APPENDIX E
Air Emission Calculations and General Conformity Rule Record of Non-Applicability (RONA)

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E.1 Introduction

This appendix describes the methods used to estimate construction and operational air emissions for the Environmental Impact Statement (EIS) for Proposed Land Acquisition at the Washington Navy Yard (WNY). The project region of analysis is the National Capital Interstate Air Quality Control Region, which includes the District of Columbia (District); Montgomery and Prince Georges Counties in the state of Maryland; and Arlington, Fairfax, Loudoun, and Prince William Counties in the state of Virginia. This region is in marginal nonattainment for the 2015 eight-hour ozone National Ambient Air Quality Standards (NAAQS) and in a maintenance area (an area that has transitioned from nonattainment to attainment) for the 2008 eight-hour ozone and carbon monoxide (CO) NAAQS. The project area also is within an ozone transport region. Therefore, pursuant to the General Conformity Rule (40 Code of Federal Regulations part 93), this appendix includes a conformity applicability analysis, which demonstrates that emissions from the Proposed Action are *de minimis* and, therefore, not subject to the requirements of the General Conformity Rule. Attachment 1 of this appendix includes a General Conformity Rule Record of Non-Applicability for the Proposed Action.

E.2 Project Alternatives

The following describes the project alternatives for the Proposed Land Acquisition at the WNY. Further details are available in EIS Section 2, Proposed Action and Alternatives.

No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The U.S. Navy (hereinafter, jointly referred to as the Navy) would not acquire the Southeast Federal Center (SEFC) E Parcels and/or redevelop the parcels. No Navy relocations as a result of a land exchange would occur on the WNY. The developer would construct the planned mixed-use development on the SEFC E Parcels, which includes renovations of existing buildings and construction of new buildings for office, residential, and vehicle parking uses. The construction period is assumed to start in year 2024 and to last for up to 10 years.

Alternative 1: Land Acquisition through Land Exchange

Under Alternative 1, the Navy would acquire approximately 6 acres of the SEFC E Parcels adjacent to the northwestern perimeter of the WNY and would transfer ownership and/or lease approximately 15 acres at the WNY Southeast Corner to the developer. Each alternative includes (1) private development of residential, office, and retail uses in the WNY Southeast Corner; (2) in-kind renovations at the WNY provided by the developer; and (3) relocation of Navy functions from the WNY Southeast Corner to other areas in the WNY.

The Navy is considering three alternatives under Alternative 1 for use of the SEFC E Parcels:

1. Alternative 1A: Reuse of the SEFC E Parcels with relocated Navy Museum
2. Alternative 1B: Reuse of the SEFC E Parcels with Navy Administrative Development
3. Alternative 1C: No Development on SEFC E Parcels

Alternative 2: Direct Land Acquisition

Under Alternative 2, the Navy would purchase the same 6-acre parcel within the SEFC E Parcels proposed under Alternative 1, but they would not transfer ownership of any WNY property to the developer. Additionally, no missions or tenants at WNY would be relocated under this alternative. Alternative 2 considers the same uses for the SEFC E Parcels as Alternative 1. Hence, the three

alternatives under Alternative 2 are numbered 2A, 2B, and 2C. The impact analysis for these alternatives only includes activities from Navy reuse of SEFC E Parcels.

E.3 Emission Calculation Methods

The analysis used the U.S. Air Force Air Conformity Applicability Model (ACAM) version 5.0.17b to estimate construction and operational air emissions from each alternative (Solutio Environmental, Inc., 2020). The ACAM uses widely accepted emission calculation methods combined with default data that can be used if site-specific information is not available. Activity data developed for each alternative were used as inputs for the ACAM. In addition, emission factors from the U.S. Environmental Protection Agency (USEPA) MOtor Vehicle Emission Simulator 3 model were applied to annual vehicle trips associated with each project alternative to estimate emissions from operational vehicular traffic.

Emissions considered in the analysis include the following:

- volatile organic compounds (VOCs)
- CO
- nitrogen oxides (NO_x)
- sulfur dioxide
- particulate matter less than 10 microns in diameter
- particulate matter less than 2.5 microns in diameter
- carbon dioxide equivalent

The following sections provide details on the assumptions and methods used in the estimation of proposed construction and operational emissions. Attachment 2 of this appendix includes spreadsheets and ACAM output reports that detail the calculations of air emissions for each alternative.

E.3.1 Calculations for Construction Emissions

The ACAM evaluated emissions from the following types of construction activities:

- demolition
- site grading
- trenching/excavation
- building construction
- application of architectural coating
- paving

Sources of air emissions associated with these activities include nonroad construction equipment, on-road trucks and worker vehicles, fugitive dust, and VOCs from architectural coatings and asphalt pavement off-gassing.

Construction activity data for each project alternative in terms of building demolition/renovation/construction volumes, areas of pavement construction, and areas of disturbed ground for fugitive dust were used as inputs to the ACAM. The specific construction and development schedules for the alternatives are currently unknown. Therefore, to perform a reasonably conservative evaluation, the analysis assumed that construction of each alternative would commence in year 2024 and would finish by no later than the end of year 2028. This approach maximizes annual emissions, as it evaluated (1) a compressed construction schedule and (2) years when the average on-road and nonroad

fleets would have higher emissions compared to future fleets that would turn over to newer and lower-emitting equipment and vehicles.

EIS Section 2.5, Best Management Practices Included in Proposed Action, presents best management practices (BMPs) that would assist in minimizing emissions from proposed construction activities. The analysis included the effects of watering exposed soil surfaces, which would reduce fugitive dust emissions generated from the use of construction equipment on exposed soil by at least 50 percent from uncontrolled levels (Countess Environmental, 2006). Construction also would comply with the fugitive dust control requirements of Department of Energy and Environment Rule 20-605, *Control of Fugitive Dust*. In addition, to minimize the potential release of asbestos to the environment from renovation and/or demolition activities, the Navy would comply with the requirements of Department of Energy and Environment Rule 20-800, *Control of Asbestos*.

E.3.2 Calculations for Operations Emissions

Operation of all alternatives, except Alternative 2C, would generate air pollutant emissions from the following sources:

- on-road vehicle traffic generated by each land use - The analysis relied on vehicle trip rates developed for the EIS traffic study to estimate emissions from vehicular traffic generated from the full buildout of each alternative. Table E.3-1 presents estimates of annual vehicle trips generated by each alternative and the associated vehicle miles travelled. The analysis estimated emissions from on-road vehicles with the use of the USEPA MOtor Vehicle Emission Simulator 3 model and based on year 2020 model vehicles for the District (Argonne National Laboratory, 2021).
- diesel-powered emergency electric generators
- natural gas-fired space and water heaters in buildings

As part of the in-kind considerations provided by the developer at the WNY, operations under Alternative 1 would include the use of a diesel-powered emergency electric generator in the rehabilitated parking garage in Building 386. Operations associated with Alternatives 1C and 2C would not generate any substantial emissions from Navy activities.

Inclusion of BMPs would reduce operations emissions. Navy buildings proposed under Alternatives 1A, 1B, 2A, and 2B would be designed to achieve Leadership in Energy and Environmental Design (LEED) silver certification (see EIS Section 2.5, Best Management Practices Included in Proposed Action), which would minimize energy usage and resulting criteria pollutant and greenhouse gas emissions. The analysis did not quantify emission reductions due to the implementation of this operational BMP.

The analysis assumed that Alternatives 1 and 2 would operate at full capacity beginning in year 2028. This is a conservative assumption, as it is probable that it would take several more years for all of the components of each alternative to reach full operations.

Under the No Action Alternative, the developer has approved plans to develop the SEFC E Parcels (GSA, 2020)). Therefore, the analysis provided estimates of potential emissions that would occur from this development and subtracted these emissions from Alternatives 1 and 2 to determine the net change in air quality impacts. The No Action Alternative in essence is the future National Environmental Policy Act baseline for the impact analysis.

Table E.3-1 Annual Vehicle Trip and Mileage Estimates - Full Buildout of WNY Land Acquisition Project Alternatives

Scenario/Land Use Type	*Building Type*	*Miles/Trip*	*Annual One-Way Trips*	*Total Annual Miles* [1]
No Action Alternative				
Three Residential Buildings	Residential	8	358,800	2,870,400
Building 202	Office	15	381,030	5,715,450
Annual Totals - No Action Alternative			739,830	8,585,850
Alternative A				
Navy Museum	Institutional	25	151,970	3,799,250
Alternative B				
Navy Administrative Facilities	Office	15	541,840	8,127,600
Private Development - WNY SE Corner				
Residential Building 1	Residential	8	423,280	3,386,240
Residential Building 2	Residential	8	423,280	3,386,240
Office Building	Office	15	491,140	7,367,100
Retail Buildings [2]	Retail	8	276,640	2,213,120
Annual Totals - Private Development - WNY SE Corner			1,614,340	16,352,700
Annual Totals – Alternative 1A [3]			1,766,310	20,151,950
Annual Totals – Alternative 1B [4]			2,156,180	24,480,300
Annual Totals – Alternative 1C [5]			1,614,340	16,352,700

Key: WNY = Washington Navy Yard; WNY SE = Washington Navy Yard Southeast.
Notes:
1. Equal to Miles/Trip * Annual One-Way Trips
2. Includes trips generated from retail uses in Buildings 68 and 70 and the first floors of Residential Buildings 1 and 2
3. Includes activity from Navy Museum and Private Development – WNY SE Corner
4. Includes activity from Navy Administrative Facilities and Private Development – WNY SE Corner
5. Includes activity from Private Development – WNY SE Corner

E.4 Results of the Emissions Analysis

The District is designated as a marginal nonattainment area for ozone and an area inside an ozone transport region, a maintenance area for CO, and unclassified/attainment for all other criteria pollutants. Therefore, the applicable conformity *de minimis* emission thresholds for the project region of analysis are 100 tons per year of CO and NO_x and 50 tons per year of VOCs. In the case of criteria pollutants for which the project region is in attainment of the NAAQS, the analysis used the USEPA Prevention of Significant Deterioration major source emissions threshold of 250 tons per year of a criteria pollutant as an indicator of the significance of projected air quality impacts. This criterion was used because the Prevention of Significant Deterioration permitting process applies to areas that attain the NAAQS.

Tables E.4-1 and E.4-2 present estimates of air pollutant emissions that would occur from construction and operation of the full buildout of Alternative 1A (the EIS Preferred Alternative - Reuse of SEFC E Parcels with relocated Navy Museum). These data show that the annual emissions from Alternative 1A would be below the applicable conformity *de minimis* thresholds for CO, NO_x, and VOCs and all other significance thresholds. Therefore, Alternative 1A would not be subject to the requirements of the

General Conformity Rule. A Rule Record of Non-Applicability has been prepared for Alternative 1A and is included as Attachment 1 of this appendix.

Table E.4-1 Annual Construction Emissions for Alternative 1A (tons/year)

Scenario/Year	*Annual Emissions (tons/year)*						
	CO	*NO_x*	*PM_{10}*	*$PM_{2.5}$*	*SO_x*	*VOCs*	*CO_2e (MT)*
Navy Museum in SEFC E Parcel							
2024	5.44	3.94	2.24	0.15	0.01	0.69	1,138
2025	5.62	3.90	0.17	0.14	0.01	1.43	1,102
2026	4.75	3.34	0.13	0.13	0.01	1.36	903
Private Development in WNY SE Corner							
2024	6.58	4.76	5.71	0.18	0.02	0.84	1,397
2025	7.25	5.09	0.19	0.19	0.02	4.36	1,416
2026	6.21	4.46	0.16	0.16	0.01	9.88	1,204
2027	4.68	3.36	0.13	0.13	0.01	6.30	894
In-Kind Development							
2024	1.23	0.91	0.11	0.03	0.00	0.15	246
2025	1.18	0.88	0.03	0.03	0.00	0.38	233
2027	1.68	1.34	0.91	0.05	0.01	0.21	415
2028	1.20	0.93	0.04	0.04	0.01	11.75	270
Total Year 2024	13.25	9.61	8.06	0.36	0.03	1.68	2,782
Total Year 2025	14.05	9.87	0.39	0.36	0.03	6.17	2,751
Total Year 2026	10.96	7.80	0.29	0.29	0.02	11.24	2,106
Total Year 2027	6.36	4.70	1.04	0.18	0.02	6.51	1,309
Total Year 2028	1.20	0.93	0.04	0.04	0.01	11.75	270
NAA Construction - Annual Minimum	4.39	3.15	0.12	0.12	0.01	0.63	838
Alternative 1A Maximum Net Change [1]	9.66	6.72	7.94	0.24	0.02	11.12	1,944
Significance Thresholds	100	100	250	250	250	50	NA

Key: CO = carbon monoxide; CO_2e = carbon dioxide equivalents; MT = metric tons; NA = not applicable; NAA = No Action Alternative; NO_x = nitrogen oxides; PM_{10} = suspended particulate matter less than or equal to 10 micrometers in diameter; $PM_{2.5}$ = fine particulate matter less than or equal to 2.5 micrometers in diameter; SEFC = Southeast Federal Center; SOx = sulfur oxides; VOC = volatile organic compound; WNY SE = Washington Navy Yard Southeast.

Note: 1. Equal to the maximum annual construction emissions from Alternative 1A minus the No Action Alternative minimum annual construction emissions

Table E.4-2 Annual Operations Emissions for Alternative 1A (tons/year) – Full Buildout

Source Type	*Annual Emissions (tons/year)*						
	CO	*NO_x*	*PM_{10}*	*$PM_{2.5}$*	*SO_x*	*VOCs*	*CO_2e (MT)*
Navy Museum - SEFC E Parcel							
Space and Water Heating	1.82	2.16	0.16	0.16	0.01	0.12	2,368
Emergency Generators	0.05	0.07	0.02	0.02	0.01	0.02	7
Commuter Vehicles	6.22	0.18	0.17	0.04	0.01	0.61	1,076
Subtotal	8.09	2.41	0.35	0.22	0.03	0.75	3,452
Private Development in WNY SE Corner							
Space and Water Heating	7.80	9.29	0.71	0.71	0.06	0.51	10,165
Emergency Generators	0.10	0.15	0.03	0.03	0.03	0.04	16
Commuter Vehicles	26.77	0.77	0.72	0.18	0.04	2.61	4,634
Subtotal	34.67	10.21	1.46	0.92	0.13	3.16	14,815
In-Kind Development							
Emergency Generators	0.02	0.02	0.01	0.01	0.00	0.01	3
Subtotal	0.02	0.02	0.01	0.01	0.00	0.01	3
Alternative 1A Total Annual Operations	42.78	12.64	1.82	1.15	0.16	3.92	18,269
NAA Total Annual Operations	18.19	5.32	0.78	0.49	0.06	1.67	7,735
Alternative 1A Net Change [1]	24.59	7.32	1.04	0.66	0.10	2.25	10,535
Significance Thresholds	100	100	250	250	250	50	NA

Key: CO = carbon monoxide; CO2e = carbon dioxide equivalent; MT = metric tons; NA = not applicable; NAA = No Action Alternative; NOx = nitrogen oxides; PM10 = particulate matter less than or equal to 10 micrometers in diameter; PM2.5 = particulate matter less than or equal to 2.5 micrometers in diameter; SEFC = Southeast Federal Center; SOx = sulfur oxides; VOC = volatile organic compound; WNY SE = Washington Navy Yard Southeast.
Note:
1. Equal to the Alternative 1A Total Annual Operations minus No Action Alternative Total Annual Operations emissions

E.5 References

Argonne National Laboratory. (2021). GREET 1 Series Fuel-Cycle Model. Available online:. Retrieved from https://greet.es.anl.gov/. File GREET1_2021.xlsm, sheets 'Car_TS' and 'LDT1_TS', rows 18.

Countess Environmental. (2006). *WRAP Fugitive Dust Handbook.* Prepared for the Western Governors' Association.

GSA. (2020). Southeast Federal Center Revised Master Plan 2nd Amendment, Executive Director's Recommendation Commission Meeting. June 4, 2020.

Solutio Environmental, Inc. (2020). USAF Air Conformity Applicability Model (ACAM). Version 5.0.17b. Retrieved from https://aqhelp.com/AQtools.html.

Attachment 1
General Conformity Rule Record of Non-Applicability (RONA)

General Conformity Rule - Record of Non-Applicability (RONA) for Clean Air Act Conformity

Environmental Impact Statement for Proposed Land Acquisition at the Washington Navy Yard, Washington, D.C.

Designation:	Environmental Impact Statement
Proposed Action Name:	Proposed Land Acquisition at the Washington Navy Yard
Location:	Washington, D.C.
Action Proponent:	Naval District Washington
Project Construction Period:	2024–2027
Proposed Action Point of Contact:	Nicole Tompkins-Flagg NAVFAC Washington 1314 Harwood Street SE Washington Navy Yard Washington, D.C. 20374 nicole.m.tompkins-flagg.civ@us.navy.mil

Proposed Action and Emissions Summary:

The Clean Air Act requires federal actions in air pollutant nonattainment or maintenance areas to conform to the applicable State Implementation Plan. The State Implementation Plan is designed to achieve or maintain an attainment designation of air pollutants as defined by the National Ambient Air Quality Standards (NAAQS). The regulations governing this requirement are found in 40 Code of Federal Regulations part 93, also known as the "General Conformity Rule," which applies to federal actions occurring in regions designated as nonattainment or areas subject to maintenance plans. Emission (*de minimis*) thresholds have been established for actions with the potential to have significant air quality impacts. A project/action in an area designated as nonattainment/maintenance and exceeding the *de minimis* thresholds must have a general conformity determination prepared to address significant impacts.

