

**Environmental Monitoring Form
North-South Commuter Railway (Malolos – Tutuban) Project**

1. General Information

a. Environmental Monitoring Results:	4 th Quarter of 2022
b. Date of Preparing This form	15 January 2023
c. Person Preparing This form	Environmental Considerations Unit Department/Organizations: North-South Commuter Railway (Malolos – Tutuban) Project

2. Monitoring Results - Construction Phase

(1) Impact on Land

No.	Potential Impact	Parameter	Method	Frequency	Location	Standard	Latest Monitoring Result in 4 th Quarter of 2022	
							Result	Monitoring Date
1	Soil contamination due to oil and lubricant spill	Oil spill	Ocular inspection	Weekly, immediately after spills	All construction sites (Malolos, Guiguinto, Balagtas, Bocaue, Meycauayan and Valenzuela City)	N.A.	Minor spills were commonly observed near/adjacent the mechanical equipment. See Annex A.	Envi Walkthrough Dates: 10-11, 24 & 26 October; 07-08 & 24 November; and 02, 06 & 19-20 December.
2	Worker and community exposure to health and safety hazards due to working in areas with the excavation of such soils	Proper removal and disposal of excavated soil from RAMCAR battery site	Compliance to RA 9003, RA 6969 and DAO 2013-22	N.A.	RAMCAR battery site	Environmental Standard for Soil Pollution (Japan): 150 mg/kg Dutch Standards of References Values for Soil: 85 mg/kg German Federal Soil Protection and Contaminated Site	Excavation of contaminated soil in Meycauayan was completed. Appropriate PPE was provided to workers directly involved in the hauling of the contaminated soil. Contaminated soil was treated and disposed to a DENR-accredited TSD Facility. COT was provided.	20-22 September 2022

						Ordinance: 200 mg/kg DAO 2013-22: <1 mg/L	See Annex B for the Certificate of Treatment.	
3	Generation of solid waste; land and water contamination; aesthetic impacts; spread of diseases	Proper waste management and disposal	Checking compliance with RA 9003 and RA 6969	Weekly	All construction sites (Malolos, Guiguinto, Balagtas, Bocaue, Meycauayan and Valenzuela City)	N.A.	Solid Waste Management (1) Appropriate and color-coded (recyclables - red; non-recyclables/residual - blue, biodegradable - green and special waste/household healthcare waste - yellow) waste bins with cover and labels were provided in active construction sites. (2) The recyclables were segregated from residuals. The residual wastes are collected by the LGUs and disposed to the disposal facility. (3) Some recovered waste materials were recycled and reused on-site. Some were sold to junkshops or given to waste collectors (4) In response to COVID-19 pandemic, particularly disposable masks, gloves and tissues were directly stored and disposed in a separate waste bag/ bins (yellow). Bags/ bins were disinfected by spraying a diluted bleach solution (1 tablespoon of bleach to 1.5 liters of water) and labelled "potential infectious waste" before disposal to reduce the	N.A.

							<p>risk of contamination to the waste collectors.</p> <ul style="list-style-type: none"> - Solid Waste Generated: 46.92 tons/quarter - Recyclable: 1.51 tons/quarter - Biodegradable: 0.88 tons/quarter - Residual: 44.53 tons/quarter <p>Hazardous Waste Management</p> <p>The hazardous wastes were stored in separate containers, according to its classification, at the subcontractor's temporary storage facility which are either banded or provided secondary containment.</p> <p>Hazardous Waste Generated for the Quarter:</p> <ul style="list-style-type: none"> - Busted Fluorescent: 0.0 ton - LED Bulb: 0.0 ton - Used Batteries: 0.0 ton - Lead-contaminated soil: tons - Used Oil: 0.0655 tons - Oil Contaminated materials: 0.263 ton - Empty chemical containers: 0.0047 ton - Waste Electrical and Electronic Equipment: 0 ton <p>Grey water disposal and treatment</p> <p>Septic tanks, sanitation facilities, and portalets were available within</p>
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							construction areas. Weekly siphoning of portalets were conducted for liquid wastes. See Annex C and D	
4	Ground subsidence	Level of ground subsidence	Measurement of level	Monthly	Valenzuela Depot	N.A.	N.A.	N.A.
5	Removal of Narra trees along with alignment from Caloocan to Tutuban and at Valenzuela depot, and other trees	<ol style="list-style-type: none"> 1. Number of trees cut 2. Number of trees replaced 3. The survival rate of species introduced 4. Provision of the corresponding number of tree seedlings 	Ocular inspection	Monthly	Designated tree planting site and/or reforestation area designated by DENR-EMB National Capital Region (NCR)	85-90% survival rate of trees planted as prescribed by DENR-EMB NCR	<p>1. CP01</p> <p>1.1 Replacement seedlings</p> <ul style="list-style-type: none"> - 71,000 seedlings in Mt. Balagbag (84.5 ha)* - 18,500 seedlings in Mt Balagbag (16.65 ha)* - 8,000 seedlings in La Mesa Watershed (20 ha)* <p>Note: *Protection and maintenance already done in December 2022.</p> <p>1.2 Transplanted Trees in NFA Compound, Malanday, Depot</p> <ul style="list-style-type: none"> - One of two transplanted trees survived. <p>2. CP02</p> <p>2.1 Replacement seedlings</p> <ul style="list-style-type: none"> - 33,650 seedlings in Mt. Balagbag (52.8 ha)* - 4,000 seedlings in Mt. Balagbag (4.0 ha)* - 4,700 seedlings in Mt. Balagbag (4.0 ha) <p>Note: *Protection and maintenance already done in December 2021.</p> <p>See Annex E for result of validation and proof of seedling replacement.</p>	N.A.

