Rahway River (Tidal) Basin, New Jersey
Coastal Storm Risk Management Feasibility Study

Appendix A.7
General Conformity Analysis

CENAN-PL-E March 30, 2020

RECORD OF NON-APPLICABILITY (RONA)

Project Name: Rahway River Coastal Storm Risk Management Study
Reference: Equipment list developed by New York District Cost Engineering

Project/Action Point of Contact: Kimberly Rightler, Project Biologist

Begin Date: September 2024

End Date: January 2029

1. The project described above has been evaluated for Section 176 of the Clean Air Act. Project related emissions associated with the federal action were estimated to evaluate the applicability of General Conformity regulations (40CFR§93 Subpart B).

2. The requirements of this rule do not apply because the total direct and indirect emissions from this project are significantly less than the 100 tons trigger levels for NO_x, CO, and $PM_{2.5}$ and less than 50 tons for VOCs for each project year (40CFR§93.153(b)(1) & (2)). The estimated total annual NO_x emissions for the project is 32 tons (evaluated in May 2017), estimated total annual emissions for CO is 4.1 and the total annual emissions of VOC and $PM_{2.5,}$ are all at or less than 3 tons per year for the project (see attached estimates).

3. The project is presumed to conform with the General Conformity requirements and is exempted from Subpart B under 40CFR§93.153(c)(1).

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Peter Weppler
Chief, Environmental Analysis Branch

Enclosure

Emissions have been estimated using project planning information developed by the New York District, consisting of anticipated equipment types and estimates of the horsepower and operating hours of the diesel engines powering the equipment. In addition to this planning information, conservative factors have been used to represent the average level of engine load of operating engines (load factors) and the average emissions of typical engines used to power the equipment (emission factors). The basic emission estimating equation is the following:

$$\mathbf{E = hrs \times LF \times EF}$$

Where:

E = Emissions per period of time such as a year or the entire project.
hrs = Number of operating hours in the period of time (e.g., hours per year, hours per project).
LF = Load factor, an estimate of the average percentage of full load an engine is run at in its usual operating mode.
EF = Emission factor, an estimate of the amount of a pollutant (such as NO_x) that an engine emits while performing a defined amount of work.

In these estimates, the emission factors are in units of grams of pollutant per horsepower hour (g/hphr). For each piece of equipment, the number of horsepower hours (hphr) is calculated by multiplying the engine's horsepower by the load factor assigned to the type of equipment and the number of hours that piece of equipment is anticipated to work during the year or during the project. For example, a crane with a 250-horsepower engine would have a load factor of 0.43 (meaning on average the crane's engine operates at 43% of its maximum rated power output). If the crane were anticipated to operate 1,000 hours during the course of the project, the horsepower hours would be calculated by:

$$\mathbf{250 \text{ horsepower} \times 0.43 \times 1{,}000 \text{ hours} = 107{,}500 \text{ hphr}}$$

The emissions from diesel engines vary with the age of an engine and, most importantly, with when it was built. Newer engines of a given size and function typically emit lower levels of most pollutants than older engines. The emission factors used in these calculations assume that the equipment pre-dates most emission control requirements (known as Tier 0 engines in most cases), to provide a reasonable "upper bound" to the emission estimates. If newer engines are actually used in the work, then emissions will be lower than estimated for the same amount of work. In the example of the crane engine, a NO_x emission factor of 9.5 g/hphr would be used to estimate emissions from this crane on the project by the following equation:

$$\frac{\mathbf{107{,}500 \text{ hphr} \times 9.5 \text{ g } NO_x\text{/hphr}}}{\mathbf{453.59 \text{ g/lb} \times 2{,}000 \text{ lbs/ton}}} = \mathbf{1.1 \text{ tons of } NO_x}$$

As noted above, information on the equipment types, horsepower, and hours of operation associated with the project have been obtained from the project's plans and represent current best estimates of the equipment and work that will be required. Load factors have been obtained from various sources depending on the type of equipment. Land-side nonroad equipment load factors are from the documentation for EPA's NONROAD emission estimating model, "Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling, EPA420-P-04-005, April 2004."