The Washington Navy Yard is in Washington, D.C., which is within the National Capital Interstate Air Quality Control Region (40 Code of Federal Regulations 81.12). This area of D.C. is designated as being in marginal nonattainment for the 2015 eight-hour ozone NAAQS and maintenance areas for the 2008 eight-hour ozone and carbon monoxide NAAQS. It is unclassified or in attainment for all other criteria pollutants, including the 1997 standard for particulate matter less than or equal to 2.5 micrometers, for which D.C. had been designated as a maintenance area when the standard was revoked in 2016. Thus, the *de minimis* thresholds for ozone precursors (nitrogen oxides, volatile organic compounds) and carbon monoxide apply to the conformity applicability analysis. Because this region is also within an ozone transport region, established by the 1990 Clean Air Act Amendments, the *de minimis* threshold for volatile organic compounds is reduced from 100 tons/year to 50 tons/year.

Air Emissions Summary

Based on the maximum annual project emissions estimates identified in Table 1 below, a general conformity determination is not required, because the maximum annual direct and indirect emissions for the Environmental Impact Statement Preferred Alternative (Alternative 1A - Reuse of Southeast Federal Center E Parcels with relocated Navy Museum) are well below the de minimis thresholds.

Supporting documentation and emissions estimates can be found in the Environmental Impact Statement in Section 3.8, Air Quality, and Appendix E, Air Emission Calculations and General Conformity Rule Record of Non-Applicability (RONA).

Table 1 Summary of Maximum Annual Air Pollutant Emissions Compared to the Applicable Conformity *de minimis* Thresholds - Alternative 1A

Project Scenario	***Annual Emissions (tons/year)***		
	CO	***NO_x***	***VOCs***
Construction Net Change [1]	9.66	6.72	11.12
Operations Net Change [2]	24.59	7.32	2.25
Conformity *de minimis* Thresholds	100	100	50

Notes: CO = carbon monoxide; NAA = No Action Alternative; NO_x = nitrogen oxides; VOC = volatile organic compound.
1. Equal to the maximum annual construction emissions from Alternative 1A minus the No Action Alternative minimum annual construction emissions
2. Equal to the Alternative 1A total annual operations minus No Action Alternative total annual operations emissions

Date RONA Prepared: March 2023

RONA Prepared by: Leidos Corporation

RONA Approval:

7/11/2023

X

Nicole Tompkins-Flagg
NEPA Program Manager
Signed by: TOMPKINS-FLAGG.NICOLE.MARIE.1511711246

Signature Date

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Attachment 2
Air Emission Calculations and Air Conformity Applicability Model Reports

Air Emission Calculations

Appendix E - Attachment 1 -
Air Emission Calculations for Construction and Operation of the Washington Naval Yard Land Acquisition Project Alternatives

Table E-1. Annual Construction Emissions for No Action Alternative - SEFC Parcel E
Table E-2. Annual Construction Emissions for Alternative 1A.
Table E-3. Annual Construction Emissions for Alternative 1B.
Table E-4. Annual Construction Emissions for Alternative 1C.
Table E-5. Annual Construction Emissions for Alternative 2A.
Table E-6. Annual Construction Emissions for Alternative 2B.
Table E-7. Annual Construction Emissions for Alternative 2C.
Table E-8. Annual 1-Way Vehicle Trip Estimates for Alternatives of the Land Acquisition Project at WNY.
Table E-9. Annual Vehicle Trip and Mileage Estimates - Full Buildout of WNY Land Acquisition Project Alternatives.
Table E-10. Emission Factors for On-road Commuter Vehicles - WNY Land Acquisition Project.
Table E-11. Annual Emissions for On-road Commuter Vehicles - WNY Land Acquisition Project Alternatives Full Buildout.
Table E-12. Annual Operations Emissions for the No Action Alternative on - SEFC Parcel E – Year 2028 Full Buildout
Table E-13. Annual Operations Emissions for Alternative 1A (tons/year) – Year 2028 Full Buildout
Table E-14. Annual Operations Emissions for Alternative 1B (tons/year) – Year 2028 Full Buildout
Table E-15. Annual Operations Emissions for Alternative 1C (tons/year) – Year 2028 Full Buildout
Table E-16. Annual Operations Emissions for Alternative 2A (tons/year) – Year 2028 Full Buildout
Table E-17. Annual Operations Emissions for Alternative 2B (tons/year) – Year 2028 Full Buildout

Table E-1. Annual Construction Emissions for No Action Alternative - SEFC Parcel E

Year	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
2024	4.86	3.87	4.42	0.15	0.01	0.63	1,286	1,169
2025	5.12	3.76	0.14	0.14	0.01	1.11	1,115	1,014
2026	4.39	3.15	0.12	0.12	0.01	8.31	922	838
Total Construction Emissions	**14.37**	**10.78**	**4.68**	**0.41**	**0.03**	**10.05**	**3,323**	**3,021**
No Action Alternative Annual Minimum Construction	**4.39**	**3.15**	**0.12**	**0.12**	**0.01**	**0.63**	**922**	**838**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	NA	**NA**

Table E-2. Annual Construction Emissions for Alternative 1A.

Year	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
Navy Museum in SEFC E Parcel								
2024	5.44	3.94	2.24	0.15	0.01	0.69	1,252	1,138
2025	5.62	3.90	0.17	0.14	0.01	1.43	1,212	1,102
2026	4.75	3.34	0.13	0.13	0.01	1.36	993	903
2027								
Subtotal	**15.81**	**11.18**	**2.54**	**0.42**	**0.03**	**3.48**	**3,457**	**3,143**
Private Development in WNY SE Corner								
2024	6.58	4.76	5.71	0.18	0.02	0.84	1,537	1,397
2025	7.25	5.09	0.19	0.19	0.02	4.36	1,558	1,416
2026	6.21	4.46	0.16	0.16	0.01	9.88	1,324	1,204
2027	4.68	3.36	0.13	0.13	0.01	6.30	983	894
Subtotal	**24.72**	**17.67**	**6.19**	**0.66**	**0.06**	**21.38**	**5,402**	**4,911**
In-Kind Development								
2024	2.34	1.80	0.63	0.07	0.01	0.29	546	496
2025	2.03	1.55	0.06	0.06	0.01	1.20	454	413
2026								
2027								
Subtotal	**4.37**	**3.35**	**0.69**	**0.13**	**0.02**	**1.49**	**1,000**	**909**
Total Year 2024	**14.36**	**10.50**	**8.58**	**0.40**	**0.04**	**1.82**	**3,335**	**3,032**
Total Year 2025	**14.90**	**10.54**	**0.42**	**0.39**	**0.04**	**6.99**	**3,224**	**2,931**
Total Year 2026	**10.96**	**7.80**	**0.29**	**0.29**	**0.02**	**11.24**	**2,317**	**2,106**
Total Year 2027	**4.68**	**3.36**	**0.13**	**0.13**	**0.01**	**6.30**	**983**	**894**
Total Construction Emissions	**44.90**	**32.20**	**9.42**	**1.21**	**0.11**	**26.35**	**9,859**	**8,963**
No Action Alternative Annual Minimum Construction	**4.39**	**3.15**	**0.12**	**0.12**	**0.01**	**0.63**	**922**	**838**
Alternative 1A Maximum Annual Net Change	**10.51**	**7.39**	**8.46**	**0.28**	**0.03**	**10.61**	**2,413**	**2,194**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Table E-3. Annual Construction Emissions for Alternative 1B.

Year	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
Administration Offices in SEFC E Parcel								
2024	5.31	3.83	2.38	0.14	0.01	0.67	1,212	1,102
2025	4.85	3.48	0.13	0.13	0.01	1.48	1,049	954
2026	2.55	1.84	0.07	0.07	0.01	0.83	529	481
2027								
Subtotal	**12.71**	**9.15**	**2.58**	**0.34**	**0.03**	**2.98**	**2,790**	**2,536**
Private Development in WNY SE Corner								
2024	6.58	4.76	5.71	0.18	0.02	0.84	1,537	1,397
2025	7.25	5.09	0.19	0.19	0.02	4.36	1,558	1,416
2026	6.21	4.46	0.16	0.16	0.01	9.88	1,324	1,204
2027	4.68	3.36	0.13	0.13	0.01	6.30	983	894
Subtotal	**24.72**	**17.67**	**6.19**	**0.66**	**0.06**	**21.38**	**5,402**	**4,911**
In-Kind Development								
2024	2.34	1.80	0.63	0.07	0.01	0.29	546	496
2025	2.03	1.55	0.06	0.06	0.01	1.20	454	413
2026								
2027								
Subtotal	**4.37**	**3.35**	**0.69**	**0.13**	**0.02**	**1.49**	**1,000**	**909**
Total Year 2024	**14.23**	**10.39**	**8.72**	**0.39**	**0.04**	**1.80**	**3,295**	**2,995**
Total Year 2025	**14.13**	**10.12**	**0.38**	**0.38**	**0.04**	**7.04**	**3,061**	**2,783**
Total Year 2026	**8.76**	**6.30**	**0.23**	**0.23**	**0.02**	**10.71**	**1,853**	**1,685**
Total Year 2027	**4.68**	**3.36**	**0.13**	**0.13**	**0.01**	**6.30**	**983**	**894**
Total Construction Emissions	**41.80**	**30.17**	**9.46**	**1.13**	**0.11**	**25.85**	**9,192**	**8,356**
No Action Alternative Annual Minimum Construction	**4.39**	**3.15**	**0.12**	**0.12**	**0.01**	**0.63**	**922**	**838**
Alternative 1B Maximum Annual Net Change	**9.84**	**7.24**	**8.60**	**0.27**	**0.03**	**10.08**	**2,373**	**2,157**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Table E-4. Annual Construction Emissions for Alternative 1C.

Year	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
Construct Fence Around SEFC E Parcel								
2024	0.18	0.11	0.01	0.004	0.0004	0.02	37	34
2025								
2026								
2027								
Subtotal	**0.18**	**0.11**	**0.01**	**0.004**	**0.0004**	**0.02**	**37**	**34**
Private Development in WNY SE Corner								
2024	6.58	4.76	5.71	0.18	0.02	0.84	1,537	1,397
2025	7.25	5.09	0.19	0.19	0.02	4.36	1,558	1,416
2026	6.21	4.46	0.16	0.16	0.01	9.88	1,324	1,204
2027	4.68	3.36	0.13	0.13	0.01	6.30	983	894
Subtotal	**24.72**	**17.67**	**6.19**	**0.66**	**0.06**	**21.38**	**5,402**	**4,911**
In-Kind Development								
2024	2.34	1.80	0.63	0.07	0.01	0.29	546	496
2025	2.03	1.55	0.06	0.06	0.01	1.20	454	413
2026								
2027								
Subtotal	**4.37**	**3.35**	**0.69**	**0.13**	**0.02**	**1.49**	**1,000**	**909**
Total Year 2024	**9.10**	**6.67**	**6.35**	**0.25**	**0.03**	**1.15**	**2,120**	**1,927**
Total Year 2025	**9.28**	**6.64**	**0.25**	**0.25**	**0.03**	**5.56**	**2,012**	**1,829**
Total Year 2026	**6.21**	**4.46**	**0.16**	**0.16**	**0.01**	**9.88**	**1,324**	**1,204**
Total Year 2027	**4.68**	**3.36**	**0.13**	**0.13**	**0.01**	**6.30**	**983**	**894**
Total Construction Emissions	**29.27**	**21.13**	**6.89**	**0.79**	**0.08**	**22.89**	**6,439**	**5,854**
No Action Alternative Annual Minimum Construction	**4.39**	**3.15**	**0.12**	**0.12**	**0.01**	**0.63**	**922**	**838**
Alternative 1C Maximum Annual Net Change	**4.89**	**3.52**	**6.23**	**0.13**	**0.02**	**9.25**	**1,198**	**1,089**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Table E-5. Annual Construction Emissions for Alternative 2A.

Year	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
Navy Museum in SEFC E Parcel								
2024	5.44	3.94	2.24	0.15	0.01	0.69	1,252	1,138
2025	5.62	3.90	0.17	0.14	0.01	1.43	1,212	1,102
2026	4.75	3.34	0.13	0.13	0.01	1.36	993	903
2027								
Total Construction Emissions	**15.81**	**11.18**	**2.54**	**0.42**	**0.03**	**3.48**	**3,457**	**3,143**
No Action Alternative Annual Minimum Construction	**4.39**	**3.15**	**0.12**	**0.12**	**0.01**	**0.63**	**922**	**838**
Alternative 2A Maximum Annual Net Change	**1.23**	**0.79**	**2.12**	**0.03**	**-**	**0.80**	**330**	**300**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Table E-6. Annual Construction Emissions for Alternative 2B.

Year	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
Administration Offices in SEFC E Parcel								
2024	5.31	3.83	2.38	0.14	0.01	0.67	1,212	1,102
2025	4.85	3.48	0.13	0.13	0.01	1.48	1,049	954
2026	2.55	1.84	0.07	0.07	0.01	0.83	529	481
2027								
Total Construction Emissions	**12.71**	**9.15**	**2.58**	**0.34**	**0.03**	**2.98**	**2,790**	**2,536**
No Action Alternative Annual Minimum Construction	**4.39**	**3.15**	**0.12**	**0.12**	**0.01**	**0.63**	**922**	**838**
Alternative 2B Maximum Annual Net Change	**0.92**	**0.68**	**2.26**	**0.02**	**-**	**0.85**	**290**	**264**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Table E-7. Annual Construction Emissions for Alternative 2C.

Year	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
Construct Fence Around SEFC E Parcel								
2024	0.18	0.11	0.01	0.004	0.0004	0.02	37	34
2025								
2026								
2027								
Total Construction Emissions	**0.18**	**0.11**	**0.01**	**0.004**	**0.0004**	**0.02**	**37**	**34**
No Action Alternative Annual Minimum Construction	**4.39**	**3.15**	**0.12**	**0.12**	**0.01**	**0.63**	**922**	**838**
Alternative 2C Maximum Annual Net Change	**(4.21)**	**(3.04)**	**(0.11)**	**(0.12)**	**(0.01)**	**(0.61)**	**(885)**	**(805)**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Table E-8. Annual 1-Way Vehicle Trip Estimates for Alternatives of the Land Acquisition Project at WNY.

	Building		ITE Method (Version 10)			Mode	Trip Productions (veh/h)			Trip Attractions (veh/h)			Weekday	Weekend	Annual
Scenario/Land Use Type	Location	Type	Parameter	Code	Value	Split (1)	AM Peak	PM Peak	WE Peak	AM Peak	PM Peak	WE Peak	(veh/d)	(veh/d)	Trips (2)
No Action															
Three residential buildings	SEFC	Residential	Units	High-Rise	540	0.40	57	32	36	15	52	44	980	1,000	358,800
Building 202	SEFC	Office	1000 Sq Ft	Office General	328	0.50	30	205	39	220	45	46	1,550	353	381,030
Total Annual Trips															**739,830**
Alternative A															
Navy museum	SEFC	Institutional	1000 Sq Ft	Museum	270	0.35	20	14	18	13	3	45	333	630	151,970
Total Annual Trips															**151,970**
Alternative B															
Navy admin offices (3)	SEFC	Office	1000 Sq Ft	Office General	582	0.50	43	295	55	317	65	65	2,200	520	541,840
Total Annual Trips															**541,840**
Private Development															
Residential/retail building 1	Southeast	Residential	Units	High-Rise	650	0.40	70	39	42	18	63	51	1,156	1,180	423,280
Residential/retail building 2	Southeast	Residential	Units	High-Rise	650	0.40	70	39	42	18	63	51	1,156	1,180	423,280
Office building	Southeast	Office	1000 Sq Ft	Office General	400	0.50	33	205	49	242	45	58	2,000	445	491,140
Buildings 68/70	Southeast	Retail	1000 Sq Ft	Center Shopping	60	0.40	33	51	52	39	51	56	920	1,180	276,640
Total Annual Trips															**1,614,340**

Note: (1) Proportion of newly generated trips resulting in vehicle trips as opposed to alternative mode trips (e.g., metro, bus, bicycle). All trip numbers in this table reflect this mode split reduction.

(2) Office and Services Buildings = ((Weekday trips * 4.5) + (Weekend trips * 1)) * 52 weeks/year.

Museum and Residential Buildings = ((Weekday trips * 5) + (Weekend trips * 2)) * 52 weeks/year.

(3) Includes a 20 percent reduction in trips due to existing staff moving into the facilities.