6	Loss of small swampy area used for migratory and resident birds due to development of depot	Seasonal bird count	Ocular Survey	Annually	Adjacent wetland of Valenzuela depot	N.A.	Bird count at the offset wetland (Tanza Marine Tree Park) are not yet conducted. The Memorandum of Agreement between DOTr and DENR-National Capital Region (NCR), and Work and Financial Plan (WFP) for the conservation of TMTP, as part of the NSCR offset wetland management project, is being routed for signing. Bird count will be conducted once TMTP management project is implemented.	N.A.
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(2) Impact on Water

No.	Potential Impact	Parameter	Method	Frequency	Location	Standard	Baseline		Latest Monitoring Result in 4 th Quarter of 2022	
							Feasibility Study Phase (2013)	Pre-construction Phase (2019)	Result (Annex F) ¹	Monitoring Date
1	Increase in suspended solid of receiving water/ pollution of receiving water bodies	1. pH 2. DO 3. Oil & Grease 4. BOD 5. Fecal 6. TSS	Water sampling (DAO 34-1990), DENR-EMB Manual for Ambient Water Quality Monitoring Volume I (2008), and Water Quality Guidelines and General Effluent Standards of (DAO 2016-08)	Quarterly	1. Guiguinto River 14.830339 N; 120.878609 E	For Class "C" freshwater ² : 1. pH: 6.5 to 9.0 2. DO: 5.0 mg/L 3. Oil & Grease: 2.0 mg/L 4. BOD: 7.0 mg/L 5. Fecal Coliform: 200 MPN/100mL 6. TSS: 80 mg/L	Guiguinto River 1. pH: 8.8 2. DO: 2.3 mg/L 3. Oil & Grease: 0.8 mg/L 4. BOD: 12 mg/L 5. Fecal Coliform: 44 MPN/100mL 6. TSS: N.A.	Guiguinto River 1. pH: 7.43 2. DO: ND 3. Oil & Grease: ND 4. BOD: 3.26 mg/L 5. Fecal Coliform: 4.9x10 ³ MPN/100mL 6. TSS: 8.6 mg/L	Guiguinto River 1. pH: 7.17 2. DO: 0.63 3. Oil & Grease: 2.67 4. BOD: 14.5 mg/L 5. Fecal Coliform: 140000 MPN/100mL 6. TSS: 8.4 mg/L	Guiguinto River: 04 October 2022
					2. Santol (Balagtas) River 14.818506 N; 120.913071 E		Santol (Balagtas) River 1. pH: 7.6 2. DO: 4.5 mg/L 3. Oil & Grease: 0.6 mg/L 4. BOD: 2 mg/L 5. Fecal Coliform: 1.3x10 ⁴ MPN/100mL 6. TSS: 8.8 mg/L	Santol (Balagtas) River 1. pH: 7.63 2. DO: 2.39 mg/L 3. Oil & Grease: ND 4. BOD: 8.01 mg/L 5. Fecal Coliform: 3.5x10 ³ MPN/100mL 6. TSS: 26.3 mg/L	Santol (Balagtas) River: 1. pH: 7.37 2. DO: 3.02 mg/L 3. Oil & Grease: ND 4. BOD: 12.5 mg/L 5. Fecal Coliform: 7800 MPN/100mL 6. TSS: 21.5 mg/L	Santol (Balagtas) River: 04 October 2022
					3. Bocaue River 14.80575 N; 120.9268 E		Bocaue River: 1. pH: 7.9 2. DO: 8.2 mg/L 3. Oil & Grease: 0.7 mg/L 4. BOD: 4 mg/L 5. Fecal Coliform: 3.5x10 ⁴ MPN/100mL 6. TSS: 44 mg/L	Bocaue River: 1. pH: 7.4 2. DO: 7.2 mg/L 3. Oil & Grease: 3 mg/L 4. BOD: 12 mg/L 5. Fecal Coliform: 3.3x10 ⁴ MPN/100mL 6. TSS: 46 mg/L	Bocaue River: 1. pH: 9.1 2. DO: 3.5 mg/L 3. Oil & Grease: <2 mg/L 4. BOD: 64 mg/L 5. Fecal Coliform: 110000000 MPN/100mL 6. TSS: 10 mg/L	Bocaue River: 10 November 2022

¹ Annex C and D presents some measures implemented on-site to mitigate possible impact on water quality.