Emission factors have also been sourced from a variety of documents and other sources depending on engine type and pollutant. Nonroad equipment NOx and other emission factors have been derived from EPA emission standards and documentation. On-road vehicle emission factors have also been developed from the EPA model MOVES2014a run for 15-year-old single-unit short-haul trucks operating in CY 2017.

As noted above, the emission factors have been chosen to be moderately conservative so as not to underestimate project emissions. Actual project emissions will be estimated and tracked during the course of the project and will be based on the characteristics and operating hours of the specific equipment chosen by the contractor to do the work.

The following pages summarize the estimated emissions in sum for the project including the anticipated equipment and engine information developed by the New York District, the load factors and emission factors as discussed above, and the estimated emissions for the project.

U.S. Army Corps of Engineers
Project : Rahway River (Tidal) CRM Feasibility Study - Alternative 4a
General Conformity Related Emission Estimates
3/3/2020

Summary of Emissions

Pollutants:	tons				
Calendar Year	NO_x	VOC	SO_x	$PM_{2.5}$	CO
2024	10.7	0.21	0.01	0.20	1.4
2025	32.1	0.65	0.01	0.58	4.1
2026	32.1	0.65	0.01	0.58	4.1
2027	32.1	0.65	0.01	0.58	4.1
2028	32.1	0.65	0.01	0.58	4.1
2029	3.1	0.05	0.01	0.58	0.4
Totals	**142.1**	**2.9**	**0.1**	**2.4**	**18.2**