Table E-9. Annual Vehicle Trip and Mileage Estimates - Full Buildout of WNY Land Acquisition Project Alternatives.

Scenario/Land Use Type	Building Type	Miles/ 1-Way Trip	Annual 1-Way Trips	Total Annual Miles (1)
No Action				
Three Residential Buildings	Residential	8	358,800	2,870,400
Building 202	Office	15	381,030	5,715,450
Annual Totals			**739,830**	**8,585,850**
Alternative A				
Navy Museum	Institutional	25	151,970	3,799,250
Annual Totals			**151,970**	**3,799,250**
Alternative B				
Navy Administrative Offices	Office	15	541,840	8,127,600
Annual Totals			**541,840**	**8,127,600**
Private Development - WNY Southeast Corner				
Residential Building 1	Residential	8	423,280	3,386,240
Residential Building 2	Residential	8	423,280	3,386,240
Office Building	Office	15	491,140	7,367,100
Retail Buildings (2)	Retail	8	276,640	2,213,120
Annual Totals			**1,614,340**	**16,352,700**

Notes: (1) Equal to miles/1-Way Trip * Annual 1-Way Trips.

(2) Includes trips generated from retail uses in Buildings 68/70 and the first floors of Residential Buildings 1 and 2.

Table E-10. Emission Factors for On-road Commuter Vehicles - WNY Land Acquisition Project.

Project Year/Source Type	Fuel Type	Emission Factors (Grams/Mile) (1)						
		VOC	CO	NOx	SO2	PM10	PM2.5	CO2
Year 2020								
Passenger Car	G	0.15	1.47	0.04	0.00	0.04	0.01	273
Light Duty Truck	G	0.13	1.53	0.05	0.00	0.04	0.01	312
Composite - Light Duty Vehicles (2)	G	**0.15**	**1.49**	**0.04**	**0.00**	**0.04**	**0.01**	**283**

Notes: (1) Estimated with the use of the EPA MOVES3 model and based on year 2020 model vehicles for the District of Columbia (Argonne Na. Lab 2021).

(2) Equal to a fleet of 75/25 percent passenger car/light duty truck.

Table E-11. Annual Emissions for On-road Commuter Vehicles - WNY Land Acquisition Project Alternatives Full Buildout.

	Annual Emissions (tons/year)							Metric Tons/yr
Scenario/Land Use Type	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CO_2e
No Action								
Three Residential Buildings	0.46	4.70	0.13	0.01	0.13	0.03	895	813
Building 202 - Office	0.91	9.36	0.27	0.01	0.25	0.06	1,781	1,619
Total Annual Emissions	**1.37**	**14.05**	**0.40**	**0.02**	**0.38**	**0.09**	**2,676**	**2,433**
Alternative A								
Navy Museum	0.61	6.22	0.18	0.01	0.17	0.04	1,184	1,076
Total Annual Emissions	**0.61**	**6.22**	**0.18**	**0.01**	**0.17**	**0.04**	**1,184**	**1,076**
Alternative B								
Navy Administrative Offices	1.30	13.30	0.38	0.02	0.36	0.09	2,533	2,303
Total Annual Emissions	**1.30**	**13.30**	**0.38**	**0.02**	**0.36**	**0.09**	**2,533**	**2,303**
Private Development								
Residential Building 1	0.54	5.54	0.16	0.01	0.15	0.04	1,055	959
Residential Building 2	0.54	5.54	0.16	0.01	0.15	0.04	1,055	959
Office Building	1.18	12.06	0.35	0.02	0.32	0.08	2,296	2,087
Retail Buildings	0.35	3.62	0.10	0.00	0.10	0.02	690	627
Total Annual Emissions	**2.61**	**26.77**	**0.77**	**0.04**	**0.72**	**0.18**	**5,097**	**4,633**

Table E-12. Annual Operations Emissions for the No Action Alternative on - SEFC Parcel E – Year 2028 Full Buildout

Building/Source Type	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
Office Building								
Space and Water Heating	1.31	1.56	0.12	0.12	0.01	0.09	1,879	1,708
Emergency Generators	0.02	0.02	0.01	0.01	-	0.01	3	3
Commuter Vehicles	9.36	0.27	0.25	0.06	0.01	0.91	1,781	1,619
Subtotal	**10.69**	**1.85**	**0.38**	**0.19**	**0.02**	**1.01**	**3,663**	**3,330**
Residential Buildings								
Space and Water Heating	2.75	3.27	0.25	0.25	0.02	0.18	3,942	3,584
Emergency Generators	0.05	0.07	0.02	0.02	0.01	0.02	8	7
Commuter Vehicles	4.70	0.13	0.13	0.03	0.01	0.46	895	814
Subtotal	**7.50**	**3.47**	**0.40**	**0.30**	**0.04**	**0.66**	**4,845**	**4,405**
Total Operations	**18.19**	**5.32**	**0.78**	**0.49**	**0.06**	**1.67**	**8,508**	**7,735**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Table E-13. Annual Operations Emissions for Alternative 1A (tons/year) – Year 2028 Full Buildout

Building/Source Type	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
Navy Museum - SEFC E Parcel								
Space and Water Heating	1.82	2.16	0.16	0.16	0.01	0.12	2,605	2,368
Emergency Generators	0.05	0.07	0.02	0.02	0.01	0.02	8	7
Commuter Vehicles	6.22	0.18	0.17	0.04	0.01	0.61	1,184	1,076
Subtotal	**8.09**	**2.41**	**0.35**	**0.22**	**0.03**	**0.75**	**3,797**	**3,452**
Private Development in WNY SE Corner								
Space and Water Heating	7.80	9.29	0.71	0.71	0.06	0.51	11,181	10,165
Emergency Generators	0.10	0.15	0.03	0.03	0.03	0.04	18	16
Commuter Vehicles	26.77	0.77	0.72	0.18	0.04	2.61	5,097	4,634
Subtotal	**34.67**	**10.21**	**1.46**	**0.92**	**0.13**	**3.16**	**16,296**	**14,815**
In-Kind Development								
Emergency Generators	0.02	0.02	0.01	0.01	-	0.01	3	3
Subtotal	**0.02**	**0.02**	**0.01**	**0.01**	**-**	**0.01**	**3**	**3**
Total Operations	**42.78**	**12.64**	**1.82**	**1.15**	**0.16**	**3.92**	**20,096**	**18,269**
No Action Alternative Total	**18.19**	**5.32**	**0.78**	**0.49**	**0.06**	**1.67**	**8,508**	**7,735**
Alternative 1A Net Change (1)	**24.59**	**7.32**	**1.04**	**0.66**	**0.10**	**2.25**	**11,588**	**10,535**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Notes: (1) Equal to Alternative 1A Total Operations minus No Action Alternative Total Operations.

Table E-14. Annual Operations Emissions for Alternative 1B (tons/year) – Year 2028 Full Buildout

Building/Source Type	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
Admin Buildings - SEFC E Parcel								
Space and Water Heating	2.79	3.32	0.25	0.25	0.02	0.18	4,002	3,638
Emergency Generators	0.05	0.07	0.02	0.02	0.01	0.02	8	7
Commuter Vehicles	13.30	0.38	0.36	0.09	0.02	1.30	2,533	2,303
Subtotal	**16.14**	**3.77**	**0.63**	**0.36**	**0.05**	**1.50**	**6,543**	**5,948**
Private Development in WNY SE Corner								
Space and Water Heating	7.80	9.29	0.71	0.71	0.06	0.51	11,181	10,165
Emergency Generators	0.10	0.15	0.03	0.03	0.03	0.04	18	16
Commuter Vehicles	26.77	0.77	0.72	0.18	0.04	2.61	5,097	4,634
Subtotal	**34.67**	**10.21**	**1.46**	**0.92**	**0.13**	**3.16**	**16,296**	**14,815**
In-Kind Development								
Emergency Generators	0.02	0.02	0.01	0.01	-	0.01	3	3
Subtotal	**0.02**	**0.02**	**0.01**	**0.01**	**-**	**0.01**	**3**	**3**
Total Operations	**50.83**	**14.00**	**2.10**	**1.29**	**0.18**	**4.67**	**22,842**	**20,765**
No Action Alternative Total Operations	**18.19**	**5.32**	**0.78**	**0.49**	**0.06**	**1.67**	**8,508**	**7,735**
Alternative 1B Net Change (1)	**32.64**	**8.68**	**1.32**	**0.80**	**0.12**	**3.00**	**14,334**	**13,031**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Notes: (1) Equal to Alternative 1B Total Operations minus No Action Alternative Total Operations.

Table E-15. Annual Operations Emissions for Alternative 1C (tons/year) – Year 2028 Full Buildout

Building/Source Type	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
SEFC E Parcel								
Subtotal								
Private Development in WNY SE Corner								
Space and Water Heating	7.80	9.29	0.71	0.71	0.06	0.51	11,181	10,165
Emergency Generators	0.10	0.15	0.03	0.03	0.03	0.04	18	16
Commuter Vehicles	26.77	0.77	0.72	0.18	0.04	2.61	5,097	4,634
Subtotal	**34.67**	**10.21**	**1.46**	**0.92**	**0.13**	**3.16**	**16,296**	**14,815**
In-Kind Development								
Emergency Generators	0.02	0.02	0.01	0.01	-	0.01	3	3
Subtotal	**0.02**	**0.02**	**0.01**	**0.01**	**-**	**0.01**	**3**	**3**
Total Operations	**34.69**	**10.23**	**1.47**	**0.004**	**0.0004**	**3.17**	**16,299**	**14,817**
No Action Alternative Total Operations	**18.19**	**5.32**	**0.78**	**0.49**	**0.06**	**1.67**	**8,508**	**7,735**
Alternative 1C Net Change (1)	**16.50**	**4.91**	**0.69**	**(0.49)**	**(0.06)**	**1.50**	**7,791**	**7,083**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Notes: (1) Equal to Alternative 1C Total Operations minus No Action Alternative Total Operations.

Table E-16. Annual Operations Emissions for Alternative 2A (tons/year) – Year 2028 Full Buildout

Building/Source Type	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
Navy Museum - SEFC E Parcel								
Space and Water Heating	1.82	2.16	0.16	0.16	0.01	0.12	2,605	2,368
Emergency Generators	0.05	0.07	0.02	0.02	0.01	0.02	8	7
Commuter Vehicles	6.22	0.18	0.17	0.04	0.01	0.61	1,184	1,076
Subtotal	**8.09**	**2.41**	**0.35**	**0.22**	**0.03**	**0.75**	**3,797**	**3,452**
Total Operations	**8.09**	**2.41**	**0.35**	**0.22**	**0.03**	**0.75**	**3,797**	**3,452**
No Action Alternative Total Operations	**18.19**	**5.32**	**0.78**	**0.49**	**0.06**	**1.67**	**8,508**	**7,735**
Alternative 2A Net Change (1)	**(10.10)**	**(2.91)**	**(0.43)**	**(0.27)**	**(0.03)**	**(0.92)**	**(4,711)**	**(4,283)**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Notes: (1) Equal to Alternative 2A Total Operations minus No Action Alternative Total Operations.

Table E-17. Annual Operations Emissions for Alternative 2B (tons/year) – Year 2028 Full Buildout

Building/Source Type	Annual Emissions (tons/year)							Metric Tons/yr
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs	CO_2e	CO_2e
Admin Buildings - SEFC E Parcel								
Space and Water Heating	2.79	3.32	0.25	0.25	0.02	0.18	4,002	3,638
Emergency Generators	0.05	0.07	0.02	0.02	0.01	0.02	8	7
Commuter Vehicles	13.30	0.38	0.36	0.09	0.02	1.30	2,533	2,303
Subtotal	**16.14**	**3.77**	**0.63**	**0.36**	**0.05**	**1.50**	**6,543**	**5,948**
Total Operations	**16.14**	**3.77**	**0.63**	**0.36**	**0.05**	**1.50**	**6,543**	**5,948**
No Action Alternative Total Operations	**18.19**	**5.32**	**0.78**	**0.49**	**0.06**	**1.67**	**8,508**	**7,735**
Alternative 2B Net Change (1)	**(2.05)**	**(1.55)**	**(0.15)**	**(0.13)**	**(0.01)**	**(0.17)**	**(1,965)**	**(1,786)**
Significance Thresholds	**100**	**100**	**250**	**250**	**250**	**50**	**NA**	**NA**

Notes: (1) Equal to Alternative 2B Total Operations minus No Action Alternative Total Operations.

Air Conformity Applicability Model Reports

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1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

b. Action Title: Washington Naval Yard EIS - No Action Alternative

c. Project Number/s (if applicable):

d. Projected Action Start Date: 3 / 2024

e. Action Description:

This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by December 2027 for all proposed components. Operations emissions would begin in year 2028.

No Action Alternative Construction and Operations for approved development within the SEFC E Parcels of several multi-story buildings.

f. Point of Contact:

Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.625	50	No
NOx	3.871	100	No
CO	4.851	100	No
SOx	0.013		
PM 10	6.045		
PM 2.5	0.147		
Pb	0.000		
NH3	0.008		
CO2e	1285.5		

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	1.108	50	No
NOx	3.757	100	No
CO	5.120	100	No
SOx	0.011		
PM 10	0.141		
PM 2.5	0.140		
Pb	0.000		
NH3	0.005		
CO2e	1114.8		

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	8.313	50	No
NOx	3.150	100	No
CO	4.390	100	No
SOx	0.010		
PM 10	0.119		
PM 2.5	0.118		
Pb	0.000		
NH3	0.003		
CO2e	921.6		

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.000	50	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000		
PM 10	0.000		
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		
CO2e	0.0		

2028

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.288	50	No
NOx	4.928	100	No
CO	4.123	100	No
SOx	0.048		
PM 10	0.388		
PM 2.5	0.388		
Pb	0.000		
NH3	0.000		
CO2e	5831.0		

2029 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.288	50	No
NOx	4.928	100	No
CO	4.123	100	No
SOx	0.048		
PM 10	0.388		
PM 2.5	0.388		
Pb	0.000		
NH3	0.000		
CO2e	5831.0		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Chris Crabtree, Air Quality Specialist/Meteorologist DATE

1. General Information

- Action Location
Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Action Title: Washington Naval Yard EIS - No Action Alternative

- Project Number/s (if applicable):

- Projected Action Start Date: 3 / 2024

- Action Purpose and Need:
Construction and Operations

- Action Description:
This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by December 2027 for all proposed components. Operations emissions would begin in year 2028.

No Action Alternative Construction and Operations for approved development within the SEFC E Parcels of several multi-story buildings.

- Point of Contact
Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	No Action Alternative Construction within the SEFC E Parcel - Office Building
3.	Heating	No Action Alternative - Office Building Operations
4.	Emergency Generator	No Action Alternative - Office Building Operations
5.	Construction / Demolition	No Action Alternative Construction within the SEFC E Parcel - Residential Units
6.	Heating	No Action Alternative - Residential Operations
7.	Emergency Generator	No Action Alternative - Residential Operations
8.	Construction / Demolition	No Action Alternative Construction within the SEFC E Parcel - Residential Parking Garage

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: No Action Alternative Construction within the SEFC E Parcel - Office Building

- Activity Description:
Construction of 328,000 gross sf of office space in existing 5-story Building 202 with a footprint of 74,000 sf. For building construction, assume half of this, or 37,000 sf since it is a re-model and not new construction.

For demolition, assume = 50,000 sf to simulate only interior demolition.

- Activity Start Date
Start Month: 3
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 0
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.361057
SO_x	0.014292
NO_x	4.604069
CO	6.276377
PM 10	1.997065

Pollutant	Total Emissions (TONs)
PM 2.5	0.172144
Pb	0.000000
NH_3	0.005783
CO_2e	1393.7

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 5
Number of Days: 0

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 50000
Height of Building to be demolished (ft): 60

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 40000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 600

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.3 Trenching/Excavating Phase

2.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

2.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 40000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 500

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Building Construction Phase

2.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 30
Number of Days: 0

2.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 37000
Height of Building (ft): 60
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.5 Architectural Coatings Phase

2.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 3
Number of Days: 0

2.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 50000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

2.6 Paving Phase

2.6.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
Start Quarter: 1
Start Year: 2026

- Phase Duration

Number of Month: 1
Number of Days: 0

2.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 30000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

3. Heating

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: No Action Alternative - Office Building Operations

- Activity Description:
Space and water heating

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.085819
SO_x	0.009362
NO_x	1.560343
CO	1.310688
PM 10	0.118586

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.118586
Pb	0.000000
NH_3	0.000000
CO_2e	1878.5

3.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 328000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0999

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

3.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

3.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

4. Emergency Generator

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: No Action Alternative - Office Building Operations

- Activity Description:
Emergency generator

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

4.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

4.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

4.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: No Action Alternative Construction within the SEFC E Parcel - Residential Units

- Activity Description:
Construction of 537,000 gross sf of residential space in 2 new buildings and re-model of existing building 74.
Dimensions of new building E3 = 30,500 sf footprint and 110' high.
Dimensions of new building E4 = 23,000 sf footprint and 110' high.
Dimensions of existing building 74 = 20,000 sf footprint and 25' high.