² DAO 2016-08: Water Quality Guidelines and Effluent Standards of 2016

					4. Marilao River 14.76135 N; 120.9507 E	Marilao River: 1. pH: 7.8 2. DO: 7.1 mg/L 3. Oil & Grease: 0.8 mg/L 4. BOD: 8 mg/L 5. Fecal Coliform: 3.5x10 ⁴ MPN/100mL 6. TSS: 36 mg/L	Marilao River: 1. pH: 7.6 2. DO: 7 mg/L 3. Oil & Grease: <1 mg/L 4. BOD: 18 mg/L 5. Fecal Coliform: 3.1x10 ⁵ MPN/100mL 6. TSS: 17 mg/L	Marilao River: 1. pH: 9.0 2. DO: 1.03 mg/L 3. Oil & Grease: <2 mg/L 4. BOD: 157 mg/L 5. Fecal Coliform: 920000000 MPN/100mL 6. TSS: 9 mg/L	Marilao River: 09 November 2022
					5. Meycauayan River 14.73063 N; 120.9644 E	Meycauayan River: 1. pH: 7.4 2. DO: <2.0 mg/L 3. Oil & Grease: 0.6 mg/L 4. BOD: 9 mg/L 5. Fecal Coliform: N.A. 6. TSS: 17 mg/L	Meycauayan River: 1. pH: 7.5 2. DO: 6.8 mg/L 3. Oil & Grease: <1 mg/L 4. BOD: 25 mg/L 5. Fecal Coliform: 1.3x10 ⁶ MPN/100mL 6. TSS: 33 mg/L	Meycauayan River: 1. pH: 8.66 2. DO: 1.03 mg/L 3. Oil & Grease: <2 mg/L 4. BOD: 281 mg/L 5. Fecal Coliform: 1600000000 MPN/100mL 6. TSS: 7 mg/L	Meycauayan River: 09 November 2022
					6. Valenzuela Depot 14.713699 N; 120.961019 E	Valenzuela Depot: 1. pH: 6.6 2. DO: <2.0 mg/L 3. Oil & Grease: 0.7 mg/L 4. BOD: 55 mg/L 5. Fecal Coliform: N.A. 6. TSS: 9 mg/L	Valenzuela Depot: 1. pH: 7.6 2. DO: 4.2 mg/L 3. Oil & Grease: 2 mg/L 4. BOD: 65 mg/L 5. Fecal Coliform: 4.9x10 ⁵ MPN/100mL 6. TSS: 9 mg/L	Valenzuela Depot: 1. pH: 8.67 2. DO: 1.37 mg/L 3. Oil & Grease: <2 mg/L 4. BOD: 79 mg/L 5. Fecal Coliform: 920000000 MPN/100mL 6. TSS: 6 mg/L	Valenzuela Depot: 10 November 2022
					7. Tullahan River 14°40.672'N 120°58.315'E	Tullahan River ³ - N.A.	Tullahan River - N.A.	Tullahan River - N.A.	Tullahan River: N.A.
					8. Estero de Maypajo 14°38.113'N 120°58.6'E	Estero de Maypajo - N.A	Estero de Maypajo - N.A.	Estero de Maypajo - N.A.	Estero de Maypajo: N.A.

³ Water quality monitoring was not conducted at Tullahan River, and Estero de Maypajo since Section1 of Contract Package 01 is not yet handed over to the contractor.

