

Appendix H: Construction Impacts
H-3 Air Quality

**Rockland Landing-Reconstruction of the South Broadway Bridge
Nonroad Emissions**

Equipment	Engine Size (hp)	Quantity	Shifts / Day	Hours / Shift	BAT: Pollutant Load after Control (%)	Peak Trucks per Day	Average Trucks per Day	PM_{2.5} Emission Factor (g/hp-hr)	PM₁₀ Emission Factor (g/hp-hr)	NOx Emission Factor (g/hp-hr)	CO Emission Factor (g/hp-hr)
Compressors - surface tools	275	2	1	8	10%			0.043	0.045	1.107	0.263
Concrete pump - general	250	2	1	8	10%			0.042	0.042	1.546	0.552
Crane - all-terrain (80t)	175	1	1	8	10%			0.079	0.081	1.237	0.351
Crane - crawler (100t)	603	1	1	8	10%			0.044	0.045	1.174	0.479
Excavator - long reach, tracked	203	1	1	8	10%			0.096	0.099	1.434	0.540
Excavator - mini-excavator	84	2	1	8	10%			0.233	0.240	1.980	1.974
Front-end loader - wheeled, large	349	1	1	8	10%			0.051	0.053	0.640	0.328
Front-end loader - wheeled, mid	197	1	1	8	10%			0.051	0.053	0.640	0.328
Generator - large	426	1	1	8	10%			0.040	0.041	1.250	0.300
Generator - mid	110	1	1	8	10%			0.068	0.071	1.251	0.340
Pump - general, water	8	1	1	8	100%			0.075	0.081	1.731	211.073
Telescopic boom - self-propelled	75	1	1	8	10%			0.062	0.064	0.818	0.807
Telescopic forklift handler	101	1	1	8	10%			0.169	0.175	1.451	0.703
Paver	224	1	1	8	10%			0.095	0.098	1.527	0.556
Vibratory Compactor Roller	18	1	1	8	100%			0.204	0.211	2.612	1.523
Truck - concrete	405	2	1	8	10%	2	1	0.003	0.003	0.062	0.053
Truck - delivery & haul-away	310	1	1	8	100%	1	1	0.003	0.003	0.081	0.069
Truck - muck-away	300	4	1	8	100%	4	2	0.003	0.004	0.084	0.072

Rockland Inland Staging Area- Concrete Batching Plant

Emission Rates	PM10 Short-Term Emissions (g/s)	PM2.5 Short-Term Emissions (g/s)	PM2.5 Annual Emissions (g/s)	CO Emissions (g/s)	NOx Emissions (g/s)
Unloading to Elevated Storage Silo (C&CS)	2.20E-03	3.96E-04	1.59E-04	--	--
Mixer Loading into Concrete Trucks	1.30E-02	2.34E-03	9.38E-04	--	--
Weigh Hopper Loading	3.87E-05	5.87E-06	2.35E-06	--	--
Delivery to Ground Storage (S&A)	1.59E-02	2.41E-03	9.63E-04	--	--
Transfer to Conveyor (S&A)	1.59E-02	2.41E-03	9.63E-04	--	--
Transfer to Elevated Storage (S&A)	3.18E-05	4.81E-06	1.93E-06	--	--
Storage Piles	7.42E-03	1.04E-03	4.16E-04	--	--
Equipment (Engine Emissions + Road Dust)	6.27E-04	3.57E-04	1.38E-04	7.95E-06	1.30E-05
Crawler Crane	1.89E-04	1.83E-04	9.15E-05	4.47E-03	1.43E-02

**Bridge Construction- Rockland Approach and Main Span
Nonroad Emissions**

Equipment	Engine Size (hp)	Quantity	Shifts / Day	Hours / Shift	BAT: Pollutant Load after Control (%)	Peak Trucks per Day	Average Trucks per Day	PM _{2.5} Emission Factor (g/hp-hr)	PM ₁₀ Emission Factor (g/hp-hr)	NOx Emission Factor (g/hp-hr)	CO Emission Factor (g/hp-hr)
Eastbound approach near River road											
Paver	224	1	1	8	10%			0.095	0.098	1.527	0.556
Vibratory Compactor Roller	18	1	1	8	100%			0.204	0.211	2.612	1.523
Truck - delivery & haul-away	310	1	1	8	100%	1	1	0.003	0.003		0.069
Truck - muck-away	300	4	1	8	100%	4	2	0.003	0.004		0.072
Bridge work											
Sheetpile vibratory hammer	300	2	1	8	10%			0.045	0.047	1.105	0.266
Barge mounted 500 Ton Ringer Crane	450	1	1	8	10%			0.046	0.047	1.247	0.309
Barge mounted 200 Ton Crane	340	2	1	8	10%			0.046	0.047	1.247	0.309
Barge mounted 100 Ton Crane	230	4	1	8	10%			0.045	0.047	1.105	0.266
Pile vibratory hammer	300	1	1	8	10%			0.045	0.047	1.105	0.266
Pile driving hammer – 500 kJ	1000	1	1	8	10%			0.048	0.050	1.513	0.335
Pile driving hammer – 800 kJ	1500	1	1	8	10%			0.048	0.050	1.513	0.335
Welding huts (supporting up to 10 welders)	35										
Rock Socket Drilling Rig	209	4	1	8	10%			0.040	0.041	1.122	0.261
Tugboats (1500 HP)- Main Engine	1500	8	1	8	60%			0.492	0.537	9.843	0.820
Tugboats Auxiliary Engine	107	8	1	8	60%			0.276	0.298	7.457	1.268
Flat deck barges (materials transport)											
Concrete delivery barges											
Concrete pumping barges											
Pile delivery barges											
Segment delivery barges											
Truss delivery barges											
Deck segment erection gantry	194	2	1	8	10%			0.045	0.047	1.105	0.266
Truss Lifting winches											
Jacking T-Cranes (pylons)	194	8	1	8	10%			0.045	0.047	1.105	0.266
Compressors - surface tools	275	20	1	8	10%			0.043	0.045	1.107	0.263
Concrete pump - general	250	3	1	8	10%			0.042	0.092	1.546	0.552
Excavator - long reach, tracked	203	1	1	8	10%			0.096	0.099	1.434	0.540
Freeze pipe rotary drilling rig	200	1	1	8	10%			0.040	0.041	1.122	0.261
Freezing plant (construction)	550										
Generator - large	426	8	1	8	10%			0.040	0.041	1.250	0.300
Generator - mid	110	15	1	8	10%			0.068	0.071	1.251	0.340
Pump - general, water	8	20	1	8	100%			0.075	0.081	1.731	211.073
Telescopic boom - self-propelled	75	8	1	8	10%			0.062	0.064	0.818	0.807
Telescopic forklift handler	101	8	1	8	10%			0.169	0.175	1.451	0.703
Vibratory Compactor Roller	18	1	1	8	100%			0.204	0.211	2.612	1.523
Truck - concrete	405	60	1	8	10%	60	30	0.003	0.003	0.062	0.053
Truck - delivery & haul-away	310	20	1	8	100%	20	10	0.003	0.003	0.081	0.069
Truck - muck-away	300	20	1	8	100%	20	10	0.003	0.004	0.084	0.072