Demolition would occur within Building 74, so used a footprint of 10,000 to simulate this activity.

Also proposes 241,000 gross sf of underground parking in 3 levels. Construction of this feature evaluated in a separate module.

- Activity Start Date
Start Month: 6
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 0
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	7.891382
SO_x	0.012554
NO_x	4.047909
CO	5.678370
PM 10	1.894586

Pollutant	Total Emissions (TONs)
PM 2.5	0.150489
Pb	0.000000
NH_3	0.004131
CO_2e	1213.0

5.1 Demolition Phase

5.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

5.1.2 Demolition Phase Assumptions

- General Demolition Information

Area of Building to be demolished (ft^2): 10000
Height of Building to be demolished (ft): 25

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.2 Site Grading Phase

5.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

5.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 90000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 10000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.3 Trenching/Excavating Phase

5.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

5.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 40000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 1000

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.4 Building Construction Phase

5.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 28
Number of Days: 0

5.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Multi-Family
Area of Building (ft^2): 54000
Height of Building (ft): N/A
Number of Units: 540

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

5.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = NU * 0.36 * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
NU: Number of Units
0.36: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = NU * 0.11 * HT$

VMT_{VT}: Vender Tips Vehicle Miles Travel (miles)
NU: Number of Units
0.11: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.5 Architectural Coatings Phase

5.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 3
Number of Days: 0

5.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Multi-Family
Total Square Footage (ft^2): N/A

Number of Units: 540

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (NU * 850 * 2.7 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
NU: Number of Units
850: Conversion Factor units to square feet (850 ft^2 / unit)
2.7: Conversion Factor total area to coated area (2.7 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

5.6 Paving Phase

5.6.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

5.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 45000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

6. Heating

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: No Action Alternative - Residential Operations

- Activity Description:
Space and water heating

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.180076
SO_x	0.019645
NO_x	3.274114
CO	2.750256
PM 10	0.248833

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.248833
Pb	0.000000
NH_3	0.000000
CO_2e	3941.7

6.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 538000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.1278

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

6.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

6.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

7. Emergency Generator

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: No Action Alternative - Residential Operations

- Activity Description:
Emergency generators - 1/building = 3 total

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.016949
SO_x	0.014276
NO_x	0.069863
CO	0.046656
PM 10	0.015248

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.015248
Pb	0.000000
NH_3	0.000000
CO_2e	8.1

7.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 3

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

7.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

7.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: No Action Alternative Construction within the SEFC E Parcel - Residential Parking Garage

- Activity Description:
241,000 gross sf of underground parking in 3 levels.

- Activity Start Date
Start Month: 6
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.792998
SO_x	0.007018
NO_x	2.125786
CO	2.406374
PM 10	2.413796

Pollutant	Total Emissions (TONs)
PM 2.5	0.083571
Pb	0.000000
NH_3	0.005611
CO_2e	715.2

8.1 Trenching/Excavating Phase

8.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

8.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 78000
Amount of Material to be Hauled On-Site (yd^3): 1000
Amount of Material to be Hauled Off-Site (yd^3): 104000

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

8.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)

2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.2 Building Construction Phase

8.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 9
Number of Days: 0

8.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 78000
Height of Building (ft): 36
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

8.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.3 Architectural Coatings Phase

8.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

8.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 40000

Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

8.4 Paving Phase

8.4.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

8.4.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 241000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	6
Rollers Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

8.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)

PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

b. Action Title: Washington Naval Yard EIS - Alternative 1A - Navy Museum in SEFC E Parcels, Private Development in WNY SE Corner, and WNY In-Kind Development

c. Project Number/s (if applicable):

d. Projected Action Start Date: 3 / 2024

e. Action Description:

This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by June 2028 for all proposed components. Operations emissions would begin in year 2028.

Navy Museum in SEFC E Parcels

New Navy Museum Building = 75,000 sf footprint and 4 stories high = 300,000 GSF.
Existing Building 74 for Retail/Restaurant = 20,000 sf footprint and 2 stories high. This building will be renovated, so for demolition and construction, assume = 10,000 sf to simulate only interior demolition/construction.
Existing Building 118 for Special Events = 8,000 sf footprint and 36' high. This building will be renovated, so for demolition and construction, assume = 4,000 sf to simulate only interior demolition/construction.
Existing Building 202 for Parking/Admin = 60,800 sf footprint and 6 stories high. This building will be renovated – the lower 4 floors for parking and upper 2 floors for Admin, so for demolition, assume = 30,000 sf to simulate only interior demolition. For construction assume 40,000 sf to simulate interior but fairly substantial construction.

Private Development in WNY SE Corner

New Residential/Retail Building 1 = 599,000 GSF, 44,600 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Residential/Retail Building 2 = 599,000 GSF, 44,500 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Office Building = 400,000 GSF, 40,000 sf footprint, and 10 stories high.
Renovation of existing Building 405 for Parking = 380,000 GSF, 76,000 sf footprint, and 57' high. This building will be renovated, so for demolition and construction, assume = 38,000 sf to simulate only interior demolition/construction.
Renovation of existing Buildings 68/70 for Retail = 30,500 GSF, 15,200 sf footprint, and 20' high. These buildings will be renovated, so for demolition and construction, assume = 8,000 sf to simulate only interior demolition/construction.
Demolish existing Building 166 = 14,600 sf footprint and 54' high.
The WNY fence would be relocated between the WNY and private development on the WNY Southeast Corner – old/new fence lengths = 1,730'/1,600'.

WNY In-Kind Development

Existing Building 405 – Add 2 new floors for Parking = 76,000 sf footprint and 20' high. This would be new construction but also some 80emolition of the roof, so for demolition, assume = 38,000 sf and 10' high to simulate demolition.

Existing Building 386 = 50,600 sf footprint and 77' high. This building would be demolished and then re-constructed with 2 additional stories, so the new building height = 77' + 20' = 97'.

f. Point of Contact:

Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	1.682	50	No
NOx	9.598	100	No
CO	13.251	100	No
SOx	0.031		
PM 10	11.118		
PM 2.5	0.359		
Pb	0.000		
NH3	0.009		
CO2e	3059.4		

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	6.170	50	No
NOx	9.874	100	No
CO	14.045	100	No
SOx	0.031		
PM 10	0.393		
PM 2.5	0.361		
Pb	0.000		
NH3	0.011		
CO2e	3026.4		

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	11.238	50	No
NOx	7.799	100	No
CO	10.960	100	No
SOx	0.024		
PM 10	0.293		
PM 2.5	0.292		
Pb	0.000		
NH3	0.009		
CO2e	2317.1		

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	6.505	50	No
NOx	4.704	100	No
CO	6.363	100	No
SOx	0.015		
PM 10	1.593		
PM 2.5	0.176		
Pb	0.000		
NH3	0.007		
CO2e	1439.0		

2028

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	12.442	50	No
NOx	12.644	100	No
CO	11.021	100	No
SOx	0.120		
PM 10	0.958		
PM 2.5	0.957		
Pb	0.000		
NH3	0.002		
CO2e	14118.0		

2029 – (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.689	50	No
NOx	11.697	100	No
CO	9.783	100	No
SOx	0.119		
PM 10	0.924		
PM 2.5	0.924		
Pb	0.000		
NH3	0.000		
CO2e	13814.6		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

_____ _____

Chris Crabtree, Air Quality Specialist/Meteorologist DATE

1. General Information

- Action Location
Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Action Title: Washington Naval Yard EIS – Alternative 1A – Navy Museum in SEFC E Parcels, Private Development in WNY SE Corner, and WNY In-Kind Development

- Project Number/s (if applicable):

- Projected Action Start Date: 3 / 2024

- Action Purpose and Need:
Construction and Operations

- Action Description:
This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by June 2028 for all proposed components. Operations emissions would begin in year 2028.

Navy Museum in SEFC E Parcels

New Navy Museum Building = 75,000 sf footprint and 4 stories high = 300,000 GSF.
Existing Building 74 for Retail/Restaurant = 20,000 sf footprint and 2 stories high. This building will be renovated, so for demolition and construction, assume = 10,000 sf to simulate only interior demolition/construction.
Existing Building 118 for Special Events = 8,000 sf footprint and 36' high. This building will be renovated, so for demolition and construction, assume = 4,000 sf to simulate only interior demolition/construction.
Existing Building 202 for Parking/Admin = 60,800 sf footprint and 6 stories high. This building will be renovated - the lower 4 floors for parking and upper 2 floors for Admin, so for demolition, assume = 30,000 sf to simulate only interior demolition. For construction assume 40,000 sf to simulate interior but fairly substantial construction.

Private Development in WNY SE Corner

New Residential/Retail Building 1 = 599,000 GSF, 44,600 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Residential/Retail Building 2 = 599,000 GSF, 44,500 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Office Building = 400,000 GSF, 40,000 sf footprint, and 10 stories high.
Renovation of existing Building 405 for Parking = 380,000 GSF, 76,000 sf footprint, and 57' high. This building will be renovated, so for demolition and construction, assume = 38,000 sf to simulate only interior demolition/construction.
Renovation of existing Buildings 68/70 for Retail = 30,500 GSF, 15,200 sf footprint, and 20' high. These buildings will be renovated, so for demolition and construction, assume = 8,000 sf to simulate only interior demolition/construction.
Demolish existing Building 166 = 14,600 sf footprint and 54' high.
The WNY fence would be relocated between the WNY and private development on the WNY Southeast Corner - old/new fence lengths = 1,730'/1,600'.

WNY In-Kind Development

Existing Building 405 - Add 2 new floors for Parking = 76,000 sf footprint and 20' high. This would be new construction but also some demolition of the roof, so for demolition, assume = 38,000 sf and 10' high to simulate demolition.

Existing Building 386 = 50,600 sf footprint and 77' high. This building would be demolished and then re-constructed with 2 additional stories, so the new building height = 77' + 20' = 97'.

- Point of Contact

Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Navy Museum Construction
3.	Heating	Navy Museum Building Operations - Heating
4.	Emergency Generator	Navy Museum Building Operations - Emergency Generator
5.	Construction / Demolition	Museum Retail Construction - Existing Building 74
6.	Heating	Museum Retail Building 74 Operations - Heating
7.	Emergency Generator	Museum Retail Building 74 Operations - Emergency Generator
8.	Construction / Demolition	Museum Building 202 Parking Construction
9.	Heating	Museum Building 202 Parking Building - Heating
10.	Emergency Generator	Museum Building 202 Parking Building - Emergency Generator
11.	Construction / Demolition	Museum Special Event Space - Building 118 Construction
12.	Heating	Museum Building 118 Special Event Space - Heating
13.	Construction / Demolition	Private Development in WNY SE Corner - New Residential/Retail Building 1
14.	Construction / Demolition	Private Development in WNY SE Corner - New Residential/Retail Building 2
15.	Heating	Private Development in WNY SE Corner - New Residential/Retail Building 1 - Heating
16.	Heating	Private Development in WNY SE Corner - New Residential/Retail Building 2 - Heating
17.	Emergency Generator	Private Development in WNY SE Corner - New Residential/Retail Building 1 - Emergency Generator
18.	Emergency Generator	Private Development in WNY SE Corner - New Residential/Retail Building 2 - Emergency Generator
19.	Construction / Demolition	Private Development in WNY SE Corner - New Office Building
20.	Heating	Private Development in WNY SE Corner - New Office Building - Heating
21.	Emergency Generator	Private Development in WNY SE Corner - New Office Building - Emergency Generator
22.	Construction / Demolition	Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail
23.	Heating	Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail - Heating
24.	Emergency Generator	Private Development in WNY SE Corner - Renovate Buildings 68/70 for Retail - Emergency Generator
25.	Construction / Demolition	WNY In-Kind Development - Existing Building 386 - Demolish and Re-build
26.	Emergency Generator	WNY In-Kind Development - New Parking Building 386 - Emergency Generator
27.	Construction / Demolition	WNY In-Kind Development - Existing Building 405 - Add 2 new floors for Parking

28.	Construction / Demolition	Demolish old WNY fence and relocate between WNY and private development on WNY Southeast Corner

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Navy Museum Construction

- Activity Description:
New Navy Museum Building = 75,000 sf footprint and 4 stories high.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 0
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.337177
SO_x	0.013604
NO_x	4.381624
CO	6.009948
PM 10	2.750310

Pollutant	Total Emissions (TONs)
PM 2.5	0.163217
Pb	0.000000
NH_3	0.004594
CO_2e	1317.4

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 120000
Amount of Material to be Hauled On-Site (yd^3): 500
Amount of Material to be Hauled Off-Site (yd^3): 1000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 500

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 30
Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Commercial or Retail
Area of Building (ft^2): 75000
Height of Building (ft): 50

Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.05 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 12
Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 50000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 1
Number of Days: 0

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 20000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

3. Heating

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Navy Museum Building Operations - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.078493
SO_x	0.008563
NO_x	1.427143
CO	1.198800
PM 10	0.108463

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.108463
Pb	0.000000
NH_3	0.000000
CO_2e	1718.1

3.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 300000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0999

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

3.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

3.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

4. Emergency Generator

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Navy Museum Building Operations - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

4.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

4.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

4.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Museum Retail Construction - Existing Building 74

- Activity Description:
Existing Building 74 for Retail/Restaurant = 20,000 sf footprint and 2 stories high. This building will be renovated, so for demolition and construction, assume = 10,000 sf to simulate only interior demolition/construction.

- Activity Start Date
Start Month: 5
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.360679
SO_x	0.004626
NO_x	1.385941
CO	2.023736
PM 10	0.127020

Pollutant	Total Emissions (TONs)
PM 2.5	0.050094
Pb	0.000000
NH_3	0.001339
CO_2e	450.5

5.1 Demolition Phase

5.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

5.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 10000
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.2 Site Grading Phase

5.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

5.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 2500
Amount of Material to be Hauled On-Site (yd^3): 40
Amount of Material to be Hauled Off-Site (yd^3): 100

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.3 Trenching/Excavating Phase

5.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

5.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1000
Amount of Material to be Hauled On-Site (yd^3): 40
Amount of Material to be Hauled Off-Site (yd^3): 100

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.4 Building Construction Phase

5.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 12
Number of Days: 0

5.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 10000
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

5.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.05 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.5 Architectural Coatings Phase

5.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

5.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 10000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

6. Heating

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Museum Retail Building 74 Operations - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.002996
SO_x	0.000327
NO_x	0.054476
CO	0.045760
PM 10	0.004140

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.004140
Pb	0.000000
NH_3	0.000000
CO_2e	65.6

6.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 20000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0572

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

6.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

6.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

7. Emergency Generator

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Museum Retail Building 74 Operations - Emergency Generator

- Activity Description:
Diesel-powered - 1 total

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

7.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

7.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

7.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Museum Building 202 Parking Construction

- Activity Description:
Existing Building 202 for Parking/Admin = 60,800 sf footprint and 6 stories high.

This building will be renovated - the lower 4 floors for parking and upper 2 floors for Admin, so for demolition, assume = 30,000 sf to simulate only interior demolition. For construction assume 40,000 sf to simulate interior but fairly substantial construction.

- Activity Start Date
Start Month: 3
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.476926
SO_x	0.013749
NO_x	4.499862
CO	6.270682
PM 10	0.640332

Pollutant	Total Emissions (TONs)
PM 2.5	0.172057
Pb	0.000000
NH_3	0.005025
CO_2e	1335.8

8.1 Demolition Phase

8.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 6
Number of Days: 0

8.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 30000
Height of Building to be demolished (ft): 60

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)

BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.2 Site Grading Phase

8.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

8.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 5000
Amount of Material to be Hauled On-Site (yd^3): 50
Amount of Material to be Hauled Off-Site (yd^3): 500

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.3 Trenching/Excavating Phase

8.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

8.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 2000
Amount of Material to be Hauled On-Site (yd^3): 40
Amount of Material to be Hauled Off-Site (yd^3): 200

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.4 Building Construction Phase

8.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 27
Number of Days: 0

8.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 40000
Height of Building (ft): 60
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

8.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.05 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.5 Architectural Coatings Phase

8.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 12
Number of Days: 0

8.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 60000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)

2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

8.6 Paving Phase

8.6.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 3
Number of Days: 0

8.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 220000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	8
Paving Equipment Composite	2	6
Rollers Composite	2	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

9. Heating

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Museum Building 202 Parking Building - Heating

- Activity Description:
Natural gas-fired for the upstairs admin facilities - 2 stories.

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.033911
SO_x	0.003699
NO_x	0.616571
CO	0.517920
PM 10	0.046859

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.046859
Pb	0.000000
NH_3	0.000000
CO_2e	742.3

9.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 120000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.1079

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

9.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

9.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

10. Emergency Generator

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Museum Building 202 Parking Building - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

10.2 Emergency Generator Assumptions

- Emergency Generator

Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

10.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

10.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Museum Special Event Space - Building 118 Construction

- Activity Description:
Existing Building 118 for Special Events = 8,000 sf footprint and 36' high. This building will be renovated, so for demolition and construction, assume = 4,000 sf to simulate only interior demolition/construction.