(3) Impact on Air

No.	Potential Impact	Parameter	Method	Frequency	Location ⁴	Standard	Baseline		Latest Monitoring Result in 4 th Quarter of 2022		
							Feasibility Study Phase ⁵	Pre-construction Phase (2019)	Result ^{6,7} (Annex G)	Monitoring Date	
1	Generation of dust and particulate matter, and gas emissions.	1. TSP 2. PM _{2.5} 3. PM ₁₀ 4. NO ₂ 5. SO ₂ ,	Clean Air Act of 1999 (RA 8749) 1. TSP: High Volume Gravimetric Method 2. PM _{2.5} : High Volume w/2.5-micron particle size inlet, Gravimetric 3. PM ₁₀ : High Volume w/10-micron particle-size inlet, Gravimetric 4. SO ₂ : Pararosaniline Method 5. NO ₂ : Griess Saltzman	Quarterly, immediately based on complaints	1. Malolos 14°51'14.53"N 120°48'50.96"E	National Ambient Air Quality Guideline Values (NAAQGV) 24-Hr Monitoring: 1. TSP:230 µg/Ncm 2. PM _{2.5} :50 µg/Ncm ⁸ 3. PM ₁₀ : 150 µg/Ncm 4. SO ₂ : 180 µg/Ncm 1. NO ₂ : 150 µg/Ncm	24-Hr Monitoring: Malolos (2012): 1. TSP: 95 µg/Ncm 2. PM _{2.5} : N.A. 3. PM ₁₀ : 61.8 µg/Ncm 4. NO ₂ : 3.093 µg/Ncm 5. SO ₂ : <0.05 µg/Ncm	24-Hr Monitoring: Malolos: 1. TSP: 297 µg/Ncm 2. PM _{2.5} : 94.1 µg/Ncm 3. PM ₁₀ : 198 µg/Ncm 4. NO ₂ : 18.9 µg/Ncm 5. SO ₂ : <25.5 µg/Ncm	24-Hr Monitoring: Malolos: 1. TSP: 66.9 µg/Ncm 2. PM ₁₀ : 35.7 µg/Ncm 3. PM _{2.5} : 16.4 µg/Ncm 4. SO ₂ : <13.7 µg/Ncm 5. NO ₂ : <3.03 µg/Ncm	24-Hr Monitoring: Malolos: 19 October 2022	
					2. Guiguinto 14°49'31.06"N 120°54'21.05"E		National Ambient Air Quality for Source-Specific Air Pollutants from Industrial Sources / Operations Guiguinto (2013): 1. TSP: 20.20 µg/Ncm 2. PM _{2.5} : N.A. 3. PM ₁₀ : 26.83 µg/Ncm 4. NO ₂ : 8.67 µg/Ncm 5. SO ₂ : 3.68 µg/Ncm	Guiguinto: 1. TSP: 188 µg/Ncm 2. PM _{2.5} : <47.2 µg/Ncm 3. PM ₁₀ : 187 µg/Ncm 4. NO ₂ : 11.3 µg/Ncm 5. SO ₂ : <25.5 µg/Ncm	Guiguinto and Malolos Boundary: 1. TSP: 47.3 µg/Ncm 2. PM ₁₀ : 24.3 µg/Ncm 3. PM _{2.5} : 20.3 µg/Ncm 4. SO ₂ : <13.7 µg/Ncm 5. NO ₂ : 7.56 µg/Ncm	Guiguinto and Malolos Boundary: 18 October 2022	
					3. Balagtas 14°50'21.90"N 120°51'31.28"E		1-Hr Monitoring: 2. TSP:300 µg/Ncm 3. PM _{2.5} : N.A 4. PM ₁₀ :200 µg/Ncm 5. SO ₂ : 340 µg/Ncm 6. NO ₂ : 260 µg/Ncm	Balagtas: N.A.	Balagtas: 1. TSP: 271 µg/Ncm 2. PM _{2.5} : 67.9 µg/Ncm 3. PM ₁₀ : 189 µg/Ncm 4. NO ₂ : 19.7 µg/Ncm 5. SO ₂ : 25.7 µg/Ncm	Balagtas: 1. TSP: 57.0 µg/Ncm 2. PM ₁₀ : 22.4 µg/Ncm 3. PM _{2.5} : 14.1 µg/Ncm 4. SO ₂ : <13.8 µg/Ncm 5. NO ₂ : 10.0 µg/Ncm	Balagtas: 17 October 2022
					4. Bocaue 14°48'2"N 120°55'53"E			Bocaue (2012): 1. TSP: 133 µg/Ncm 2. PM _{2.5} : N.A. 3. PM ₁₀ : 67.9 µg/Ncm 4. NO ₂ : 2.7 µg/Ncm 5. SO ₂ : <0.05 µg/Ncm	Bocaue: 1. TSP: 98.8 µg/Ncm 2. PM _{2.5} : 17.3 µg/Ncm 3. PM ₁₀ : 43.8 µg/Ncm 4. NO ₂ : 3.6 µg/Ncm 5. SO ₂ : 1.0 µg/Ncm	Bocaue: 1. TSP: 44.4 µg/Ncm 2. PM ₁₀ : 1.3 µg/Ncm 3. PM _{2.5} : 12.3 µg/Ncm 4. SO ₂ : 1.1 µg/Ncm 5. NO ₂ : 4.4 µg/Ncm	Bocaue: 18 November 2022

4 Indicates the location of the 2021 1st quarter air quality monitoring station.

5 Source: NSCR EPRMP, March 2015

6 Ambient air quality monitoring was not conducted in Caloocan, Manila, Solis and Tutuban stations since Section1 of Contract Package 01 is not yet handed over to the contractor.

7 Dust mitigation measures are presented in **Annex H**.

8 DAO 2013-13 – Establishing the Provisional National Ambient Air Quality Guideline Values for Particulate Matter 2.5 (PM_{2.5})