Off-Road Emission Sources

Category	Horsepower (approx.)	Load Factor	Hours	hphrs	g/hphr					tons				
					NO_x	VOC	SO_x	$PM_{2.5}$	CO	NO_x	VOC	SO_x	$PM_{2.5}$	CO
Rubber tired loader	300	0.59	1,949	344,973	9.5	0.19	0.0050	0.16	1.21	3.613	0.072	0.002	0.061	0.460
Other diesel engines	100	0.59	159	9,381	9.5	0.19	0.0050	0.16	1.21	0.098	0.002	0.000	0.002	0.013
Compactor	250	0.43	41,683	4,474,473	9.5	0.19	0.0050	0.16	1.21	46.925	0.938	0.025	0.789	5.968
Crane	300	0.43	0	0	9.5	0.19	0.0050	0.16	1.21	0.000	0.000	0.000	0.000	0.000
Excavator	300	0.59	79	13,983	9.5	0.19	0.0050	0.16	1.21	0.146	0.003	0.000	0.002	0.019
Excavator	500	0.59	21,398	6,288,810	9.5	0.19	0.0050	0.16	1.21	66.103	1.321	0.035	1.113	8.419
Skid Steer Loader	175	0.21	159	5,843	9.5	0.19	0.0050	0.16	1.21	0.061	0.001	0.000	0.001	0.008
Rubber tired loader	175	0.59	588	60,711	9.5	0.19	0.0050	0.16	1.21	0.636	0.013	0.000	0.011	0.081
Dozer	250	0.59	285	42,038	9.5	0.19	0.0050	0.16	1.21	0.440	0.009	0.000	0.007	0.056
Other diesel engines	50	0.59	173	5,104	9.5	0.19	0.0050	0.16	1.21	0.053	0.001	0.000	0.001	0.007
Other diesel engines	100	0.59	0	0	9.5	0.19	0.0050	0.16	1.21	0.000	0.000	0.000	0.000	0.000
Pump	50	0.43	8,311	178,687	9.5	0.19	0.0050	0.16	1.21	1.871	0.037	0.001	0.032	0.238
Dozer	300	0.59	285	50,445	9.5	0.19	0.0050	0.16	1.21	0.528	0.011	0.000	0.009	0.067
Rubber tired loader	110	0.59	23	1,493	9.5	0.19	0.0050	0.16	1.21	0.016	0.000	0.000	0.000	0.002
Off-road truck	100	0.59	105	6,195	9.5	0.19	0.0050	0.16	1.21	0.065	0.001	0.000	0.001	0.008
Generator	100	0.43	3,326	143,018	9.5	0.19	0.0050	0.16	1.21	1.498	0.030	0.001	0.025	0.191
Grader	135	0.59	80	6,372	9.5	0.19	0.0050	0.16	1.21	0.067	0.001	0.000	0.001	0.008
Rubber tired loader	300	0.59	0	0	9.5	0.19	0.0050	0.16	1.21	0.000	0.000	0.000	0.000	0.000
Off-road truck	250	0.59	21	3,098	9.5	0.19	0.0050	0.16	1.21	0.032	0.001	0.000	0.001	0.004
Compressor	75	0.43	1,595	51,439	9.5	0.19	0.0050	0.16	1.21	0.539	0.011	0.000	0.009	0.069
Compressor	100	0.43	24	1,032	9.5	0.19	0.0050	0.16	1.21	0.011	0.000	0.000	0.000	0.001
Compressor	125	0.43	387	20,801	9.5	0.19	0.0050	0.16	1.21	0.218	0.004	0.000	0.004	0.028
Compressor	75	0.43	47	1,516	9.5	0.19	0.0050	0.16	1.21	0.016	0.000	0.000	0.000	0.002
Other diesel engines	100	0.59	40	2,360	9.5	0.19	0.0050	0.16	1.21	0.025	0.000	0.000	0.000	0.003
Compactor	250	0.43	387	41,603	9.5	0.19	0.0050	0.16	1.21	0.436	0.009	0.000	0.007	0.055
Compactor	250	0.43	33	3,548	9.5	0.19	0.0050	0.16	1.21	0.037	0.001	0.000	0.001	0.005
Other diesel engines	225	0.59	1,595	211,736	9.5	0.19	0.0050	0.16	1.21	2.217	0.044	0.001	0.037	0.282
Crane	225	0.43	1,209	116,970	9.5	0.19	0.0050	0.16	1.21	1.225	0.024	0.001	0.020	0.155
Crane	300	0.43	9	1,161	9.5	0.19	0.0050	0.16	1.21	0.012	0.000	0.000	0.000	0.002
Crane	300	0.43	2,328	300,312	9.5	0.19	0.0050	0.16	1.21	3.145	0.063	0.002	0.053	0.401
Other diesel engines	225	0.59	1,179	156,512	9.5	0.19	0.0050	0.16	1.21	1.639	0.033	0.001	0.028	0.209
Other diesel engines	100	0.59	714	42,126	9.5	0.19	0.0050	0.16	1.21	0.441	0.009	0.000	0.007	0.056
Generator	100	0.43	1,663	71,509	9.5	0.19	0.0050	0.16	1.21	0.749	0.015	0.000	0.013	0.095
Excavator	300	0.59	115	20,355	9.5	0.19	0.0050	0.16	1.21	0.213	0.004	0.000	0.004	0.027
Skid Steer Loader	175	0.21	24	882	9.5	0.19	0.0050	0.16	1.21	0.009	0.000	0.000	0.000	0.001
Skid Steer Loader	175	0.21	40	1,470	9.5	0.19	0.0050	0.16	1.21	0.015	0.000	0.000	0.000	0.002
Rubber tired loader	175	0.59	274	28,291	9.5	0.19	0.0050	0.16	1.21	0.296	0.006	0.000	0.005	0.038
Rubber tired loader	250	0.59	21	3,098	9.5	0.19	0.0050	0.16	1.21	0.032	0.001	0.000	0.001	0.004
Rubber tired loader	110	0.59	5	325	9.5	0.19	0.0050	0.16	1.21	0.003	0.000	0.000	0.000	0.000
Other diesel engines	100	0.59	1,255	74,045	9.5	0.19	0.0050	0.16	1.21	0.775	0.016	0.000	0.013	0.099
Other diesel engines	100	0.59	1,073	63,307	9.5	0.19	0.0050	0.16	1.21	0.663	0.013	0.000	0.011	0.084
Pump	50	0.43	237	5,096	9.5	0.19	0.0050	0.16	1.21	0.053	0.001	0.000	0.001	0.007
Pump	50	0.43	1,179	25,349	9.5	0.19	0.0050	0.16	1.21	0.265	0.005	0.000	0.004	0.034
Pump	50	0.43	1,179	25,349	9.5	0.19	0.0050	0.16	1.21	0.265	0.005	0.000	0.004	0.034
Pump	50	0.43	1,179	25,349	9.5	0.19	0.0050	0.16	1.21	0.265	0.005	0.000	0.004	0.034
Other diesel engines	150	0.59	124	10,974	9.5	0.19	0.0050	0.16	1.21	0.115	0.002	0.000	0.002	0.015
Other diesel engines	250	0.59	0	0	9.5	0.19	0.0050	0.16	1.21	0.000	0.000	0.000	0.000	0.000
Other diesel engines	200	0.59	38	4,484	9.5	0.19	0.0050	0.16	1.21	0.047	0.001	0.000	0.001	0.006
Dozer	75	0.59	123	5,443	9.5	0.19	0.0050	0.16	1.21	0.057	0.001	0.000	0.001	0.007
Dozer	250	0.59	45	6,637	9.5	0.19	0.0050	0.16	1.21	0.069	0.001	0.000	0.001	0.008
Generator	7.5	0.43	652	2,103	9.5	0.19	0.0050	0.16	1.21	0.022	0.000	0.000	0.000	0.003
Other diesel engines	225	0.59	105	13,939	9.5	0.19	0.0050	0.16	1.21	0.146	0.003	0.000	0.002	0.019
Off-road truck	100	0.59	0	0	9.5	0.19	0.0050	0.16	1.21	0.000	0.000	0.000	0.000	0.000

U.S. Army Corps of Engineers
Project : Rahway River (Tidal) CSRM Feasibility Study - Alternative 4a
General Conformity Related Emission Estimates
3/3/2020

Category	Horsepower (approx.)	Load Factor	Hours	hphrs	g/hphr NO_x	VOC	SO_x	$PM_{2.5}$	CO	tons NO_x	VOC	SO_x	$PM_{2.5}$	CO
Compressor	100	0.43	329	14,147	9.5	0.19	0.0050	0.16	1.21	0.148	0.003	0.000	0.002	0.019
Compressor	75	0.43	657	21,188	9.5	0.19	0.0050	0.16	1.21	0.222	0.004	0.000	0.004	0.028
Other diesel engines	225	0.59	25	3,319	9.5	0.19	0.0050	0.16	1.21	0.035	0.001	0.000	0.001	0.004
Other diesel engines	225	0.59	38	5,045	9.5	0.19	0.0050	0.16	1.21	0.053	0.001	0.000	0.001	0.007
Crane	225	0.43	35	3,386	9.5	0.19	0.0050	0.16	1.21	0.035	0.001	0.000	0.001	0.005
Crane	225	0.43	209	20,221	9.5	0.19	0.0050	0.16	1.21	0.212	0.004	0.000	0.004	0.027
Crane	225	0.43	23	2,225	9.5	0.19	0.0050	0.16	1.21	0.023	0.000	0.000	0.000	0.003
Grader	138	0.59	20	1,628	9.5	0.19	0.0050	0.16	1.21	0.017	0.000	0.000	0.000	0.002
Excavator	300	0.59	139	24,603	9.5	0.19	0.0050	0.16	1.21	0.258	0.005	0.000	0.004	0.033
Excavator	400	0.59	348	82,128	9.5	0.19	0.0050	0.16	1.21	0.860	0.017	0.000	0.014	0.110
Excavator	300	0.59	348	61,596	9.5	0.19	0.0050	0.16	1.21	0.645	0.013	0.000	0.011	0.082
Skid Steer Loader	175	0.21	17	625	9.5	0.19	0.0050	0.16	1.21	0.007	0.000	0.000	0.000	0.001
Skid Steer Loader	175	0.21	497	18,265	9.5	0.19	0.0050	0.16	1.21	0.191	0.004	0.000	0.003	0.024
Rubber tired loader	175	0.59	514	53,071	9.5	0.19	0.0050	0.16	1.21	0.556	0.011	0.000	0.009	0.071
Rubber tired loader	175	0.59	348	35,931	9.5	0.19	0.0050	0.16	1.21	0.376	0.008	0.000	0.006	0.048
Rubber tired loader	250	0.59	77	11,358	9.5	0.19	0.0050	0.16	1.21	0.119	0.002	0.000	0.002	0.015
Rubber tired loader	110	0.59	81	5,257	9.5	0.19	0.0050	0.16	1.21	0.055	0.001	0.000	0.001	0.007
Rubber tired loader	110	0.59	1,133	73,532	9.5	0.19	0.0050	0.16	1.21	0.770	0.015	0.000	0.013	0.098
Other diesel engines	250	0.59	173	25,518	9.5	0.19	0.0050	0.16	1.21	0.267	0.005	0.000	0.005	0.034
Other diesel engines	150	0.59	25	2,213	9.5	0.19	0.0050	0.16	1.21	0.023	0.000	0.000	0.000	0.003
Other diesel engines	200	0.59	5	590	9.5	0.19	0.0050	0.16	1.21	0.006	0.000	0.000	0.000	0.001
Other diesel engines	150	0.59	25	2,213	9.5	0.19	0.0050	0.16	1.21	0.023	0.000	0.000	0.000	0.003
Other diesel engines	150	0.59	194	17,169	9.5	0.19	0.0050	0.16	1.21	0.180	0.004	0.000	0.003	0.023
Other diesel engines	200	0.59	20	2,360	9.5	0.19	0.0050	0.16	1.21	0.025	0.000	0.000	0.000	0.003
Dozer	250	0.59	329	48,528	9.5	0.19	0.0050	0.16	1.21	0.508	0.010	0.000	0.009	0.065
Dozer	340	0.59	20	4,012	9.5	0.19	0.0050	0.16	1.21	0.042	0.001	0.000	0.001	0.005
Totals										**141.8**	**2.8**	**0.07**	**2.4**	**18.0**