- Activity Start Date
Start Month: 7
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.295525
SO_x	0.003640
NO_x	0.915520
CO	1.509402
PM 10	0.076237

Pollutant	Total Emissions (TONs)
PM 2.5	0.030996
Pb	0.000000
NH_3	0.000973
CO_2e	353.0

11.1 Demolition Phase

11.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

11.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 4000
Height of Building to be demolished (ft): 36

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.2 Site Grading Phase

11.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

11.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 1000
Amount of Material to be Hauled On-Site (yd^3): 20
Amount of Material to be Hauled Off-Site (yd^3): 100

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.3 Trenching/Excavating Phase

11.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

11.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 500
Amount of Material to be Hauled On-Site (yd^3): 20
Amount of Material to be Hauled Off-Site (yd^3): 60

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.4 Building Construction Phase

11.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 12
Number of Days: 0

11.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 4000
Height of Building (ft): 36
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

11.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (0.32 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.05 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.5 Architectural Coatings Phase

11.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2026

- Phase Duration
Number of Month: 2
Number of Days: 0

11.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 10000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)

WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

12. Heating

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Museum Building 118 Special Event Space - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.003595
SO_x	0.000392
NO_x	0.065371
CO	0.054912
PM 10	0.004968

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.004968
Pb	0.000000
NH_3	0.000000
CO_2e	78.7

12.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 24000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0572

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

12.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

12.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

13. Construction / Demolition

13.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 1

- Activity Description:
New Residential/Retail Building 1 = 599,000 GSF, 44,600 sf footprint, and 13 stories high. First floor is retail.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	9.575463
SO_x	0.016384
NO_x	5.269683
CO	7.352166
PM 10	3.479998

Pollutant	Total Emissions (TONs)
PM 2.5	0.196772
Pb	0.000000
NH_3	0.004978
CO_2e	1580.3

13.1 Site Grading Phase

13.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

13.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 100000
Amount of Material to be Hauled On-Site (yd^3): 500
Amount of Material to be Hauled Off-Site (yd^3): 5000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

13.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

13.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

13.2 Trenching/Excavating Phase

13.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

13.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 1000

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

13.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

13.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

13.3 Building Construction Phase

13.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 36
Number of Days: 0

13.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Multi-Family
Area of Building (ft^2): 44600
Height of Building (ft): N/A
Number of Units: 650

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

13.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

13.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = NU * 0.36 * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
NU: Number of Units
0.36: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = NU * 0.11 * HT

VMT_{VT}: Vender Tips Vehicle Miles Travel (miles)
NU: Number of Units
0.11: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

13.4 Architectural Coatings Phase

13.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 24
Number of Days: 0

13.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Multi-Family
Total Square Footage (ft^2): N/A
Number of Units: 650

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

13.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

13.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (NU * 850 * 2.7 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
NU: Number of Units
850: Conversion Factor units to square feet (850 ft^2 / unit)
2.7: Conversion Factor total area to coated area (2.7 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

13.5 Paving Phase

13.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration

Number of Month: 2
Number of Days: 0

13.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 40000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

13.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

13.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

14. Construction / Demolition

14.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 2

- Activity Description:
New Residential/Retail Building 2 = 599,000 GSF, 44,500 sf footprint, and 13 stories high. First floor is retail.

Demolish existing Building 211 = 11,200 sf footprint and 12' high.
Demolish existing Building 218 = 9,000 sf footprint and 31' high.
Assume total demolished dimensions = 20,670 sf footprint and 20' high.

- Activity Start Date
Start Month: 3
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	9.591136
SO_x	0.016755
NO_x	5.381382
CO	7.540136
PM 10	2.972407

Pollutant	Total Emissions (TONs)
PM 2.5	0.199243
Pb	0.000000
NH_3	0.005073
CO_2e	1617.3

14.1 Demolition Phase

14.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 4
Number of Days: 0

14.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 20670
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

14.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)

BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

14.2 Site Grading Phase

14.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

14.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 80000
Amount of Material to be Hauled On-Site (yd^3): 200
Amount of Material to be Hauled Off-Site (yd^3): 2000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

14.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

14.3 Trenching/Excavating Phase

14.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

14.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 600

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

14.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

14.4 Building Construction Phase

14.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 10
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 36
Number of Days: 0

14.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Multi-Family
Area of Building (ft^2): 44500
Height of Building (ft): N/A
Number of Units: 650

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

14.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

14.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = NU * 0.36 * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
NU: Number of Units
0.36: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = NU * 0.11 * HT$

VMT_{VT}: Vender Tips Vehicle Miles Travel (miles)
NU: Number of Units
0.11: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

14.5 Architectural Coatings Phase

14.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 24
Number of Days: 0

14.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Multi-Family
Total Square Footage (ft^2): N/A

Number of Units: 650

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

14.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (NU * 850 * 2.7 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
NU: Number of Units
850: Conversion Factor units to square feet (850 ft^2 / unit)
2.7: Conversion Factor total area to coated area (2.7 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

14.6 Paving Phase

14.6.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

14.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 15000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e

Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

14.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

15. Heating

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 1 - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.200494
SO_x	0.021872
NO_x	3.645343
CO	3.062088
PM 10	0.277046

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.277046
Pb	0.000000
NH_3	0.000000
CO_2e	4388.6

15.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 599000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.1278

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

15.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

15.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

16. Heating

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 2 - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.200494
SO_x	0.021872
NO_x	3.645343
CO	3.062088
PM 10	0.277046

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.277046
Pb	0.000000
NH_3	0.000000
CO_2e	4388.6

16.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 599000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.1278

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

16.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

16.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year
HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

17. Emergency Generator

17.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 1 - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010463
SO_x	0.008813
NO_x	0.043125
CO	0.028800
PM 10	0.009413

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.009413
Pb	0.000000
NH_3	0.000000
CO_2e	5.0

17.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 250
Average Operating Hours Per Year (hours): 30

17.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

17.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

18. Emergency Generator

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District

Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 2 - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010463
SO_x	0.008813
NO_x	0.043125
CO	0.028800
PM 10	0.009413

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.009413
Pb	0.000000
NH_3	0.000000
CO_2e	5.0

18.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 250
Average Operating Hours Per Year (hours): 30

18.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

18.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

19. Construction / Demolition

19.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Office Building

- Activity Description:
New Office Building = 400,000 GSF, 47,500 sf footprint, and 10 stories high.

Demolish existing Building 166 = 14,600 sf footprint and 54' high.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.856236
SO_x	0.017005
NO_x	5.483437
CO	7.420000
PM 10	1.565252

Pollutant	Total Emissions (TONs)
PM 2.5	0.204548
Pb	0.000000
NH_3	0.006849
CO_2e	1658.9

19.1 Demolition Phase

19.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 5
Number of Days: 0

19.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 14600
Height of Building to be demolished (ft): 54

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

19.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

19.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

19.2 Site Grading Phase

19.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

19.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 50000
Amount of Material to be Hauled On-Site (yd^3): 400
Amount of Material to be Hauled Off-Site (yd^3): 4000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

19.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

19.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

19.3 Trenching/Excavating Phase

19.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

19.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 1000

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

19.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

19.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

19.4 Building Construction Phase

19.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 36
Number of Days: 0

19.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 40000
Height of Building (ft): 100
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

19.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

19.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

19.5 Architectural Coatings Phase

19.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 24
Number of Days: 0

19.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 80000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

19.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

19.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

19.6 Paving Phase

19.6.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 1
Number of Days: 0

19.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 8000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

19.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

19.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

20. Heating

20.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Office Building - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.104657
SO_x	0.011417
NO_x	1.902857
CO	1.598400
PM 10	0.144617

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.144617
Pb	0.000000
NH_3	0.000000
CO_2e	2290.8

20.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 400000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0999

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

20.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

20.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

21. Emergency Generator

21.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Office Building - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010463
SO_x	0.008813
NO_x	0.043125
CO	0.028800
PM 10	0.009413

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.009413
Pb	0.000000
NH_3	0.000000
CO_2e	5.0

21.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 250
Average Operating Hours Per Year (hours): 30

21.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

21.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

22. Construction / Demolition

22.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail

- Activity Description:
Renovation of existing Buildings 68/70 for Retail = 30,500 GSF, 15,200 sf footprint, and 20' high. These buildings will be renovated, so for demolition and construction, assume = 8,000 sf to simulate only interior demolition/construction.

Demolish existing Building 154 = 4,000 sf footprint and 27' high.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.339964
SO_x	0.005238
NO_x	1.418525
CO	2.226962
PM 10	0.163684

Pollutant	Total Emissions (TONs)
PM 2.5	0.050386
Pb	0.000000
NH_3	0.001492
CO_2e	507.9

22.1 Demolition Phase

22.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

22.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 8000
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

22.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

22.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)

BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

22.2 Site Grading Phase

22.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

22.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 6000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 600

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

22.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

22.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

22.3 Trenching/Excavating Phase

22.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

22.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 2000
Amount of Material to be Hauled On-Site (yd^3): 40
Amount of Material to be Hauled Off-Site (yd^3): 100

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

22.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

22.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

22.4 Building Construction Phase

22.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 18
Number of Days: 0

22.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 8000
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

22.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

22.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (0.32 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

22.5 Architectural Coatings Phase

22.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

22.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 6000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

22.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

22.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

22.6 Paving Phase

22.6.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

22.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 9000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

22.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

22.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

23. Heating

23.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005176
SO_x	0.000565
NO_x	0.094114
CO	0.079056
PM 10	0.007153

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.007153
Pb	0.000000
NH_3	0.000000
CO_2e	113.3

23.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 30500
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value ($MMBtu/ft^3$): 0.00105
Energy Intensity ($MMBtu/ft^2$): 0.0648

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

23.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

23.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

24. Emergency Generator

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - Renovate Buildings 68/70 for Retail - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

24.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

24.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

24.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

25. Construction / Demolition

25.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: WNY In-Kind Development - Existing Building 386 - Demolish and Re-build

- Activity Description:
Existing Building 386 = 50,600 sf footprint and 77' high. Demolish entirely, then re-build 2 stories higher, so new height = 77' + 20' = 97'.

- Activity Start Date
Start Month: 3
Start Month: 2027

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2028

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	11.961895
SO_x	0.007555
NO_x	2.299373
CO	2.927205
PM 10	1.501936

Pollutant	Total Emissions (TONs)
PM 2.5	0.084902
Pb	0.000000
NH_3	0.005245
CO_2e	761.3

25.1 Demolition Phase

25.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 4
Number of Days: 0

25.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 50600
Height of Building to be demolished (ft): 77

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

25.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

25.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

25.2 Trenching/Excavating Phase

25.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1

Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

25.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 60000
Amount of Material to be Hauled On-Site (yd^3): 2500
Amount of Material to be Hauled Off-Site (yd^3): 4500

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

25.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

25.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

25.3 Building Construction Phase

25.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 12
Number of Days: 0

25.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 50600
Height of Building (ft): 97
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

25.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

25.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

25.4 Architectural Coatings Phase

25.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 3
Number of Days: 0

25.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 1000000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

25.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

25.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)

BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

25.5 Paving Phase

25.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 1
Number of Days: 0

25.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 20000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

25.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

25.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

26. Emergency Generator

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: WNY In-Kind Development - New Parking Building 386 - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

26.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

26.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

26.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

27. Construction / Demolition

27.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: WNY In-Kind Development - Existing Building 405 - Add 2 new floors for Parking

- Activity Description:
Existing Building 405 - Add 2 new floors for Parking = 76,000 sf footprint and 20' high. This would be new construction but also some demolition of the roof, so for demolition, assume = 38,000 sf and 10' high to simulate demolition.

- Activity Start Date
Start Month: 5
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.534406
SO_x	0.005389
NO_x	1.784748
CO	2.405787
PM 10	0.148214

Pollutant	Total Emissions (TONs)
PM 2.5	0.067901
Pb	0.000000
NH_3	0.002402
CO_2e	527.1

27.1 Demolition Phase

27.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

27.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 38000
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

27.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

27.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

27.2 Building Construction Phase

27.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 12
Number of Days: 0

27.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 76000
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

27.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

27.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

27.3 Architectural Coatings Phase

27.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

27.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 20000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

27.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

27.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)

2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

27.4 Paving Phase

27.4.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

27.4.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 120000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

27.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

27.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

28. Construction / Demolition

28.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Demolish old WNY fence and relocate between WNY and private development on WNY Southeast Corner

- Activity Description:
The WNY fence would be relocated between the WNY and private development on the WNY Southeast Corner. = 1,600' long.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.020299
SO_x	0.000381
NO_x	0.113408
CO	0.178890
PM 10	0.007237

Pollutant	Total Emissions (TONs)
PM 2.5	0.004077
Pb	0.000000
NH_3	0.000122
CO_2e	37.2

28.1 Demolition Phase

28.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

28.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 1500
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

28.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

28.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

28.2 Building Construction Phase

28.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

28.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 1200
Height of Building (ft): 10
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

28.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

28.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

b. Action Title: Washington Naval Yard EIS - Alternative A - Only Navy Museum in SEFC E Parcels

c. Project Number/s (if applicable):

d. Projected Action Start Date: 3 / 2024

e. Action Description:

This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by December 2027 for all proposed components. Operations emissions would begin in year 2028.

Navy Museum in SEFC E Parcels

New Navy Museum Building = 75,000 sf footprint and 4 stories high = 300,000 GSF.
Existing Building 74 for Retail/Restaurant = 20,000 sf footprint and 2 stories high. This building will be renovated, so for demolition and construction, assume = 10,000 sf to simulate only interior demolition/construction.
Existing Building 118 for Special Events = 8,000 sf footprint and 36' high. This building will be renovated, so for demolition and construction, assume = 4,000 sf to simulate only interior demolition/construction.
Existing Building 202 for Parking/Admin = 60,800 sf footprint and 6 stories high. This building will be renovated - the lower 4 floors for parking and upper 2 floors for Admin, so for demolition, assume = 30,000 sf to simulate only interior demolition. For construction assume 40,000 sf to simulate interior but fairly substantial construction.

f. Point of Contact:

Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.688	50	No
NOx	3.938	100	No
CO	5.439	100	No
SOx	0.013		
PM 10	3.293		
PM 2.5	0.147		
Pb	0.000		
NH3	0.004		
CO2e	1251.6		

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	1.426	50	No
NOx	3.903	100	No
CO	5.621	100	No
SOx	0.013		
PM 10	0.172		
PM 2.5	0.141		
Pb	0.000		
NH3	0.004		
CO2e	1212.1		

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	1.356	50	No
NOx	3.342	100	No
CO	4.754	100	No
SOx	0.010		
PM 10	0.129		
PM 2.5	0.129		
Pb	0.000		
NH3	0.004		
CO2e	993.1		

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.000	50	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000		
PM 10	0.000		
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		
CO2e	0.0		

2028

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.136	50	No
NOx	2.233	100	No
CO	1.864	100	No
SOx	0.027		
PM 10	0.180		
PM 2.5	0.180		
Pb	0.000		
NH3	0.000		
CO2e	2612.8		

2029 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.136	50	No
NOx	2.233	100	No
CO	1.864	100	No
SOx	0.027		
PM 10	0.180		
PM 2.5	0.180		
Pb	0.000		
NH3	0.000		
CO2e	2612.8		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Chris Crabtree, Air Quality Specialist/Meteorologist DATE

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

b. Action Title: Washington Naval Yard EIS - Alternative 1 - Only Private Development in WNY SE Corner

c. Project Number/s (if applicable):

d. Projected Action Start Date: 3 / 2024

e. Action Description:

This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by December 2027 for all proposed components. Operations emissions would begin in year 2028.

Private Development in WNY SE Corner

New Residential/Retail Building 1 = 599,000 GSF, 44,600 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Residential/Retail Building 2 = 599,000 GSF, 44,500 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Office Building = 400,000 GSF, 40,000 sf footprint, and 10 stories high.
Renovation of existing Building 405 for Parking = 380,000 GSF, 76,000 sf footprint, and 57' high. This building will be renovated, so for demolition and construction, assume = 38,000 sf to simulate only interior demolition/construction.
Renovation of existing Buildings 68/70 for Retail = 30,500 GSF, 15,200 sf footprint, and 20' high. These buildings will be renovated, so for demolition and construction, assume = 8,000 sf to simulate only interior demolition/construction.
Demolish existing Building 166 = 14,600 sf footprint and 54' high.
The WNY fence would be relocated between the WNY and private development on the WNY Southeast Corner - old/new fence lengths = 1,730'/1,600'.

f. Point of Contact:

Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.843	50	No
NOx	4.755	100	No
CO	6.584	100	No
SOx	0.016		
PM 10	7.711		
PM 2.5	0.179		
Pb	0.000		
NH3	0.004		
CO2e	1536.9		

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	4.360	50	No
NOx	5.092	100	No
CO	7.246	100	No
SOx	0.016		
PM 10	0.186		
PM 2.5	0.186		
Pb	0.000		
NH3	0.006		
CO2e	1558.2		

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	9.882	50	No
NOx	4.457	100	No
CO	6.207	100	No
SOx	0.014		
PM 10	0.164		
PM 2.5	0.164		
Pb	0.000		
NH3	0.005		
CO2e	1324.0		

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	6.298	50	No
NOx	3.363	100	No
CO	4.682	100	No
SOx	0.010		
PM 10	0.127		
PM 2.5	0.127		
Pb	0.000		
NH3	0.004		
CO2e	982.5		

2028

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.548	50	No
NOx	9.440	100	No
CO	7.904	100	No
SOx	0.087		
PM 10	0.739		
PM 2.5	0.739		
Pb	0.000		
NH3	0.000		
CO2e	11199.1		

2029 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.548	50	No
NOx	9.440	100	No
CO	7.904	100	No
SOx	0.087		
PM 10	0.739		
PM 2.5	0.739		
Pb	0.000		
NH3	0.000		
CO2e	11199.1		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Chris Crabtree, Air Quality Specialist/Meteorologist DATE

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

b. Action Title: Washington Naval Yard EIS - Alternative 1 - Only WNY In-Kind Development

c. Project Number/s (if applicable):

d. Projected Action Start Date: 5 / 2024

e. Action Description:

This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by June 2028 for all proposed components. Operations emissions would begin in year 2028.