			Reaction			<ol style="list-style-type: none"> 1. TSP: 145 µg/Ncm 2. PM_{2.5}: N.A. 3. PM₁₀: 104.4 µg/Ncm 4. NO₂: 2.7 µg/Ncm 5. SO₂: <0.05 µg/Ncm 			
				5. Marilao 14°45'44"N 120°57'2"E		Marilao: N.A.	Marilao: <ol style="list-style-type: none"> 1. TSP: 55.2 µg/Ncm 2. PM_{2.5}: 6.1 µg/Ncm 3. PM₁₀: 47.5 µg/Ncm 4. NO₂: 4.1 µg/Ncm 5. SO₂: 0.6 µg/Ncm 	Marilao: <ol style="list-style-type: none"> 1. TSP: 29.7 µg/Ncm 2. PM₁₀: 0.9 µg/Ncm 3. PM_{2.5}: 22.8 µg/Ncm 4. SO₂: 1.8 µg/Ncm 5. NO₂: 3.8 µg/Ncm 	Marilao: 17 November 2022
				6. Meycauayan 14°44'20"N 120°57'39.32"E		Meycauayan: N.A.	Meycauayan: <ol style="list-style-type: none"> 1. TSP: 61.6 µg/Ncm 2. PM_{2.5}: 14.6 µg/Ncm 3. PM₁₀: 15 µg/Ncm 4. NO₂: 5.1 µg/Ncm 5. SO₂: 0.8 µg/Ncm 	Meycauayan: <ol style="list-style-type: none"> 1. TSP: 34.1 µg/Ncm 2. PM₁₀: 1.1 µg/Ncm 3. PM_{2.5}: 20.1 µg/Ncm 4. SO₂: 1.2 µg/Ncm 5. NO₂: 10.5 µg/Ncm 	Meycauayan: 08 November 2022
				7. Valenzuela 14°42'51" N 120°57'39"E		Valenzuela (2013): <ol style="list-style-type: none"> 1. TSP: 37.52 µg/Ncm 2. PM_{2.5}: N.A. 3. PM₁₀: 49.68 µg/Ncm 4. NO₂: 10.43 µg/Ncm 5. SO₂: 3.96 µg/Ncm 	Valenzuela: <ol style="list-style-type: none"> 1. TSP: 27.3 µg/Ncm 2. PM_{2.5}: 5.3 µg/Ncm 3. PM₁₀: 12.5 µg/Ncm 4. NO₂: 4.9 µg/Ncm 5. SO₂: 1.2 µg/Ncm 	Valenzuela: <ol style="list-style-type: none"> 1. TSP: 33.3 µg/Ncm 2. PM₁₀: 0.9 µg/Ncm 3. PM_{2.5}: 28.2 µg/Ncm 4. SO₂: 0.8 µg/Ncm 5. NO₂: 10.3 µg/Ncm 	Valenzuela: 07 November 2022
				8. Caloocan 14°39'28.3" N 120°58'26.2"E		Caloocan (2014): <ol style="list-style-type: none"> 1. TSP: 97.28 µg/Ncm 2. PM_{2.5}: N.A. 3. PM₁₀: 97.60 µg/Ncm 4. NO₂: 30.81 µg/Ncm 5. SO₂: 15.53 µg/Ncm 	Caloocan – N.A.	Caloocan – N.A.	Caloocan: N.A.
				9. Manila 14°37'26.75" N 120°58'25.52"E		Manila – N.A.	Manila – N.A.	Manila – N.A.	Manila – N.A.
				10. Solis 14°37'56" N 120°58'34.6"E		Solis (2014). <ol style="list-style-type: none"> 1. TSP: 84.6 µg/Ncm 2. PM_{2.5}: N.A. 3. PM₁₀: 30.5 µg/Ncm 4. NO₂: 10.9 µg/Ncm 	Solis – N.A.	Solis – N.A.	Solis – N.A.

						5. SO ₂ : 0.9 µg/Ncm			
					11. Tutuban 14°36'22" N 120°58'17"E	Tutuban (2014): 1. TSP: 81.3 µg/Ncm 2. PM _{2.5} : N.A. 3. PM ₁₀ : 46.7 µg/Ncm 4. NO ₂ : 12.7 µg/Ncm 5. SO ₂ : 2.3 µg/Ncm	Tutuban – N.A.	Tutuban – N.A.	Tutuban – N.A.

No.	Potential Impact	Parameter	Method	Frequency	Location	Standard ⁹	Baseline		Latest Monitoring Result in 4 th Quarter of 2021	
							Feasibility Study Phase ¹⁰	Pre-construction Phase (2019)	Result (Annex I) ¹¹	Monitoring Date
2	Noise pollution	Noise level	Noise level meter	Monthly, immediately based on complaints	Westside of NSCR alignment, residential area, Taal, Bocaue*	Class A - Morning: 55 dB - Daytime: 60 dB - Evening: 55 dB - Nighttime: 50 dB	- N.A.	N.A.	- Morning: 67.4 dB - Daytime: 69.2 dB - Evening: 60.7 dB - Nighttime: 63.3 dB	21-22 October 2022
					Westside of NSCR alignment, inside Violeta Metroville Homes, Biñang 2 nd , Bocaue*	Class 3-4; Class A - Morning: 75 dB - Daytime: 75 dB - Evening: 55 dB - Nighttime: 50 dB			- Morning: 61.9 dB - Daytime: 60.7 dB - Evening: 56.3 dB - Nighttime: 55.0 dB	20-21 October 2022
									- Morning: 64.1 dB - Daytime: 64.9 dB - Evening: 62.6 dB - Nighttime: 56.5 dB	17-18 November 2022
									- Morning: 62.5 dB - Daytime: 62.7 dB - Evening: 54.8 dB - Nighttime: 59.3 dB	22-23 December 2022

⁹ Environmental Quality Standards for Noise in General Areas (NPCC, Memorandum Circular No. 002 Series of 1980). Note: For stations which indicates "Class 3-4; Class A", Standard for 'Class 3-4 Construction activities' was adopted for Morning and Daytime, and Standard for 'Class A General Areas' was adopted during Evening and Nighttime. Also, a corrective factor was applied for stations directly facing 2-lane and 4 or more-lane road as indicated in the NPCC MC No. 1980-002.