**Bridge Construction- Westchester Approach and Main Span
Nonroad Emissions**

Equipment	Engine Size (hp)	Quantity	Shifts / Day	Hours / Shift	BAT: Pollutant Load after Control (%)	Peak Trucks per Day	Average Trucks per Day	PM _{2.5} Emission Factor (g/hp-hr)	PM ₁₀ Emission Factor (g/hp-hr)	NOx Emission Factor (g/hp-hr)	CO Emission Factor (g/hp-hr)
Landing- Road work											
Paver	224	1	1	8	10%			0.095	0.098		0.556
Vibratory Compactor Roller	18	1	1	8	100%			0.204	0.211		1.523
Generator - mid	110	1	1	8	10%			0.068	0.071	1.251	0.340
Compressors - surface tools	275	1	1	8	10%			0.043	0.045	1.107	0.263
Truck - delivery & haul-away	310	1	1	8	100%	1	1	0.003	0.003		0.069
Truck - muck-away	300	4	1	8	100%	4	2	0.003	0.004		0.072
Bridge work											
Sheetpile vibratory hammer	300	2	1	8	10%			0.045	0.047	1.105	0.266
Barge mounted 500 Ton Ringer Crane	450	1	1	8	10%			0.046	0.047	1.247	0.309
Barge mounted 200 Ton Crane	340	2	1	8	10%			0.046	0.047	1.247	0.309
Barge mounted 100 Ton Crane	230	4	1	8	10%			0.045	0.047	1.105	0.266
Pile vibratory hammer	300	1	1	8	10%			0.045	0.047	1.105	0.266
Pile driving hammer – 500 kJ	1000	1	1	8	10%			0.048	0.050	1.513	0.335
Pile driving hammer – 800 kJ	1500	1	1	8	10%			0.048	0.050	1.513	0.335
Welding huts (supporting up to 10 welders)	35										
Rock Socket Drilling Rig	209	4	1	8	10%			0.040	0.041	1.122	0.261
Tugboats (1500 HP)- Main Engine	1500	8	1	8	60%			0.492	0.537	9.843	0.820
Tugboats Auxiliary Engine	107	8	1	8	60%			0.276	0.298	7.457	1.268
Flat deck barges (materials transport)											
Concrete delivery barges											
Concrete pumping barges											
Pile delivery barges											
Segment delivery barges											
Truss delivery barges											
Deck segment erection gantry	194	2	1	8	10%			0.045	0.047	1.105	0.266
Truss Lifting winches											
Jacking T-Cranes (pylons)	194	8	1	8	10%			0.045	0.047	1.105	0.266
Compressors - surface tools	275	20	1	8	10%			0.043	0.045	1.107	0.263
Concrete pump - general	250	3	1	8	10%			0.042	0.092	1.546	0.552
Crane - crawler (100t)	603	2	1	8	10%			0.044	0.045	1.174	0.479
Excavator - long reach, tracked	203	1	1	8	10%			0.096	0.099	1.434	0.540
Freeze pipe rotary drilling rig	200	1	1	8	10%			0.040	0.041	1.122	0.261
Freezing plant (construction)	550										
Generator - large	426	8	1	8	10%			0.040	0.041	1.250	0.300
Generator - mid	110	15	1	8	10%			0.068	0.071	1.251	0.340
Pump - general, water	8	20	1	8	100%			0.075	0.081	1.731	211.073
Telescopic boom - self-propelled	75	5	1	8	10%			0.062	0.064	0.818	0.807
Telescopic forklift handler	101	5	1	8	10%			0.169	0.175	1.451	0.703
Vibratory Compactor Roller	18	1	1	8	100%			0.204	0.211	2.612	1.523
Truck - concrete	405	60	1	8	10%	60	30	0.003	0.003	0.062	0.053
Truck - delivery & haul-away	310	20	1	8	100%	20	10	0.003	0.003	0.081	0.069
Truck - muck-away	300	20	1	8	100%	20	10	0.003	0.004	0.084	0.072