WNY In-Kind Development

Existing Building 405 - Add 2 new floors for Parking = 76,000 sf footprint and 20' high. This would be new construction but also some demolition of the roof, so for demolition, assume = 38,000 sf and 10' high to simulate demolition.

Existing Building 386 = 50,600 sf footprint and 77' high. This building would be demolished and then re-constructed with 2 additional stories, so the new building height = 77' + 20' = 97'.

f. Point of Contact:

Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.150	50	No
NOx	0.906	100	No
CO	1.227	100	No
SOx	0.003		
PM 10	0.114		
PM 2.5	0.034		
Pb	0.000		
NH3	0.001		
CO2e	271.0		

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.384	50	No
NOx	0.879	100	No
CO	1.178	100	No
SOx	0.003		
PM 10	0.034		
PM 2.5	0.034		
Pb	0.000		
NH3	0.001		
CO2e	256.1		

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.000	50	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000		
PM 10	0.000		
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		
CO2e	0.0		

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.207	50	No
NOx	1.341	100	No
CO	1.682	100	No
SOx	0.005		
PM 10	1.465		
PM 2.5	0.049		
Pb	0.000		
NH3	0.003		
CO2e	456.6		

2028

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	11.751	50	No
NOx	0.927	100	No
CO	1.197	100	No
SOx	0.005		
PM 10	0.037		
PM 2.5	0.036		
Pb	0.000		
NH3	0.002		
CO2e	296.7		

2029 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.006	50	No
NOx	0.023	100	No
CO	0.016	100	No
SOx	0.005		
PM 10	0.005		
PM 2.5	0.005		
Pb	0.000		
NH3	0.000		
CO2e	2.7		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Chris Crabtree, Air Quality Specialist/Meteorologist DATE

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

b. Action Title: Washington Naval Yard EIS - Alternative 1B - Navy Administration Building in SEFC E Parcels, Private Development in WNY SE Corner, and WNY In-Kind Development

c. Project Number/s (if applicable):

d. Projected Action Start Date: 3 / 2024

e. Action Description:

This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by June 2028 for all proposed components. Operations emissions would begin in year 2028.

Navy Administration Building in SEFC E Parcels

New Navy Administration Building = 64,000 sf footprint and 36' high.
Existing Building 74 for Administrative Offices = 20,000 sf footprint and 2 stories high. This building will be renovated, so for demolition and construction, assume = 10,000 sf to simulate only interior demolition/construction.
Existing Building 202 for Administrative Offices = 60,800 sf footprint and 6 stories high. This building will be renovated - the lower 4 floors for parking and upper 2 floors for Admin, so for demolition, assume = 30,000 sf to simulate only interior demolition. For construction assume 40,000 sf to simulate interior but fairly substantial construction.
Demolish existing fence and relocate to incorporate the SEFC E Parcels - old/new fence lengths = 950'/1,200'.

Private Development in WNY SE Corner

New Residential/Retail Building 1 = 599,000 GSF, 44,600 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Residential/Retail Building 2 = 599,000 GSF, 44,500 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Office Building = 400,000 GSF, 40,000 sf footprint, and 10 stories high.
Renovation of existing Building 405 for Parking = 380,000 GSF, 76,000 sf footprint, and 57' high. This building will be renovated, so for demolition and construction, assume = 38,000 sf to simulate only interior demolition/construction.
Renovation of existing Buildings 68/70 for Retail = 30,500 GSF, 15,200 sf footprint, and 20' high. These buildings will be renovated, so for demolition and construction, assume = 8,000 sf to simulate only interior demolition/construction.
Demolish existing Building 166 = 14,600 sf footprint and 54' high.
The WNY fence would be relocated between the WNY and private development on the WNY Southeast Corner - old/new fence lengths = 1,730'/1,600'.

WNY In-Kind Development

Existing Building 405 - Add 2 new floors for Parking = 76,000 sf footprint and 20' high. This would be new construction but also some demolition of the roof, so for demolition, assume = 38,000 sf and 10' high to simulate demolition.

Existing Building 386 = 50,600 sf footprint and 77' high. This building would be demolished and then re-constructed with 2 additional stories, so the new building height = 77' + 20' = 97'

f. Point of Contact:

Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	1.659	50	No
NOx	9.489	100	No
CO	13.120	100	No
SOx	0.031		
PM 10	11.100		
PM 2.5	0.355		
Pb	0.000		
NH3	0.010		
CO2e	3019.7		

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	6.222	50	No
NOx	9.452	100	No
CO	13.277	100	No
SOx	0.030		
PM 10	0.349		
PM 2.5	0.347		
Pb	0.000		
NH3	0.011		
CO2e	2863.0		

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	10.716	50	No
NOx	6.298	100	No
CO	8.757	100	No
SOx	0.019		
PM 10	0.237		
PM 2.5	0.236		
Pb	0.000		
NH3	0.007		
CO2e	1852.9		

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	6.505	50	No
NOx	4.704	100	No
CO	6.363	100	No
SOx	0.015		
PM 10	1.593		
PM 2.5	0.176		
Pb	0.000		
NH3	0.007		
CO2e	1439.0		

2028

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	12.506	50	No
NOx	13.804	100	No
CO	11.996	100	No
SOx	0.127		
PM 10	1.046		
PM 2.5	1.046		
Pb	0.000		
NH3	0.002		
CO2e	15515.5		

2029 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.753	50	No
NOx	12.858	100	No
CO	10.758	100	No
SOx	0.126		
PM 10	1.012		
PM 2.5	1.012		
Pb	0.000		
NH3	0.000		
CO2e	15212.1		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Chris Crabtree, Air Quality Specialist/Meteorologist DATE

1. General Information

- Action Location
Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Action Title: Washington Naval Yard EIS - Alternative 1B - Navy Administration Building in SEFC E Parcels, Private Development in WNY SE Corner, and WNY In-Kind Development

- Project Number/s (if applicable):

- Projected Action Start Date: 3 / 2024

- Action Purpose and Need:
Construction and Operations

- Action Description:
This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by June 2028 for all proposed components. Operations emissions would begin in year 2028.

Navy Administration Building in SEFC E Parcels

New Navy Administration Building = 64,000 sf footprint and 36' high.
Existing Building 74 for Administrative Offices = 20,000 sf footprint and 2 stories high. This building will be renovated, so for demolition and construction, assume = 10,000 sf to simulate only interior demolition/construction.
Existing Building 202 for Administrative Offices = 60,800 sf footprint and 6 stories high. This building will be renovated - the lower 4 floors for parking and upper 2 floors for Admin, so for demolition, assume = 30,000 sf to simulate only interior demolition. For construction assume 40,000 sf to simulate interior but fairly substantial construction.
Demolish existing fence and relocate to incorporate the SEFC E Parcels - old/new fence lengths = 950'/1,200'.

Private Development in WNY SE Corner

New Residential/Retail Building 1 = 599,000 GSF, 44,600 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Residential/Retail Building 2 = 599,000 GSF, 44,500 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Office Building = 400,000 GSF, 40,000 sf footprint, and 10 stories high.
Renovation of existing Building 405 for Parking = 380,000 GSF, 76,000 sf footprint, and 57' high. This building will be renovated, so for demolition and construction, assume = 38,000 sf to simulate only interior demolition/construction.
Renovation of existing Buildings 68/70 for Retail = 30,500 GSF, 15,200 sf footprint, and 20' high. These buildings will be renovated, so for demolition and construction, assume = 8,000 sf to simulate only interior demolition/construction.
Demolish existing Building 166 = 14,600 sf footprint and 54' high.
The WNY fence would be relocated between the WNY and private development on the WNY Southeast Corner - old/new fence lengths = 1,730'/1,600'.

WNY In-Kind Development

Existing Building 405 - Add 2 new floors for Parking = 76,000 sf footprint and 20' high. This would be new construction but also some demolition of the roof, so for demolition, assume = 38,000 sf and 10' high to simulate demolition.

Existing Building 386 = 50,600 sf footprint and 77' high. This building would be demolished and then re-constructed with 2 additional stories, so the new building height = 77' + 20' = 97'

- Point of Contact

Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	New Navy Administration Building Construction
3.	Heating	Navy Administration Building Operations - Heating
4.	Emergency Generator	Navy Administration Building Operations - Emergency Generator
5.	Construction / Demolition	Administrative Offices Construction - Existing Building 74
6.	Heating	Administrative Offices Building 74 Operations - Heating
7.	Emergency Generator	Administrative Offices Building 74 Operations - Emergency Generator
8.	Construction / Demolition	Administrative Offices Construction - Existing Building 202
9.	Heating	Administrative Offices Building 202 - Heating
10.	Emergency Generator	Administrative Offices Building 202 - Emergency Generator
11.	Construction / Demolition	Private Development in WNY SE Corner - New Residential/Retail Building 1
12.	Construction / Demolition	Private Development in WNY SE Corner - New Residential/Retail Building 2
13.	Heating	Private Development in WNY SE Corner - New Residential/Retail Building 1 - Heating
14.	Heating	Private Development in WNY SE Corner - New Residential/Retail Building 2 - Heating
15.	Emergency Generator	Private Development in WNY SE Corner - New Residential/Retail Building 1 - Emergency Generator
16.	Emergency Generator	Private Development in WNY SE Corner - New Residential/Retail Building 2 - Emergency Generator
17.	Construction / Demolition	Private Development in WNY SE Corner - New Office Building
18.	Heating	Private Development in WNY SE Corner - New Office Building - Heating
19.	Emergency Generator	Private Development in WNY SE Corner - New Office Building - Emergency Generator
20.	Construction / Demolition	Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail
21.	Heating	Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail - Heating
22.	Emergency Generator	Private Development in WNY SE Corner - Renovate Buildings 68/70 for Retail - Emergency Generator
23.	Construction / Demolition	WNY In-Kind Development - Existing Building 386 - Demolish and Re-build
24.	Emergency Generator	WNY In-Kind Development - New Parking Building 386 - Emergency Generator
25.	Construction / Demolition	WNY In-Kind Development - Existing Building 405 - Add 2 new floors for Parking
26.	Construction / Demolition	Demolish existing fence and relocate to incorporate the SEFC E Parcels

27.	Construction / Demolition	Relocate WNY fence between WNY and private development on the WNY Southeast Corner

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: New Navy Administration Building Construction

- Activity Description:
New Navy Administration Building = 64,000 sf footprint and 3 stories or 36' high.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.215900
SO_x	0.011544
NO_x	3.703660
CO	5.010021
PM 10	2.725846

Pollutant	Total Emissions (TONs)
PM 2.5	0.138641
Pb	0.000000
NH_3	0.004182
CO_2e	1122.1

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 120000
Amount of Material to be Hauled On-Site (yd^3): 500
Amount of Material to be Hauled Off-Site (yd^3): 1000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 500

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 24
Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 64000
Height of Building (ft): 36
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 15
Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 50000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2026

- Phase Duration

Number of Month: 1
Number of Days: 0

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 20000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

3. Heating

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Navy Administration Building Operations - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.054258
SO_x	0.005919
NO_x	0.986514
CO	0.828672
PM 10	0.074975

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.074975
Pb	0.000000
NH_3	0.000000
CO_2e	1187.7

3.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 192000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.1079

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

3.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

3.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

4. Emergency Generator

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Navy Administration Building Operations - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

4.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

4.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

4.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Administrative Offices Construction - Existing Building 74

- Activity Description:
Existing Building 74 for Administrative Offices = 20,000 sf footprint and 2 stories high. This building will be renovated, so for demolition and construction, assume = 10,000 sf to simulate only interior demolition/construction.

- Activity Start Date
Start Month: 5
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.360679
SO_x	0.004626
NO_x	1.385941
CO	2.023736
PM 10	0.127020

Pollutant	Total Emissions (TONs)
PM 2.5	0.050094
Pb	0.000000
NH_3	0.001339
CO_2e	450.5

5.1 Demolition Phase

5.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

5.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 10000
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.2 Site Grading Phase

5.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 8

Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

5.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 2500
Amount of Material to be Hauled On-Site (yd^3): 40
Amount of Material to be Hauled Off-Site (yd^3): 100

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.3 Trenching/Excavating Phase

5.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

5.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 1000
Amount of Material to be Hauled On-Site (yd^3): 40
Amount of Material to be Hauled Off-Site (yd^3): 100

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.4 Building Construction Phase

5.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 12
Number of Days: 0

5.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 10000
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

5.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.05 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

5.5 Architectural Coatings Phase

5.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

5.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft^2): 10000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

5.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

6. Heating

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Administrative Offices Building 74 Operations - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.002996
SO_x	0.000327
NO_x	0.054476
CO	0.045760
PM 10	0.004140

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.004140
Pb	0.000000
NH_3	0.000000
CO_2e	65.6

6.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 20000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0572

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

6.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

6.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

7. Emergency Generator

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Administrative Offices Building 74 Operations - Emergency Generator

- Activity Description:
Diesel-powered - 1 total

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

7.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

7.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

7.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Administrative Offices Construction - Existing Building 202

- Activity Description:
Existing Building 202 for Administrative Offices = 60,800 sf footprint and 6 stories high.

This building will be renovated, so for demolition/construction, assume = 30,000 sf to simulate only interior demolition/construction.

- Activity Start Date
Start Month: 3
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.381031
SO_x	0.012146
NO_x	3.948197
CO	5.500451
PM 10	0.617554

Pollutant	Total Emissions (TONs)
PM 2.5	0.149372
Pb	0.000000
NH_3	0.004388
CO_2e	1179.7

8.1 Demolition Phase

8.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 6
Number of Days: 0

8.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 30000
Height of Building to be demolished (ft): 60

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.2 Site Grading Phase

8.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

8.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 5000
Amount of Material to be Hauled On-Site (yd^3): 50
Amount of Material to be Hauled Off-Site (yd^3): 500

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.3 Trenching/Excavating Phase

8.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

8.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 2000
Amount of Material to be Hauled On-Site (yd^3): 40
Amount of Material to be Hauled Off-Site (yd^3): 200

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.4 Building Construction Phase

8.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 24
Number of Days: 0

8.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 30000
Height of Building (ft): 60
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

8.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.05 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.5 Architectural Coatings Phase

8.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 15
Number of Days: 0

8.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 60000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

8.6 Paving Phase

8.6.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 5
Start Quarter: 1
Start Year: 2026

- Phase Duration

Number of Month: 2
Number of Days: 0

8.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 200000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

9. Heating

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Administrative Offices Building 202 - Heating

- Activity Description:
Natural gas-fired.

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.125589
SO_x	0.013701
NO_x	2.283429
CO	1.918080
PM 10	0.173541

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.173541
Pb	0.000000
NH_3	0.000000
CO_2e	2749.0

9.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 480000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0999

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

9.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

9.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

10. Emergency Generator

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Administrative Offices Building 202 - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

10.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

10.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

10.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 1

- Activity Description:
New Residential/Retail Building 1 = 599,000 GSF, 44,600 sf footprint, and 13 stories high. First floor is retail.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	9.575463
SO_x	0.016384
NO_x	5.269683
CO	7.352166
PM 10	3.479998

Pollutant	Total Emissions (TONs)
PM 2.5	0.196772
Pb	0.000000
NH_3	0.004978
CO_2e	1580.3

11.1 Site Grading Phase

11.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

11.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 100000
Amount of Material to be Hauled On-Site (yd^3): 500
Amount of Material to be Hauled Off-Site (yd^3): 5000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.2 Trenching/Excavating Phase

11.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

11.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 1000

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.3 Building Construction Phase

11.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 36
Number of Days: 0

11.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Multi-Family
Area of Building (ft^2): 44600
Height of Building (ft): N/A
Number of Units: 650

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

11.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = NU * 0.36 * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
NU: Number of Units
0.36: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = NU * 0.11 * HT

VMT_{VT}: Vender Tips Vehicle Miles Travel (miles)
NU: Number of Units
0.11: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.4 Architectural Coatings Phase

11.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 24
Number of Days: 0

11.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Multi-Family
Total Square Footage (ft^2): N/A
Number of Units: 650

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (NU * 850 * 2.7 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
NU: Number of Units
850: Conversion Factor units to square feet (850 ft^2 / unit)
2.7: Conversion Factor total area to coated area (2.7 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

11.5 Paving Phase

11.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration

Number of Month: 2
Number of Days: 0

11.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 40000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

12. Construction / Demolition

12.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 2

- Activity Description:
New Residential/Retail Building 2 = 599,000 GSF, 44,500 sf footprint, and 13 stories high. First floor is retail.