¹⁰ Source: NSCR EPRMP, March 2015

¹¹ Results for March 2022 for Valenzuela, Meycauyan, Marilao and Bocaue are included since they were not yet available during the 1st quarter report submission. However, the results for June 2022 in these stations are not yet available. This will be included in the next reporting period.

					Tabig Ilog Elementary School, Marilao Class AA - Morning: 45 dB - Daytime: 50 dB - Evening: 45 dB - Nighttime: 40 dB	N.A.	- Morning: 77.8 dB - Daytime: 78.93 dB - Evening: 76.8 dB - Nighttime: 68.42 dB	N.A.	N.A.
					Abangan Norte Elementary School, Marilao Class AA - Morning: 45 dB - Daytime: 50 dB - Evening: 45 dB - Nighttime: 40 dB	N.A.	- Morning: 70.1 dB - Daytime: 71.84 dB - Evening: 70.83 dB - Nighttime: 63.5 dB	N.A.	N.A.
					Eastside of NSCR alignment (Near Medallion Homes), Marilao Class A - Morning: 60 dB - Daytime: 65 dB - Evening: 60 dB - Nighttime: 55 dB	N.A.	N.A.	- Morning: 66.5 dB - Daytime: 66.8 dB - Evening: 65.2 dB - Nighttime: 64.1 dB - Morning: 67.3 dB - Daytime: 67.1 dB - Evening: 65.4 dB - Nighttime: 64.1 dB - Morning: 67.7 dB - Daytime: 67.9 dB - Evening: 67.4 dB - Nighttime: 63.9 dB	19-20 October 2022 16-17 November 2022 21-22 December 2022
					Near St. Mary Meycauayan College Class AA - Morning: 55 dB - Daytime: 60 dB - Evening: 55 dB - Nighttime: 50 dB	N.A.	- Morning: 86.45 dB - Daytime: 86.0 dB - Evening: 87.760 dB - Nighttime: 86.90 dB	N.A.	N.A.

					Front of Meycauayan College	Class AA - Morning: 45 dB - Daytime: 50 dB - Evening: 45 dB - Nighttime: 40 dB	N.A.	- Morning: 86.28 dB - Daytime: 86.58 dB - Evening: 86.73 dB - Nighttime: 86.41 dB	N.A.	N.A.
					Eastside of Old PNR Meycauayan, near Little Grace Park Subd., Malhakan, Meycauayan, Bulacan	Class 3-4; Class A - Morning: 75 dB - Daytime: 75 dB - Evening: 55 dB - Nighttime: 50 dB	N.A.	N.A.	- Morning: 65.6 dB - Daytime: 65.8 dB - Evening: 65.0 dB - Nighttime: 63.6 dB - Morning: 63.4 dB - Daytime: 66.1 dB - Evening: 64.2 dB - Nighttime: 59.5 dB - Morning: 64.4 dB - Daytime: 67.4 dB - Evening: 71.5 dB - Nighttime: 62.7 dB	18-19 October 2022 15-16 November 2022 20-21 December 2022
					Residential area, Eastside of Depot, Viente Reales, Valenzuela City:	Class 3-4; Class A - Morning: 75 dB - Daytime: 75 dB - Evening: 55 dB - Nighttime: 50 dB	N.A.	N.A.	- Morning: 61.4 dB - Daytime: 72.2 dB - Evening: 58.2 dB - Nighttime: 58.5 dB - Morning: 62.0 dB - Daytime: 67.4 dB - Evening: 62.4 dB - Nighttime: 60.2 dB - Morning: 64.1 dB - Daytime: 61.0 dB - Evening: 63.3 dB - Nighttime: 57.3 dB	17-18 October 2022 14-15 November 2022 19-20 December 2022

					Malinta Elementary School	Class AA - Morning: 45 dB - Daytime: 50 dB - Evening: 45 dB - Nighttime: 40 dB	N.A.	Inside Malinta Elementary School (Class AA): - Morning: 65.25 dB - Daytime: 60.88 dB - Evening: 66.85 dB - Nighttime: 61.61 dB Outside campus Malinta Elementary School - Morning: 85.68 dB - Daytime: 85.53 dB - Evening: 85.3 dB - Nighttime: 85.86 dB	N.A.	N.A.
					Holy Infant Elementary School, Malolos	Class AA - Morning: 55 dB - Daytime: 60 dB - Evening: 55 dB - Nighttime: 50 dB	N.A.	- Morning: 66.62 dB - Daytime: 65.71 dB - Evening: 67.05 dB - Nighttime: 64.7 dB	- Morning: 70.7 dB - Daytime: 74.3 dB - Evening: 70.3 dB - Nighttime: 66.6 dB - Morning: 74.1 dB - Daytime: 74.5 dB - Evening: 71.5 dB - Nighttime: 67.8 dB	21-22 October 2022 07-08 November 2022

Note: The result of noise in Holy Infant Elementary School, Malolos for December 2022 is not yet available at the moment. However, the noise monitoring activity was conducted.

No.	Potential Impact	Parameter	Method	Frequency	Location	Standard	Baseline		Latest Monitoring Result in 4 th Quarter of 2022	
							Feasibility Study Phase ¹²	Pre-construction Phase (2019)	Result (Annex J)	Monitoring Date
3	Increase in ground vibration level due to the operation of heavy equipment and machinery	Vibration level	Vibration level meter	Quarterly, immediately based on complaints	Holy Infant School, Malolos City (Category 3)	BS 5228-2:2009¹³: - 1.0 mm/s - <i>It is likely that vibration of this level in residential environments will cause complaints but can be tolerated if warning and explanation have been given to residents.</i>	N.A.	- Daytime: 0.69 mm/s	Point 1 - PPV: 0.0549 in/s or 1.39 mm/s	17-18 October 2022
					Westside of NSCR alignment, inside Violeta Metroville Homes, Biñang 2nd, Bocaue (alternative station)	FTA Ground-Borne Vibration and Noise Impact Criteria for Frequent events¹⁴ Category 2: Residences and buildings where people normally sleep: 72 Vdb	N.A.	N.A.	Morning - x: 48 VdB y: 51 VdB z: 52 VdB Day - x: 48 VdB y: 50 VdB z: 50 VdB Evening - x: 48 VdB y: 50 VdB z: 50 VdB Nighttime - x: 48 VdB y: 50 VdB z: 50 VdB	17-18 November 2022

¹² Source: NSCR EPRMP, March 2015

¹³ Source: BS 5228-2:2009 (BSI British Standards: Code of practice for noise and vibration control on construction and open sites)

¹⁴ Frequent events are defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category

				Westside of NSCR alignment, residential area, Taal, Bocaue	Category 2: Residences and buildings where people normally sleep: 72 Vdb	N.A.	N.A	Morning - x: 48 VdB y: 50 VdB z: 51 VdB Day - x: 48 VdB y: 50 VdB z: 51 VdB Evening - x: 48 VdB y: 50 VdB z: 51 VdB Nighttime - x: 48 VdB y: 50 VdB z: 51 VdB	18-19 November 2022
				Tabing Ilog Elementary School, Marilao (Category 3):	Category 3: Institutional land uses with primarily daytime use: 75 Vdb	N.A.	- Morning: 63 VdB - Daytime: 70 VdB - Evening: 68 VdB - Nighttime: 60VdB	N.A.	N.A.
				Abangan Norte Elementary School, Marilao (Category 3)	Category 3: Institutional land uses with primarily daytime use: 75 Vdb	N.A.	- Morning: 53 VdB - Daytime: 63 VdB - Evening: 57 VdB - Nighttime: 56 VdB	N.A.	N.A.

					Eastside of NSCR alignment, Residential area, Medallion Subd., Ibayo, Marilao (alternative station)	Category 2: Residences and buildings where people normally sleep: 72 Vdb	N.A.	N.A.	Morning - x: 49 VdB y: 50 VdB z: 51 VdB Day - x: 49 VdB y: 50 VdB z: 51 VdB Evening - x: 49 VdB y: 50 VdB z: 51 VdB Nighttime - x: 60 VdB y: 61 VdB z: 62 VdB	16-17 November 2022
					St. Mary Meycauayan College (Category 3)	Category 3: Institutional land uses with primarily daytime use: 75 Vdb	N.A.	- Morning: 72 VdB - Daytime: 76 VdB - Evening: 77 VdB - Nighttime: 78 VdB	N.A.	N.A.
						Category 3: Institutional land uses with primarily daytime use: 75 Vdb	N.A.	Meycauayan College (Category 3): - Morning: 66 VdB - Daytime: 68 VdB - Evening: 70 VdB - Nighttime: 67 VdB	N.A.	N.A.

