447.6$	Concrete Saw	16	16.5	0.0018	0.1256	263.644	0.029	2.010	863.297				
Crane 90 ton 26 180 0.0085 0.5013 4682.633 0.220 13.035 8572.52 Crane 25 ton 80 112 0.0054 0.3458 8972.712 0.433 27.667 17228.16 Drill 475 6.4 0.0006 0.0466 3037.845 0.284 22.145 9644.19 Excavator material bucket 58 112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Excavator Concrete Pulverizer 58 112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Ocader front end 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Orange 20 trans 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Outage 5 59.0 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Outage 5 59.0 0.0041 0.3039 294.944 0.020	Crane 65 ton	2113	112	0.0054	0.3458	236991.761	11.433	730.745	455039.53				
Crane 25 ton80112 0.0054 0.3458 8972.712 0.433 27.667 17228.16 Drill4756.4 0.0006 0.0466 3037.845 0.284 22.145 9644.19 Excavator material bucket58112 0.0054 0.3458 6505.216 0.314 20.058 12490.42 Excavator Concrete Pulverizer58112 0.0054 0.3458 6505.216 0.314 20.058 12490.42 Loader front end58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Loader backhoe58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Pump475 7.4 0.0008 0.0571 3526.283 0.392 27.116 11616.79 Roller static 13 Ton5 59.0 0.0041 0.3039 294.944 0.020 1.520 748.283 Roller static 2.7 Ton8 26.0 0.0036 0.1870 207.865 0.029 1.496 654.527 Forch150 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 0.0000 Concrete Vibrator41 6.4 0.0006 0.0466 262.214 0.025 1.911 832.446 Total (metric tons) 877.264 0.038 1.911 $1.447.6$ Cogeq = X*CO2 + Y*N2O + Z*CH4Threshold (metric tons) $25,000.6$ <	Crane 90 ton	26	180	0.0085	0.5013	4682.633	0.220	13.035	8572.528				
Orilli 475 6.4 0.0006 0.0466 3037.845 0.284 22.145 9644.19 Excavator material bucket 58 112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Excavator Concrete Pulverizer 58 112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Loader front end 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Loader backhoe 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Loader backhoe 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Pump 475 7.4 0.0008 0.0571 3526.283 0.392 27.116 11616.79 Roller static 13 Ton 5 59.0 0.0041 0.3039 294.944 0.020 1.520 748.283 Roller static 2.7 Ton 8 26.0 0.0036 0.1870 207.865 0.029 1.496 654.527 Orch	Crane 25 ton	80	112	0.0054	0.3458	8972.712	0.433	27.667	17228.189				
Excavator material bucket 58 112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Excavator Concrete Pulverizer 58 112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Excavator Concrete Pulverizer 58 112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Loader front end 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Loader backhoe 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Loader backhoe 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Pump 475 7.4 0.0008 0.0571 3526.283 0.392 27.116 11616.79 Roller static 13 Ton 5 59.0 0.0041 0.3039 294.944 0.020 1.520 748.283 Roller static 2.7 Ton 8 26.0 0.0036 0.1870 207.865 0.029 1.496 654.527 <tr< td=""><td>Drilll</td><td>475</td><td>6.4</td><td>0.0006</td><td>0.0466</td><td>3037.845</td><td>0.284</td><td>22.145</td><td>9644.195</td></tr<>	Drilll	475	6.4	0.0006	0.0466	3037.845	0.284	22.145	9644.195				
Excavator Concrete Pulverizer 58 112 0.0054 0.3458 6505.216 0.314 20.058 12490.43 Loader front end 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Loader backhoe 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Qump 475 7.4 0.0008 0.0571 3526.283 0.392 27.116 11616.73 Roller static 13 Ton 5 59.0 0.0041 0.3039 294.944 0.020 1.520 748.283 Roller static 2.7 Ton 8 26.0 0.0036 0.1870 207.865 0.029 1.496 654.527 Forch 15 0 0.0000 <td>Excavator material bucket</td> <td>58</td> <td>112</td> <td>0.0054</td> <td>0.3458</td> <td>6505.216</td> <td>0.314</td> <td>20.058</td> <td>12490.437</td>	Excavator material bucket	58	112	0.0054	0.3458	6505.216	0.314	20.058	12490.437				
Loader front end 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Loader backhoe 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Pump 475 7.4 0.0008 0.0571 3526.283 0.392 27.116 11616.75 Roller static 13 Ton 5 59.0 0.0041 0.3039 294.944 0.020 1.520 748.283 Roller static 2.7 Ton 8 26.0 0.0036 0.1870 207.865 0.029 1.496 654.527 Forch 15 0 0.0000 <t< td=""><td>Excavator Concrete Pulverizer</td><td>58</td><td>112</td><td>0.0054</td><td>0.3458</td><td>6505.216</td><td>0.314</td><td>20.058</td><td>12490.437</td></t<>	Excavator Concrete Pulverizer	58	112	0.0054	0.3458	6505.216	0.314	20.058	12490.437				
Loader backhoe 58 42.8 0.0017 0.1364 2480.186 0.098 7.914 4841.03 Pump 475 7.4 0.0008 0.0571 3526.283 0.392 27.116 11616.79 Roller static 13 Ton 5 59.0 0.0041 0.3039 294.944 0.020 1.520 748.283 Roller static 2.7 Ton 8 26.0 0.0036 0.1870 207.865 0.029 1.496 654.52* Forch 15 0 0.0000	oader front end	58	42.8	0.0017	0.1364	2480.186	0.098	7.914	4841.039				
Pump 475 7.4 0.0008 0.0571 3526.283 0.392 27.116 11616.79 Roller static 13 Ton 5 59.0 0.0041 0.3039 294.944 0.020 1.520 748.283 Roller static 2.7 Ton 8 26.0 0.0036 0.1870 207.865 0.029 1.496 654.52' Forch 15 0 0.0000 0.0000 0.000 0.000 0.000 0.000 Concrete Vibrator 41 6.4 0.0006 0.0466 262.214 0.025 1.911 832.446 Total (metric tons) 877.264 0.038 1.911 1,447.6 CO ₂ eq = X*CO ₂ + Y*N ₂ O + Z*CH ₄	oader backhoe	58	42.8	0.0017	0.1364	2480.186	0.098	7.914	4841.039				
Roller static 13 Ton 5 59.0 0.0041 0.3039 294.944 0.020 1.520 748.283 Roller static 2.7 Ton 8 26.0 0.0036 0.1870 207.865 0.029 1.496 654.527 Forch 15 0 0.0000 0.0000 0.000 0.000 0.000 0.000 Concrete Vibrator 41 6.4 0.0006 0.0466 262.214 0.025 1.911 832.440 Total (metric tons) 877.264 0.038 1.911 1,447.6 CO2eq = X*CO2 + Y*N2O + Z*CH4 Threshold (metric tons) 25,000.00	Pump	475	7.4	0.0008	0.0571	3526.283	0.392	27.116	11616.798				
Roller static 2.7 Ton 8 26.0 0.0036 0.1870 207.865 0.029 1.496 654.52* Torch 15 0 0.0000 0.0000 0.000	Roller static 13 Ton	5	59.0	0.0041	0.3039	294.944	0.020	1.520	748.285				
Torch 15 0 0.0000 0.0000 0.00	Roller static 2.7 Ton	8	26.0	0.0036	0.1870	207.865	0.029	1.496	654.521				
Concrete Vibrator 41 6.4 0.0006 0.0466 262.214 0.025 1.911 832.440 Total (metric tons) 877.264 0.038 1.911 1,447.6 CO2eq = X*CO2 + Y*N2O + Z*CH4	Forch	15	0	0.0000	0.0000	0.000	0.000	0.000	0.000				
Total (metric tons) 877.264 0.038 1.911 1,447.6 CO2eq = X*CO2 + Y*N2O + Z*CH4 Threshold (metric tons) 25,000.0	Concrete Vibrator	41	6.4	0.0006	0.0466	262.214	0.025	1.911	832.446				
$CO_2 eq = X^*CO_2 + Y^*N_2O + Z^*CH_4$ Threshold (metric tons) 25,000.0				Total (metr	ic tons)	877.264	0.038	1.911	1,447.68				
	CO ₂ eq = X*CO ₂ + Y*N ₂ O + Z*CH ₄ Threshold (metric tons)								25,000.00				

CFR Title 40 Chapter I Subchapter C Part 98: Table A-1 Global Warming Potentials