Demolish existing Building 211 = 11,200 sf footprint and 12' high.
Demolish existing Building 218 = 9,000 sf footprint and 31' high.
Assume total demolished dimensions = 20,670 sf footprint and 20' high.

- Activity Start Date
Start Month: 3
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	9.591136
SO_x	0.016755
NO_x	5.381382
CO	7.540136
PM 10	2.972407

Pollutant	Total Emissions (TONs)
PM 2.5	0.199243
Pb	0.000000
NH_3	0.005073
CO_2e	1617.3

12.1 Demolition Phase

12.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 4
Number of Days: 0

12.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 20670
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

12.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)

BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

12.2 Site Grading Phase

12.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

12.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 80000
Amount of Material to be Hauled On-Site (yd^3): 200
Amount of Material to be Hauled Off-Site (yd^3): 2000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

12.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

12.3 Trenching/Excavating Phase

12.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

12.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 600

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

12.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

12.4 Building Construction Phase

12.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 10
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 36
Number of Days: 0

12.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Multi-Family
Area of Building (ft^2): 44500
Height of Building (ft): N/A
Number of Units: 650

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

12.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

12.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = NU * 0.36 * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
NU: Number of Units
0.36: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = NU * 0.11 * HT$

VMT_{VT}: Vender Tips Vehicle Miles Travel (miles)
NU: Number of Units
0.11: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

12.5 Architectural Coatings Phase

12.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 24
Number of Days: 0

12.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Multi-Family
Total Square Footage (ft^2): N/A

Number of Units: 650

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

12.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (NU * 850 * 2.7 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
NU: Number of Units
850: Conversion Factor units to square feet (850 ft^2 / unit)
2.7: Conversion Factor total area to coated area (2.7 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

12.6 Paving Phase

12.6.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

12.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 15000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

12.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

12.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

13. Heating

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 1 - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.200494
SO_x	0.021872
NO_x	3.645343
CO	3.062088
PM 10	0.277046

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.277046
Pb	0.000000
NH_3	0.000000
CO_2e	4388.6

13.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 599000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.1278

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

13.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

13.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

14. Heating

14.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 2 - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.200494
SO_x	0.021872
NO_x	3.645343
CO	3.062088
PM 10	0.277046

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.277046
Pb	0.000000
NH_3	0.000000
CO_2e	4388.6

14.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft^2): 599000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.1278

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

14.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

14.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

15. Emergency Generator

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 1 - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010463
SO_x	0.008813
NO_x	0.043125
CO	0.028800
PM 10	0.009413

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.009413
Pb	0.000000
NH_3	0.000000
CO_2e	5.0

15.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 250
Average Operating Hours Per Year (hours): 30

15.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

15.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

16. Emergency Generator

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 2 - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010463
SO_x	0.008813
NO_x	0.043125
CO	0.028800
PM 10	0.009413

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.009413
Pb	0.000000
NH_3	0.000000
CO_2e	5.0

16.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 250
Average Operating Hours Per Year (hours): 30

16.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

16.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

17. Construction / Demolition

17.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Office Building

- Activity Description:
New Office Building = 400,000 GSF, 40,000 sf footprint, and 10 stories high.

Demolish existing Building 166 = 14,600 sf footprint and 54' high.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.856236
SO_x	0.017005
NO_x	5.483437
CO	7.420000
PM 10	1.565252

Pollutant	Total Emissions (TONs)
PM 2.5	0.204548
Pb	0.000000
NH_3	0.006849
CO_2e	1658.9

17.1 Demolition Phase

17.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 5
Number of Days: 0

17.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 14600
Height of Building to be demolished (ft): 54

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

17.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

17.2 Site Grading Phase

17.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

17.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 50000
Amount of Material to be Hauled On-Site (yd^3): 400
Amount of Material to be Hauled Off-Site (yd^3): 4000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

17.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

17.3 Trenching/Excavating Phase

17.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

17.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 1000

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

17.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

17.4 Building Construction Phase

17.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 36
Number of Days: 0

17.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 40000
Height of Building (ft): 100
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

17.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

17.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

17.5 Architectural Coatings Phase

17.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 24
Number of Days: 0

17.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 80000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

17.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

17.6 Paving Phase

17.6.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 1
Number of Days: 0

17.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 8000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

17.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

18. Heating

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Office Building - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.104657
SO_x	0.011417
NO_x	1.902857
CO	1.598400
PM 10	0.144617

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.144617
Pb	0.000000
NH_3	0.000000
CO_2e	2290.8

18.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 400000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0999

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

18.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

18.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

19. Emergency Generator

19.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Office Building - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010463
SO_x	0.008813
NO_x	0.043125
CO	0.028800
PM 10	0.009413

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.009413
Pb	0.000000
NH_3	0.000000
CO_2e	5.0

19.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 250
Average Operating Hours Per Year (hours): 30

19.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

19.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

20. Construction / Demolition

20.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail

- Activity Description:
Renovation of existing Buildings 68/70 for Retail = 30,500 GSF, 15,200 sf footprint, and 20' high. These buildings will be renovated, so for demolition and construction, assume = 8,000 sf to simulate only interior demolition/construction.

Demolish existing Building 154 = 4,000 sf footprint and 27' high.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.339964
SO_x	0.005238
NO_x	1.418525
CO	2.226962
PM 10	0.163684

Pollutant	Total Emissions (TONs)
PM 2.5	0.050386
Pb	0.000000
NH_3	0.001492
CO_2e	507.9

20.1 Demolition Phase

20.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

20.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 8000
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

20.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)

BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

20.2 Site Grading Phase

20.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

20.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 6000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 600

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

20.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

20.3 Trenching/Excavating Phase

20.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

20.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 2000
Amount of Material to be Hauled On-Site (yd^3): 40
Amount of Material to be Hauled Off-Site (yd^3): 100

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

20.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

20.4 Building Construction Phase

20.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 18
Number of Days: 0

20.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 8000
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

20.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

20.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (0.32 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

20.5 Architectural Coatings Phase

20.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

20.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 6000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

20.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

20.6 Paving Phase

20.6.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9

Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

20.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 9000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

20.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

20.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

21. Heating

21.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005176
SO_x	0.000565
NO_x	0.094114
CO	0.079056
PM 10	0.007153

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.007153
Pb	0.000000
NH_3	0.000000
CO_2e	113.3

21.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 30500
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value ($MMBtu/ft^3$): 0.00105
Energy Intensity ($MMBtu/ft^2$): 0.0648

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

21.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

21.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

22. Emergency Generator

22.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - Renovate Buildings 68/70 for Retail - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

22.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

22.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

22.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

23. Construction / Demolition

23.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: WNY In-Kind Development - Existing Building 386 - Demolish and Re-build

- Activity Description:
Existing Building 386 = 50,600 sf footprint and 77' high. Demolish entirely, then re-build 2 stories higher, so new height = 77' + 20' = 97'.

- Activity Start Date
Start Month: 5
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2028

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	11.961895
SO_x	0.007555
NO_x	2.299373
CO	2.927205
PM 10	1.501936

Pollutant	Total Emissions (TONs)
PM 2.5	0.084902
Pb	0.000000
NH_3	0.005245
CO_2e	761.3

23.1 Demolition Phase

23.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 4
Number of Days: 0

23.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 50600
Height of Building to be demolished (ft): 77

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

23.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

23.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

23.2 Trenching/Excavating Phase

23.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1

Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

23.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 60000
Amount of Material to be Hauled On-Site (yd^3): 2500
Amount of Material to be Hauled Off-Site (yd^3): 4500

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

23.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

23.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

23.3 Building Construction Phase

23.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 12
Number of Days: 0

23.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 50600
Height of Building (ft): 97
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

23.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

23.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

23.4 Architectural Coatings Phase

23.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 3
Number of Days: 0

23.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 1000000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

23.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

23.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)

2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

23.5 Paving Phase

23.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 1
Number of Days: 0

23.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 20000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

23.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

23.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

24. Emergency Generator

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: WNY In-Kind Development - New Parking Building 386 - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 7
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

24.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

24.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

24.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

25. Construction / Demolition

25.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: WNY In-Kind Development - Existing Building 405 - Add 2 new floors for Parking

- Activity Description:
Existing Building 405 - Add 2 new floors for Parking = 76,000 sf footprint and 20' high. This would be new construction but also some demolition of the roof, so for demolition, assume = 38,000 sf and 10' high to simulate demolition.

- Activity Start Date
Start Month: 5
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.534406
SO_x	0.005389
NO_x	1.784748
CO	2.405787
PM 10	0.148214

Pollutant	Total Emissions (TONs)
PM 2.5	0.067901
Pb	0.000000
NH_3	0.002402
CO_2e	527.1

25.1 Demolition Phase

25.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

25.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 38000
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

25.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

25.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

25.2 Building Construction Phase

25.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 12
Number of Days: 0

25.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 76000
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

25.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

25.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

25.3 Architectural Coatings Phase

25.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

25.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 20000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

25.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

25.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)

2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

25.4 Paving Phase

25.4.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

25.4.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 120000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

25.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

25.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

26. Construction / Demolition

26.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Demolish existing fence and relocate to incorporate the SEFC E Parcels

- Activity Description:
Old/new fence lengths = 950'/1,200'.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.020259
SO_x	0.000379
NO_x	0.112931
CO	0.178716
PM 10	0.005745

Pollutant	Total Emissions (TONs)
PM 2.5	0.004057
Pb	0.000000
NH_3	0.000119
CO_2e	37.0

26.1 Demolition Phase

26.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

26.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 800
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

26.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

26.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

26.2 Building Construction Phase

26.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

26.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 900
Height of Building (ft): 10
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

26.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

26.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

27. Construction / Demolition

27.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Relocate WNY fence between WNY and private development on the WNY Southeast Corner

- Activity Description:
Old/new fence lengths = 1,730'/1,600'.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.020299
SO_x	0.000381
NO_x	0.113408
CO	0.178890
PM 10	0.007237

Pollutant	Total Emissions (TONs)
PM 2.5	0.004077
Pb	0.000000
NH_3	0.000122
CO_2e	37.2

27.1 Demolition Phase

27.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

27.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 1500
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

27.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

27.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

27.2 Building Construction Phase

27.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

27.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 1200
Height of Building (ft): 10
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

27.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

27.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

b. Action Title: Washington Naval Yard EIS - Alternative B - Only Navy Administration Building in SEFC E Parcels

c. Project Number/s (if applicable):

d. Projected Action Start Date: 3 / 2024

e. Action Description:

This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by December 2027 for all proposed components. Operations emissions would begin in year 2028.

Navy Administration Building in SEFC E Parcels

New Navy Administration Building = 64,000 sf footprint and 36' high.
Existing Building 74 for Administrative Offices = 20,000 sf footprint and 2 stories high. This building will be renovated, so for demolition and construction, assume = 10,000 sf to simulate only interior demolition/construction.
Existing Building 202 for Administrative Offices = 60,800 sf footprint and 6 stories high. This building will be renovated - the lower 4 floors for parking and upper 2 floors for Admin, so for demolition, assume = 30,000 sf to simulate only interior demolition. For construction assume 40,000 sf to simulate interior but fairly substantial construction.
Demolish existing fence and relocate to incorporate the SEFC E Parcels - old/new fence lengths = 950'/1,200'.

f. Point of Contact:

Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.665	50	No
NOx	3.828	100	No
CO	5.309	100	No
SOx	0.012		
PM 10	3.276		
PM 2.5	0.142		
Pb	0.000		
NH3	0.004		
CO2e	1211.8		

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	1.478	50	No
NOx	3.482	100	No
CO	4.853	100	No
SOx	0.011		
PM 10	0.128		
PM 2.5	0.127		
Pb	0.000		
NH3	0.004		
CO2e	1048.6		

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.834	50	No
NOx	1.841	100	No
CO	2.551	100	No
SOx	0.005		
PM 10	0.073		
PM 2.5	0.072		
Pb	0.000		
NH3	0.002		
CO2e	528.9		

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.000	50	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000		
PM 10	0.000		
PM 2.5	0.000		
Pb	0.000		
NH3	0.000		
CO2e	0.0		

2028

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.200	50	No
NOx	3.394	100	No
CO	2.839	100	No
SOx	0.034		
PM 10	0.268		
PM 2.5	0.268		
Pb	0.000		
NH3	0.000		
CO2e	4010.3		

2029 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.200	50	No
NOx	3.394	100	No
CO	2.839	100	No
SOx	0.034		
PM 10	0.268		
PM 2.5	0.268		
Pb	0.000		
NH3	0.000		
CO2e	4010.3		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Chris Crabtree, Air Quality Specialist/Meteorologist DATE

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

b. Action Title: Washington Naval Yard EIS - Alternative 1C - No Development n SEFC E Parcels, Private Development in WNY SE Corner, and WNY In-Kind Development

c. Project Number/s (if applicable):

d. Projected Action Start Date: 3 / 2024

e. Action Description:

This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by June 2028 for all proposed components. Operations emissions would begin in year 2028.

Demolish existing fence and relocate to incorporate the SEFC E Parcels - old/new fence lengths = 950'/1,200'.

Private Development in WNY SE Corner

New Residential/Retail Building 1 = 599,000 GSF, 44,600 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Residential/Retail Building 2 = 599,000 GSF, 44,500 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
New Office Building = 400,000 GSF, 40,000 sf footprint, and 10 stories high.
Renovation of existing Building 405 for Parking = 380,000 GSF, 76,000 sf footprint, and 57' high. This building will be renovated, so for demolition and construction, assume = 38,000 sf to simulate only interior demolition/construction.
Renovation of existing Buildings 68/70 for Retail = 30,500 GSF, 15,200 sf footprint, and 20' high. These buildings will be renovated, so for demolition and construction, assume = 8,000 sf to simulate only interior demolition/construction.
Demolish existing Building 166 = 14,600 sf footprint and 54' high.
The WNY fence would be relocated between the WNY and private development on the WNY Southeast Corner - old/new fence lengths = 1,730'/1,600'.

WNY In-Kind Development

Existing Building 405 - Add 2 new floors for Parking = 76,000 sf footprint and 20' high. This would be new construction but also some demolition of the roof, so for demolition, assume = 38,000 sf and 10' high to simulate demolition.

Existing Building 386 = 50,600 sf footprint and 77' high. This building would be demolished and then re-constructed with 2 additional stories, so the new building height = 77' + 20' = 97'.

f. Point of Contact:

Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist
Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

Conformity Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	1.014	50	No
NOx	5.774	100	No
CO	7.990	100	No
SOx	0.019		
PM 10	7.830		
PM 2.5	0.217		
Pb	0.000		
NH3	0.006		
CO2e	1844.9		

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	4.744	50	No
NOx	5.971	100	No
CO	8.424	100	No
SOx	0.019		
PM 10	0.221		
PM 2.5	0.220		
Pb	0.000		
NH3	0.007		
CO2e	1814.4		

2026

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	9.882	50	No
NOx	4.457	100	No
CO	6.207	100	No
SOx	0.014		
PM 10	0.164		
PM 2.5	0.164		
Pb	0.000		
NH3	0.005		
CO2e	1324.0		

2027

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	6.505	50	No
NOx	4.704	100	No
CO	6.363	100	No
SOx	0.015		
PM 10	1.593		
PM 2.5	0.176		
Pb	0.000		
NH3	0.007		
CO2e	1439.0		

2028

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	12.306	50	No
NOx	10.410	100	No
CO	9.157	100	No
SOx	0.092		
PM 10	0.778		
PM 2.5	0.778		
Pb	0.000		
NH3	0.002		
CO2e	11505.2		

2029 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
Washington, DC-MD-VA			
VOC	0.554	50	No
NOx	9.464	100	No
CO	7.919	100	No
SOx	0.092		
PM 10	0.744		
PM 2.5	0.744		
Pb	0.000		
NH3	0.000		
CO2e	11201.8		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Chris Crabtree, Air Quality Specialist/Meteorologist DATE

1. General Information

- Action Location
Base: BOLLING AFB
State: District of Columbia
County(s): Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Action Title: Washington Naval Yard EIS - Alternative 1C - No Development n SEFC E Parcels, Private Development in WNY SE Corner, and WNY In-Kind Development

- Project Number/s (if applicable):

- Projected Action Start Date: 3 / 2024

- Action Purpose and Need:
Construction and Operations

- Action Description:
This ACAM run estimates construction emissions and operations emissions for heating and emergency generators. Emissions for personnel commuting activities estimated separately out of model. Construction activities would start in year 2024 and would complete by June 2028 for all proposed components. Operations emissions would begin in year 2028.