					A6 Eastside of Old PNR Meycauayan, near Little Grace Park Subd., Malhakan, Meycauayan, Bulacan (alternative station)	Category 2: Residences and buildings where people normally sleep: 72 Vdb	N.A.	N.A.	Morning - x: 52 VdB y: 51 VdB z: 52 VdB Day - x: 54 VdB y: 52 VdB z: 54 VdB Evening - x: 55 VdB y: 55 VdB z: 56 VdB Nighttime - x: 51 VdB y: 49 VdB z: 51 VdB	15-16 November 2022
					Malinta Elementary School, Valenzuela City (Category 3)	Category 3: Institutional land uses with primarily daytime use: 75 Vdb	Valenzuela: - ND	- Morning: 59 VdB - Daytime: 57 VdB - Evening: 58 VdB - Nighttime: 55 VdB	N.A.	N.A.
					A5 Residential area, Eastside of Depot, Viente Reales, Valenzuela City (alternative station)	Category 2: Residences and buildings where people normally sleep: 72 Vdb	N.A.	N.A.	Morning - x: 50 VdB y: 48 VdB z: 50 VdB Daytime: - x: 50 VdB y: 48 VdB z: 50 VdB Evening - x: 51 VdB y: 51 VdB z: 52 VdB Nighttime - x: 50 VdB y: 48 VdB z: 50 VdB	14-15 November 2022

					Old PNR Stations	BS 5228-2:2009¹⁵: - 1.0 mm/s - <i>It is likely that vibration of this level in residential environments will cause complaints but can be tolerated if warning and explanation have been given to residents.</i>	N.A.	Malolos Old PNR Station (Category 3): - Daytime: 0.76 mm/s	Point 1 - PPV: 0.0318 in/s or 0.8077 mm/s	17 October 2022
					Malolos Old PNR Station (Category 3)					
					Guiguinto Old PNR Station (Category 3):		Guiguinto Old PNR Station (Category 1): - 0.002 mm/s ²	Guiguinto Old PNR Station (Category 3): - Daytime: 0.56 mm/s	Point 1 - PPV: 0.0276 in/s or 0.701 mm/s Point 2 - PPV: 0.0161 in/s or 0.4089 mm/s	17 October 2022
					Balagtas Old PNR Station (Category 3)		N.A.	Balagtas Old PNR Station (Category 3): - Daytime: 0.38 mm/s	Point 1 - PPV: 0.0225 in/s or 0.5715 mm/s Point 2 PPV: 0.0786 in/s or 1.9964 mm/s	17 October 2022
					Meycauayan Old PNR Station (Category 3)	FTA Ground-Borne Vibration and Noise Impact Criteria for Frequent events Category 3:	N.A.	Meycauayan Old PNR Station (Category 3): ¹⁶ - Morning: 83 VdB - Daytime: 84.67 VdB - Evening: 84.33 VdB - Nighttime:83.33 VdB	N.A.	N.A.
					Valenzuela Old PNR Station (Category 3)	Institutional land uses with primarily daytime use:75 Vdb	N.A.	Valenzuela Old PNR Station (Category 3): ¹⁷ - Morning: 83.67 VdB - Daytime: 85.33 VdB - Evening: 84.67 VdB - Nighttime:84.00 VdB	N.A.	N.A.

¹⁵ Source: BS 5228-2:2009 (BSI British Standards: Code of practice for noise and vibration control on construction and open sites)

¹⁶ Date of Sampling: January 2020

¹⁷ Date of Sampling: January 2020

(4) Impact on People

No.	Potential Impact	Parameter	Method	Frequency	Location	Standard	Latest Monitoring Result in 3 rd Quarter 2022	
							Result	Monitoring Date
1	Traffic conditions	Traffic flow (congestion)	Ocular inspection	Weekly	A major intersection in the vicinity of constriction sites	N.A.	<p>To manage traffic flow, the contractors provided flagmen with proper traffic gears, and cautionary signages.</p> <p>Contract Package 01:</p> <p>Hired 15 flagmen and 21 traffic enforcers (on-call) from different Barangay and LGU of Bulacan and Valenzuela, as of December 2022.</p> <p>Contract Package 02:</p> <p>Provisions being implemented on site such as cautionary signages, re-routing schemes, banksmen, traffic assessment and traffic engineering works. Traffic Management Officer is full time designated on site.</p> <p>Conducted monthly traffic impact assessment at Malolos, Guiguinto, and Balagtas area along major routes of third-party vehicles as required by DOTr.</p> <p>Malolos, Guiguinto and Balagtas Project Site have pedestrian access routes. Each Site has 17, 10, and 3, respectively. TMP provisions the placement of traffic and safety signages and deployment of flagmen in all road intersections of the transportation route.</p> <p>See Annex K</p>	N.A.

2	Loss of old PNR stations	Status of old PNR stations	Ocular inspection	Monthly until preservation work of station is completed	Malolos Station, Meycauayan Station, Polo/Valenzuela Station, and Tutuban Station	Status of old PNR stations	See Annex L for the observations and findings during inspections.	<p>Valenzuela Old PNR Station: 27 October 2022 22 November 2022 22 December 2022</p> <p>Meycauayan Old PNR Station: 27 October 2022 22 November 2022 22 December 2022</p> <p>Bigaa (Balagtas) Old PNR Station: 28 October 2022 28 November 2022 15 December 2022</p> <p>Guiguinto Old PNR Station: 28 October 2022 28 November 2022 15 December 2022</p> <p>Malolos Old PNR Station: 28 October 2022 28 November 2022 15 December 2022</p>
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