On-Road Emission Sources

Category	Miles	grams per mile* NO_x	VOC	SO_x	$PM_{2.5}$	CO	tons NO_x	VOC	SO_x	$PM_{2.5}$	CO
Short-haul diesel truck	3,752	9.315	2.183	0.011	0.667	5.339	0.038	0.010	0.000	0.003	0.023
Short-haul diesel truck	3,752	9.315	2.183	0.011	0.667	5.339	0.038	0.010	0.000	0.003	0.023
Short-haul diesel truck	3,334	9.315	2.183	0.011	0.667	5.339	0.034	0.008	0.000	0.002	0.020
Short-haul diesel truck	80	9.315	2.183	0.011	0.667	5.339	0.001	0.000	0.000	0.000	0.000
Short-haul diesel truck	2,034	9.315	2.183	0.011	0.667	5.339	0.021	0.005	0.000	0.001	0.012
Short-haul diesel truck	52	9.315	2.183	0.011	0.667	5.339	0.001	0.000	0.000	0.000	0.000
Short-haul diesel truck	3,334	9.315	2.183	0.011	0.667	5.339	0.034	0.008	0.000	0.002	0.020
Short-haul diesel truck	2,114	9.315	2.183	0.011	0.667	5.339	0.022	0.005	0.000	0.002	0.012
Short-haul diesel truck	524	9.315	2.183	0.011	0.667	5.339	0.005	0.001	0.000	0.000	0.003
Short-haul diesel truck	337	9.315	2.183	0.011	0.667	5.339	0.003	0.001	0.000	0.000	0.002
Short-haul diesel truck	2,248	9.315	2.183	0.011	0.667	5.339	0.023	0.005	0.000	0.002	0.013
Short-haul diesel truck	2,248	9.315	2.183	0.011	0.667	5.339	0.023	0.005	0.000	0.002	0.013
Short-haul diesel truck	20	9.315	2.183	0.011	0.667	5.339	0.000	0.000	0.000	0.000	0.000
Short-haul diesel truck	662	9.315	2.183	0.011	0.667	5.339	0.007	0.002	0.000	0.000	0.004
Short-haul diesel truck	34	9.315	2.183	0.011	0.667	5.339	0.000	0.000	0.000	0.000	0.000
Short-haul diesel truck	20	9.315	2.183	0.011	0.667	5.339	0.000	0.000	0.000	0.000	0.000
Short-haul diesel truck	524	9.315	2.183	0.011	0.667	5.339	0.005	0.001	0.000	0.000	0.003
Totals		**0.3**	**0.06**	**0.000**	**0.02**	**0.15**					

* Emission factors from MOVES2014 for 2017, Union Co. NJ. MY 2002 (15-year-old) single-unit short-haul truck