Demolish existing fence and relocate to incorporate the SEFC E Parcels - old/new fence lengths = 950'/1,200'.

Private Development in WNY SE Corner

New Residential/Retail Building 1 = 599,000 GSF, 44,600 sf footprint, and 13 stories high. Develops 650 residential units. First floor is retail.
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Demolish existing Building 166 = 14,600 sf footprint and 54' high.
The WNY fence would be relocated between the WNY and private development on the WNY Southeast Corner - old/new fence lengths = 1,730'/1,600'.

WNY In-Kind Development

Existing Building 405 - Add 2 new floors for Parking = 76,000 sf footprint and 20' high. This would be new construction but also some demolition of the roof, so for demolition, assume = 38,000 sf and 10' high to simulate demolition.

Existing Building 386 = 50,600 sf footprint and 77' high. This building would be demolished and then re-constructed with 2 additional stories, so the new building height = 77' + 20' = 97'.

- Point of Contact
Name: Chris Crabtree
Title: Air Quality Specialist/Meteorologist

Organization: Leidos Corp.
Email: crabtreec@leidos.com
Phone Number: 805-566-6422

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Private Development in WNY SE Corner - New Residential/Retail Building 1
3.	Construction / Demolition	Private Development in WNY SE Corner - New Residential/Retail Building 2
4.	Heating	Private Development in WNY SE Corner - New Residential/Retail Building 1 - Heating
5.	Heating	Private Development in WNY SE Corner - New Residential/Retail Building 2 - Heating
6.	Emergency Generator	Private Development in WNY SE Corner - New Residential/Retail Building 1 - Emergency Generator
7.	Emergency Generator	Private Development in WNY SE Corner - New Residential/Retail Building 2 - Emergency Generator
8.	Construction / Demolition	Private Development in WNY SE Corner - New Office Building
9.	Heating	Private Development in WNY SE Corner - New Office Building - Heating
10.	Emergency Generator	Private Development in WNY SE Corner - New Office Building - Emergency Generator
11.	Construction / Demolition	Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail
12.	Heating	Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail - Heating
13.	Emergency Generator	Private Development in WNY SE Corner - Renovate Buildings 68/70 for Retail - Emergency Generator
14.	Construction / Demolition	WNY In-Kind Development - Existing Building 386 - Demolish and Re-build
15.	Emergency Generator	WNY In-Kind Development - New Parking Building 386 - Emergency Generator
16.	Construction / Demolition	WNY In-Kind Development - Existing Building 405 - Add 2 new floors for Parking
17.	Construction / Demolition	Demolish existing fence and relocate to incorporate the SEFC E Parcels
18.	Construction / Demolition	Relocate WNY fence between WNY and private development on the WNY Southeast Corner

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 1

- Activity Description:
New Residential/Retail Building 1 = 599,000 GSF, 44,600 sf footprint, and 13 stories high. First floor is retail.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	9.575463
SO_x	0.016384
NO_x	5.269683
CO	7.352166
PM 10	3.479998

Pollutant	Total Emissions (TONs)
PM 2.5	0.196772
Pb	0.000000
NH_3	0.004978
CO_2e	1580.3

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 100000
Amount of Material to be Hauled On-Site (yd^3): 500
Amount of Material to be Hauled Off-Site (yd^3): 5000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 1000

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 36
Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Multi-Family
Area of Building (ft^2): 44600
Height of Building (ft): N/A
Number of Units: 650

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = NU * 0.36 * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
NU: Number of Units
0.36: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = NU * 0.11 * HT

VMT_{VT}: Vender Tips Vehicle Miles Travel (miles)
NU: Number of Units
0.11: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 24
Number of Days: 0

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Multi-Family
Total Square Footage (ft^2): N/A
Number of Units: 650

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

VOC_{AC} = (NU * 850 * 2.7 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
NU: Number of Units
850: Conversion Factor units to square feet (850 ft^2 / unit)
2.7: Conversion Factor total area to coated area (2.7 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

2.5 Paving Phase

2.5.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 6
Start Quarter: 1
Start Year: 2027

- Phase Duration

Number of Month: 2
Number of Days: 0

2.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 40000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

2.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 2

- Activity Description:
New Residential/Retail Building 2 = 599,000 GSF, 44,500 sf footprint, and 13 stories high. First floor is retail.

Demolish existing Building 211 = 11,200 sf footprint and 12' high.
Demolish existing Building 218 = 9,000 sf footprint and 31' high.
Assume total demolished dimensions = 20,670 sf footprint and 20' high.

- Activity Start Date
Start Month: 3
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 11
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	9.591136
SO_x	0.016755
NO_x	5.381382
CO	7.540136
PM 10	2.972407

Pollutant	Total Emissions (TONs)
PM 2.5	0.199243
Pb	0.000000
NH_3	0.005073
CO_2e	1617.3

3.1 Demolition Phase

3.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 4
Number of Days: 0

3.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 20670
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

3.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)

BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.2 Site Grading Phase

3.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

3.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 80000
Amount of Material to be Hauled On-Site (yd^3): 200
Amount of Material to be Hauled Off-Site (yd^3): 2000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

3.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.3 Trenching/Excavating Phase

3.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

3.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 600

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

3.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.4 Building Construction Phase

3.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 10
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 36
Number of Days: 0

3.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Multi-Family
Area of Building (ft^2): 44500
Height of Building (ft): N/A
Number of Units: 650

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

3.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

3.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = NU * 0.36 * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
NU: Number of Units
0.36: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = NU * 0.11 * HT

VMT_{VT}: Vender Tips Vehicle Miles Travel (miles)
NU: Number of Units
0.11: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3.5 Architectural Coatings Phase

3.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 24
Number of Days: 0

3.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Multi-Family
Total Square Footage (ft^2): N/A

Number of Units: 650

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

3.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_{AC} = (NU * 850 * 2.7 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
NU: Number of Units
850: Conversion Factor units to square feet (850 ft^2 / unit)
2.7: Conversion Factor total area to coated area (2.7 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

3.6 Paving Phase

3.6.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

3.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 15000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

3.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)

VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

4. Heating

4.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 1 - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.200494
SO_x	0.021872
NO_x	3.645343
CO	3.062088
PM 10	0.277046

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.277046
Pb	0.000000
NH_3	0.000000
CO_2e	4388.6

4.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 599000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.1278

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

4.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

4.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

5. Heating

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 2 - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.200494
SO_x	0.021872
NO_x	3.645343
CO	3.062088
PM 10	0.277046

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.277046
Pb	0.000000
NH_3	0.000000
CO_2e	4388.6

5.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 599000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.1278

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

5.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

5.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

6. Emergency Generator

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 1 - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010463
SO_x	0.008813
NO_x	0.043125
CO	0.028800
PM 10	0.009413

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.009413
Pb	0.000000
NH_3	0.000000
CO_2e	5.0

6.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 250
Average Operating Hours Per Year (hours): 30

6.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

6.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

7. Emergency Generator

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Residential/Retail Building 2 - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010463
SO_x	0.008813
NO_x	0.043125
CO	0.028800
PM 10	0.009413

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.009413
Pb	0.000000
NH_3	0.000000
CO_2e	5.0

7.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 250
Average Operating Hours Per Year (hours): 30

7.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

7.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Office Building

- Activity Description:
New Office Building = 400,000 GSF, 40,000 sf footprint, and 10 stories high.

Demolish existing Building 166 = 14,600 sf footprint and 54' high.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2027

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.856236
SO_x	0.017005
NO_x	5.483437
CO	7.420000
PM 10	1.565252

Pollutant	Total Emissions (TONs)
PM 2.5	0.204548
Pb	0.000000
NH_3	0.006849
CO_2e	1658.9

8.1 Demolition Phase

8.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 5
Number of Days: 0

8.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 14600
Height of Building to be demolished (ft): 54

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.2 Site Grading Phase

8.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

8.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 50000
Amount of Material to be Hauled On-Site (yd^3): 400
Amount of Material to be Hauled Off-Site (yd^3): 4000

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)

1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.3 Trenching/Excavating Phase

8.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

8.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 10000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 1000

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.4 Building Construction Phase

8.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 36
Number of Days: 0

8.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 40000
Height of Building (ft): 100
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

8.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

8.5 Architectural Coatings Phase

8.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 24
Number of Days: 0

8.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 80000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

8.6 Paving Phase

8.6.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 6
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 1
Number of Days: 0

8.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 8000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

8.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

8.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

9. Heating

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Office Building - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.104657
SO_x	0.011417
NO_x	1.902857
CO	1.598400
PM 10	0.144617

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.144617
Pb	0.000000
NH_3	0.000000
CO_2e	2290.8

9.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 400000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0999

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

9.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

9.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

10. Emergency Generator

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - New Office Building - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010463
SO_x	0.008813
NO_x	0.043125
CO	0.028800
PM 10	0.009413

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.009413
Pb	0.000000
NH_3	0.000000
CO_2e	5.0

10.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 250
Average Operating Hours Per Year (hours): 30

10.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

10.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail

- Activity Description:
Renovation of existing Buildings 68/70 for Retail = 30,500 GSF, 15,200 sf footprint, and 20' high. These buildings will be renovated, so for demolition and construction, assume = 8,000 sf to simulate only interior demolition/construction.

Demolish existing Building 154 = 4,000 sf footprint and 27' high.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.339964
SO_x	0.005238
NO_x	1.418525
CO	2.226962
PM 10	0.163684

Pollutant	Total Emissions (TONs)
PM 2.5	0.050386
Pb	0.000000
NH_3	0.001492
CO_2e	507.9

11.1 Demolition Phase

11.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 3
Number of Days: 0

11.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 8000
Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.2 Site Grading Phase

11.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

11.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 6000
Amount of Material to be Hauled On-Site (yd^3): 100
Amount of Material to be Hauled Off-Site (yd^3): 600

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)

HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.3 Trenching/Excavating Phase

11.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

11.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 2000
Amount of Material to be Hauled On-Site (yd^3): 40
Amount of Material to be Hauled Off-Site (yd^3): 100

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.4 Building Construction Phase

11.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 18
Number of Days: 0

11.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Commercial or Retail
Area of Building (ft^2): 8000
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

11.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (0.32 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

11.5 Architectural Coatings Phase

11.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

11.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 6000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

11.6 Paving Phase

11.6.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

11.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 9000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

11.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

11.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

12. Heating

12.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - Renovation of existing Buildings 68/70 for Retail - Heating

- Activity Description:
Natural gas

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005176
SO_x	0.000565
NO_x	0.094114
CO	0.079056
PM 10	0.007153

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.007153
Pb	0.000000
NH_3	0.000000
CO_2e	113.3

12.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 30500
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0648

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

12.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

12.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement ($MMBtu/ft^2$)
HV: Heat Value ($MMBTU/ft^3$)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

13. Emergency Generator

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Private Development in WNY SE Corner - Renovate Buildings 68/70 for Retail - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 1
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

13.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

13.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

13.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

14. Construction / Demolition

14.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: WNY In-Kind Development - Existing Building 386 - Demolish and Re-build

- Activity Description:
height = 77' + 20' = 97'.

- Activity Start Date
Start Month: 5
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2028

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	11.961895
SO_x	0.007555
NO_x	2.299373
CO	2.927205
PM 10	1.501936

Pollutant	Total Emissions (TONs)
PM 2.5	0.084902
Pb	0.000000
NH_3	0.005245
CO_2e	761.3

14.1 Demolition Phase

14.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 4
Number of Days: 0

14.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 50600
Height of Building to be demolished (ft): 77

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0336	0.0006	0.2470	0.3705	0.0093	0.0093	0.0030	58.539
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1671	0.0024	1.0824	0.6620	0.0418	0.0418	0.0150	239.45
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

14.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

14.2 Trenching/Excavating Phase

14.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1

Start Year: 2027

- Phase Duration
Number of Month: 1
Number of Days: 0

14.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 60000
Amount of Material to be Hauled On-Site (yd^3): 2500
Amount of Material to be Hauled Off-Site (yd^3): 4500

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

14.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)

2000: Conversion Factor pounds to tons

14.3 Building Construction Phase

14.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2027

- Phase Duration
Number of Month: 12
Number of Days: 0

14.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 50600
Height of Building (ft): 97
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

14.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

14.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

14.4 Architectural Coatings Phase

14.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 3
Number of Days: 0

14.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 1000000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

14.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)

2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

14.5 Paving Phase

14.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2028

- Phase Duration
Number of Month: 1
Number of Days: 0

14.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 20000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

14.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

14.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

15. Emergency Generator

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: WNY In-Kind Development - New Parking Building 386 - Emergency Generator

- Activity Description:
Diesel-powered

- Activity Start Date
Start Month: 7
Start Year: 2028

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.005650
SO_x	0.004759
NO_x	0.023288
CO	0.015552
PM 10	0.005083

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.005083
Pb	0.000000
NH_3	0.000000
CO_2e	2.7

15.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: Yes

- Emergency Generators Consumption
Emergency Generator's Horsepower: 135 (default)
Average Operating Hours Per Year (hours): 30 (default)

15.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

15.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

16. Construction / Demolition

16.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: WNY In-Kind Development - Existing Building 405 - Add 2 new floors for Parking

- Activity Description:
Existing Building 405 - Add 2 new floors for Parking = 76,000 sf footprint and 20' high. This would be new construction but also some demolition of the roof, so for demolition, assume = 38,000 sf and 10' high to simulate demolition.

- Activity Start Date
Start Month: 5
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.534406
SO_x	0.005389
NO_x	1.784748
CO	2.405787
PM 10	0.148214

Pollutant	Total Emissions (TONs)
PM 2.5	0.067901
Pb	0.000000
NH_3	0.002402
CO_2e	527.1

16.1 Demolition Phase

16.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 2
Number of Days: 0

16.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 38000
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

16.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

16.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

16.2 Building Construction Phase

16.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 12
Number of Days: 0

16.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 76000
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

16.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

16.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

16.3 Architectural Coatings Phase

16.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 2
Number of Days: 0

16.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
Total Square Footage (ft^2): 20000
Number of Units: N/A

- Architectural Coatings Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

16.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

16.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

16.4 Paving Phase

16.4.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2025

- Phase Duration
Number of Month: 1
Number of Days: 0

16.4.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 120000

- Paving Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

16.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.486	000.008	000.543	004.349	000.013	000.011		000.034	00390.447
LDGT	000.632	000.010	000.931	006.791	000.015	000.013		000.034	00521.358
HDGV	001.506	000.016	003.054	027.300	000.033	000.029		000.047	00805.286
LDDV	000.245	000.003	000.309	003.564	000.006	000.006		000.008	00397.486
LDDT	000.577	000.006	000.833	007.381	000.008	000.008		000.008	00620.049
HDDV	000.638	000.014	007.539	002.571	000.405	000.372		000.026	01567.085
MC	002.634	000.008	000.735	014.249	000.027	000.024		000.047	00394.816

16.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

17. Construction / Demolition

17.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Demolish existing fence and relocate to incorporate the SEFC E Parcels

- Activity Description:
Old/new fence lengths = 950'/1,200'.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.020259
SO_x	0.000379
NO_x	0.112931
CO	0.178716
PM 10	0.005745

Pollutant	Total Emissions (TONs)
PM 2.5	0.004057
Pb	0.000000
NH_3	0.000119
CO_2e	37.0

17.1 Demolition Phase

17.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

17.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 800
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

17.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

17.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

17.2 Building Construction Phase

17.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

17.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 900
Height of Building (ft): 10
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

17.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

17.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

18. Construction / Demolition

18.1 General Information & Timeline Assumptions

- Activity Location
County: Entire District
Regulatory Area(s): Washington, DC-MD-VA

- Activity Title: Relocate WNY fence between WNY and private development on the WNY Southeast Corner

- Activity Description:
Old/new fence lengths = 1,730'/1,600'.

- Activity Start Date
Start Month: 4
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.020299
SO_x	0.000381
NO_x	0.113408
CO	0.178890
PM 10	0.007237

Pollutant	Total Emissions (TONs)
PM 2.5	0.004077
Pb	0.000000
NH_3	0.000122
CO_2e	37.2

18.1 Demolition Phase

18.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

18.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 1500
Height of Building to be demolished (ft): 10

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

18.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

18.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

18.2 Building Construction Phase

18.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1

Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

18.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 1200
Height of Building (ft): 10
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

18.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.254	000.002	000.190	002.971	000.007	000.006		000.023	00340.675
LDGT	000.315	000.003	000.335	004.077	000.009	000.008		000.024	00439.030
HDGV	000.779	000.005	001.076	017.040	000.020	000.018		000.047	00806.186
LDDV	000.109	000.003	000.126	002.489	000.004	000.004		000.008	00330.514
LDDT	000.258	000.004	000.367	004.320	000.007	000.006		000.008	00469.489
HDDV	000.320	000.013	003.837	001.396	000.177	000.163		000.026	01501.720
MC	002.525	000.003	000.716	012.738	000.026	000.023		000.051	00395.513

18.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons