

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

1. General Information

| | |
|--------------------------------------|---|
| a. Environmental Monitoring Results: | 2nd Quarter of 2020 |
| b. Date of Preparing This form | 24 September 2020 |
| c. Office Preparing This form | Unit: 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 2nd quarter of 2020 | |
|-----|--|--|--|----------------------------------|---|---|--|-----------------|
| | | | | | | | 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. | No soil contamination due to oil and lubricant spill was reported. | N.A. |
| 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 and Contaminated Site Ordinance: 200 mg/kg DAO 2013-22: <1 mg/L | TCLP results in soil samples at shallow depth (<50 cm) are greater than 1 mg/L. (Annex A). | 17 June 2020 |

| | | | | | | | | |
|---|---|---|--|---------|--|---|--|---------------------------|
| 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. | The CP01 and CP02 contractors implement solid waste management and disposal. Solid wastes are regularly collected by Local Government Units (LGUs) for final disposal at a sanitary landfill. Material Recovery Facilities (MRFs) were established however need to provide better labeling for CP02 since it was not maintained during ECQ. (Annex B). | 23 June 2020 ¹ |
| 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 | No tree cutting and earth-balling activities were conducted during the reporting period. | N.A. |

¹ Similar activities were cancelled due to the implementation of Enhanced Community Quarantine (ECQ).

| | | | | | | | | |
|---|---|---------------------|---------------|----------|---|------|---|--------------------------------------|
| 6 | Loss of small swampy area used for migratory and resident birds due to development of depot | Seasonal bird count | Ocular Survey | Annually | Adjacent offset wetland of Valenzuela depot | N.A. | <p>Separate online consultation meetings with DENR-R3 (Annex C) and DENR-NCR.</p> <p>DENR-NCR will prepare a proposed work and financial plan for the conservation of Tanza Marine Tree Park as part of the NSCR offset wetland management project.</p> | <p>11 June 2020 26 June 2020</p> |
|---|---|---------------------|---------------|----------|---|------|---|--------------------------------------|

(2) Impact on Water

| No. | Potential Impact | Parameter | Method | Frequency | Location | Standard | Latest Monitoring Result in 2nd quarter of 2020 | |
|-----|---|---|--|-----------|--|---|---|---|
| | | | | | | | Result (Annex D) | 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°49'49.33" N 120°52'42.93" E 2. Santol (Balagtas) River 14°49'6.31" N 120°54'46.96" E 3. Bocaue River 14°48'19.77" N 120°55'37.85" E 4. Marilao River 14°45'41.45" N 120°57'3.15" E 5. Meycauayan River 14°43'50.69" N 120°57'49.35" E 6. Valenzuela Depot 14°42'48.64" N 120°57'39.53" E 7. Tullahan River 14°40.672'N 120°58.315'E 8. Estero de Maypajo 14°38.113'N 120°58.6'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: 7.17 2. DO: 1.19 mg/L 3. Oil & Grease: ND 4. BOD: 22.8 mg/L 5. Fecal Coliform: 7.9x10 ⁴ MPN/100mL 6. TSS: 13.3 mg/L Santol (Balagtas) River 1. pH: 7.37 2. DO: ND 3. Oil & Grease: ND 4. BOD: 27.0 mg/L 5. Fecal Coliform: 1.7x10 ⁵ MPN/100mL 6. TSS: 19.20 mg/L Bocaue River: 1. pH: 6.0 2. DO: 8.4 mg/L 3. Oil & Grease: 2 mg/L 4. BOD: 58 mg/L 5. Fecal Coliform: 1.1x10 ⁵ MPN/100mL 6. TSS: 29 mg/L | Guiguinto River: 25 June 2020 Santol (Balagtas) River: 25 June 2020 Bocaue River: 24 June 2020 |

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

| | | | | | | | |
|--|--|--|--|--|--|---|--|
| | | | | | | <p>Marilao River:</p> <ol style="list-style-type: none"> 1. pH: 6.1 2. DO: 8.9 mg/L 3. Oil & Grease: 1 mg/L 4. BOD: 108 mg/L 5. Fecal Coliform: 2.3x10⁵ MPN/100mL 6. TSS: 20 mg/L <p>Meycauayan River:</p> <ol style="list-style-type: none"> 1. pH: 7.9 2. DO: 0 mg/L 3. Oil & Grease: <1 mg/L 4. BOD: 2,210 mg/L 5. Fecal Coliform: 4.9x10⁵ MPN/100mL 6. TSS: 21 mg/L <p>Valenzuela Depot:</p> <ol style="list-style-type: none"> 1. pH: 6.1 2. DO: 8.5 mg/L 3. Oil & Grease: <1 mg/L 4. BOD: 84 mg/L 5. Fecal Coliform: 2.3x10⁵ MPN/100mL 6. TSS: 15 mg/L <p>Tullahan River³ - N.A. Estero de Maypajo - N.A.</p> | <p>Marilao River: 24 June 2020</p> <p>Meycauayan River: 02 July 2020</p> <p>Valenzuela Depot: 24 June 2020</p> <p>Tullahan River: N.A. Estero de Maypajo: N.A.</p> |
|--|--|--|--|--|--|---|--|

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 | Standard | Latest Monitoring Result in 2nd quarter of 2020 | |
|-----|---|---|--|--|---|--|--|--|
| | | | | | | | Result (Annex E) | 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 Reaction | Quarterly, immediately based on complaints | 1. Malolos 14°51'14.11"N 120°48'52.04"E 2. Guiguinto and Malolos Boundary 14°50'18.84"N 120°51'32.82"E 3. Balagtas 14°49'21.1"N 120°54'21.89"E 4. Bocaue 14°48'2"N 120°55'53"E 5. Marilao 14°45'44"N 120°57'2"E 6. Meycauayan 14°44'20"N 120°57'39"E 7. Valenzuela 14°42'51" N 120°57'39"E 8. Caloocan 14°39'28.3" N 120°58'26.2"E 9. Manila 14°37'26.75" N 120°58'25.52"E 10. Solis 14°37'56" N 120°58'34.6"E 11. Tutuban 14°36'22" N 120°58'17"E | National Ambient Air Quality Guideline Values (NAAQGV) 24-Hr Monitoring: 1. TSP:230 µg/Ncm 2. PM _{2.5} :50 µg/Ncm ⁴ 3. PM ₁₀ : 150 µg/Ncm 4. SO ₂ : 180 µg/Ncm 1. NO ₂ : 150 µg/Ncm National Ambient Air Quality for Source-Specific Air Pollutants from Industrial Sources / Operations 1-Hr Monitoring: 2. TSP:300 µg/Ncm 3. PM _{2.5} : N.A 4. PM ₁₀ :200 µg/Ncm 5. SO ₂ : 340 µ/Ncm 6. NO ₂ : 260 µ/Ncm | 24-Hr Monitoring: Malolos ⁵ 1. TSP: 45.1 mg/Ncm 2. PM _{2.5} : 8.84 mg/Ncm 3. PM ₁₀ : 22.2 mg/Ncm 4. NO ₂ : <3.02 mg/Ncm* 5. SO ₂ : <10.4 mg/Ncm* Guiguinto and Malolos Boundary: 1. TSP: 49.8 mg/Ncm 2. PM _{2.5} : 22.7 mg/Ncm 3. PM ₁₀ : 24.0 mg/Ncm 4. NO ₂ : <3.03 mg/Ncm* 5. SO ₂ : <10.4 mg/Ncm* Balagtas 1. TSP: 46.0 mg/Ncm 2. PM _{2.5} : 16.8 mg/Ncm 3. PM ₁₀ : 24.0 mg/Ncm 4. NO ₂ : <3.02 mg/Ncm* 5. SO ₂ : <10.4 mg/Ncm* Bocaue: 1. TSP: 273.76 mg/Ncm 2. PM _{2.5} : 27.80 mg/Ncm 3. PM ₁₀ : 45.24 mg/Ncm 4. NO ₂ : 8.93 mg/Ncm 5. SO ₂ : 1.29 mg/Ncm Marilao: 1. TSP: 156.43 mg/Ncm 2. PM _{2.5} : 20.51 mg/Ncm 3. PM ₁₀ : 46.94 mg/Ncm | 24-Hr Monitoring: Malolos: 25-26 June 2020 Guiguinto and Malolos Boundary: 26-27 June 2020 Balagtas: 27-28 June 2020 Bocaue: 25-26 June 2020 Marilao: 24-25 June 2020 |

⁴ DAO 2013-13 – Establishing the Provisional National Ambient Air Quality Guideline Values for Particulate Matter 2.5 (PM_{2.5})

⁵ Ambient air quality monitoring was not conducted in Caloocan, Manila, Solis and Tutuban stations since Section 1 of Contract Package 01 is not yet handed over to the contractor.

* Values detected are below the laboratory's Method detection limit

| | | | | | | | |
|--|--|--|--|--|--|---|---|
| | | | | | | <p>4. NO₂: 16.86 mg/Ncm 5. SO₂: 0.87 mg/Ncm</p> <p>Meycauayan (Old Station):</p> <p>1. TSP: 140.26 mg/Ncm 2. PM_{2.5}: 29.33 mg/Ncm 3. PM₁₀: 52.14 mg/Ncm 4. NO₂: 14.16 mg/Ncm 5. SO₂: 0.88 mg/Ncm</p> <p>Valenzuela (PR3-44 Malanday Depot):</p> <p>1. TSP: 108.92 mg/Ncm 2. PM_{2.5}: 14.51 mg/Ncm 3. PM₁₀: 22.16 mg/Ncm 4. NO₂: 6.27 mg/Ncm 5. SO₂: 0.50 mg/Ncm</p> <p>Caloocan – N.A. Manila – N.A. Solis – N.A. Tutuban – N.A.</p> | <p>Meycauayan: 23-24 June 2020</p> <p>Valenzuela: 22-23 June 2020</p> <p>Caloocan: N.A. Manila – N.A. Solis – N.A. Tutuban – N.A.</p> |
|--|--|--|--|--|--|---|---|

| No. | Potential Impact | Parameter | Method | Frequency | Location | Standard | Latest Monitoring Result in 2nd quarter of 2020 | |
|-----|------------------|-------------|-------------------|--|---|---|---|--|
| | | | | | | | Result (Annex F) | Monitoring Date |
| 2 | Noise pollution | Noise level | Noise level meter | Monthly, immediately based on complaints | Class AA: School Institutions 1. Malolos (Holy Infant School) 14°50'41.47"N 120°50'10.88"E 2. Marilao (Abangan Norte Elementary School) 14°46'27"N; 120°56'38"E 3. Marilao (Tabing-Ilog Elementary School) 14°45'53"N; 120°56'55"E 4. Meycauayan (St. Mary's College) 14°44'23"N; 120°57'36"E 5. Meycauayan (Meycauayan College) 14°44'11"N; 120°57'41"E | Environmental Quality Standards for Noise in General Areas (NPCC, Memorandum Circular No. 002 Series of 1980) “AA” categorized areas (Areas which require quietness) - Morning (0500-0900H): 45 dB - Daytime (0900-1800H): 50 dB - Evening (1800-2200H): 45 dB - Nighttime (2200-0500H): 40 dB | Malolos (Holy Infant School) ⁶ : N.A. Marilao (Abangan Norte Elementary School) ⁷ : - Morning: 59.1 dB - Daytime: 61.3 dB - Evening: 62.7 dB - Nighttime: 59.7 dB Marilao (Tabing-Ilog Elementary School): - Morning: 74.8 dB - Daytime: 76.3 dB - Evening: 72.6 dB - Nighttime: 69.3 dB Meycauayan (St. Mary's College): - Morning: 84.4 dB - Daytime: 84.8 dB - Evening: 85.3 dB - Night Time: 84.9 dB | Malolos (Holy Infant School): N.A. Marilao (Abangan Norte Elementary School): 19-20 June 2020 Marilao (Tabing-Ilog Elementary School): 18-19 June 2020 Meycauayan (St. Mary's College): 17-18 June 2020 |

⁶ Noise monitoring in Holy Infant School was not conducted since the school stopped its operations.

⁷ Noise monitoring for April, May and June not conducted in all noise monitoring stations due to the government's declaration of Enhanced Community Quarantine (ECQ). Noise monitoring for 2nd quarter was also delayed.

| | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
| | | | | | <p>6. Valenzuela (Malinta Elementary School) 14°41'26"N; 120°57'58"E</p> <p>Class A: Residential area</p> <p>7. Malolos (Near Old PNR Station) 14°51'12.92"N 120°48'51.04"E</p> | <p>"A" categorized areas (residential areas) Morning (0500-0900H): 50 dB Daytime (0900-1800H): 55 dB Evening (1800-2200H): 50 dB Nighttime (2200-0500H): 45 dB</p> | <p>Meycauayan (Meycauayan College):</p> <ul style="list-style-type: none"> - Morning: 83.2 dB - Daytime: 83.9 dB - Evening: 82.9 dB - Nighttime: 81.4 dB <p>Valenzuela (Malinta Elementary School - Inside):</p> <ul style="list-style-type: none"> - Morning: 79.0 dB - Daytime: 79.4 dB - Evening: 76.9 dB - Nighttime: 74.0 dB <p>Residential area</p> <p>Malolos (Near Old PNR Station):⁸</p> <ul style="list-style-type: none"> - Morning: 66.70 dB - Daytime: 67.50 dB - Evening: 60.50 dB - Nighttime: 58.90 dB | <p>Meycauayan (Meycauayan College): 16-17 June 2020</p> <p>Valenzuela (Malinta Elementary School): 15-16 June 2020</p> <p>Malolos (Old PNR Station): 25-26 June 2020</p> |
|--|--|--|--|--|--|--|--|--|

⁸ Alternate sampling point to Holy Infant School. The sampling point is located in residential area near Old PNR Station

| No. | Potential Impact | Parameter | Method | Frequency | Location | Standard | Latest Monitoring Result in 2nd quarter of 2020 | |
|-----|--|-----------------|-----------------------|--|---|--|--|--|
| | | | | | | | Result (Annex G) | 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 | Class AA areas (School Institutions) 1. Malolos (Holy Infant School) 14°50'41.40"N 120°50'11.09"E 2. Marilao (Abangan Norte Elementary School) 14°46'27.36"N; 120°56'39.18d"E | BS 5228-2:2009⁹: - 0.14 mm/s - <i>Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration</i> - 0.3 mm/s - <i>Vibration might be just perceptible in residential environments.</i> - 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</i> | Malolos (Holy Infant School) ¹¹ : N.A. Marilao (Abangan Norte Elementary School): - Morning: x: 53 VdB y: 54 VdB z: 54 VdB - Daytime: x: 53 VdB y: 54 VdB z: 54 VdB - Evening: x: 54 VdB y: 54 VdB z: 54 VdB - Nighttime: x: 53 VdB y: 55 VdB z: 54 VdB | Malolos (Holy Infant School): N.A. Marilao (Abangan Norte Elementary School): 19-20 June 2020 |

⁹ Source: BS 5228-2:2009 (BSI British Standards: Code of practice for noise and vibration control on construction and open sites)

¹¹ Vibration monitoring in Holy Infant School was not conducted since the school stopped its operations.

| | | | | | | | |
|--|--|--|--|---|--|---|---|
| | | | | | <p>3. Marilao (Tabing-Ilog Elementary School) 14°45'53.43"N; 120°56'55.93"E</p> <p><i>residents.</i></p> <p>- 10 mm/s - <i>Vibration is likely to be intolerable for any more than very brief exposure to this level.</i></p> <p>FTA Ground-Borne Vibration and Noise Impact Criteria for Frequent events¹⁰ (Vdb 1 micro inch/sec)</p> <p>Category A: Buildings where vibration would interfere with interior operations: 65 Vdb</p> <p>Category 2: Residences and buildings where people normally sleep: 72 Vdb</p> <p>Category 3: Institutional land uses with primarily daytime use: 75 Vdb</p> | <p>Marilao (Tabing-Ilog Elementary School):</p> <ul style="list-style-type: none"> - Morning: x: 53 VdB y: 54 VdB z: 54 VdB - Daytime: x: 55 VdB y: 64 VdB z: 55 VdB - Evening: x: 53 VdB y: 54 VdB z: 54 VdB - Nighttime: x: 53 VdB y: 54 VdB z: 54 VdB <p>Meycauayan (St. Mary's College):</p> <ul style="list-style-type: none"> - Morning: x: 54 VdB y: 61 VdB z: 54 VdB - Daytime: x: 55 VdB y: 62 VdB z: 55 VdB - Evening: x: 54 VdB y: 63 VdB z: 54 VdB - Nighttime: x: 53 VdB y: 59 VdB z: 54 VdB | <p>Marilao (Tabing-Ilog Elementary School): 18 19 June 2020</p> <p>Meycauayan (St. Mary's College): 17-18 June 2020</p> |
| | | | | <p>4. Meycauayan (St. Mary's College) 14°44'22.05"N; 120°57'36.54"E</p> | | | |

¹⁰ Frequent events are defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category

| | | | | | | | | |
|--|--|--|--|--|--|--|---|--|
| | | | | | <p>5. Meycauayan (Meycauyan College) 14°44'1.60"N; 120°57'41.32"E</p> | | <p>Meycauayan (Meycauyan College):</p> <ul style="list-style-type: none"> - Morning: x: 53 VdB y: 55 VdB z: 54 VdB - Daytime: x: 54 VdB y: 56 VdB z: 54 VdB - Evening: x: 53 VdB y: 55 VdB z: 54 VdB - Nighttime: x: 53 VdB y: 55 VdB z: 54 VdB | <p>Meycauayan (Meycauyan College): 16-17 June 2020</p> |
| | | | | | <p>6. Valenzuela (Malinta Elementary School) 14°41'32.79"N; 120°57'56.56"E</p> | | <p>Valenzuela (Malinta Elementary School):</p> <ul style="list-style-type: none"> - Morning: x: 53 VdB y: 55 VdB z: 53 VdB - Daytime: x: 54 VdB y: 57 VdB z: 54 VdB - Evening: x: 54 VdB y: 56 VdB z: 54 VdB - Nighttime: x: 53 VdB y: 54 VdB z: 53 VdB | <p>Valenzuela (Malinta Elementary School): 15-18 June 2020</p> |

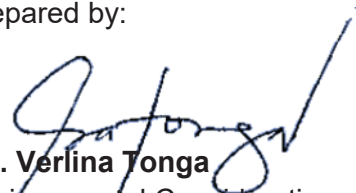
| | | | | | | | | |
|--|--|--|--|--|---|--|--|--|
| | | | | | <p>Old PNR Station</p> <p>7. Malolos Old PNR Station 14°49'47.95"N 120°53'1.91"E</p> | | <p>Old PNR Station¹²</p> <p>Malolos Old PNR Station - Daytime: 1113-1203H: 8.11 mm/s</p> | <p>Malolos Old PNR Station: 26 June 2020</p> |
|--|--|--|--|--|---|--|--|--|

¹² No monitoring activities were conducted in Old PNR Guiguinto, Balagtas, Meycauayan and Valenzuela Stations since there are no active construction works during Enhanced Community Quarantine (ECQ) implementation.

(4) Impact on People

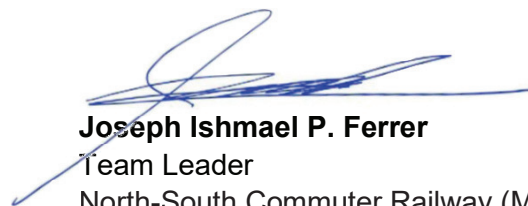
| No. | Potential Impact | Parameter | Method | Frequency | Location | Standard | Latest Monitoring Result in 2nd quarter of 2020 | |
|-----|--------------------------|----------------------------|-------------------|---|---|---|--|-------------------|
| | | | | | | | Result | Monitoring Date |
| 1 | Traffic conditions | Traffic flow (congestion) | Ocular inspection | Weekly | A major intersection in the vicinity of construction sites | N.A | The CP02 and CP01 Contractors conduct Traffic Management in areas where construction activities could hamper the normal traffic flow. Provisions such as cautionary signages, re-routing schemes, banksmen, traffic assessment, and traffic engineering works are being implemented on-site. Traffic Management Officer is full time designated on-site. (Annex F). | N.A ¹³ |
| 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 | Precondition status of old PNR stations | Inspection documentation for Malolos, Guiguinto, and Balagtas Old PNR Stations (Annex G). | 25 June 2020 |

Prepared by:



Ma. Verlina Tonga
 Environmental Considerations Head
 North-South Commuter Railway (Malolos – Tutuban) Project
 DOTr Railway Sector

Noted by:



Joseph Ishmael P. Ferrer
 Team Leader
 North-South Commuter Railway (Malolos – Tutuban) Project
 DOTr Railway Sector

¹³ Monitoring activities were cancelled due to the implementation of Enhanced Community Quarantine (ECQ).

ANNEX A: TCLP Results



MACH UNION LABORATORIES INC.

Main Office: Mach Union Building, 335 Alabang-Zapote Road, Talon 3, 1740 Las Piñas City, Philippines
 Extension Office: Anfra Bldg., FMC-LTO Crmpd., 314 Alabang-Zapote Road, Talon 1, 1740 Las Piñas City
 Tel. No.: (02) 8553-8381 / (02) 8553-8382 / (02) 8553-8879 Fax No.: (02) 8553-8878
 Email: info@machunion.com • Website: www.machunion.com
 Philippine Accreditation Bureau (DTI-PAB) • Department of Health (DOH) • Food & Drug's Administration (FDA)
 Department of Environment & Natural Resources (DENR-EMB) • Bureau of Animal Industry (DA-BAI)

Accredited / Recognized:

Result of Physico-Chemical Analysis

Job Number: MU20017039 Laboratory Number: MU20017039-001 Date: 06/22/2020
 Customer: NCRVLZ-000095 NORTH-SOUTH COMMUTER RAILWAY (MALOLOS TO TUTUBAN) PROJECT
 Address: NSCR (Malolos-Tutuban) Office, 4th Flr, ARCA Building, Karuhatan Valenzuela City

Sampling Date: 06/17/2020 Analyzed Date: 06/17/2020
 Date Received: 06/17/2020
 Sample ID: PR3-68
 Sample Description: Soil Sample in Ziplock Bag

Analysis are based on sample (s) of: NCRVLZ-000095 NORTH-SOUTH COMMUTER RAILWAY (MALOLOS TO TUTUBAN) PROJECT
 Mach Union Water Laboratory, Inc. does not guarantee that sample(s) submitted is (are) representative of the whole bulk from where it/they was (were) taken. Reproduction of this report is not authorized except in full, without written approval of the laboratory.

| Parameters | Method | Units | Result |
|------------|-------------|-------|--------|
| Lead | Flame - AAS | mg/L | 11.1 |


Method 1311. Toxicity Characteristic Leaching Procedure. US EPA. 1992
 SW-846 Test Method for Evaluating Solid Waste: Physical/Chemical Methods


**Customer/s is/are given (7) days upon receipt of report to question any discrepancies (i.e. customer name & address, sample description, result, etc.)
 This document has been signed by those names that appear on this report and are the authorised signatories.

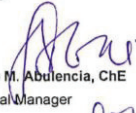
Checked by:

Certified by:

Noted by:


 Katrina L. Pagulayan, RCh
 Chemist
 PRC#: 0013681


 Marisa T. Manao, RCh
 Supervising Chemist
 PRC#: 0005465


 Aladino M. Abulencia, ChE
 Technical Manager

MU20017039_FINAL_200624 1607H

Page 1 of 1



MACH UNION LABORATORIES INC.

Main Office: Mach Union Building, 335 Alabang-Zapote Road, Talon 3, 1740 Las Piñas City, Philippines
 Extension Office: Anfra Bldg., FMC-LTO Cmpd., 314 Alabang-Zapote Road, Talon 1, 1740 Las Piñas City
 Tel. No.: (02) 8553-8381 / (02) 8553-8382 / (02) 8553-8879 Fax No.: (02) 8553-8878
 Email: info@machunion.com • Website: www.machunion.com
 Philippine Accreditation Bureau (DTI-PAB) • Department of Health (DOH) • Food & Drugs Administration (FDA)
 Department of Environment & Natural Resources (DENR-EMB) • Bureau of Animal Industry (DA-BAI)

Result of Physico-Chemical Analysis

Job Number: MU20017040 Laboratory Number MU20017040-001 Date: 06/22/2020
 Customer: NCRVLZ-000095 NORTH-SOUTH COMMUTER RAILWAY (MALOLOS TO TUTUBAN) PROJECT
 Address: NSCR (Malolos-Tutuban) Office, 4th Flr, ARCA Building, Karuhatan Valenzuela City
 Sampling Date: 06/17/2020 Analyzed Date: 06/17/2020
 Date Received: 06/17/2020
 Sample ID: PR3-69
 Sample Description: Soil Sample in Ziplock Bag

Analysis are based on sample (s) of: NCRVLZ-000095 NORTH-SOUTH COMMUTER RAILWAY (MALOLOS TO TUTUBAN) PROJECT
 Mach Union Water Laboratory, Inc. does not guarantee that sample(s) submitted is (are) representative of the whole bulk from where it/they was (were) taken. Reproduction of this report is not authorized except in full, without written approval of the laboratory.

| Parameters | Method | Units | Result |
|------------|-------------|-------|--------|
| Lead | Flame - AAS | mg/L | 2.20 |

Method 1311. Toxicity Characteristic Leaching Procedure. US EPA. 1992
 SW-846 Test Method for Evaluating Solid Waste: Physical/Chemical Methods

**Customer/s is/are given (7) days upon receipt of report to question any discrepancies (i.e. customer name & address, sample description, result, etc.)

This document has been signed by those names that appear on this report and are the authorised signatories.

Checked by:

Katring U. Pagulayan, RCh
 Chemist
 PRC#: 0013681

Certified by:

Marisa T. Manao, RCh
 Supervising Chemist
 PRC#: 0005465

Noted by:

Aladino M. Abulencia, ChE
 Technical Manager

MU20017040_FINAL_200624 1607H

Page 1 of 1



MACH UNION LABORATORIES INC.

Main Office: Mach Union Building, 335 Alabang-Zapote Road, Talon 3, 1740 Las Piñas City, Philippines
 Extension Office: Anfra Bldg., FMC-LTO Cmpd., 314 Alabang-Zapote Road, Talon 1, 1740 Las Piñas City
 Tel. No.: (02) 8553-8381 / (02) 8553-8382 / (02) 8553-8879 Fax No.: (02) 8553-8878
 Email: info@machunion.com • Website: www.machunion.com
 Philippine Accreditation Bureau (DTI-PAB) • Department of Health (DOH) • Food & Drugs Administration (FDA)
 Department of Environment & Natural Resources (DENR-EMB) • Bureau of Animal Industry (DA-BAI)

Accredited / Recognized:

Result of Physico-Chemical Analysis

Job Number: MU20017041 Laboratory Number MU20017041-001 Date: 06/22/2020
 Customer: NCRVLZ-000095 NORTH-SOUTH COMMUTER RAILWAY (MALOLOS TO TUTUBAN) PROJECT
 Address: NSCR (Malolos-Tutuban) Office, 4th Flr, ARCA Building, Karuhatan Valenzuela City
 Sampling Date: 06/17/2020 Analyzed Date: 06/17/2020
 Date Received: 06/17/2020
 Sample ID: PR3-70
 Sample Description: Soil Sample in Ziplock Bag

Analysis are based on sample (s) of: NCRVLZ-000095 NORTH-SOUTH COMMUTER RAILWAY (MALOLOS TO TUTUBAN) PROJECT
 Mach Union Water Laboratory, Inc. does not guarantee that sample(s) submitted is (are) representative of the whole bulk from where it/they was (were) taken. Reproduction of this report is not authorized except in full, without written approval of the laboratory.

| Parameters | Method | Units | Result |
|------------|-------------|-------|--------|
| Lead | Flame - AAS | mg/L | 6.15 |

Method 1311.Toxicity Characteristic Leaching Procedure. US EPA. 1992
 SW-846 Test Method for Evaluating Solid Waste: Physical/Chemical Methods

**Customer/s is/are given (7) days upon receipt of report to question any discrepancies (i.e. customer name & address, sample description, result, etc.)

This document has been signed by those names that appear on this report and are the authorised signatories.

Checked by:

Katrina U. Pagulayan, RCh
 Chemist
 PRC# 0013681

Certified by:

Marisa T. Manao, RCh
 Supervising Chemist
 PRC# 0005465

Noted by:

Aladino M. Abulencia, ChE
 Technical Manager

MU20017041_FINAL_200624 1607H

Page 1 of 1



MACH UNION LABORATORIES INC.

Main Office: Mach Union Building, 335 Alabang-Zapote Road, Talon 3, 1740 Las Piñas City, Philippines
Extension Office: Anfra Bldg., FMC-LTO Cmpd., 314 Alabang-Zapote Road, Talon 1, 1740 Las Piñas City
Tel. No.: (02) 8553-8381 / (02) 8553-8382 / (02) 8553-8879 Fax No.: (02) 8553-8878

Email: info@machunion.com • Website: www.machunion.com

Philippine Accreditation Bureau (DTI-PAB) • Department of Health (DOH) • Food & Drugs Administration (FDA)
Department of Environment & Natural Resources (DENR-EMB) • Bureau of Animal Industry (DA-BAI)

Accredited / Recognized:

Result of Physico-Chemical Analysis

Job Number: MU20017042 Laboratory Number: MU20017042-001 Date: 06/22/2020
 Customer: NCRVLZ-000095 NORTH-SOUTH COMMUTER RAILWAY (MALOLOS TO TUTUBAN) PROJECT
 Address: NSCR (Malolos-Tutuban) Office, 4th Flr, ARCA Building, Karuhatan Valenzuela City

Sampling Date: 06/17/2020 Analyzed Date: 06/17/2020
 Date Received: 06/17/2020
 Sample ID: PR3-71
 Sample Description: Soil Sample in Ziplock Bag

Analysis are based on sample (s) of: NCRVLZ-000095 NORTH-SOUTH COMMUTER RAILWAY (MALOLOS TO TUTUBAN) PROJECT
 Mach Union Water Laboratory, Inc. does not guarantee that sample(s) submitted is (are) representative of the whole bulk from where it/they was (were) taken. Reproduction of this report is not authorized except in full, without written approval of the laboratory.

| Parameters | Method | Units | Result |
|------------|-------------|-------|--------|
| Lead | Flame - AAS | mg/L | 14.0 |

Method 1311.Toxicity Characteristic Leaching Procedure. US EPA. 1992
SW-846 Test Method for Evaluating Solid Waste: Physical/Chemical Methods

**Customer/s is/are given (7) days upon receipt of report to question any discrepancies (i.e. customer name & address, sample description, result, etc.)

This document has been signed by those names that appear on this report and are the authorised signatories.

Checked by:

Katrina J. Pagulayan, RCh
Chemist
PRC#: 0013681

Certified by:

Marisa T. Mangor, RCh
Supervising Chemist
PRC#: 0005465

Noted by:

Aladino M. Abulencia, ChE
Technical Manager

MU20017042_FINAL_200624 1608H

Page 1 of 1

ANNEX B: SOLID WASTE MANAGEMENT

Ref. No. : SCIC-EXT-0001
Date : May 31, 2019

ENGR. SUDAN C. CARREON
MENRO Head
Municipal Government of Guiguinto Bulacan
Poblacion, Guiguinto, Bulacan

Dear Engr. Carreon:

Greetings!

On May 30, 2019, your good office kindly sent Mr. Orlan Asuncion for an inspection on our facility and requested me to write a letter regarding my concern for our garbage collection.

For a brief background Sta Clara International Corporation would be working as a subcontractor on the national government "Build, Build, Build" Program under the Department of Transportation and Railway (DOTR) namely the North-South Commuter Railway project here in Bulacan.

It would be expected to have a large number of workers here in our temporary facility at Tabe, Guiguinto Bulacan which we like to have a provision our solid waste are as follows:

1. Propose that the waste collected be weighed here on site before it will delivered at the MRF of Guiguinto
2. Propose a three day delivery of waste on your MRF and have a gate pass for our service to deliver the collected waste to avoid bulk accumulation.
3. Propose that our workers food waste/kitchen waste be collected to avoid smell on site.

In line with these, we shall collect empty sachets of 3in1 packs of instant coffees as part of the municipalities campaign on Solid Waste Management.

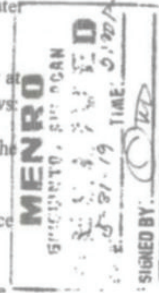
Your consideration on this matter is greatly appreciated.

Thank you and more Power!

Respectfully yours,

[Signature]
CHRISTINE DAWN S. BONAEBRA
Pollution Control Officer

Noted by: *[Signature]*
MANOLO C. BAUTISTA
Project Manager



*Domestic waste (No. construction debris) of household
twice a week of disposal
- Monday / Thursday 8am-5pm*

*Under 5/31/19
about June 3, 2019
of disposal*





Receptacles for recyclable materials like bottles and aluminum cans



Color-coded garbage bins at designated areas for proper waste segregation



On-going installation and assembly of underground septic tank for temporary toilet at Bocaue construction site.



Installation and assembly of pipes and underground septic tank at Malanday Depot Temporary Office.



Temporary toilet facility at Malanday Depot with fabricated septic tank.



North South Commuter Railway (NSCR) Project
 CP01 Elevated Structure, 6 Stations and Depot
 Contact No.: PNRN1-03
 Location: Malanday Depot
 Description: Site inspection/Double Barrel inspection
 Jun 9, 2020 10:06:46 AM

North South Commuter Railway (NSCR) Project
 CP01 Elevated Structure, 6 Stations and Depot
 Contact No.: PNRN1-03
 Location: Bocaue Station, Bocaue, Bulacan
 Description: Site Inspection
 Jun 29, 2020 11:49:26 AM

Portalet deployed at Malanday Depot and temporary sanitation facility located at Bocaue bored pile works.



Portalets deployed at Meycauayan NSCR alignment works.

**ANNEX C:
COORDINATION LETTER TO
DENR-NCR**



Republic of the Philippines
DEPARTMENT OF TRANSPORTATION (DOTr)
RAILWAYS SECTOR

19 June 2020

JACQUELINE A. CAANCAN

Regional Executive Director
Department of Environment and Natural Resources
National Capital Region
NEC, East Ave., Quezon City

Attention: Carlito P. Castañeda
Chief, PAMBS

**Subject: North-South Commuter Railway (Malolos-Tutuban) Project;
Environmental Considerations; Request for an online consultation
meeting**

Dear **Director Caancan**:

This is in relation to the mitigating measures stipulated in the Environmental Performance Report and Management Plan (EPRMP) of the North-South Commuter Railway (Malolos – Tutuban) Project.

As a brief background, a coordination meeting was previously conducted with the Conservation Development Division (CDD) of the DENR Region 3 to discuss the status of Candaba wetlands since it was identified to be a feasible offset wetland during the Detailed Design Study of the above-mentioned Project.

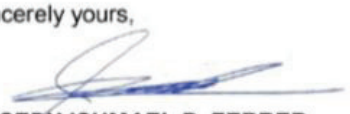
However, the viability of Sasmuan Bangkung Malapad Critical Habitat and Ecotourism Area¹ was endorsed through a letter by the office of the Regional Director of DENR – Central Luzon and this Department is now currently considering the same given their expertise in this matter.

Since the affected wetland area is located in Valenzuela City, which is under DENR-NCR's jurisdiction, we would like to discuss this further with you or your representative through an online consultation meeting, possibly on 24 June 2020 at 1:00 pm.

Should you have any questions and clarifications, you may contact Ma. Verlina E. Tonga at (02) 7752 4184, +63 9455348405 or e-mail through maverlina.tonga.dotr@gmail.com.

Thank you very much.

Sincerely yours,


JOSEPH ISHMAEL P. FERRER
Project Officer IV
Team Leader, NSCR (Malolos - Tutuban) Project
Office of the Undersecretary for Railways

cc:

Mr. Timothy John R. Batan, Undersecretary for Railways, DOTr
Mr. Junn B. Magno, General Manager, PNR

¹ Attached as Annex "A"
Reference No.

DOTR CENTRAL OFFICE:

Pinatubo Street corner S. Osmeña Street,
Clark Freeport Zone, Pampanga
(02) 7908300

PROJECT MANAGEMENT OFFICE:

4/F ARCA North Building
ARCA North Compound, Mc Arthur Highway
Karuhatan, Valenzuela City
(02) 7752 4184

ANNEX D: WATER QUALITY MONITORING REPORT



Environmental Management Service Provider

12 August 2020

Ref. No.: FR-20-006-P2-4-56

MS. AIDENN C. RANAS
Senior Environmental Supervisor
TAISEI-DMCI JV
DMCI Annex Building, 2278 Chino Roces Ave,
Makati City.

Subject: Surface Water Quality Monitoring Results

Dear Ms. Ranas:

Presented herewith are the procedures and results of the surface water quality monitoring conducted on June 24 and July 2, 2020 at the designated stations near the North South Commuter Railway Project situated in Makati City. The surface water sampling was conducted by Mr. Lynbert G. Yasar of BSI.

A. OBJECTIVE OF THE MONITORING

The purpose of the monitoring was to verify the company's compliance with the water quality standards from the DENR Administrative Order No. 2016-08 (*Water Quality Guidelines and General Effluent Standards of 2016*).

B. SAMPLING PROCEDURE

Samples were obtained from the surface water source. The sampling procedures and analyses are in accordance with the prescribed methods in Volume II: Effluent Quality Monitoring Manual issued through EMB Memorandum Circular 2008-008 and with American Public Health Association or APHA's Standard Methods for the Examination of Water and Wastewater. As a standard procedure, the water samples collected were preserved in an ice-filled cooler before being sent to an independent laboratory for analysis. The water sampling methodologies are shown in *Table 1*.

2nd Floor, VAG Bldg, Ortigas Ave., Greenhills
San Juan, Metro Manila, Philippines
Tel No. (632) 863-6129- Fax (632) 727-9831
Email: info@bsienv.com



ACCREDITED THIRD PARTY TESTER

Table 1. Methods of Analysis for Surface Water

| Parameters | Methodology |
|---|--|
| pH (in-situ) | Direct Reading |
| Temperature (in-situ) | Direct Reading |
| Color (True) | Platinum Cobalt Colorimetric |
| Dissolve Oxygen (DO) | Azide Modification |
| Biochemical Oxygen Demand (BOD ₅) | Azide Modification (Dilution Technique) |
| Total Suspended Solids (TSS) | Gravimetric Method (dried at 103-105 °C) |
| Surfactants (MBAS) | Methylene Blue Method (Colorimetric) |
| Oil & Grease | Partition – Gravimetric Method |
| Nitrate as N | Brucine Sulfanilic |
| Phosphate as P | Stannous Chloride Method |
| Phenols | Chloroform Extraction |
| Chloride (Cl) | Argentometric |
| Chromium Hexavalent (Cr ⁺⁶) | Diphenyl Carbazide – Colorimetric Method |
| Mercury (Hg) | Cold Vapour Technique |
| Copper (Cu) | Flame AAS |
| Cyanide (CN) | Ion-Selective Electrode |
| Arsenic (As) | Hydride Generation - AAS |
| Cadmium (Cd) | Flame AAS |
| Lead (Pb) | Flame AAS |
| Thermotolerant Coliform | Multiple Tube Fermentation Technique |
| Total Coliform | Multiple Tube Fermentation Technique |

AAS – Atomic Absorption Spectrophotometry

C. SUMMARY OF RESULTS

The results of the water sampling and analyses are presented in *Table 2*. The results were compared with the DAO No. 2016-08 Water Quality Guidelines for Class C waters.

Class C waters are characterized by its primary use for recreation (boating, fishing, or similar activities), fisheries (propagation and growth of fish and other aquatic resources) or industrial use (for agriculture, irrigation, and livestock watering).

Clear skies were observed during sampling (*except for SW3*) but intermittent rain was observed in the past 24 hrs. All water samples have no visible surface oils however, sewage odor were perceived. Floating debris and the color of the water sources were observed in all stations (*see photo documentation*).

Table 2. Surface Water Quality Monitoring Results

| Parameters | SW1 | SW2 | DAO No. 2016-08 |
|---|--|--|---|
| | Valenzuela Depot [24-Jun-2020] 0953H | Meycauayan River [02-Jul-2020] 1510H | Water Quality Guidelines for Class C Waters |
| pH (in-situ) | 6.1 | 7.9 | 6.5-9.0 |
| Temperature (in-situ), °C | 29.0 | 31.0 | 25-31* |
| Color (True), TCU | 20 @ pH 7.80 | 30 @ pH 7.00 | 75 |
| Biochemical Oxygen Demand (BOD ₅), mg/L | 84 | 2,210 | 7 |
| Chloride (Cl), mg/L | 30 | 1,002 | 350 |
| Cyanide (CN), mg/L | < 0.025 | < 0.025 | 0.1 ^b |
| Dissolved Oxygen (DO) | 8.5 | 0 | 5 [#] |
| Nitrate as N, mg/L | < 0.003 | 0.038 | 7 ^d |
| Oil & Grease, mg/L | < 1 | < 1 | 2 |
| Phenol, mg/L | < 0.003 | < 0.003 | 0.05 ^c |
| Phosphate, mg/L | 0.676 | 1.53 | 0.5 |
| Surfactants (MBAS), mg/L | 0.1 | 0.9 | 1.5 |
| Total Suspended Solids (TSS), mg/L | 15 | 21 | 80 |
| Thermotolerant (Fecal) Coliform, MPN/100mL | 2.3 x 10 ⁵ | 4.9 x 10 ⁵ | 200 |
| Total Coliform, MPN/100mL | 2.4 x 10 ⁶ | 4.9 x 10 ⁵ | None |
| Arsenic (As), mg/L | < 0.001 | < 0.001 | 0.02 |
| Cadmium (Cd), mg/L | < 0.001 | < 0.001 | 0.005 |
| Chromium (Cr), mg/L | < 0.01 | < 0.01 | none |
| Chromium as Hexavalent Chromium (Cr ⁶⁺), mg/L | 0.004 | 0.004 | 0.01 |
| Copper (Cu), mg/L | 0.005 | 0.014 | 0.02 ^a |
| Lead (Pb), mg/L | < 0.01 | < 0.01 | 0.05 |
| Mercury (Hg), mg/L | < 0.0003 | < 0.0003 | 0.002 |

*The natural background temperature as determined by EMB shall prevail if the temperature is lower or higher than the WQG; provided that the maximum increase is only up to 10 percent and that it will not cause any risk to human health and the environment.

[#] minimum value (samples shall be taken from 9:00 AM to 4:00 PM)

^a Copper as dissolved Copper

^b Cyanide as Free Cyanide

^c Phenols include 2-chlorophenol, 2,4-dichlorophenol, and 2,4,6-trichlorophenol

^d NO₃ - N

Note: TCU – True Color Units; MPN – Most Probable Number;

MBAS – Methylene Blue Active Substances

| Parameters | SW3 Marilao River [24-Jun-2020] 1431H | SW4 Bocaue River [24-Jun-2020] 1157H | DAO No. 2016-08 Water Quality Guidelines for Class C Waters |
|---|--|---|--|
| pH (in-situ) | 6.1 | 6.0 | 6.5-9.0 |
| Temperature (in-situ), °C | 29.0 | 31.0 | 25-31* |
| Color (True), TCU | 40 @ pH 7.19 | 40 @ pH 7.27 | 75 |
| Biochemical Oxygen Demand (BOD ₅), mg/L | 108 | 58 | 7 |
| Chloride (Cl), mg/L | 30 | 142 | 350 |
| Cyanide (CN), mg/L | < 0.025 | < 0.025 | 0.1 ^b |
| Dissolved Oxygen (DO) | 8.9 | 8.4 | 5 [#] |
| Nitrate as N, mg/L | 1.35 | 1.54 | 7 ^d |
| Oil & Grease, mg/L | 1 | 2 | 2 |
| Phenol, mg/L | < 0.003 | < 0.003 | 0.05 ^c |
| Phosphate, mg/L | 1.40 | 0.500 | 0.5 |
| Surfactants (MBAS), mg/L | 0.1 | 0.1 | 1.5 |
| Total Suspended Solids (TSS), mg/L | 20 | 29 | 80 |
| Thermotolerant (Fecal) Coliform, MPN/100mL | 2.3 x 10 ⁵ | 1.1 x 10 ⁵ | 200 |
| Total Coliform, MPN/100mL | 4.6 x 10 ⁵ | 1.7 x 10 ⁵ | None |
| Arsenic (As), mg/L | < 0.001 | < 0.001 | 0.02 |
| Cadmium (Cd), mg/L | < 0.001 | < 0.001 | 0.005 |
| Chromium (Cr), mg/L | < 0.01 | < 0.01 | none |
| Chromium as Hexavalent Chromium (Cr ⁶⁺), mg/L | 0.007 | 0.004 | 0.01 |
| Copper (Cu), mg/L | 0.005 | 0.004 | 0.02 ^a |
| Lead (Pb), mg/L | < 0.01 | < 0.01 | 0.05 |
| Mercury (Hg), mg/L | < 0.0003 | < 0.0003 | 0.002 |

*The natural background temperature as determined by EMB shall prevail if the temperature is lower or higher than the WQG; provided that the maximum increase is only up to 10 percent and that it will not cause any risk to human health and the environment.

[#] minimum value (samples shall be taken from 9:00 AM to 4:00 PM)

^a Copper as dissolved Copper

^b Cyanide as Free Cyanide

^c Phenols include 2-chlorophenol, 2,4-dichlorophenol, and 2,4,6-trichlorophenol

^d NO₃ - N

Note: TCU – True Color Units; MPN – Most Probable Number;

MBAS – Methylene Blue Active Substances

TO: MS. AIDENN C. RANAS
COMPANY: NORTH SOUTH COMMUTER RAILWAY PROJECT
DATE: 12 AUGUST 2020
Page 6 of 8

There are many sources of phosphate in industrial and janitorial products because they are good cleaners and lubricants. Phosphates are essential for plants and animals, but too much phosphate contributes to eutrophication – fertilization of streams, rivers, and lakes, allowing algae to grow so abundantly that it dies for lack of light; the decomposition of the algae uses water's dissolved oxygen, thereby causing the death of fish and marine life. Chemical precipitation is used to remove the inorganic forms of phosphates by the addition of a coagulant and a mixing of wastewater and coagulant. The multivalent metal ions most commonly used are calcium, aluminium and iron.

Exposure to chloride in surface and groundwater can come from both natural and anthropogenic sources, such as run-off containing road de-icing salts, the use of inorganic fertilizers, landfill leachates, septic tank effluents, animal feeds, industrial effluents, irrigation drainage, and seawater intrusion in coastal areas. Chloride toxicity has not been observed in humans except in the special case of impaired sodium chloride metabolism, e.g. in congestive heart failure. Healthy individuals can tolerate the intake of large quantities of chloride provided that there is a concomitant intake of fresh water (WHO, 2003).

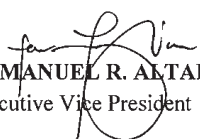
Anthropogenic sources of oil and grease include chronic discharges from storage facilities and refineries, discharges from tankers and other shipping along major routes and accidental events, such as oil spills and ruptures of pipelines. Sources also include river-borne discharges, diffuse discharges from industrialised municipal areas, offshore oil production (e.g. drilling, transport, refining and burning of oil and petrochemicals) and the atmosphere.

Attached with this report are the photo documentations during sampling and the certificates of the conducted laboratory analyses.

If you have any inquiry regarding the water quality monitoring, please do not hesitate to call us.

Thank you and regards.

Very truly yours,


EMMANUEL R. ALTAREJOS
Executive Vice President

ERA/mss
2nd Floor, VAG Bldg, Ortigas Ave., Greenhills
San Juan, Metro Manila, Philippines
Tel No. (632) 863-6129 • Fax (632) 727-9831
Email: info@bsienv.com

 Department of Environment and Natural Resources (DENR)
ENVIRONMENTAL MANAGEMENT BUREAU
ACCREDITED THIRD PARTY TESTER

PHOTO DOCUMENTATION



Latitude: 14.713955
Longitude: 120.960946
Elevation: 10.21m
Accuracy: 3.0m
Time: 06-24-2020 09:57
Note: SW1 FJ20-006 P2 TD JV

**SW1 - Valenzuela Depot
[24-June-2020]
0953H**



14°43'51.7661"N 120°57'48.3629"E
Drive Road
Meycauayan
Bulacan
Central Luzon
Altitude: 12.0m
Speed: 0.0km/h
South Commuter Railway (NSCR) Project
Elevated Structure, 6 Stations and Depot
Contact No.: PNRNT-03
Location: Meycauayan River
Description: Water Sampling
Jul 2, 2020 3:10:58 PM



14°43'51.7661"N 120°57'48.3629"E
Drive Road
Meycauayan
Bulacan
Central Luzon
Altitude: 37.0m
Speed: 0.0km/h
Commuter Railway (NSCR) Project
Elevated Structure, 6 Stations and Depot
Contact No.: PNRNT-03
Location: Meycauayan River
Description: Water Sampling
Jul 2, 2020 3:31:44 PM

**SW2- Meycauayan River
[02-July-2020]
1510H**

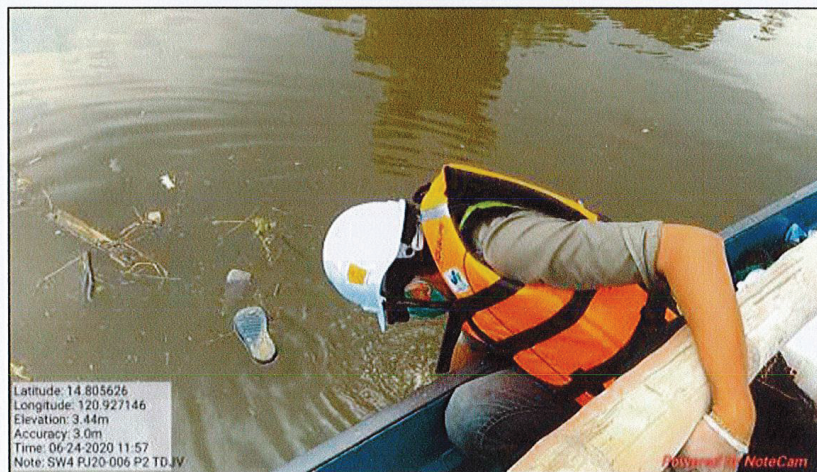


**Surface Water Quality Monitoring
North South Commuter Railway Project
June 24 and July 2, 2020**

PHOTO DOCUMENTATION



**SW3 – Marila River
[24-June-2020]
1431H**



**SW4- Bocaue River
[24-June-2020]
1157H**



Environmental Management Service Provider

**Surface Water Quality Monitoring
North South Commuter Railway Project**
June 24 and July 2, 2020



Unit 201-202 & 406 Rizalina Annex Bldg, 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

| | | | |
|---------------------------|--|-----------------|------------------------|
| CLIENT | : BSI | Lab. Report No. | : 201277-SW |
| ADDRESS | : 2 nd Flr., VAG Bldg Ortigas Ave. Greenhills | Date Sampled | : 06-24-20 |
| | : San Juan, Metro Manila | Date Received | : 06-24-20 |
| Nature of Sample/s | : Surface Water | Date Analyzed | : 06-24-20 to 07-20-20 |
| No. of Sample/s Submitted | : Three (3) | Date Reported | : 07-20-20 |

[R E P O R T O F A N A L Y S E S]

Sample No. Sample ID
 ES-2005761 = PJ 20 006 P2 SW 1

| Parameters | Result | Method | Reporting Limit |
|---|--------------|---|-----------------|
| Color, TCU | 20 @ pH 7.80 | 2120B / Visual Comparison | 5 |
| Biochemical Oxygen Demand (BOD ₅), mg/L | 84 | 5210B / Azide Modification (Dilution Technique) | 1 |
| Chloride (Cl), mg/L | 30 | 4500Cl B / Argentometric | 1 |
| Cyanide (CN), mg/L | < 0.025 | 4500-CN F / Ion-Selective Electrode | 0.025 |
| Dissolved Oxygen (DO), mg/L | 8.5 | 4500-O C / Azide Modification | 0.1 |
| Nitrate as N, mg/L | < 0.003 | EPA 352.1 / Brucine - Sulfanilic | 0.003 |
| Oil and Grease (O&G), mg/L | < 1 | 5520B / Partition-Gravimetric | 1 |
| Phenols, mg/L | < 0.003 | 5530C / Chloroform Extraction | 0.003 |
| Phosphate as P, mg/L | 0.676 | 4500-P D / Stannous Chloride | 0.006 |
| Surfactants (MBAS), mg/L | 0.1 | 5540C / Methylene Blue | 0.1 |
| Total Suspended Solids (TSS), mg/L | 15 | 2540D / Gravimetric | 2 |

Reference
 Standard Methods for Examination of Water and Wastewater, APHA-AWWA, 22nd ed., 2012

Test results reflect the quality of the samples as received.
 No portion of this report may be reproduced in any form
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory.



Page 1 of 6 Page/s
 EI_HRAFORM_10

ELARSI, INC.

Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

| | |
|--|--------------------------------------|
| CLIENT : BSI | Lab. Report No. : 201277-SW |
| ADDRESS : 2 nd Flr., VAG Bldg Ortigas Ave. Greenhills | Date Sampled : 06-24-20 |
| San Juan, Metro Manila | Date Received : 06-24-20 |
| Nature of Sample/s : Surface Water | Date Analyzed : 06-24-20 to 07-20-20 |
| No. of Sample/s Submitted : Three (3) | Date Reported : 07-20-20 |

[R E P O R T O F A N A L Y S E S]

Sample No. Sample ID
 ES-2005762 = PJ 20 006 P2 SW 3

| Parameters | Result | Method | Reporting Limit |
|---|--------------|---|-----------------|
| Color, TCU | 40 @ pH 7.19 | 2120B / Visual Comparison | 5 |
| Biochemical Oxygen Demand (BOD ₅), mg/L | 108 | 5210B / Azide Modification (Dilution Technique) | 1 |
| Chloride (Cl), mg/L | 30 | 4500Cl B / Argentometric | 1 |
| Cyanide (CN), mg/L | < 0.025 | 4500-CN F / Ion-Selective Electrode | 0.025 |
| Dissolved Oxygen (DO), mg/L | 8.9 | 4500-O C / Azide Modification | 0.1 |
| Nitrate as N, mg/L | 1.35 | EPA 352.1 / Brucine - Sulfanilic | 0.003 |
| Oil and Grease (O&G), mg/L | 1 | 5520B / Partition-Gravimetric | 1 |
| Phenols, mg/L | < 0.003 | 5530C / Chloroform Extraction | 0.003 |
| Phosphate as P, mg/L | 1.40 | 4500-P D / Stannous Chloride | 0.006 |
| Surfactants (MBAS), mg/L | 0.1 | 5540C / Methylene Blue | 0.1 |
| Total Suspended Solids (TSS), mg/L | 20 | 2540D / Gravimetric | 2 |

Reference
Standard Methods for Examination of Water and Wastewater. APHA-AWWA. 22nd ed., 2012

Test results reflect the quality of the samples as received.
No portion of this report may be reproduced in any form
without written authorization of ELARSI, Inc.
This report is not valid without the official dry seal and watermarks of the laboratory



DENR
RECOGNIZED
LABORATORY
C.R. No. 005/2016



DOH
ACCREDITED
LABORATORY
13-0010-1920-LW-2

Page 2 of 6 Pages

EI_HRAFORM_10



Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : BSI
 ADDRESS : 2nd Flr., VAG Bldg Ortigas Ave. Greenhills
 San Juan, Metro Manila
 Nature of Sample/s : Surface Water
 No. of Sample/s Submitted : Three (3)

Lab. Report No. : 201277-SW
 Date Sampled : 06-24-20
 Date Received : 06-24-20
 Date Analyzed : 06-24-20 to 07-20-20
 Date Reported : 07-20-20

[R E P O R T O F A N A L Y S E S]

Sample No. ES-2005763 = Sample ID PJ 20 006 P2 SW 4

| Parameters | Result | Method | Reporting Limit |
|---|--------------|---|-----------------|
| Color, TCU | 40 @ pH 7.27 | 2120B / Visual Comparison | 5 |
| Biochemical Oxygen Demand (BOD ₅), mg/L | 58 | 5210B / Azide Modification (Dilution Technique) | 1 |
| Chloride (Cl), mg/L | 142 | 4500Cl B / Argentometric | 1 |
| Cyanide (CN), mg/L | < 0.025 | 4500-CN F / Ion-Selective Electrode | 0.025 |
| Dissolved Oxygen (DO), mg/L | 8.4 | 4500-O C / Azide Modification | 0.1 |
| Nitrate as N, mg/L | 1.54 | EPA 352.1 / Brucine - Sulfanilic | 0.003 |
| Oil and Grease (O&G), mg/L | 2 | 5520B / Partition-Gravimetric | 1 |
| Phenols, mg/L | < 0.003 | 5530C / Chloroform Extraction | 0.003 |
| Phosphate as P, mg/L | 0.500 | 4500-P D / Stannous Chloride | 0.006 |
| Surfactants (MBAS), mg/L | 0.1 | 5540C / Methylene Blue | 0.1 |
| Total Suspended Solids (TSS), mg/L | 29 | 2540D / Gravimetric | 2 |

Reference
 Standard Methods for Examination of Water and Wastewater, APHA-AWWA, 22nd ed., 2012

Test results reflect the quality of the samples as received.
 No portion of this report may be reproduced in any form
 without written authorization of ELARSI, Inc
 This report is not valid without the official dry seal and watermarks of the laboratory



DENR
 RECOGNIZED
 LABORATORY
 C.R. No. 005/2018



DOH
 ACCREDITED
 LABORATORY
 13-0010-1920-LW-2

Page 3 of 6 Pages

EI_HRAFORM_10

ELARSI, INC.


Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

| | | | |
|---------------------------|--|-----------------|------------------------|
| CLIENT | : BSI | Lab. Report No. | : 201277-SW |
| ADDRESS | : 2 nd Flr., VAG Bldg Ortigas Ave. Greenhills San Juan, Metro Manila | Date Sampled | : 06-24-20 |
| Nature of Sample/s | : Surface Water | Date Received | : 06-24-20 |
| No. of Sample/s Submitted | : Three (3) | Date Analyzed | : 06-24-20 to 07-20-20 |
| | | Date Reported | : 07-20-20 |


Analyzed By:


MARINELLA FRANCESCA S. CARLOS, RChT
Laboratory Chemical Technician
PRC Lic. No. 0003462


Analyzed By:


HEDDY SUZANE D. GHIONG, RChT
Laboratory Chemical Technician
PRC Lic. No. 0004673

Checked By:


JULIE CHRISTILLE HAPPY G. MORTE, RChT
Laboratory Supervisor
PRC Lic. No. 0012578

Analyzed By:


ISABEL NICOLE P. CRISOSTOMO, RChT
Laboratory Chemical Technician
PRC Lic. No. 0002845

Certified Correct By:


RENATO M. GOFREDO, JR., RChT
Laboratory Manager
PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.
No portion of this report may be reproduced in any form,
without written authorization of ELARSI, Inc.
This report is not valid without the official dry seal and watermarks of the laboratory.



Page 4 of 6 Page/s

EI_HRAFORM_10



Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : BSI
 ADDRESS : 2nd Flr., VAG Bldg Ortigas Ave. Greenhills
 San Juan, Metro Manila
 Nature of Sample/s : Surface Water
 No. of Sample/s Submitted : Three (3)

Lab. Report No. : 201277-SW
 Date Sampled : 06-24-20
 Date Received : 06-24-20
 Date Analyzed : 06-24-20 to 07-20-20
 Date Reported : 07-20-20

[R E P O R T O F A N A L Y S E S]

| Sample No. | Sample ID | Thermotolerant Collform, MPN/100 mL |
|------------|-------------------|-------------------------------------|
| ES-2005761 | PJ 20 006 P2 SW 1 | 2.3 x 10 ⁵ |
| ES-2005762 | PJ 20 006 P2 SW 3 | 2.3 x 10 ⁵ |
| ES-2005763 | PJ 20 006 P2 SW 4 | 1.1 x 10 ⁵ |

| Method | Method 9221E / Multiple Tube Fermentation Technique |
|-----------------|---|
| Reporting Limit | 1.8 |

Reference
 Standard Methods for Examination of Water and Wastewater, APHA-AWWA, 22nd ed., 2012

Analyzed By:

[Signature]
DIMPLE JOY D. BACULI, RMT
 Microbiologist
 PRC Lic. No. 0062620

Checked By:

[Signature]
MARIBETH B. MADERAZO, RMicro, MSPH
 Microbiologist
 PAM. No. 06-00193RM

Certified Correct By:

[Signature]
RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.
 No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory





Unit 201-202 & 406 Rizalina Annex Bldg, 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : BSI
 ADDRESS : 2nd Flr., VAG Bldg Ortigas Ave. Greenhills
 San Juan, Metro Manila
 Nature of Sample/s : Surface Water
 No. of Sample/s Submitted : Three (3)

Lab. Report No. : 201277-SW
 Date Sampled : 06-24-20
 Date Received : 06-24-20
 Date Analyzed : 06-24-20 to 07-20-20
 Date Reported : 07-20-20

[R E P O R T O F A N A L Y S E S]

| Sample No. | Sample ID | Total Coliform, MPN/100 mL |
|------------|-------------------|----------------------------|
| ES-2005761 | PJ 20 006 P2 SW 1 | 2.4 x 10 ⁶ |
| ES-2005762 | PJ 20 006 P2 SW 3 | 4.6 x 10 ⁵ |
| ES-2005763 | PJ 20 006 P2 SW 4 | 1.7 x 10 ⁵ |

| Method | Method 9221B / Multiple Tube Fermentation Technique |
|-----------------|---|
| Reporting Limit | 1.8 |

Reference:
 Standard Methods for Examination of Water and Wastewater, APHA-AWWA, 22nd ed., 2012

Analyzed By:

DIMPLE JOY D. BACULI, RMT
 Microbiologist
 PRC Lic. No. 0062820

Checked By:

MARIBETH B. MADERAZO, RMicro, MSPH
 Microbiologist
 PAM. No. 06-00193RM

Certified Correct By:

RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.
 No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory.



Page 6 of 6 Page/s

EI_HRAFORM_10



Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : BSI
ADDRESS : 2nd Flr., VAG Bldg Ortigas Ave. Greenhills
San Juan, Metro Manila
Nature of Sample/s : Surface water
No. of Sample/s Submitted : One (1)

Lab. Report No. : 201362-SW
Date Sampled : 07-02-20
Date Received : 07-02-20
Date Analyzed : 07-03-20 to 07-18-20
Date Reported : 07-20-20

[R E P O R T O F A N A L Y S E S]

Sample No. ES-2006176 = Sample ID PJ 20 006 P2 SW 2

| Parameters | Result | Method | Reporting Limit |
|---|--------------|---|-----------------|
| Color, TCU | 30 @ pH 7.00 | 2120B / Visual Comparison | 5 |
| Biochemical Oxygen Demand (BOD ₅), mg/L | 2,210 | 5210B / Azide Modification (Dilution Technique) | 1 |
| Chloride (Cl), mg/L | 1,002 | 4500Cl B / Argentometric | 1 |
| Cyanide (CN), mg/L | < 0.025 | 4500-CN F / Ion-Selective Electrode | 0.025 |
| Dissolved Oxygen (DO), mg/L | 0 | 4500-O C / Azide Modification | 0.1 |
| Nitrate as N, mg/L | 0.038 | EPA 352.1 / Brucine - Sulfanilic | 0.003 |
| Oil and Grease (O&G), mg/L | < 1 | 5520B / Partition-Gravimetric | 1 |
| Phenols, mg/L | < 0.003 | 5530C / Chloroform Extraction | 0.003 |
| Phosphate as P, mg/L | 1.53 | 4500-P D / Stannous Chloride | 0.006 |
| Surfactants (MBAS), mg/L | 0.9 | 5540C / Methylene Blue | 0.1 |
| Total Suspended Solids (TSS), mg/L | 21 | 2540D / Gravimetric | 2 |

Reference
Standard Methods for Examination of Water and Wastewater, APHA-AWWA, 22nd ed., 2012

Test results reflect the quality of the samples as received.
No portion of this report may be reproduced in any form
without written authorization of ELARSI, Inc.
This report is not valid without the official dry seal and watermarks of the laboratory



Page 1 of 4 Pages

EI_HRAFORM_10



Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

| | | | |
|---------------------------|--|-----------------|------------------------|
| CLIENT | : BSI | Lab. Report No. | : 201362-SW |
| ADDRESS | : 2 nd Flr., VAG Bldg Ortigas Ave. Greenhills San Juan, Metro Manila | Date Sampled | : 07-02-20 |
| Nature of Sample/s | : Surface water | Date Received | : 07-02-20 |
| No. of Sample/s Submitted | : One (1) | Date Analyzed | : 07-03-20 to 07-18-20 |
| | | Date Reported | : 07-20-20 |

[R E P O R T O F A N A L Y S E S]

| Sample No. | Sample ID | Thermotolerant Coliform, MPN/100 mL |
|------------|-------------------|-------------------------------------|
| ES-2006176 | PJ 20 006 P2 SW 2 | 4.9 x 10 ⁵ |

| Method | Method 9221E / Multiple Tube Fermentation Technique |
|-----------------|---|
| Reporting Limit | 1.8 |

Reference
 Standard Methods for Examination of Water and Wastewater, APHA-AWWA, 22nd ed., 2012

Analyzed By:

MARIBETH B. MADERAZO, RMicro, MSPH
 Microbiologist
 PAM. No. 06-00193RM

Checked By:

DIMPLE JOY D. BACULI, RMT
 Microbiologist
 PRC Lic. No. 0062620

Certified Correct By:

RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.
 No portion of this report may be reproduced in any form
 without written authorization of ELARSI, Inc
 This report is not valid without the official dry seal and watermarks of the laboratory



DENR
 RECOGNIZED
 LABORATORY
 C.R. No. 005/2018



DOH
 ACCREDITED
 LABORATORY
 13-0010-1920-LW-2

Page 3 of 4 Page/s

EI_HRAFORM_10



Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

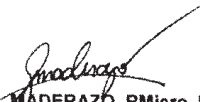
| | | | |
|---------------------------|--|-----------------|------------------------|
| CLIENT | : BSI | Lab. Report No. | : 201362-SW |
| ADDRESS | : 2 nd Flr., VAG Bldg Ortigas Ave. Greenhills | Date Sampled | : 07-02-20 |
| | : San Juan, Metro Manila | Date Received | : 07-02-20 |
| Nature of Sample/s | : Surface water | Date Analyzed | : 07-03-20 to 07-18-20 |
| No. of Sample/s Submitted | : One (1) | Date Reported | : 07-20-20 |

[R E P O R T O F A N A L Y S E S]

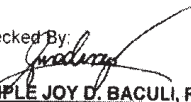
| Sample No. | Sample ID | Total Coliform, MPN/100 mL |
|------------------------|-------------------|--|
| ES-2006176 | PJ 20 006 P2 SW 2 | 4.9 x 10 ⁵ |
| Method | | Method 9221B / Multiple Tube Fermentation Technique |
| Reporting Limit | | 1.8 |

Reference
 Standard Methods for Examination of Water and Wastewater. APHA-AWWA, 22nd ed., 2012

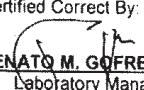
Analyzed By:


MARIBETH B. MADERAZO, RMicro, MSPH
 Microbiologist
 PAM. No. 06-00193RM

Checked By:


DIMPLE JOY D. BACULI, RMT
 Microbiologist
 PRC Lic. No. 0062620

Certified Correct By:


RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.
 No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc
 This report is not valid without the official dry seal and watermarks of the laboratory



DENR
 RECOGNIZED
 LABORATORY
 C.R. No. 005/2018



DOH
 ACCREDITED
 LABORATORY
 13-0010-1920-LW-2

Page 4 of 4 Page/s

EI_HRAFORM_10



Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : **BSI** Lab. Report No. : 201278-SW
 ADDRESS : 2nd Flr., VAG Bldg Ortigas Ave. Greenhills Date Sampled : 06-24-20
 San Juan, Metro Manila Date Received : 06-24-20
 Nature of Sample/s : Surface Water Date Analyzed : 06-24-20 to 07-23-20
 No. of Sample/s Submitted : Three (3) Date Reported : 07-23-20

[REPORT OF ANALYSES]

Sample No. ES-2005761 = Sample ID PJ 20 006 P2 SW1

| Parameters | Result | Method | Reporting Limit |
|----------------------------------|----------|--|-----------------|
| Arsenic (As), mg/L | < 0.001 | 3114B / Hydride Generation - AAS | 0.001 |
| Cadmium (Cd), mg/L | < 0.001 | 3030F / Flame AAS | 0.001 |
| Chromium (Cr), mg/L | < 0.01 | 3030F / Flame - AAS | 0.01 |
| Chromium Hexavalent (Cr+6), mg/L | 0.004 | 3500-Cr B / Diphenylcarbazide - Colorimetric | 0.002 |
| Copper (Cu), mg/L | 0.005 | 3030F / Flame AAS | 0.004 |
| Lead (Pb), mg/L | < 0.01 | 3030E / Flame AAS | 0.01 |
| Mercury (Hg), mg/L | < 0.0003 | 3112B / Cold Vapor Technique - AAS | 0.0003 |

Reference:
 Standard Methods for Examination of Water and Wastewater, APHA-AWWA, 22nd ed., 2012

Analyzed By:
ARON PAUL V. SOLIMAN, RChT
 Laboratory Chemical Technician
 PRC Lic. No. 0002567

Checked By:
JULIE CHRISTILLE HAPPY G. MORTE, RCh
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By:
RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.
 No portion of this report may be reproduced in any form
 without written authorization of ELARSI, Inc
 This report is not valid without the official dry seal and watermarks of the laboratory





Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : BSI
 ADDRESS : 2nd Flr., VAG Bldg Ortigas Ave. Greenhills
 San Juan, Metro Manila
 Nature of Sample/s : Surface Water
 No. of Sample/s Submitted : One (1)

Lab. Report No. : 201363-SW
 Date Sampled : 07-02-20
 Date Received : 07-02-20
 Date Analyzed : 07-02-20 to 07-23-20
 Date Reported : 07-23-20

[REPORT OF ANALYSES]

| Parameters | Result | Method | Reporting Limit |
|----------------------------------|----------|--|-----------------|
| Arsenic (As), mg/L | < 0.001 | 3114B / Hydride Generation - AAS | 0.001 |
| Cadmium (Cd), mg/L | < 0.001 | 3030F / Flame AAS | 0.001 |
| Chromium (Cr), mg/L | < 0.01 | 3030F / Flame - AAS | 0.01 |
| Chromium Hexavalent (Cr+6), mg/L | 0.004 | 3500-Cr B / Diphenylcarbazide - Colorimetric | 0.002 |
| Copper (Cu), mg/L | 0.014 | 3030F / Flame AAS | 0.004 |
| Lead (Pb), mg/L | < 0.01 | 3030E / Flame AAS | 0.01 |
| Mercury (Hg), mg/L | < 0.0003 | 3112B / Cold Vapor Technique - AAS | 0.0003 |

Reference
 Standard Methods for Examination of Water and Wastewater, APHA-AWWA, 22nd ed., 2012

Analyzed By:
ARON PAUL V. SOLIMAN, RChT
 Laboratory Chemical Technician
 PRC Lic. No. 0002567

Checked By:
JULIE CHRISTILLE HAPPY G. MORTE, RCh
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By:
RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.
 No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory.



Page 1 of 1 Page/s
 EI_HRAFORM_10

ELARSI, INC.

Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com


| | |
|--|--------------------------------------|
| CLIENT : BSI | Lab. Report No. : 201278-SW |
| ADDRESS : 2 nd Flr., VAG Bldg Ortigas Ave. Greenhills | Date Sampled : 06-24-20 |
| San Juan, Metro Manila | Date Received : 06-24-20 |
| Nature of Sample/s : Surface Water | Date Analyzed : 06-24-20 to 07-23-20 |
| No. of Sample/s Submitted : Three (3) | Date Reported : 07-23-20 |


[R E P O R T O F A N A L Y S E S]

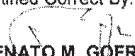
Sample No. Sample ID
ES-2005762 = PJ 20 006 P2 SW3

| Parameters | Result | Method | Reporting Limit |
|----------------------------------|----------|--|-----------------|
| Arsenic (As), mg/L | < 0.001 | 3114B / Hydride Generation - AAS | 0.001 |
| Cadmium (Cd), mg/L | < 0.001 | 3030F / Flame AAS | 0.001 |
| Chromium (Cr), mg/L | < 0.01 | 3030F / Flame - AAS | 0.01 |
| Chromium Hexavalent (Cr+6), mg/L | 0.007 | 3500-Cr B / Diphenylcarbazide - Colorimetric | 0.002 |
| Copper (Cu), mg/L | 0.005 | 3030F / Flame AAS | 0.004 |
| Lead (Pb), mg/L | < 0.01 | 3030E / Flame AAS | 0.01 |
| Mercury (Hg), mg/L | < 0.0003 | 3112B / Cold Vapor Technique - AAS | 0.0003 |

Reference:
Standard Methods for Examination of Water and Wastewater, APHA-AWWA, 22nd ed. 2012

Analyzed By: 
ARON PAUL V. SOLIMAN, RChT
Laboratory Chemical Technician
PRC Lic. No. 0002567

Checked By: 
JULIE CHRISTILLE HAPPY G. MORTE, RCh
Laboratory Supervisor
PRC Lic. No. 0012578

Certified Correct By: 
RENATO M. GOFREDO, JR., RCh
Laboratory Manager
PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.
No portion of this report may be reproduced in any form,
without written authorization of ELARSI, Inc.
This report is not valid without the official dry seal and watermarks of the laboratory.



Page 2 of 3 Page/s
EI_HRAFORM_10



Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : BSI
 ADDRESS : 2nd Flr., VAG Bldg Ortigas Ave. Greenhills
 San Juan, Metro Manila
 Nature of Sample/s : Surface Water
 No. of Sample/s Submitted : Three (3)

Lab. Report No. : 201278-SW
 Date Sampled : 06-24-20
 Date Received : 06-24-20
 Date Analyzed : 06-24-20 to 07-23-20
 Date Reported : 07-23-20

[REPORT OF ANALYSES]

| Parameters | Result | Method | Reporting Limit |
|----------------------------------|----------|--|-----------------|
| Arsenic (As), mg/L | < 0.001 | 3114B / Hydride Generation - AAS | 0.001 |
| Cadmium (Cd), mg/L | < 0.001 | 3030F / Flame AAS | 0.001 |
| Chromium (Cr), mg/L | < 0.01 | 3030F / Flame - AAS | 0.01 |
| Chromium Hexavalent (Cr+6), mg/L | 0.004 | 3500-Cr B / Diphenylcarbazide - Colorimetric | 0.002 |
| Copper (Cu), mg/L | 0.004 | 3030F / Flame AAS | 0.004 |
| Lead (Pb), mg/L | < 0.01 | 3030E / Flame AAS | 0.01 |
| Mercury (Hg), mg/L | < 0.0003 | 3112B / Cold Vapor Technique - AAS | 0.0003 |

Reference:
 Standard Methods for Examination of Water and Wastewater, APHA-AWWA, 22nd ed., 2012

Analyzed By:
ARON PAUL V. SOLIMAN, RChT
 Laboratory Chemical Technician
 PRC Lic. No. 0002567

Checked By:
JULIE CHRISTILLE HAPPY G. MORTE, RCh
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By:
RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.
 No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory.





HiAdvance Philippines Incorporated
 3F Maga Center, San Antonio St.Paseo de Magallanes,
 1232 Makati City, PHILIPPINES
 Office : +632.7729.4327 Fax No : +632.8854.8365



| | | |
|---|---|-----------------|
| Sumitomo Mitsui Construction Co. Ltd. | Project: North-South Commuter Railway Project | Reported: |
| 8735 Paseo de Roxas Cor. Makati Ave., 6F Peninsula Court Makati City PHILIPPINES, 1226 | Project Number: Inone1 Project Manager: Ydette Kristine Catong | 06-Jul-20 14:03 |

**WQSS#1: Guiguinto River
 M20F427-01 (Water)**

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---------|--------|-----------------|-------|----------|-------|----------|----------|--------|-------|
|---------|--------|-----------------|-------|----------|-------|----------|----------|--------|-------|

HiAdvance Philippines Incorporated

Physical Parameters by APHA/AWWA Methods

| | | | | | | | | | |
|------------------------|------|------|----------|---|---------|-----------|-----------|------------|------|
| pH on-site | 7.17 | | pH Units | 1 | 20G0005 | 25-Jun-20 | 25-Jun-20 | pH on-site | T-04 |
| Total Suspended Solids | 13.3 | 5.00 | mg/L | " | 20F0430 | 30-Jun-20 | 30-Jun-20 | APHA 2540D | |

Inorganic Non-Metallic Constituents by APHA/AWWA Methods

| | | | | | | | | | |
|------------------|------|-------|------|---|---------|-----------|-----------|----------|------|
| Dissolved Oxygen | 1.19 | 0.200 | mg/L | 1 | 20G0051 | 25-Jun-20 | 25-Jun-20 | DO meter | X-03 |
|------------------|------|-------|------|---|---------|-----------|-----------|----------|------|

Aggregate Organic Constituents by APHA/AWWA Methods

| | | | | | | | | | |
|---------------------------|------|------|------|---|---------|-----------|-----------|------------|--|
| Biochemical Oxygen Demand | 22.8 | 2.00 | mg/L | 1 | 20F0396 | 26-Jun-20 | 01-Jul-20 | APHA 5210B | |
| Oil & Grease | ND | 2.00 | " | " | 20G0053 | 03-Jul-20 | 03-Jul-20 | APHA 5520B | |

HiAdvance Philippines Incorporated

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Report Prepared By :

Annabelle Bangoy, Project Manager

Reviewed By :

Vienna Rose O. Cabana, Department Manager
 Chemist PRC# 0013464

Certified Correct By :

Princess S. Galvez, Laboratory Manager
 Chemist PRC# 9207



HiAdvance Philippines Incorporated
 3F Maga Center, San Antonio St.Paseo de Magallanes,
 1232 Makati City, PHILIPPINES
 Office : +632.7729.4327 Fax No : +632.8854.8365



| | | |
|---|---|-----------------|
| Sumitomo Mitsui Construction Co. Ltd. | Project: North-South Commuter Railway Project | Reported: |
| 8735 Paseo de Roxas Cor. Makati Ave., 6F Peninsula Court Makati City PHILIPPINES, 1226 | Project Number: Inonel Project Manager: Ydette Kristine Catong | 06-Jul-20 14:03 |

**WQSS#2: Balagtas (Santol) River
 M20F427-02 (Water)**

| Analyte | Result | Reporting Limit | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|---------|--------|-----------------|-------|----------|-------|----------|----------|--------|-------|
|---------|--------|-----------------|-------|----------|-------|----------|----------|--------|-------|

HiAdvance Philippines Incorporated

Physical Parameters by APHA/AWWA Methods

| | | | | | | | | | |
|-------------------------------|------|------|----------|---|---------|-----------|-----------|------------|-------|
| pH on-site | 7.37 | | pH Units | 1 | 20G0005 | 25-Jun-20 | 25-Jun-20 | pH on-site | T-04a |
| Total Suspended Solids | 19.2 | 5.00 | mg/L | " | 20F0430 | 30-Jun-20 | 30-Jun-20 | APHA 2540D | |

Inorganic Non-Metallic Constituents by APHA/AWWA Methods

| | | | | | | | | | |
|-------------------------|----|-------|------|---|---------|-----------|-----------|----------|------------|
| Dissolved Oxygen | ND | 0.200 | mg/L | 1 | 20G0051 | 25-Jun-20 | 25-Jun-20 | DO meter | J-01, X-03 |
|-------------------------|----|-------|------|---|---------|-----------|-----------|----------|------------|

Aggregate Organic Constituents by APHA/AWWA Methods

| | | | | | | | | | |
|----------------------------------|------|------|------|---|---------|-----------|-----------|------------|--|
| Biochemical Oxygen Demand | 27.0 | 2.00 | mg/L | 1 | 20F0396 | 26-Jun-20 | 01-Jul-20 | APHA 5210B | |
| Oil & Grease | ND | 2.00 | " | " | 20G0053 | 03-Jul-20 | 03-Jul-20 | APHA 5520B | |

HiAdvance Philippines Incorporated

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Report Prepared By :

Annabelle Bangoy, Project Manager

Reviewed By :

Vienna Rose O. Cabana, Department Manager
 Chemist PRC# 0013464

Certified Correct By :

Princess S. Galvez, Laboratory Manager
 Chemist PRC# 9207



HiAdvance Philippines Incorporated
 3F Maga Center, San Antonio St.Paseo de Magallanes,
 1232 Makati City, PHILIPPINES
 Office : +632.7729.4327 Fax No : +632.8854.8365



| | | |
|--|--|-----------------|
| Sumitomo Mitsui Construction Co. Ltd. | Project: North-South Commuter Railway Project | Reported: |
| 8735 Paseo de Roxas Cor. Makati Ave., 6F Peninsula | Project Number: [none] | 06-Jul-20 14:04 |
| Makati City, PHILIPPINES 1226 | Project Manager: Ydette Kristine Catong | |

Microbiological Parameters by APHA Standard Methods
HiAdvance Philippines Incorporated

| Analyte | Result | Reporting | | Units | Dilution | Batch | Prepared | Analyzed | Method | Notes |
|--|--------|-----------|------------|-------|----------|-----------|-----------|-------------|--------|-------|
| | | Limit | Limit | | | | | | | |
| WQSS#1: Guiguinto River (M20F427-01) Water Sampled: 25-Jun-20 11:30 Received: 25-Jun-20 15:30 | | | | | | | | | | |
| Fecal Coliform | 79000 | 1.80 | MPN/100 ml | 1 | 20F0403 | 25-Jun-20 | 27-Jun-20 | APHA 9221 E | | X-03 |
| Total Coliform | 220000 | 1.80 | " | " | 20F0402 | " | " | APHA 9221B | | X-03 |
| WQSS#2: Balagtas (Santol) River (M20F427-02) Water Sampled: 25-Jun-20 13:10 Received: 25-Jun-20 15:30 | | | | | | | | | | |
| Fecal Coliform | 170000 | 1.80 | MPN/100 ml | 1 | 20F0403 | 25-Jun-20 | 27-Jun-20 | APHA 9221 E | | X-03 |
| Total Coliform | 280000 | 1.80 | " | " | 20F0402 | " | " | APHA 9221B | | X-03 |

HiAdvance Philippines Incorporated

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Report Prepared By:

Annabelle Bangoy, Project Manager

Reviewed By:

Ermani Hilarlo Espiritu, Medical Technologist
 RMT PRC# 0037503

Certified Correct By:

Princess S. Galvez, Laboratory Manager
 Chemist PRC# 9207

Page 2 of 4

ANNEX D: AIR QUALITY MONITORING REPORT

AMBIENT AIR SAMPLING REPORT

| | |
|-------------------------|--|
| Company Name | Sumitomo Mitsui Construction Co. Ltd. |
| Address | 8735 Paseo de Roxas Cor., Makati Avenue, 6F Peninsula Court Bldg. Makati, 1226 Metro Manila |
| Project Name | North-South Commuter Railways Project (Malolos-Tutuban) Project; CP02 |
| Sampling Site(s) | Within Municipalities of Bulacan (Guiguinto, Balagtas & Malolos) |
| Sampling Date | 25 th – 28 th of June, 2020 |
| Contact Person | Ms. Ydette Kristine D. Catong |

1.0 INTRODUCTION

HiAdvance Philippines, Incorporated (HiAdvance) was contracted by Sumitomo Mitsui Construction Co. Ltd. to conduct a 24- hours ambient air sampling at three (3) sampling areas located within the Municipalities of Bulacan. The sampling activity was conducted last June 25-28, 2020. Sampling was done to determine the concentrations of Nitrogen Dioxide, Sulfur Dioxide, Total Suspended Particulates (TSP), Particulate Matter as PM10 and Particulate Matter as PM 2.5.

Noise Level was also measured at the sampling locations. The values determined are presented in a separate report.

2.0 METHODOLOGY

Ambient air sampling equipment and analytical procedures used were based on DENR Standards. All supporting field data sheets and calibration record of equipments are provided as attachments. The equipment and procedures are as follows:

Total Suspended Particulates (TSP)

Reference Procedure: USEPA 40 CFR, Part 50, Appendix B
 Sampling Equipment: High Volume Sampler
 Method of Analysis: Hi Volume Gravimetric Method

Particulate Matter as PM10

Reference Procedure: USEPA 40 CFR, Part 50, Appendix J
 Sampling Equipment: High Volume with 10-micron particle-size inlet
 Method of Analysis: Hi Volume Gravimetric Method

Particulate Matter as PM2.5

Reference Procedure: USEPA 40 CFR, Part 50, Appendix L
 Sampling Equipment: High Volume with 2.5-micron particle-size inlet
 Method of Analysis: Hi Volume Gravimetric Method

Nitrogen Dioxide (NO₂)

Reference Procedure: Methods of Air Sampling and Analysis - 3rd ed. / James P. Lodge, Jr.
 Sampling Equipment: RAC3 Gas Analyzer
 Method of Analysis: Impinger Griess-Saltzman Reaction Method

Sulfur Dioxide (SO₂)

Reference Procedure: USEPA 40 CFR, Part 50, Appendix A
 Sampling Equipment: RAC3 Gas Analyzer
 Method of Analysis: Tetra-chloromercurate (TCM) Absorber –Pararosaniline Colorimetric

The NO₂ and SO₂ samples were stored in amber bottles and were preserved on a cooler with ice. The samples were submitted to and analyzed by a DENR recognized laboratory using a Spectrophotometer. The TSP, PM10 and PM 2.5 samples were conditioned before undergoing gravimetric analysis. Stock solutions, standard reagents and other reagents are prepared using chemicals recommended by the reference methods mentioned above.

3.0 SAMPLING LOCATION

3.1 The estimated location of the sampling stations is briefly described as follows:

Station #1: AQSS#10: Malolos Station

Latitude: 14.853919 N
 Longitude: 120.814456 E

Remarks/Environmental Conditions:

- It is located beside/ near Malolos station approximately 1-5m away
- Drilling activities was observed during the sampling approximately 40-60m away
- Vehicles passing within sampling point was also observed
- Moderate to heavy rainfall occurred around 1712H
- Sunny and Cloudy weather condition with low to moderate wind blowing

Station #2: AQSS#9: Guiguinto Station

Latitude: 14.838567 N
 Longitude: 120.859116 E

Remarks/Environmental Conditions:

- It is located between residential area approximately 5-10m away
- It is also located nearby highway approximately 30-60m away
- Around 1130H PM 2.5 equipment stop, resume after immediately
- Equipment set up at dusty, grassy ground area
- Vehicles such as motors and trucks passing in the road was observed
- Low to moderate rainfall occurred around 12MN
- Cloudy and Sunny weather condition with low to moderate wind blowing

Station #3: AQSS#8: Balagtas Station

Latitude: 14.825529 N
 Longitude: 120.906081 E

Remarks/Environmental Conditions:

- It is located at near Old Bigaa Balagtas station
- It is also located near residential area approximately 5-10m away
- Truck loaded with soil passed by
- Mild continuous rainfall occurred around 1AM-5AM

- Equipment set up at dusty, grassy ground area
- Vehicles passing within the perimeter was observed
- Cloudy weather condition with low to moderate wind blowing

3.2 Sampling Period

- **Twenty- four (24) hours**

4.0 AMBIENT AIR SAMPLING RESULTS

Below is the ambient air sampling result. All supporting field data, analytical reports and calibration records are provided as attachments.

📌 **Table 4.1. 24-hours Sampling**

| STATION NO. | LOCATION | NO ₂ (µg / Nm ³) | SO ₂ (µg / Nm ³) | TSP (µg / Nm ³) | PM10 (µg / Nm ³) | PM2.5 (µg / Nm ³) |
|-----------------------------|---------------------------|--|--|--------------------------------|---------------------------------|----------------------------------|
| 1 | AQSS#10: Malolos Station | <3.02* | <10.4* | 45.1 | 22.2 | 8.84 |
| 2 | AQSS#9: Guiguinto Station | <3.03* | <10.4* | 49.8 | 24.0 | 22.7 |
| 3 | AQSS#8: Balagtas Station | <3.02* | <10.4* | 46.0 | 24.0 | 16.8 |
| DENR NAAQSSAP | | 150 | 180 | 230 | 150 | - |
| Averaging Time (min) | | 1440 | 1440 | 1440 | 1440 | 1440 |

*Values detected are below the laboratory's Method detection limit

*(-) No standard limit of PM2.5 for 24-hours duration using High Volume sampler

5.0 DISCUSSION OF RESULTS

Ambient air quality standards (AAQS) define clean air, and are established to protect even the most sensitive individuals in our communities. An air quality standard defines the maximum amount of a pollutant that can be present in outdoor air without harm to the public's health.

The sampling activity was conducted on a sunny and cloudy weather conditions. The results of NO₂, SO₂ and TSP, PM10 & PM2.5 for samples collected during the twenty-four (24) hours monitoring were compared to the National Ambient Air Quality Guideline Values (NAAQGV) as stipulated in Table 1, Section 1, Rule VII and Part II of the Implementing Rules and Regulations (IRR) of the Philippine Clean Air Act (R.A. 8749). See Table above. All values for the pollutants identified are below its maximum permissible limits.

Currently, there are no existing limits from DENR for PM 2.5 measured for 24 hours using the high-volume sampler. The guidance value available at present is only for samples taken for 24 hours using the low volume sampler.

6.0 CONCLUSION

The results of sampling and analysis for the sampling locations demonstrated that the ambient concentrations of NO₂, SO₂, TSP, PM10 and PM2.5 are within the acceptable guidance values.



HiAdvance Philippines

HiAdvance Philippines Incorporated
 3F Maga Center, San Antonio St.
 Paseo de Magallanes, 1232
 Makati City, PHILIPPINES
 Office : +632.729.4327
 Fax No : +632.854.8365
 philippines@hiadvance.com

SUMMARY REPORT

Sumitomo Mitsui Construction Co. Ltd.

Project: North-South Commuter Railway Project
 (Ambient)

8735 Paseo de Roxas Cor. Makati Ave., 6F Peninsula Court Bldg.,
 Makati City, PHILIPPINES, 1226

Project Number: [none]

Project Manager: Ms. Ydette Kristine Catong

SAMPLED : 25-Jun-20 to 28-Jun-20
RECEIVED: 29-Jun-20

ANALYZED: 29 to 30-Jun-20
REPORTED: 10-Jul-20 15:47

| LAB # | M20F442-01 | M20F442-02 | M20F442-03 |
|------------------|-----------------------------|--------------------------------|---------------------------|
| MATRIX | Ambient Air | Ambient Air | Ambient Air |
| SAMPLE ID | STN1 | STN2 | STN3 |
| | NEAR OLD PNR MALOLOS STN | BOUND. OF TIKAY & TABANG | OLD BIGAA BALAGTAS STN |

Parameters

| Parameter | 45.1 | 49.8 | 46.0 | µg/Ncm | Method |
|--------------------------------------|--------|--------|--------|--------|----------------------------------|
| Total Suspended Particulates, TSP | 45.1 | 49.8 | 46.0 | µg/Ncm | High Volume – Gravimetric Method |
| Nitrogen Dioxide | <3.02* | <3.03* | <3.02* | µg/Ncm | Griess- Saltzman Method |
| Sulfur Dioxide | <10.4* | <10.4* | <10.4* | µg/Ncm | Pararosaniline Method |
| Particulate Matter 10 Micron, PM10 | 22.2 | 24.0 | 24.0 | µg/Ncm | High Volume – Gravimetric Method |
| Particulate Matter 2.5 Micron, PM2.5 | 8.84 | 22.7 | 16.8 | µg/Ncm | High Volume – Gravimetric Method |

Special Notes

* Values detected are below the laboratory's Method Detection Limit

HiAdvance Philippines Incorporated

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Report Prepared by


Annabelle Bangoy
 Project Manager

Certified Correct by


Princess Galvez, RCh
 Laboratory Manager


Data Summary for Ambient Air Analysis

| TSP | M20F442-01 | M20F442-02 | M20F442-03 |
|------------------------|------------|------------|------------|
| Pressure, inHg | 29.75 | 29.79 | 29.81 |
| Temperature, °C | 29.9 | 31.0 | 30.2 |
| Flowrate, L/min | 1.184 | 1.184 | 1.186 |
| Sampling Duration, min | 1440 | 1440 | 1440 |
| Pressure, STD | 29.92 | 29.92 | 29.92 |
| Temperature, STD | 298 | 298 | 298 |
| Volume of Air, Vm | 1668.2 | 1664.2 | 1672.4 |
| µg TSP (MDL = 2197) | 75200 | 82800 | 77000 |
| Concentration, µg/Ncm | 45.1 | 49.8 | 46.0 |

| NO ₂ | M20F442-01 | M20F442-02 | M20F442-03 |
|---------------------------------------|------------|------------|------------|
| Pressure, inHg | 29.75 | 29.79 | 29.81 |
| Temperature, °C | 29.9 | 31.0 | 30.2 |
| Flowrate, L/min | 0.2 | 0.2 | 0.2 |
| Sampling Duration, min | 1440 | 1440 | 1440 |
| Pressure, STD | 29.92 | 29.92 | 29.92 |
| Temperature, STD | 298 | 298 | 298 |
| Volume of Air, Vm | 0.2818 | 0.2811 | 0.2820 |
| µg NO ₂ (MDL-24hrs= 0.852) | 0.392 | 0.191 | 0.593 |
| Concentration, µg/Ncm | 1.39 | 0.678 | 2.10 |
| Reported as less than, ug/Ncm | 3.02 | 3.03 | 3.02 |

| SO ₂ | M20F442-01 | M20F442-02 | M20F442-03 |
|--------------------------------------|------------|------------|------------|
| Pressure, inHg | 29.75 | 29.79 | 29.81 |
| Temperature, °C | 29.9 | 31.0 | 30.2 |
| Flowrate, L/min | 0.2 | 0.2 | 0.2 |
| Sampling Duration, min | 1440 | 1440 | 1440 |
| Pressure, STD | 29.92 | 29.92 | 29.92 |
| Temperature, STD | 298 | 298 | 298 |
| Volume of Air, Vm | 0.2818 | 0.2811 | 0.2820 |
| µg SO ₂ (MDL-24hrs= 2.92) | 0.782 | 0.156 | 0.469 |
| Concentration, µg/Ncm | 2.78 | 0.556 | 1.66 |
| Reported as less than, ug/Ncm | 10.4 | 10.4 | 10.4 |

Note: Values in italics are less than the laboratory's Method Detection Limit



Data Summary for Ambient Air Analysis

| PM10 | M20F442-01 | M20F442-02 | M20F442-03 |
|------------------------|-------------------|-------------------|-------------------|
| Pressure, inHg | 29.75 | 29.79 | 29.81 |
| Temperature, °C | 29.9 | 31.0 | 30.2 |
| Flowrate, L/min | 1.268 | 1.267 | 1.268 |
| Sampling Duration, min | 1440 | 1440 | 1440 |
| Pressure, STD | 29.92 | 29.92 | 29.92 |
| Temperature, STD | 298 | 298 | 298 |
| Volume of Air, Vm | 1786.5 | 1780.9 | 1788.0 |
| µg PM10 (MDL= 3053) | 39700 | 42700 | 43000 |
| Concentration, µg/Ncm | 22.2 | 24.0 | 24.0 |

| PM2.5 | M20F442-01 | M20F442-02 | M20F442-03 |
|------------------------|-------------------|-------------------|-------------------|
| Pressure, inHg | 29.75 | 29.79 | 29.81 |
| Temperature, °C | 29.9 | 31.0 | 30.2 |
| Flowrate, L/min | 1.261 | 1.262 | 1.266 |
| Sampling Duration, min | 1440 | 1440 | 1440 |
| Pressure, STD | 29.92 | 29.92 | 29.92 |
| Temperature, STD | 298 | 298 | 298 |
| Volume of Air, Vm | 1776.7 | 1773.9 | 1785.2 |
| µg PM2.5 (MDL= 3053) | 15700 | 40300 | 30000 |
| Concentration, µg/Ncm | 8.84 | 22.7 | 16.8 |





STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT NO2 SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME: Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | | Standard Volume Vmstd, Nm ³ | Mass NO ₂ µg | Concentration NO ₂ µg/Ncm |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------|--|--|-------------------------|--------------------------------------|
| | °C | K | in. Hg | mmHg | | | | l/min | | | | |
| 3 | 30.2 | 303.2 | 29.81 | 757.1 | 27-28 Jun 2020 | 1200H-1200H | 1440 | 0.2 | | 0.2820 | 0.593 | <3.02 |

A. Nomenclature [Terms are listed by the order of their appearance in the table above]

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minute
- Qa = actual flowrate through the orifice, fixed at 0.4 lpm
- Vm(std) = sampled volume corrected to standard conditions, Nm³
- NO₂ mass = mass of nitrogen dioxide, µg
- NO₂ conc. = nitrogen dioxide concentrations, µg/Nm³
- 1,000 = conversion from liters to m³
- Philippine Standard Pressure and Temperature
- 298 = Standard ambient temperature, K (25°C + 273)
- 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

a. Total volume of air sampled, corrected to standard condition (Nm³)

$$V_{m(std)} = \frac{Q_a}{1,000} \times \frac{298}{T} \times P_{bar} \times t$$

b. NO₂ concentration, µg/Nm³

$$NO_2 conc. = \frac{NO_2 mass}{V_{m(std)}}$$

STANDARDIZED SAMPLE VOLUMES
FOR 24-HOUR AMBIENT SO₂ SAMPLING
PROJECT NAME: Ambient-Air Monitoring
COMPANY NAME : Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | Standard Volume | Mass | Concentration |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------|-----------------|-------|---------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 3 | 30.2 | 303.2 | 29.81 | 757.1 | 27-28 Jun 2020 | 1200H-1200H | 1440 | 0.2 | 0.2820 | 0.469 | <10.4 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

T = ambient temperature, K
Pbar = barometric pressure, mm Hg
t = total sampling time, minute
Qa = actual flowrate through the orifice, fixed at 0.4 lpm
V(m(std)) = sampled volume corrected to standard conditions, Nm³
SO₂ mass = mass of sulfur dioxide, µg
SO₂ conc. = sulfur dioxide concentration, µg/Nm³
1,000 = conversion from liters to m³
Philippine Standard Pressure and Temperature
298 = Standard ambient temperature, K (25°C + 273)
760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

a. Total volume of air sampled, corrected to standard condition (Nm³)

$$V_{m(std)} = \frac{Q_a}{1,000} \times \frac{298}{T} \times \frac{P_{bar}}{760} \times t$$

b. SO₂ concentration, µg/Nm³

$$SO_2 \text{ conc.} = \frac{SO_2 \text{ mass}}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT TSP SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME : Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | Standard Volume | Mass | | Concentration |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------|-----------------|--------|-------|---------------|
| | °C | K | in. Hg | mmHg | | | | | | TSP | µg | |
| 3 | 30.2 | 303.2 | 29.81 | 757.1 | 27-28 Jun 2020 | 1200H-1200H | 1440 | m3/min | 1.186 | 1672.4 | 77000 | 46.0 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minutes
- Vm(std) = sampled volume corrected to standard conditions, Nm3
- TSP mass = mass of total suspended particulates, µg
- TSPconc. = Total Suspended Particulates concentrations, µg/Nm3
- Qa = actual flowrate, m3/min
- Philippine Standard Pressure and Temperature
- 298 = Standard ambient temperature, K (25°C + 273)
- 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

a. Total volume of air sampled, corrected to standard condition (Nm3)

$$V_{m(std)} = \frac{Q_a}{T} \times \frac{298}{P_{bar}} \times t$$

b. TSP concentration, µg/Nm3

$$TSP_{conc.} = \frac{TSP_{mass}}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT PM10 SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME : Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | Standard Volume | Mass | Concentration |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------------|----------------------|------------|------------------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 3 | 30.2 | 303.2 | 29.81 | 757.1 | 27-28 Jun 2020 | 1200H-1200H | 1440 | m3/min 1.268 | Vmstd, Nm3 1788.0 | PM10 µg | PM10 µg/Ncm 24.0 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minutes
- Vm(std) = sampled volume corrected to standard conditions, Nm3
- PM10 mass = mass of particulate matter, 10, µg
- PM10 conc. = Particulate Matter 10 concentrations, µg/Nm3
- Qa = actual flowrate, m3/min
- Philippine Standard Pressure and Temperature
- 298 = Standard ambient temperature, K (25°C + 273)
- 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

a. Total volume of air sampled, corrected to standard condition (Nm3)

$$V_{m(std)} = \frac{Q_a}{T} \times \frac{298}{P_{bar}} \times t$$

b. PM10 concentration, µg/Nm3

$$PM10\ conc = \frac{PM10\ mass}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT PM2.5 SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME : Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | Standard Volume | Mass | Concentration |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------------|----------------------|-------------|--------------------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 3 | 30.2 | 303.2 | 29.81 | 757.1 | 27-28 Jun 2020 | 1200H-1200H | 1440 | m3/min 1.266 | Vmstd, Nm3 1785.2 | PM2.5 µg | PM2.5 µg/Ncm3 16.8 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

T = ambient temperature, K

Pbar = barometric pressure, mm Hg

t = total sampling time, minutes

Vm(std) = sampled volume corrected to standard conditions, Nm3

PM2.5 mass = mass of particulate matter 2.5, µg

PM2.5 conc. = Particulate Matter 2.5 concentrations, µg/Nm3

Qa = actual flowrate, m3/min

Philippine Standard Pressure and Temperature

298 = Standard ambient temperature, K (25°C + 273)

760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:
 a. Total volume of air sampled, corrected to standard condition (Nm3)

$$V_{m(std)} = \frac{Q_a}{T} \times \frac{298}{T} \times \frac{P_{bar}}{760} \times t$$

b. PM2.5 concentration, µg/Nm3

$$PM2.5 conc = \frac{PM2.5 mass}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT TSP SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME: Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | Standard Volume | Mass | Concentration |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------------|----------------------------------|--------------------|-----------------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 1 | 29.9 | 302.9 | 29.75 | 755.8 | 25-26 Jun 2020 | 1005H-1005H | 1440 | m3/min 1.184 | Vmstd, Nm ³ 1668.2 | TSP µg 75200 | TSP µg/Ncm 45.1 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minutes
- Vm(std) = sampled volume corrected to standard conditions, Nm³
- TSP mass = mass of total suspended particulates, µg
- TSPconc. = Total Suspended Particulates concentrations, µg/Nm³
- Qa = actual flowrate, m³/min
- Philippine Standard Pressure and Temperature
- 298 = Standard ambient temperature, K (25°C + 273)
- 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:
 a. Total volume of air sampled, corrected to standard condition (Nm³)

$$V_{m(std)} = \frac{Q_a}{T} \times \frac{298}{P_{bar}} \times t$$

b. TSP concentration, µg/Nm³

$$TSPconc. = \frac{TSPmass}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT NO2 SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME : Sumitomo Mitsui Construction Co., Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate Li/min | Standard Volume Vmstd, Nm ³ | Mass NO ₂ µg | Concentration NO ₂ µg/Ncm |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|------------------|--|-------------------------|--------------------------------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 1 | 29.9 | 302.9 | 29.75 | 755.8 | 25-26 Jun 2020 | 1005H-1005H | 1440 | 0.2 | 0.2818 | 0.392 | <3.02 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minute
- Qa = actual flowrate through the orifice, fixed at 0.4 lpm
- Vm(std) = sampled volume corrected to standard conditions, Nm³
- NO2 mass = mass of nitrogen dioxide, µg
- NO2 conc. = nitrogen dioxide concentrations, µg/Nm³
- 1,000 = conversion from liters to m³
- Philippine Standard Pressure and Temperature
- 298 = Standard ambient temperature, K (25°C + 273)
- 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

a. Total volume of air sampled, corrected to standard condition (Nm³)

$$V_{m(std)} = \frac{Q_a}{1,000} \times \frac{298}{T} \times \frac{P_{bar}}{760} \times t$$

b. NO2 concentration, µg/Nm³

$$NO_2 conc. = \frac{NO_2 mass}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT SO₂ SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME : Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | Standard Volume | Mass | Concentration |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------|------------------------|-------|---------------------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 1 | 29.9 | 302.9 | 29.75 | 755.8 | 25-26 Jun 2020 | 1005H-1005H | 1440 | L/min | Vmstd, Nm ³ | µg | SO ₂ µg/Ncm |
| | | | | | | | | 0.2 | 0.2818 | 0.782 | <10.4 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minute
- Qa = actual flowrate through the orifice, fixed at 0.4 lpm
- Vm(std) = sampled volume corrected to standard conditions, Nm³
- SO₂ mass = mass of sulfur dioxide, µg
- SO₂ conc. = sulfur dioxide concentrations, µg/Nm³
- 1,000 = conversion from liters to m³
- Philippine Standard Pressure and Temperature
- 298 = Standard ambient temperature, K (25°C + 273)
- 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

a. Total volume of air sampled, corrected to standard condition (Nm³)

$$V_{m(std)} = \frac{Q_a}{1,000} \times \frac{298}{T} \times \frac{P_{bar}}{760} \times t$$

b. SO₂ concentration, µg/Nm³

$$SO_2 \text{ conc.} = \frac{SO_2 \text{ mass}}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT PM10 SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME: Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | Standard Volume | Mass | Concentration |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------------|----------------------|-------------|---------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 1 | 29.9 | 302.9 | 29.75 | 755.8 | 25-26 Jun 2020 | 1005H-1005H | 1440 | m3/min 1.268 | Vmstd, Nm3 1786.5 | µg 39700 | PM10 22.2 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minutes
- Vm(std) = sampled volume corrected to standard conditions, Nm3
- PM10 mass = mass of particulate matter, 10, µg
- PM10 conc. = Particulate Matter 10 concentrations, µg/Nm3
- Qa = actual flowrate, m3/min
- Philippine Standard Pressure and Temperature
 298 = Standard ambient temperature, K (25°C + 273)
 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

a. Total volume of air sampled, corrected to standard condition (Nm3)

$$V_{m(std)} = \frac{Q_a}{T} \times \frac{298}{T} \times \frac{P_{bar}}{760} \times t$$

b. PM10 concentration, µg/Nm3

$$PM10 conc = \frac{PM10 mass}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT PM2.5 SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME : Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate m3/min | Standard Volume Vmstd, Nm3 | Mass PM2.5 µg | Concentration PM2.5 µg/Ncm |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|------------------|----------------------------|---------------|----------------------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 1 | 29.9 | 302.9 | 29.75 | 755.8 | 25-26 Jun 2020 | 1005H-1005H | 1440 | 1.261 | 1776.7 | 15700 | 8.84 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minutes
- Vm(std) = sampled volume corrected to standard conditions, Nm3
- PM2.5 mass = mass of particulate matter 2.5, µg
- PM2.5 conc. = Particulate Matter 2.5 concentrations, µg/Nm3
- Qa = actual flowrate, m3/min
- Philippine Standard Pressure and Temperature
- 298 = Standard ambient temperature, K (25°C + 273)
- 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

a. Total volume of air sampled, corrected to standard condition (Nm3)

$$V_{m(std)} = \frac{Q_a}{T} \times \frac{298}{T} \times \frac{P_{bar}}{760} \times t$$

b. PM2.5 concentration, µg/Nm3

$$PM2.5\ conc = \frac{PM2.5\ mass}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT TSP SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME: Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | Standard Volume | Mass | Concentration | |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------|-----------------|--------|---------------|------|
| | °C | K | in. Hg | mmHg | | | | | | | | |
| 2 | 31.0 | 304.0 | 29.79 | 756.7 | 25-26 Jun-2020 | 1100H-1100H | 1440 | m3/min | 1.184 | 1664.2 | 82800 | 49.8 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minutes
- Vm(std) = sampled volume corrected to standard conditions, Nm3
- TSP mass = mass of total suspended particulates, µg
- TSPconc. = Total Suspended Particulates concentrations, µg/Nm3
- Qa = actual flowrate, m3/min
- Philippine Standard Pressure and Temperature
- 298 = Standard ambient temperature, K (25°C + 273)
- 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

a. Total volume of air sampled, corrected to standard condition (Nm3)

$$V_{m(std)} = \frac{Q_a}{T} \times \frac{298}{P_{bar}} \times t$$

b. TSP concentration, µg/Nm3

$$TSPconc. = \frac{TSPmass}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT NO2 SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME : Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t:minutes) | Flow Rate | Standard Volume Vmstd, Nm ³ | Mass NO ₂ µg | Concentration NO ₂ µg/Ncm |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|-------------------------------|-----------|--|-------------------------|--------------------------------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 2 | 31.0 | 304.0 | 29.79 | 756.7 | 25-26 Jun-2020 | 11:00H-11:00H | 1440 | 0.2 | 0.2811 | 0.191 | <3.03 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minute
- Qa = actual flowrate through the orifice, fixed at 0.4 lpm
- Vm(std) = sampled volume corrected to standard conditions, Nm³
- NO₂ mass = mass of nitrogen dioxide, µg
- NO₂ conc. = nitrogen dioxide concentrations, µg/Nm³
- 1,000 = conversion from liters to m³
- Philippine Standard Pressure and Temperature
- 298 = Standard ambient temperature, K (25°C + 273)
- 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

- a. Total volume of air sampled, corrected to standard condition (Nm³)

$$V_{m(std)} = \frac{Q_a}{1,000} \times \frac{298}{T} \times \frac{P_{bar.}}{760} \times t$$

- b. NO₂ concentration, µg/Nm³

$$NO_2 conc. = \frac{NO_2 mass}{V_{m(std)}}$$

STANDARDIZED SAMPLE VOLUMES
FOR 24-HOUR AMBIENT SO₂ SAMPLING
PROJECT NAME: Ambient Air Monitoring
COMPANY NAME : Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | Standard Volume | Mass | Concentration |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------|------------------------|-------|---------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 2 | 31.0 | 304.0 | 29.79 | 756.7 | 25-26 Jun-2020 | 1100H-1100H | 1440 | L/min | Vmstd, Nm ³ | µg | µg/Ncm |
| | | | | | | | | 0.2 | 0.2811 | 0.156 | <10.4 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minute
- Qa = actual flowrate through the orifice, fixed at 0.4 lpm
- Vm(std) = sampled volume corrected to standard conditions, Nm³
- SO₂ mass = mass of sulfur dioxide, µg
- SO₂ conc. = sulfur dioxide concentrations, µg/Nm³
- 1,000 = conversion from liters to m³
- Philippine Standard Pressure and Temperature
 - 298 = Standard ambient temperature, K (25°C + 273)
 - 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

- a. Total volume of air sampled, corrected to standard condition (Nm³)

$$V_{m(std)} = \frac{Q_a}{1,000} \times \frac{298}{T} \times \frac{P_{bar}}{760} \times t$$

- b. SO₂ concentration, µg/Nm³

$$SO_2 conc. = \frac{SO_2 mass}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT PM10 SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME : Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | Standard Volume | Mass | Concentration |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------------|----------------------|------------|------------------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 2 | 31.0 | 304.0 | 29.79 | 756.7 | 25-26 Jun-2020 | 1100H-1100H | 1440 | m3/min 1.267 | Vmstd, Nm3 1780.9 | PM10 µg | PM10 µg/Ncm 24.0 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minutes
- Vm(std) = sampled volume corrected to standard conditions, Nm3
- PM10 mass = mass of particulate matter, µg
- PM10 conc. = Particulate Matter 10 concentrations, µg/Nm3
- Qa = actual flowrate, m3/min
- Philippine Standard Pressure and Temperature
 298 = Standard ambient temperature, K (25°C + 273)
 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

a. Total volume of air sampled, corrected to standard condition (Nm3)

$$V_{m(std)} = \frac{Q_a}{T} \times 298 \times \frac{P_{bar}}{760} \times t$$

b. PM10 concentration, µg/Nm3

$$PM10_{conc} = \frac{PM10_{mass}}{V_{m(std)}}$$



STANDARDIZED SAMPLE VOLUMES
 FOR 24-HOUR AMBIENT PM2.5 SAMPLING
 PROJECT NAME: Ambient Air Monitoring
 COMPANY NAME : Sumitomo Mitsui Construction Co. Ltd.

| Station | Ambient Temperature (T) | | Barometric Pressure (Pbar) | | Sampling Date | Sampling Time | Sampling Duration (t, minutes) | Flow Rate | Standard Volume | Mass | Concentration |
|---------|-------------------------|-------|----------------------------|-------|----------------|---------------|--------------------------------|-----------------|----------------------|----------------------|-------------------------|
| | °C | K | in. Hg | mmHg | | | | | | | |
| 2 | 31.0 | 304.0 | 29.79 | 756.7 | 22-23 Jan 2020 | 10:00H-10:00H | 1440 | m3/min 1.262 | Vmstd, Nm3 1773.9 | PM2.5 µg 40300 | PM2.5 µg/Ncm 22.7 |

A. Nomenclature (Terms are listed by the order of their appearance in the table above)

- T = ambient temperature, K
- Pbar = barometric pressure, mm Hg
- t = total sampling time, minutes
- Vm(std) = sampled volume corrected to standard conditions, Nm3
- PM2.5 mass = mass of particulate matter 2.5, µg
- PM2.5 conc. = Particulate Matter 2.5 concentrations, µg/Nm3
- Qa = actual flowrate, m3/min
- Philippine Standard Pressure and Temperature
- 298 = Standard ambient temperature, K (25°C + 273)
- 760 = Standard atmospheric pressure, mm Hg

B. Formulas used in Calculations:

a. Total volume of air sampled, corrected to standard condition (Nm3)

$$V_{m(std)} = \frac{Q_a}{T} \times \frac{298}{T} \times \frac{P_{bar}}{760} \times t$$

b. PM2.5 concentration, µg/Nm3

$$PM2.5conc = \frac{PM2.5mass}{V_{m(std)}}$$

Ambient Air Quality Summary of Results for the 24-Hour Monitoring of TSP, PM₁₀, PM_{2.5}, SO₂, and NO₂

Project No. : PJ20-006 P2

Client : Taisei

Location : Valenzuela City

| Station Code | A24-1 | A24-2 | A24-3 | A24-4 |
|------------------|--------------------|--------------------|------------------|------------------|
| Location | Valenzuela Station | Meycauayan Station | Maniao Station | Bocaue Station |
| Date of Sampling | June 22-23, 2020 | June 23-24, 2020 | June 24-25, 2020 | June 25-26, 2020 |
| Time of Sampling | 1037H-1037H | 1226H-1226H | 1322H-1322H | 1429H-1429H |

Total Suspended Particulates (TSP), Particulate Matter less than 10 microns (PM₁₀) and Particulate Matter less than 2.5 microns (PM_{2.5}) Data

| | | | | |
|---|------------|------------|------------|------------|
| Volume of air for TSP, PM ₁₀ & PM _{2.5} sampling, Ncm | 1,385,4750 | 1,380,9854 | 1,384,6327 | 1,381,5200 |
| TSP Weight, µg | 150,900 | 193,700 | 216,600 | 378,200 |
| TSP Concentration, µg/Ncm | 108.92 | 140.26 | 156.43 | 273.76 |
| PM ₁₀ Weight, µg | 30,700 | 72,000 | 65,000 | 62,500 |
| PM ₁₀ Concentration, µg/Ncm | 22.16 | 52.14 | 46.94 | 45.24 |
| PM _{2.5} Weight, µg | 20,100 | 40,500 | 28,400 | 38,400 |
| PM _{2.5} Concentration, µg/Ncm | 14.51 | 29.33 | 20.51 | 27.80 |

Sulfur Dioxide (SO₂) and Nitrogen Dioxide (NO₂) Data

| | | | | |
|---|--------|--------|--------|--------|
| Volume of air for SO ₂ , NO ₂ and HCl sampling, Ncm | 1,3855 | 1,3810 | 1,3846 | 1,3815 |
| SO ₂ Weight, µg | 0.694 | 1.21 | 1.21 | 1.78 |
| SO ₂ Concentration, µg/Ncm | 0.50 | 0.88 | 0.87 | 1.29 |
| NO ₂ Weight, µg | 8.69 | 19.56 | 23.34 | 12.34 |
| NO ₂ Concentration, µg/Ncm | 6.27 | 14.16 | 16.86 | 8.93 |

| | | | | |
|---------------------------|------------|------------|------------|------------|
| Average Temperature, °C | 28.6 | 30.6 | 29.4 | 30.0 |
| Clouds (Octa) | 2/8 to 8/8 | 2/8 to 8/8 | 2/8 to 7/8 | 4/8 to 7/8 |
| Prevailing Wind Direction | SW | NW | NW | SW |
| Prevailing Wind Condition | BF1 | BF1 | BF1 | BF1 |

Remarks:

BF Beaufort Force
BF0 Calm (0.0 - 0.2 m/s)

BF1 Light Air (0.3 - 1.5 m/s)
BF2 Light Breeze (1.6 - 3.3 m/s)

BF3 Gentle Breeze (3.4 - 5.4 m/s)
BF4 Moderate Breeze (5.5 - 7.9 m/s)



Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : BSI
 ADDRESS : 2nd Flr. VAG Bldg., Ortigas Ave., Greenhills, San Juan, Metro Manila
 Nature of Sample/s : Ambient Air Sample
 No. of Sample/s Submitted : One (1)

Lab. Report No. : 201305-AA
 Date Sampled : 06-22-20 to 06-25-20
 Date Received : 06-26-20
 Date Analyzed : 06-30-20 to 07-01-20
 Date Reported : 07-02-20

[R E P O R T O F A N A L Y S E S]

| Sample No. | Sample ID | TSP, µg |
|------------|----------------------|---------|
| ES-2005843 | PJ 20 006 P2 A24 - 1 | 150,900 |
| ES-2005844 | PJ 20 006 P2 A24 - 2 | 193,700 |
| ES-2005845 | PJ 20 006 P2 A24 - 3 | 216,600 |

| Method | Method 501 / Gravimetric |
|-----------------|--------------------------|
| Detection Limit | 100 |

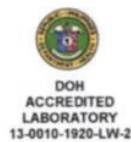
Reference:
 James P. Lodge, Methods for Ambient Air Sampling & Analysis, 3rd edition

Analyzed By: **IRVIN PAUL S. AGINALDO, RChT**
 Laboratory Chemical Technician
 PRC Lic. 0003482

Checked By: **JULIE CHRISTILLE HAPPY G. MORTE, RCh**
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By: **RENATO M. GOFREDO, JR., RCh**
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.
 No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory.






Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com


| | | | |
|---------------------------|---|-----------------|------------------------|
| CLIENT | : BSI | Lab. Report No. | : 201308-AA |
| ADDRESS | : 2 nd Flr. VAG Bldg., Ortigas Ave., Greenhills, San Juan, Metro Manila | Date Sampled | : 06-25-20 to 06-26-20 |
| Nature of Sample/s | : Ambient Air Sample | Date Received | : 06-26-20 |
| No. of Sample/s Submitted | : One (1) | Date Analyzed | : 06-29-20 to 06-30-20 |
| | | Date Reported | : 07-02-20 |

[R E P O R T O F A N A L Y S E S]

| Sample No. | Sample ID | TSP, µg |
|------------------------|----------------------|---------------------------------|
| ES-2005852 | PJ 20 006 P2 A24 – 4 | 378,200 |
| Method | | Method 501 / Gravimetric |
| Detection Limit | | 100 |

Reference:
 James P. Lodge, Methods for Ambient Air Sampling & Analysis, 3rd edition

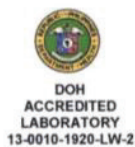
Analyzed By: 
IRVIN PAUL S. AGUINALDO, RChT
 Laboratory Chemical Technician
 PRC Lic. 0003482

Checked By: 
JULIE CHRISTILLE HAPPY G. MORFE, RCh
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By: 
RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.

No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory



Page 1 of 1 Page/s

EI_HRAFORM_10



Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com


CLIENT : **BSI** Lab. Report No. : 201306-AA
 ADDRESS : 2nd Flr. VAG Bldg., Ortigas Ave., Greenhills, Date Sampled : 06-22-20 to 06-25-20
 San Juan, Metro Manila Date Received : 06-26-20
 Nature of Sample/s : Ambient Air Sample Date Analyzed : 06-29-20 to 06-30-20
 No. of Sample/s Submitted : Three (3) Date Reported : 07-02-20


[R E P O R T O F A N A L Y S E S]

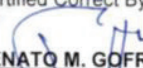
| Sample No. | Sample ID | PM ₁₀ , µg |
|------------|--------------------|-----------------------|
| ES-2005846 | PJ 20 006 P2 A24-1 | 30,700 |
| ES-2005847 | PJ 20 006 P2 A24-2 | 72,000 |
| ES-2005848 | PJ 20 006 P2 A24-3 | 65,000 |

| Method | Method 501 / Gravimetric |
|-----------------|--------------------------|
| Detection Limit | 100 |

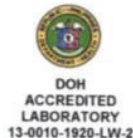
Reference:
 James P. Lodge, Methods for Ambient Air Sampling & Analysis, 3rd edition

Analyzed By: 
IRVIN PAUL S. AGUINALDO, RChT
 Laboratory Chemical Technician
 PRC Lic. 0003482

Checked By: 
JULIE CHRISTILLE HAPPY G. MORTE, RCh
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By: 
RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.
 No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory



Page 1 of 1 Page/s

EI_HRAFORM_10



Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : **BSI**
 ADDRESS : 2nd Flr. VAG Bldg., Ortigas Ave., Greenhills,
 San Juan, Metro Manila
 Nature of Sample/s : Ambient Air Sample
 No. of Sample/s Submitted : Three (3)

Lab. Report No. : 201307-AA
 Date Sampled : 06-22-20 to 06-25-20
 Date Received : 06-26-20
 Date Analyzed : 06-29-20 to 06-30-20
 Date Reported : 07-02-20

[R E P O R T O F A N A L Y S E S]

| Sample No. | Sample ID | PM _{2.5} , µg |
|------------|----------------------|------------------------|
| ES-2005849 | PJ 20 006 P2 A24 – 1 | 20,100 |
| ES-2005850 | PJ 20 006 P2 A24 – 2 | 40,500 |
| ES-2005851 | PJ 20 006 P2 A24 – 3 | 28,400 |

| Method | Method 501 / Gravimetric |
|-----------------|--------------------------|
| Detection Limit | 100 |

Reference:
 James P. Lodge, Methods for Ambient Air Sampling & Analysis, 3rd edition

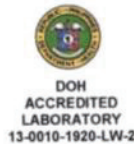
Analyzed By:
IRVIN PAUL S. AGUINALDO, RChT
 Laboratory Chemical Technician
 PRC Lic. 0003482

Checked By:
JULIE CHRISTILLE HAPPY G. MORTE, RCh
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By:
RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.

No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory.





Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

| | | | |
|---------------------------|---|-----------------|------------------------|
| CLIENT | : BSI | Lab. Report No. | : 201310-AA |
| ADDRESS | : 2 nd Flr. VAG Bldg., Ortigas Ave., Greenhills, San Juan, Metro Manila | Date Sampled | : 06-25-20 to 06-26-20 |
| Nature of Sample/s | : Ambient Air Sample | Date Received | : 06-26-20 |
| No. of Sample/s Submitted | : One (1) | Date Analyzed | : 06-29-20 to 06-30-20 |
| | | Date Reported | : 07-02-20 |

[R E P O R T O F A N A L Y S E S]

| Sample No. | Sample ID | PM _{2.5} , µg |
|------------------------|----------------------|---------------------------------|
| ES-2005854 | PJ 20 006 P2 A24 – 4 | 38,400 |
| Method | | Method 501 / Gravimetric |
| Detection Limit | | 100 |

Reference:
 James P. Lodge, Methods for Ambient Air Sampling & Analysis, 3rd edition

Analyzed By:

Ir Schomerto
IRVIN PAUL S. AGUINALDO, RChT
 Laboratory Chemical Technician
 PRC Lic. 0003482

Checked By:

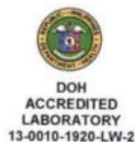
Schomerto
JULIE CHRISTILLE HAPPY G. MORTE, RCh
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By:

Schomerto
RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.

No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory



Page 1 of 1 Page/s

EI_HRAFORM_10



Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : **BSI** Lab. Report No. : 201298-AA
 ADDRESS : 2nd Flr. VAG Bldg., Ortigas Ave., Greenhills, Date Sampled : 06-22-20 to 06-25-20
 San Juan, Metro Manila Date Received : 06-26-20
 Nature of Sample/s : Ambient Air Sample Date Analyzed : 06-26-20
 No. of Sample/s Submitted : Three (3) Date Reported : 07-02-20

[R E P O R T O F A N A L Y S E S]

| Sample No. | Sample ID | SO ₂ , µg |
|------------|------------------|----------------------|
| ES-2005796 | PJ 20 006 P2 A-1 | 0.694 |
| ES-2005797 | PJ 20 006 P2 A-2 | 1.21 |
| ES-2005798 | PJ 20 006 P2 A-3 | 1.21 |


| Method | Method 704A / Pararosaniline |
|-----------------|------------------------------|
| Detection Limit | 0.167 |

Reference:
 James P. Lodge, Methods for Ambient Air Sampling & Analysis, 3rd edition

Analyzed By:


JENNY MAY A. ANOR, RChT
 Laboratory Chemical Technician
 PRC Lic. No. 0003726

Checked By:

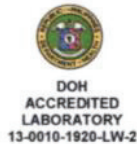

JULIE CHRISTILLE HAPPY G. MORTE, RCh
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By:


RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.

No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory.





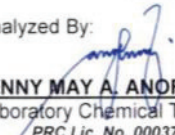
Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : **BSI** Lab. Report No. : 201312-AA
 ADDRESS : 2nd Flr. VAG Bldg., Ortigas Ave., Greenhills, Date Sampled : 06-25-20 to 06-26-20
 San Juan, Metro Manila Date Received : 06-26-20
 Nature of Sample/s : Ambient Air Sample Date Analyzed : 06-26-20 to 06-29-20
 No. of Sample/s Submitted : One (1) Date Reported : 07-02-20

[R E P O R T O F A N A L Y S E S]

| Sample No. | Sample ID | SO ₂ , µg |
|------------------------|--------------------|-------------------------------------|
| ES-2005856 | PJ 20 006 P2 A24-4 | 1.78 |
| Method | | Method 704A / Pararosaniline |
| Detection Limit | | 0.167 |

Reference:
 James P. Lodge, Methods for Ambient Air Sampling & Analysis, 3rd edition

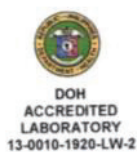
Analyzed By: 
JENNY MAY A. ANOR, RChT
 Laboratory Chemical Technician
 PRC Lic. No. 0003726

Checked By: 
JULIE CHRISTILLE HAPPY G. MORTE, RCh
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By: 
RENATO M. GOFREDO, JR., RChT
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.

No portion of this report may be reproduced in any form, without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory





Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

CLIENT : **BSI** Lab. Report No. : 201297-AA
 ADDRESS : 2nd Flr. VAG Bldg., Ortigas Ave., Greenhills, Date Sampled : 06-22-20 to 06-25-20
 San Juan, Metro Manila Date Received : 06-26-20
 Nature of Sample/s : Ambient Air Sample Date Analyzed : 06-26-20
 No. of Sample/s Submitted : Three (3) Date Reported : 07-02-20

[R E P O R T O F A N A L Y S E S]

| Sample No. | Sample ID | NO ₂ , µg |
|---|----------------------|-------------------------------------|
| ES-2005793 | PJ 20 006 P2 A24 - 1 | 8.69 |
| ES-2005794 | PJ 20 006 P2 A24 - 2 | 19.56 |
| ES-2005795 | PJ 20 006 P2 A24 - 3 | 23.34 |
| Method | | Method 406 / Griess-Saltzman |
| Detection Limit | | 0.040 |
| <i>Reference:</i> James P. Lodge, Methods for Ambient Air Sampling & Analysis, 3 rd edition | | |

Analyzed By:

Jenny May A. Anor
JENNY MAY A. ANOR, RChT
 Laboratory Chemical Technician
 PRC Lic. No. 0003726

Checked By:

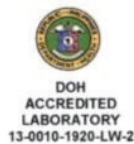
Julie Christille Happy G. Morte
JULIE CHRISTILLE HAPPY G. MORTE, RCh
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By:

Renato M. Gofredo, Jr.
RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.

No portion of this report may be reproduced in any form, without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory.





Unit 201-202 & 406 Rizalina Annex Bldg. 1677 Quezon Avenue, Quezon City
 Tel. No. 927-77-15 Fax No. 929-4824 Email: info@elarsi.com

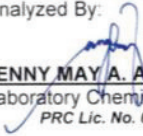
| | | | |
|---------------------------|---|-----------------|------------------------|
| CLIENT | : BSI | Lab. Report No. | : 201311-AA |
| ADDRESS | : 2 nd Flr. VAG Bldg., Ortigas Ave., Greenhills, San Juan, Metro Manila | Date Sampled | : 06-25-20 to 06-26-20 |
| Nature of Sample/s | : Ambient Air Sample | Date Received | : 06-26-20 |
| No. of Sample/s Submitted | : One (1) | Date Analyzed | : 06-26-20 |
| | | Date Reported | : 07-02-20 |

[R E P O R T O F A N A L Y S E S]

| Sample No. | Sample ID | NO ₂ , µg |
|------------------------|----------------------|-------------------------------------|
| ES-2005855 | PJ 20 006 P2 A24 - 4 | 12.34 |
| Method | | Method 406 / Griess-Saltzman |
| Detection Limit | | 0.040 |

Reference
 James P. Lodge, Methods for Ambient Air Sampling & Analysis, 3rd edition

Analyzed By:


JENNY MAY A. ANOR, RChT
 Laboratory Chemical Technician
 PRC Lic. No. 0003726

Checked By:

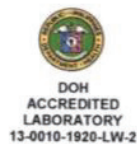

JULIE CHRISTILLE HAPPY G. MORTE, RCh
 Laboratory Supervisor
 PRC Lic. No. 0012578

Certified Correct By:


RENATO M. GOFREDO, JR., RCh
 Laboratory Manager
 PRC Lic. No. 0009824

Test results reflect the quality of the samples as received.


No portion of this report may be reproduced in any form,
 without written authorization of ELARSI, Inc.
 This report is not valid without the official dry seal and watermarks of the laboratory





Page 1 of 1 Page/s

EI_HRAFORM_10

| Station | Field Observations | Photo Documentations |
|---|--|--|
| <p style="text-align: center;">A24-1</p> <p style="text-align: center;">Valenzuela Station (PR3-44 Malanday Depot)</p> <p style="text-align: center;">June 22 to 23 2020</p> <p style="text-align: center;"><i>1037H-1037H</i></p> | <p>The station was situated on a concrete ground. Some parts of sampling area were slightly wet. A total of seventy-eight (78) light vehicles, fifty-five (55) motorcycles and twenty-eight (28) trucks passed by near the station at the time of sampling. Ongoing construction in the area and heavy equipment operations were also observed throughout the monitoring period.</p> <p>Skies were partly cloudy to overcast throughout the monitoring period. Light rainfall was observed from 1737H-2037H. Wind was blowing predominantly from the southwest and at light air conditions. Air temperature ranged from 24.2 to 35.7 °C, averaging to 28.6 °C.</p> |  |

| Station | Field Observations | Photo Documentations |
|--|--|---|
| <p data-bbox="667 1832 692 1906">A24-2</p> <p data-bbox="738 1756 802 1982">Meycauayan Station (Old Station)</p> <p data-bbox="847 1760 873 1977">June 23 to 24, 2020</p> <p data-bbox="919 1789 944 1948">1226H-1226H</p> | <p data-bbox="544 1211 820 1695">The station was situated on an unpaved dusty ground. It was located within the construction site. A total of fifty-two (52) light vehicles, eight (8) heavy vehicles and five (5) trucks passed by near the station at the time of sampling. Heavy equipment working activities and on-going construction works were also observed during the monitoring period.</p> <p data-bbox="855 1211 1067 1695">Skies were partly cloudy to overcast throughout the monitoring period. Wind was blowing predominantly from the northwest and at light air conditions. Light rainfall was observed at 1706H and heavy rainfall at 2028H. Air temperature ranged from 26.2 to 37.2°C, averaging to 30.6°C.</p> |  |

| Station | Field Observations | Photo Documentations |
|--|---|---|
| <p style="text-align: center;">A24-3</p> <p style="text-align: center;">Marilao Station (Tabing Ilog Chapel)</p> <p style="text-align: center;">June 24 to 25, 2020</p> <p style="text-align: center;"><i>1322H-1322H</i></p> | <p>The station was situated on an unpaved ground near the main road beside the chapel's fences. Over grown vegetation were present near the station. Continuous passing of vehicles was observed throughout the sampling.</p> <p>Skies were partly to mostly cloudy throughout the monitoring period. Wind was blowing predominantly from the northwest and at light air conditions. No rainfall was observed during sampling. Air temperature ranged from 25.3 to 34.7°C, averaging to 29.4°C.</p> |  |

| Station | Field Observations | Photo Documentations |
|--|--|---|
| <p data-bbox="699 1825 721 1899"><i>A24-4</i></p> <p data-bbox="770 1780 793 1944">Bocaue Station</p> <p data-bbox="842 1758 865 1966">June 25 to 26, 2020</p> <p data-bbox="914 1780 936 1944"><i>1429H-1429H</i></p> | <p data-bbox="619 1209 769 1686">The station was situated on a dusty flattened dry ground. Heavy equipment working activities, ongoing construction works and continuous passing of vehicles were observed at the time of sampling.</p> <p data-bbox="805 1209 1018 1686">Skies were partly to mostly cloudy throughout the monitoring period. Wind was blowing predominantly from the southwest and at light air to light breeze conditions. No rainfall was observed during sampling. Air temperature ranged from 26.5 to 36.2°C, averaging to 30.0°C.</p> |  |

ANNEX E: AMBIENT NOISE MONITORING REPORT

NOISE LEVEL MEASUREMENT REPORT

| | |
|------------------------|--|
| Company Name | Sumitomo Mitsui Construction Co. Ltd. |
| Address | 8735 Paseo de Roxas Cor., Makati Avenue, 6F Peninsula Court Bldg. Makati |
| Project Name | North-South Commuter Railways Project (Malolos-Tutuban) Project; CP02 |
| Project Site(s) | Malolos Station |
| Sampling Date | 25 th -26 th of June, 2020 |
| Contact Person | Ms. Ydette Kristine D. Catong |

1.0 Noise Analysis Background

HiAdvance Philippines, Incorporated (HiAdvance) was contracted by Sumitomo Mitsui Construction Co. Ltd. to monitor the noise level at one (1) sampling area located at Malolos Station with thirty (30) seconds interval per hour until a twenty-four (24) hours monitoring is obtained. The noise level monitoring was conducted last June 25-26, 2020.

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities within the work premises. Sound (noise) is described in terms of loudness, frequency and duration. Loudness is the sound pressure level measured on a logarithmic scale in units of decibels (dB).

2.0 Noise Evaluation Methodology


For noise level monitoring, sound level frequency characteristics are based upon human hearing, using an A-weighted [dB (A)] frequency filter. The A-weighted filter is used to approximate the way humans hear sound.

SL-4033SD Model with Serial No. I. 386255, a digital sound level meter that meets ANSI and IEC Type 2 specifications was used to measure the noise level at the sampling points specified by the client. This measuring device has ± 1.5 dB accuracy with 0.1 dB resolution.

Prior to actual noise measurement, the digital sound level meter was calibrated using Extech 407733SD Sound level Calibrator set at 94 dB.

3.0 Sampling Location

3.1 Sampling station:

 **Malolos Station**
Latitude: 14.85359 N
Longitude: 120.814178 E

Remarks/Environmental Condition:

- Weather condition is sunny with occasional rain
- Sampling site near the road where passing of vehicles were observed
- Ongoing activities in the nearby construction site
- Located 30m away from the jackhammer activity inside the area

3.2 Sampling period:

- Twenty-four (24) Hours with thirty (30) seconds interval per hour

4.0 Measured Sound Levels and Noise Analysis

4 Time Zone (Average of Median Values)

| SAMPLING TIME (24 hrs) | Value (dBA) | Limit (dBA) |
|----------------------------|----------------|----------------|
| 0900H-1800H (Daytime) | 67.5 | 55 |
| 1800H-2200H (Evening) | 60.5 | 50 |
| 2200H-0500H (Nighttime) | 58.9 | 45 |
| 0500H-0900H (Morning) | 66.7 | 45 |

**Category A-primarily used for Residential area*

24 Hrs Monitoring

| SAMPLING TIME (24 hours) | Min (dBA) | Max (dBA) | Median (dBA) | Limit (dBA) |
|-----------------------------|-----------|-----------|--------------|-------------|
| 1046H-1145H | 53.4 | 74.4 | 70.1 | 55 |
| 1146H-1245H | 49.1 | 69.6 | 66.3 | 55 |
| 1246H-1345H | 48.8 | 68.9 | 67.2 | 55 |
| 1346H-1445H | 55.0 | 70.6 | 68.1 | 55 |
| 1446H-1545H | 51.6 | 69.4 | 66.8 | 55 |
| 1546H-1645H | 49.0 | 66.9 | 62.9 | 55 |
| 1646H-1745H | 49.6 | 76.4 | 70.3 | 55 |
| 1746H-1845H | 52.2 | 73.7 | 68.3 | 50 |
| 1846H-1945H | 49.4 | 72.3 | 66.9 | 50 |
| 1946H-2045H | 50.5 | 68.1 | 62.0 | 50 |
| 2046H-2145H | 48.1 | 59.5 | 57.6 | 50 |
| 2146H-2245H | 49.2 | 58.6 | 55.3 | 45 |
| 2246H-2345H | 45.6 | 63.8 | 57.4 | 45 |
| 2346H-0045H | 46.1 | 64.7 | 59.9 | 45 |

| SAMPLING TIME (24 hours) | Min (dBA) | Max (dBA) | Median (dBA) | Limit (dBA) |
|-----------------------------|-----------|-----------|--------------|-------------|
| 0046H-0145H | 45.2 | 57.2 | 54.9 | 45 |
| 0146H-0245H | 43.9 | 59.7 | 55.8 | 45 |
| 0246H-0345H | 45.3 | 54.8 | 53.2 | 45 |
| 0346H-0445H | 46.0 | 74.6 | 70.0 | 45 |
| 0446H-0545H | 48.7 | 67.3 | 60.9 | 50 |
| 0546H-0645H | 51.0 | 66.2 | 64.3 | 50 |
| 0646H-0745H | 51.5 | 69.9 | 68.7 | 50 |
| 0746H-0845H | 53.3 | 66.9 | 64.5 | 50 |
| 0846H-0945H | 53.2 | 73.6 | 64.7 | 55 |
| 0946H-1045H | 53.5 | 74.4 | 71.4 | 55 |

**Category A-primarily used for residential area*

5.0 Environmental Quality Standards for Noise in General Areas

Noise becomes a pollutant when it contaminates the environment, which becomes a nuisance and affects the health of persons, their activities and mental abilities. In other words, noise pollution is unwanted sound which is dumped into the atmosphere without regarding to the adverse effects it may be having.

Noise though not defined in any statute, is now included as an environmental pollutant in Section 78 (Ambient Noise) Quality and Emission Standards for Noise Act, 1980 and hence, recognized as a kind of air pollution.

The table below shows the limits for noise for different types of areas, at different applicable sampling time.

| Area Category | Limit Daytime (9:00AM – 6:00PM) (dBA) | Limit Morning (5:00AM – 9:00AM) and Evening (6:00PM – 10:00PM) (dBA) | Limit Night time (10:00PM – 5:00AM) (dBA) |
|---|---|---|--|
| AA - Areas within 100m from schools, hospitals etc. | 50 | 45 | 40 |
| A – Residential | 55 | 50 | 45 |
| B – Commercial | 65 | 60 | 55 |
| C - Light Industrial Area | 70 | 65 | 60 |
| D - Heavy Industrial Area | 75 | 70 | 65 |

Note: Limits are based on the NPCC Memorandum Circular No. 002 Series of 1980

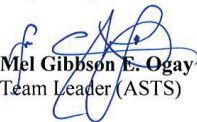
6.0 Discussion of Results and Conclusion

The results of noise level measurement were compared to the standards based on the proposed land use within the sampling location. The sampling location is considered as Category A (primarily used for residential area).

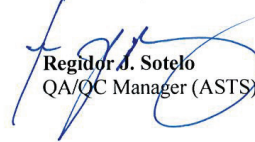
As observed from the table, the Max noise values (dBA) were only read momentarily and will not affect the result in general. On the table, the noise level measured didn't pass the standard limit for all time zones based on the NPCC Memorandum Circular No. 002 Series of 1980.

For this sampling, the following are the main contributors of noise: ongoing activities in the construction site, noise from machines and equipment, vehicles like motorcycles and tricycles passing in the main road; residential noise and animal sounds from dogs barking, birds chirping, crickets and other insects at nighttime.

Prepared by:


Mel Gibson E. Ogay
Team Leader (ASTS)

Reviewed by:


Regidor J. Sotelo
QA/QC Manager (ASTS)

NOTED by:


Princess Galvez, RCh
Laboratory Manager

| Station N1 – Near Malinta Elementary School | | | | | | |
|---|---------------|---|---------------|--------------|------------------------|-----------------------|
| Period | Date | Equivalent Noise Level (L _{eq}) | NPCC Standard | IFC Standard | Remarks | |
| | | | | | Based on NPCC Standard | Based on IFC Standard |
| 1100H-1159H | June 15, 2020 | 86.1 | 50 | 55 | FAILED | FAILED |
| 1200H-1259H | June 15, 2020 | 78.6 | 50 | 55 | FAILED | FAILED |
| 1300H-1359H | June 15, 2020 | 77.3 | 50 | 55 | FAILED | FAILED |
| 1400H-1459H | June 15, 2020 | 77.5 | 50 | 55 | FAILED | FAILED |
| 1500H-1559H | June 15, 2020 | 75.3 | 50 | 55 | FAILED | FAILED |
| 1600H-1659H | June 15, 2020 | 77.1 | 50 | 55 | FAILED | FAILED |
| 1700H-1759H | June 15, 2020 | 80.6 | 50 | 55 | FAILED | FAILED |
| 1800H-1859H | June 15, 2020 | 78.9 | 45 | 55 | FAILED | FAILED |
| 1900H-1959H | June 15, 2020 | 76.9 | 45 | 55 | FAILED | FAILED |
| 2000H-2059H | June 15, 2020 | 76.7 | 45 | 55 | FAILED | FAILED |
| 2100H-2159H | June 15, 2020 | 75.0 | 45 | 55 | FAILED | FAILED |
| 2200H-2259H | June 15, 2020 | 73.7 | 40 | 45 | FAILED | FAILED |
| 2300H-2359H | June 15, 2020 | 74.7 | 40 | 45 | FAILED | FAILED |
| 0000H-0059H | June 16, 2020 | 72.8 | 40 | 45 | FAILED | FAILED |
| 0100H-0159H | June 16, 2020 | 73.2 | 40 | 45 | FAILED | FAILED |
| 0200H-0259H | June 16, 2020 | 74.1 | 40 | 45 | FAILED | FAILED |
| 0300H-0359H | June 16, 2020 | 74.4 | 40 | 45 | FAILED | FAILED |
| 0400H-0459H | June 16, 2020 | 75.2 | 40 | 45 | FAILED | FAILED |
| 0500H-0559H | June 16, 2020 | 76.9 | 45 | 45 | FAILED | FAILED |
| 0600H-0659H | June 16, 2020 | 78.6 | 45 | 45 | FAILED | FAILED |
| 0700H-0759H | June 16, 2020 | 79.7 | 45 | 55 | FAILED | FAILED |
| 0800H-0859H | June 16, 2020 | 80.8 | 45 | 55 | FAILED | FAILED |
| 0900H-0959H | June 16, 2020 | 80.2 | 55 | 55 | FAILED | FAILED |
| 1000H-1059H | June 16, 2020 | 81.5 | 55 | 55 | FAILED | FAILED |

Note: For areas directly facing a public transportation route, a correction factor is added to the applicable NPCC standard by:

- i. +5 dBA (if the area is facing a two-lane road) or
- ii. +10 dBA (if the area is facing a four-lane or wider road)

| Station N2 – Front of Meycauayan College (Near the Highway) | | | | | | |
|---|---------------|---|---------------|--------------|------------------------|-----------------------|
| Period | Date | Equivalent Noise Level (L _{eq}) | NPCC Standard | IFC Standard | Remarks | |
| | | | | | Based on NPCC Standard | Based on IFC Standard |
| 1400H-1459H | June 16, 2020 | 84.0 | 50 | 55 | FAILED | FAILED |
| 1500H-1559H | June 16, 2020 | 83.8 | 50 | 55 | FAILED | FAILED |
| 1600H-1659H | June 16, 2020 | 84.3 | 50 | 55 | FAILED | FAILED |
| 1700H-1759H | June 16, 2020 | 84.5 | 50 | 55 | FAILED | FAILED |
| 1800H-1859H | June 16, 2020 | 84.0 | 45 | 55 | FAILED | FAILED |
| 1900H-1959H | June 16, 2020 | 82.7 | 45 | 55 | FAILED | FAILED |
| 2000H-2059H | June 16, 2020 | 82.7 | 45 | 55 | FAILED | FAILED |
| 2100H-2159H | June 16, 2020 | 82.2 | 45 | 55 | FAILED | FAILED |
| 2200H-2259H | June 16, 2020 | 83.3 | 40 | 45 | FAILED | FAILED |
| 2300H-2359H | June 16, 2020 | 81.6 | 40 | 45 | FAILED | FAILED |
| 0000H-0059H | June 17, 2020 | 81.9 | 40 | 45 | FAILED | FAILED |
| 0100H-0159H | June 17, 2020 | 82.8 | 40 | 45 | FAILED | FAILED |
| 0200H-0259H | June 17, 2020 | 80.4 | 40 | 45 | FAILED | FAILED |
| 0300H-0359H | June 17, 2020 | 80.0 | 40 | 45 | FAILED | FAILED |
| 0400H-0459H | June 17, 2020 | 79.6 | 40 | 45 | FAILED | FAILED |
| 0500H-0559H | June 17, 2020 | 82.6 | 45 | 45 | FAILED | FAILED |
| 0600H-0659H | June 17, 2020 | 83.4 | 45 | 45 | FAILED | FAILED |
| 0700H-0759H | June 17, 2020 | 83.5 | 45 | 55 | FAILED | FAILED |
| 0800H-0859H | June 17, 2020 | 83.4 | 45 | 55 | FAILED | FAILED |
| 0900H-0959H | June 17, 2020 | 84.1 | 50 | 55 | FAILED | FAILED |
| 1000H-1059H | June 17, 2020 | 83.5 | 50 | 55 | FAILED | FAILED |
| 1100H-1159H | June 17, 2020 | 83.6 | 50 | 55 | FAILED | FAILED |
| 1200H-1259H | June 17, 2020 | 83.5 | 50 | 55 | FAILED | FAILED |
| 1300H-1359H | June 17, 2020 | 83.8 | 50 | 55 | FAILED | FAILED |

Note: For areas directly facing a public transportation route, a correction factor is added to the applicable NPCC standard by:

- i. +5 dBA (if the area is facing a two-lane road) or
- +10 dBA (if the area is facing a four-lane or wider road)

| Station N4 -Near Tabing Ilog Elementary School | | | | | | |
|--|---------------|------------------------------|---------------|--------------|------------------------|-----------------------|
| Period | Date | Equivalent Noise Level (Leq) | NPCC Standard | IFC Standard | Remarks | |
| | | | | | Based on NPCC Standard | Based on IFC Standard |
| 1530H-1629H | June 18, 2020 | 77.6 | 50 | 55 | FAILED | FAILED |
| 1630H-1729H | June 18, 2020 | 76.5 | 50 | 55 | FAILED | FAILED |
| 1730H-1829H | June 18, 2020 | 76.4 | 50 | 55 | FAILED | FAILED |
| 1830H-1929H | June 18, 2020 | 75.4 | 45 | 55 | FAILED | FAILED |
| 1930H-2029H | June 18, 2020 | 71.8 | 45 | 55 | FAILED | FAILED |
| 2030H-2129H | June 18, 2020 | 70.1 | 45 | 55 | FAILED | FAILED |
| 2130H-2229H | June 18, 2020 | 73.3 | 45 | 55 | FAILED | FAILED |
| 2230H-2329H | June 18, 2020 | 70.5 | 40 | 45 | FAILED | FAILED |
| 2330H-0029H | June 18, 2020 | 67.3 | 40 | 45 | FAILED | FAILED |
| 0030H-0129H | June 18, 2020 | 69.0 | 40 | 45 | FAILED | FAILED |
| 0130H-0229H | June 18, 2020 | 66.8 | 40 | 45 | FAILED | FAILED |
| 0230H-0329H | June 19, 2020 | 67.6 | 40 | 45 | FAILED | FAILED |
| 0330H-0429H | June 19, 2020 | 70.6 | 40 | 45 | FAILED | FAILED |
| 0430H-0529H | June 19, 2020 | 73.3 | 40 | 45 | FAILED | FAILED |
| 0530H-0629H | June 19, 2020 | 73.2 | 45 | 45 | FAILED | FAILED |
| 0630H-0729H | June 19, 2020 | 74.7 | 45 | 45 | FAILED | FAILED |
| 0730H-0829H | June 19, 2020 | 75.7 | 45 | 55 | FAILED | FAILED |
| 0830H-0929H | June 19, 2020 | 75.6 | 45 | 55 | FAILED | FAILED |
| 0930H-1029H | June 19, 2020 | 74.7 | 50 | 55 | FAILED | FAILED |
| 1030H-1129H | June 19, 2020 | 77.1 | 50 | 55 | FAILED | FAILED |
| 1130H-1229H | June 19, 2020 | 77.3 | 50 | 55 | FAILED | FAILED |
| 1230H-1329H | June 19, 2020 | 77.6 | 50 | 55 | FAILED | FAILED |
| 1330H-1429H | June 19, 2020 | 74.4 | 50 | 55 | FAILED | FAILED |
| 1430H-1529H | June 19, 2020 | 75.5 | 50 | 55 | FAILED | FAILED |

Note: For areas directly facing a public transportation route, a correction factor is added to the applicable NPCC

| Station N3 - Near St. Mary Meycauayan College | | | | | | |
|---|---------------|------------------------------|---------------|--------------|------------------------|-----------------------|
| Period | Date | Equivalent Noise Level (Leq) | NPCC Standard | IFC Standard | Remarks | |
| | | | | | Based on NPCC Standard | Based on IFC Standard |
| 1500H-1559H | June 17, 2020 | 85.8 | 50 | 55 | FAILED | FAILED |
| 1600H-1659H | June 17, 2020 | 85.2 | 50 | 55 | FAILED | FAILED |
| 1700H-1759H | June 17, 2020 | 85.8 | 50 | 55 | FAILED | FAILED |
| 1800H-1859H | June 17, 2020 | 85.3 | 45 | 55 | FAILED | FAILED |
| 1900H-1959H | June 17, 2020 | 84.5 | 45 | 55 | FAILED | FAILED |
| 2000H-2059H | June 17, 2020 | 85.1 | 45 | 55 | FAILED | FAILED |
| 2100H-2159H | June 17, 2020 | 86.2 | 45 | 55 | FAILED | FAILED |
| 2200H-2259H | June 17, 2020 | 85.9 | 40 | 45 | FAILED | FAILED |
| 2300H-2359H | June 17, 2020 | 88.0 | 40 | 45 | FAILED | FAILED |
| 0000H-0059H | June 18, 2020 | 86.2 | 40 | 45 | FAILED | FAILED |
| 0100H-0159H | June 18, 2020 | 84.5 | 40 | 45 | FAILED | FAILED |
| 0200H-0259H | June 18, 2020 | 82.9 | 40 | 45 | FAILED | FAILED |
| 0300H-0359H | June 18, 2020 | 83.7 | 40 | 45 | FAILED | FAILED |
| 0400H-0459H | June 18, 2020 | 83.3 | 40 | 45 | FAILED | FAILED |
| 0500H-0559H | June 18, 2020 | 84.4 | 45 | 45 | FAILED | FAILED |
| 0600H-0659H | June 18, 2020 | 84.4 | 45 | 45 | FAILED | FAILED |
| 0700H-0759H | June 18, 2020 | 84.4 | 45 | 55 | FAILED | FAILED |
| 0800H-0859H | June 18, 2020 | 84.6 | 45 | 55 | FAILED | FAILED |
| 0900H-0959H | June 18, 2020 | 84.6 | 50 | 55 | FAILED | FAILED |
| 1000H-1059H | June 18, 2020 | 84.2 | 50 | 55 | FAILED | FAILED |
| 1100H-1159H | June 18, 2020 | 83.7 | 50 | 55 | FAILED | FAILED |
| 1200H-1259H | June 18, 2020 | 84.4 | 50 | 55 | FAILED | FAILED |
| 1300H-1359H | June 18, 2020 | 85.0 | 50 | 55 | FAILED | FAILED |
| 1400H-1459H | June 18, 2020 | 84.8 | 50 | 55 | FAILED | FAILED |

Note: For areas directly facing a public transportation route, a correction factor is added to the applicable NPCC standard by:

- i. +5 dBA (if the area is facing a two-lane road) or
- ii. +10 dBA (if the area is facing a four-lane or wider road)

| Station N5 - Abangan Norte Elementary School | | | | | | |
|--|---------------|------------------------------|---------------|--------------|------------------------|-----------------------|
| Period | Date | Equivalent Noise Level (Leq) | NPCC Standard | IFC Standard | Remarks | |
| | | | | | Based on NPCC Standard | Based on IFC Standard |
| 1558H-1657H | June 19, 2020 | 63.4 | 50 | 55 | FAILED | FAILED |
| 1658H-1757H | June 19, 2020 | 63.9 | 50 | 55 | FAILED | FAILED |
| 1758H-1857H | June 19, 2020 | 63.9 | 50 | 55 | FAILED | FAILED |
| 1858H-1957H | June 19, 2020 | 59.9 | 45 | 55 | FAILED | FAILED |
| 1958H-2057H | June 19, 2020 | 65.3 | 45 | 55 | FAILED | FAILED |
| 2058H-2157H | June 19, 2020 | 61.7 | 45 | 55 | FAILED | FAILED |
| 2158H-2257H | June 19, 2020 | 60.8 | 45 | 55 | FAILED | FAILED |
| 2258H-2357H | June 19, 2020 | 59.0 | 40 | 45 | FAILED | FAILED |
| 2358H-0057H | June 19, 2020 | 60.2 | 40 | 45 | FAILED | FAILED |
| 0058H-0157H | June 20, 2020 | 60.3 | 40 | 45 | FAILED | FAILED |
| 0158H-0257H | June 20, 2020 | 59.1 | 40 | 45 | FAILED | FAILED |
| 0258H-0357H | June 20, 2020 | 59.1 | 40 | 45 | FAILED | FAILED |
| 0358H-0457H | June 20, 2020 | 59.5 | 40 | 45 | FAILED | FAILED |
| 0458H-0557H | June 20, 2020 | 57.9 | 40 | 45 | FAILED | FAILED |
| 0558H-0657H | June 20, 2020 | 57.6 | 45 | 45 | FAILED | FAILED |
| 0658H-0757H | June 20, 2020 | 60.5 | 45 | 45 | FAILED | FAILED |
| 0758H-0857H | June 20, 2020 | 60.4 | 45 | 55 | FAILED | FAILED |
| 0858H-0957H | June 20, 2020 | 62.0 | 45 | 55 | FAILED | FAILED |
| 0958H-1057H | June 20, 2020 | 58.6 | 50 | 55 | FAILED | FAILED |
| 1058H-1157H | June 20, 2020 | 61.5 | 50 | 55 | FAILED | FAILED |
| 1158H-1257H | June 20, 2020 | 56.1 | 50 | 55 | FAILED | FAILED |
| 1258H-1357H | June 20, 2020 | 59.4 | 50 | 55 | FAILED | FAILED |
| 1358H-1457H | June 20, 2020 | 62.0 | 50 | 55 | FAILED | FAILED |
| 1458H-1557H | June 20, 2020 | 64.6 | 50 | 55 | FAILED | FAILED |

Table 7-6. Summary of Results of Continuous Noise Monitoring

| Station N1 | Near Malinta Elementary School | | | |
|-------------------------|--------------------------------|----------|-----------------------|----------|
| | Based on NPCC Standard | | Based on IFC Standard | |
| | Complied | Exceeded | Complied | Exceeded |
| Total Number of Periods | | | | |
| 24 | none | 24 | none | 24 |

Remarks

The station is located near an elementary school. It is situated in a concrete ground near walk way beside a two-lane (paved) road.

Weather was generally fair with partly cloudy to overcast skies. Wind predominantly blew from northeast at light air condition. No rainfall was observed during sampling. Air temperature ranged from 26.6 °C to 34.9 °C, and averaged 29.2 °C.

All of the L_{Aeq} values failed to comply with the NPCC and IFC standards. Elevated readings for each period were primarily due to passing, blowing horn and idling vehicles (i.e. light vehicles, motorcycles, trucks and tricycles). Conversing people were observed between 1200H, 1500H-2000H and 0700H-0900H and barking dog at 0900H. Light rainfall were perceived at 1215H and 1332H. For the whole monitoring period, continuous passing of vehicles was observed.

As observed during the monitoring period, the railway alignment activity does not contribute on the elevated noise level readings as perceived on the station.

Photo Documentation



| Station N2 | Front of Meycauayan College (Near the Highway) | | | |
|-------------------------|--|----------|-----------------------|----------|
| Total Number of Periods | Based on NPCC Standard | | Based on IFC Standard | |
| | Complied | Exceeded | Complied | Exceeded |
| 24 | none | 24 | none | 24 |

Remarks

The station is situated beside a two-lane (paved) road. The station is located under a footbridge near the commercial establishments and educational institution.

Weather was generally fair with partly cloudy skies. Wind predominantly blew from northeast at light air condition. No rainfall was observed during sampling. Air temperature ranged from 28.1 °C to 36.0 °C, and averaged 29.2 °C.

All of the L_{Aeq} values failed to comply with the NPCC and IFC standards. Elevated readings for each period were primarily due to passing, blowing horn and idling vehicles (i.e. light vehicles, motorcycles, trucks and tricycles). Conversing people was also observed at 0800H. For the whole monitoring period, continuous passing of vehicles was observed.

As observed during the monitoring period, the railway alignment activity does not contribute on the elevated noise level readings as perceived on the station.

Photo Documentation



| Station N3 | Near St. Mary Meycauayan College | | | |
|-------------------------|----------------------------------|----------|-----------------------|----------|
| Total Number of Periods | Based on NPCC Standard | | Based on IFC Standard | |
| | Complied | Exceeded | Complied | Exceeded |
| 24 | none | 24 | none | 24 |

Remarks

The station is situated beside a two-lane (paved) road in a flat concrete ground. The station is located near an educational institution. Plants were present behind the sampling station.

Weather was generally fair with clear to partly cloudy skies. Wind predominantly blew from northeast at light air condition. No rainfall was observed during sampling. Air temperature ranged from 24.0 °C to 37.1 °C, and averaged 32.1 °C.

For this station, all of the L_{Aeq} values failed to comply with the NPCC and IFC standards. Elevated readings for each period were primarily due to passing vehicles, blowing horn and idling vehicles (i.e. light vehicles, motorcycles, trucks and tricycles). For the whole monitoring period, continuous passing of vehicles was observed.

As observed during the monitoring period, the railway alignment activity does not contribute on the elevated noise level readings as perceived on the station.

Photo Documentation



| Station N4 | Near Tabing Ilog Elementary School | | | |
|-------------------------|------------------------------------|----------|-----------------------|----------|
| Total Number of Periods | Based on NPCC Standard | | Based on IFC Standard | |
| | Complied | Exceeded | Complied | Exceeded |
| 22 | none | 22 | none | 22 |

Remarks

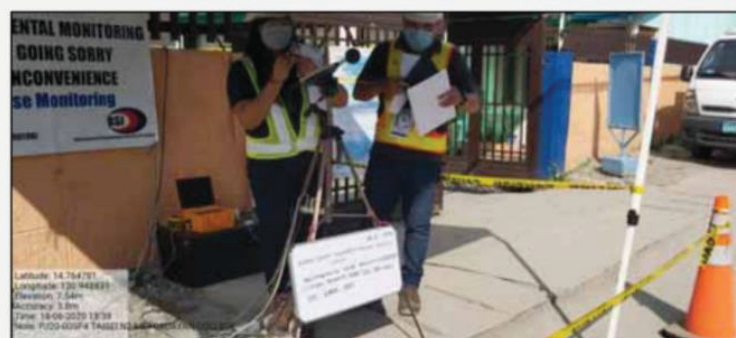
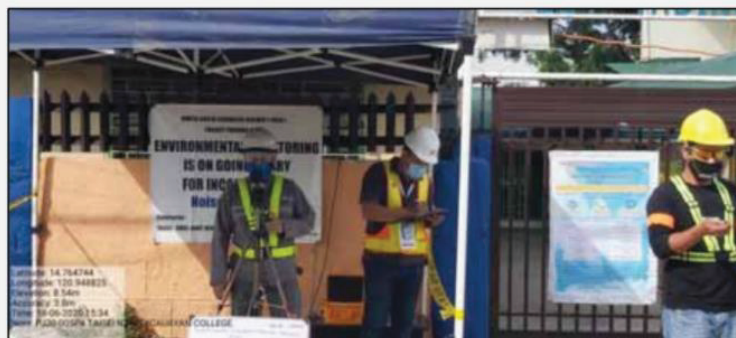
The station is located in front of an elementary school, situated beside a two-lane (paved) road in a paved ground with pebbles and stones.

Weather was generally fair with partly cloudy to overcast skies. Wind predominantly blew from northeast at light air condition. No rainfall was observed during sampling. Air temperature ranged from 26.1 °C to 36.4 °C, and averaged 30.1 °C.

For this station, all of the periods exceeded the standards of NPCC and IFC. Elevated readings for each period were primarily due to passing and idling vehicles (i.e. motorcycles and tricycles). Barking dog at 1730H, noises from nearby residential area between 2330H-0030H, conversing people between 0930H-1030H and 1430H were observed during sampling. Also, light rainfall was perceived between 1130H-1330H. For the whole monitoring period, a total 204 light vehicles, 195 tricycles and 192 motorcycles were noted passing the nearby road.

As observed during the monitoring period, the railway alignment activity does not contribute on the elevated noise level readings as perceived on the station.

Photo Documentation



| Station N5 | Abangan Norte Elementary School | | | |
|-------------------------|---------------------------------|----------|-----------------------|----------|
| Total Number of Periods | Based on NPCC Standard | | Based on IFC Standard | |
| | Complied | Exceeded | Complied | Complied |
| 22 | none | 22 | 22 | none |

Remarks

The station is located in the premise of an elementary school. The station is situated in a concrete ground with sparse of grass around the area.

Weather was generally fair with partly to mostly cloudy skies. Wind predominantly blew from northeast at light air condition. No rainfall was observed during sampling. Air temperature ranged from 25.4 °C to 34.6 °C, and averaged 28.1 °C.

All of the L_{Aeq} values failed to comply with the standards of NPCC and IFC. Elevated readings for each period were primarily due to animal calls (dogs, insects, roosters and birds) and passing vehicles (i.e. motorcycles and tricycles). Open radio were observed at 1658H, 0858H and 1258H-1358H, conversing people at 1658H and 1158H, and noises from nearby residential area at 0658H and 0858H were observed during sampling. For the whole monitoring period, a total 51 motorcycles, 30 light vehicles and 22 tricycles were noted passing the nearby road.

As observed during the monitoring period, the railway alignment activity does not contribute on the elevated noise level readings as perceived on the station.

Photo Documentation



ANNEX F: VIBRATION MONITORING REPORT

GROUND VIBRATION and NOISE MONITORING REPORT

| | |
|-------------------------|--|
| Company Name | Sumitomo Mitsui Construction Co. Ltd. |
| Address | 8735 Paseo de Roxas Cor., Makati Avenue, 6F Peninsula Court Bldg. Makati |
| Project Name | North-South Commuter Railways Project (Malolos-Tutuban) Project; CP02 |
| Sampling Site(s) | Within the Municipalities of Bulacan (Malolos) |
| Sampling Date | 26 th of June, 2020 |
| Project Director | Mr. Hitoshi Yamaji |

1.0 Vibration Analysis Background

HiAdvance Philippines, Incorporated (HiAdvance) contracted Nitro Asia Company Inc. to conduct the Ground Vibration monitoring required by Sumitomo Mitsui Construction Co. Ltd. at one (1) sampling areas located within the municipalities of Bulacan (Malolos). Sampling was conducted last June 26, 2020.

Ambient Vibration is the recording, evaluation and interpretation of the vibration behavior of a structure under ambient influences without artificial excitation. Noise Monitoring is also included in this report provided by the sub-contractor.

Ground Vibration can be caused by construction, equipment or blasting, etc. Seismographs can be used to measure and record ground vibration. It is measured in terms of Peak Particle Velocity (PPV) and the units are mm/s. PPV refers to the movement within the ground of molecular particles and not surface movement. Ground vibration on a building or structure should be measured outside the structure and at ground level. The displacement value in mm refers to the movement of particles at the surface.

2.0 Sampling Location

2.1 Sampling Station:

Malolos Station

- Point 1- East face of structure, 5m away from sampling point
- Point 2- West face of the structure, 10m away from sampling point

2.2 Sampling Period:

- Fifteen (15) minutes per point

3.0 Measured Ground Vibration Analysis

- 3.1 See data summary table on the next page. All supporting field data, analytical reports and calibration records are provided as attachments.

3.1.1 DATA

GROUND VIBRATION AND NOISE MONITORING TABLE

TABLE:

| AREA/STATION | Monitoring Point | MONITORING TIME | TIME TRIGGER | Velocity Units (in /sec) | Velocity Units (mm/sec) | Vibration Analysis | | | MAX Acceleration (milli(g)s)/AVERAGE | m/s ² | ISEE Linear Microphone | |
|----------------|------------------|-----------------------------|--------------|--------------------------|-------------------------|--------------------|-------|--------|--------------------------------------|------------------|------------------------|-----------------------------|
| | | | | | | X (R) | Y (T) | Z (V) | | | NOISE (Decibel) | ZeroCrossing Frequency (Hz) |
| Mablos Station | 1 | 11:13:00 AM- 11:27:00 AM | 11:13:07 | 0.02 | 0.42 | 0.019 | 0.010 | 0.016 | 0.015 | 0.147 | <88 | 32.00 |
| | | | 11:13:29 | 0.01 | 0.37 | 0.023 | 0.017 | 0.014 | 0.018 | 0.177 | <88 | 7.80 |
| | | | 11:13:46 | 0.03 | 0.79 | 0.041 | 0.047 | 0.030 | 0.039 | 0.386 | <88 | 8.40 |
| | | | 11:14:05 | 0.05 | 1.34 | 0.034 | 0.022 | 0.053 | 0.036 | 0.356 | <88 | 3.90 |
| | | | 11:15:33 | 0.01 | 0.36 | 0.017 | 0.012 | 0.010 | 0.013 | 0.127 | 91.20 | 2.20 |
| | | | 11:25:08 | 0.01 | 0.36 | 0.007 | 0.006 | 0.005 | 0.006 | 0.059 | <88 | 39.40 |
| | | | 11:49:02 | 0.02 | 0.50 | 0.021 | 0.007 | 0.018 | 0.015 | 0.150 | 91.20 | 2.00 |
| | 11:57:25 | 0.03 | 0.76 | 0.012 | 0.026 | 0.029 | 0.022 | 0.219 | <88 | >100 | | |
| | 11:57:42 | 0.06 | 1.49 | 0.024 | 0.064 | 0.068 | 0.052 | 0.510 | <88 | >100 | | |
| | 11:59:08 | 0.07 | 1.87 | 0.038 | 0.051 | 0.040 | 0.043 | 0.422 | 100.10 | 2.00 | | |
| | 11:59:43 | 0.04 | 1.00 | 0.017 | 0.035 | 0.028 | 0.027 | 0.262 | 99.00 | 2.00 | | |
| | 12:00:02 | 0.11 | 2.85 | 0.058 | 0.132 | 0.204 | 0.131 | 1.288 | 97.80 | 2.30 | | |
| | 12:00:31 | 0.02 | 0.41 | 0.009 | 0.007 | 0.010 | 0.009 | 0.085 | 89.20 | 2.50 | | |
| | 12:01:21 | 0.16 | 4.18 | 0.177 | 0.271 | 0.186 | 0.211 | 2.072 | 97.20 | 5.80 | | |
| 12:01:38 | 0.28 | 7.20 | 0.401 | 0.227 | 0.237 | 0.288 | 2.828 | 91.80 | 3.60 | | | |
| 12:01:55 | 0.16 | 4.12 | 0.185 | 0.076 | 0.151 | 0.137 | 1.347 | 102.40 | 2.70 | | | |
| 12:02:15 | 0.32 | 8.11 | 0.162 | 0.548 | 0.242 | 0.317 | 3.112 | 131.70 | 10.20 | | | |
| 12:02:51 | 0.05 | 1.14 | 0.043 | 0.026 | 0.035 | 0.035 | 0.340 | 90.50 | 3.00 | | | |
| 12:03:20 | 0.02 | 0.51 | 0.012 | 0.011 | 0.016 | 0.013 | 0.127 | 97.70 | 3.70 | | | |

4.0 Discussion of Result and Conclusion

Below is the evaluation provided by the Technical service engineers who conducted the monitoring.

Sampling started at around 11AM, vibrometer is located 5m and 10m away from the sampling points for Malolos station. Recording is done for fifteen (15) minutes per points.

Based on the table, at monitoring point 1 at **Malolos Station**, the highest recorded event is measuring **1.34 mm/s** with total of 6 monitored events. For monitoring point 2, **8.11 mm/s** is the highest recorded with total of 13 monitored events. Both points, including the lesser values will not affect the structural integrity of the station as far as vibration is concerned.

Monitoring point 1, 91.2 dBA is the highest recorded with zero crossing frequency of 2.2 Hz and average dBA of events per point by <88.53 dBA. However, point 2 got the highest recorded noise by 131.7 dBA with zero crossing frequency of 10.2 Hz and average of <97.28 dBA. See Table 3.1.1.

Vibration is perceptible by human starts at **2.00 mm/sec** and plaster cracking on concrete wall occurs at **50 mm/sec**.

Prepared by:



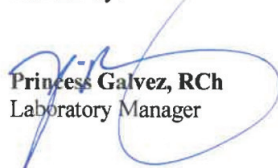
Carrissa Clarisse T. Lico
Data Encoder/Field Sampler

Reviewed by:



Regidor J. Sotelo
QA/QC Manager (ASTS)

NOTED by:



Princess Galvez, RCh
Laboratory Manager

C. SUMMARY OF RESULTS

Five (5) designated stations were assessed with vibration level at North-South Commuter Railway (NSCR) Project in Meycauayan and Valenzuela. The results for maximum and peak vibration levels, stations and the corresponding Global Positioning System (GPS) coordinates of the stations are shown below in *Tables 1 and 2*. See attached location map, Measurement and Assessment of Baseline Vibration Report and equipment calibration certificate.

Table 1. Maximum Vibration Levels Monitoring Results

| Survey Stations | GPS Coordinates | Vibration Levels (VdB) | | | | | | Vibration Impact Levels | | |
|---|-----------------|--------------------------|--------------------------|--------------------------|----------------------------|----------------------|-------------------------|--------------------------|--|--|
| | | Morning (0500H-0900H) | Daytime (0900H-1800H) | Evening (1800H-2200H) | Nighttime (2200H-0500H) | Frequent Events * | Occasional Events ** | Infrequent Events *** | | |
| Malinta Elementary School (15 to 16-Jun-20) | X-axis | 53 | 54 | 54 | 53 | 72 ^A | 75 ^A | 80 ^A | | |
| | Y-axis | 55 | 57 | 56 | 54 | 75 ^B | 78 ^B | 83 ^B | | |
| | Z-axis | 53 | 54 | 54 | 53 | | | | | |
| Meycauayan College (16 to 17-Jun-20) | X-axis | 53 | 54 | 53 | 53 | 72 ^A | 75 ^A | 80 ^A | | |
| | Y-axis | 55 | 56 | 55 | 55 | 75 ^B | 78 ^B | 83 ^B | | |
| | Z-axis | 54 | 54 | 54 | 54 | | | | | |
| St. Mary's College Meycauayan (17 to 18-Jun-20) | X-axis | 54 | 55 | 54 | 53 | 72 ^A | 75 ^A | 80 ^A | | |
| | Y-axis | 61 | 62 | 63 | 59 | 75 ^B | 78 ^B | 83 ^B | | |
| | Z-axis | 54 | 55 | 54 | 54 | | | | | |
| Tabing Ilog Elementary School (18 to 19-Jun-20) | X-axis | 53 | 55 | 53 | 53 | 72 ^A | 75 ^A | 80 ^A | | |
| | Y-axis | 54 | 64 | 54 | 54 | 75 ^B | 78 ^B | 83 ^B | | |
| | Z-axis | 54 | 55 | 54 | 54 | | | | | |
| Abangan Norte Elementary School (19 to 20-Jun-20) | X-axis | 53 | 53 | 54 | 53 | 72 ^A | 75 ^A | 80 ^A | | |
| | Y-axis | 54 | 54 | 54 | 55 | 75 ^B | 78 ^B | 83 ^B | | |
| | Z-axis | 54 | 54 | 54 | 54 | | | | | |

Note: Vibration Impact Levels (VdB re 1 micro inch/sec);

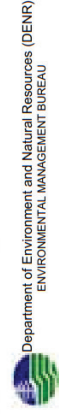
^A Category 2: Residences and buildings where people normally sleep; ^B Category 3: Institutional land uses with primarily daytime use.

* Frequent Events- defined as more than 70 vibration events of the same source per day. Most rapid transit project fall into this category.

** Occasional Events- defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

*** Infrequent Events- defined as fewer than 30 vibration events of the same kind per day. This category includes most of commuter rail branch lines

2nd Floor, VAG Bldg, Ortigas Ave., Greenhills
San Juan, Metro Manila, Philippines
Tel No. (632) 863-6729, Fax (632) 727-9831
Email: info@bsenv.com



ACCREDITED THIRD PARTY TESTER



Environmental Management Service Provider

17 September 2020

Ref. No.: FR-20-007P3-6-41

MS. AIDENN C. RANAS

Senior Environmental Supervisor

TAISEI – DMCI JV

DMCI Annex Building, 2278 Chino Roces Ave, Makati

Subject: *Vibration Levels Measurement Report*

Dear Ms. Ranas,

This report presents the results of vibration levels measurements conducted on June 15 to 20, 2020 at North-South Commuter Railways (NSCR) Project in Meycauayan and Valenzuela. BSI commissioned Tekton Geometrix Incorporated to conduct the vibration acceleration measurements.

A. OBJECTIVE OF THE MONITORING

The purpose of the monitoring was to determine the 2nd Quarter vibration levels at five (5) designated stations in North-South Commuter Railway (NSCR) Project.

B. SAMPLING PROCEDURE

At each site, 24-hour sampling was undertaken where vibration was recorded using the Vibron Seismometer, which is a seismic data recorder connected to geophones. A set of triaxial sensors composed of a vertical sensor and two horizontal sensors arranged orthogonally was used at each observation area. The triaxial sensors have a natural frequency of 4.5 Hz and the recorder used a sampling frequency of 150 samples per second.

Each seismic sensor was deployed on the natural ground whenever available, or on concrete pavement or road surface in areas where the natural ground is covered. In each site, the data recording was supervised by a crew of three which alternated over 12-hour shifts. The crew surveyed one site per day to gather the 24-hour data set before moving to the next site.

It is expressed in terms of the frequency-weighted level in units of Velocity Decibels (VdB). The peak vibration acceleration over a measurement period was recorded.

2nd Floor, VAG Bldg, Ortigas Ave., Greenhills
San Juan, Metro Manila, Philippines
Tel No. (632) 863-6129• Fax (632) 727-9831
Email: info@bsienv.com



Department of Environment and Natural Resources (DENR)
ENVIRONMENTAL MANAGEMENT BUREAU

ACCREDITED THIRD PARTY TESTER

Table 2. Peak Vibration Levels Monitoring Results

| Survey Stations | Recorded Peak Vibration (VdB) | Peak Time |
|--|--------------------------------------|-------------------------|
| Malinta Elementary School (15 to 16-Jun-20) | 57 (Y-axis) | Daytime (0900H-1800H) |
| Meycauayan College (16 to 17-Jun-20) | 56 (Y-axis) | Daytime (0900H-1800H) |
| St. Mary's College Meycauayan (17 to 18-Jun-20) | 63 (Y-axis) | Evening (1800H-2200H) |
| Tabing Ilog Elementary School (18 to 19-Jun-20) | 64 (Y-axis) | Daytime (0900H-1800H) |
| Abangan Norte Elementary School (19 to 20-Jun-20) | 55 (Y-axis) | Nighttime (2200H-0500H) |

Observation and activities noted on each station monitored are summarized and presented on the succeeding report.

If you have any inquiry regarding the vibration levels monitoring, please do not hesitate to contact us.

Thank you and regards,


EMMANUEL R. ALTAREJOS
Executive Vice President

**ANNEX G:
TRAFFIC MANAGEMENT PLAN
(MALOLOS, GUIGUINTO,
BALAGTAS AND PARTS OF
BOCAUE)**



North-South Commuter Railway (NSCR) Project
CP01 Elevated Structures, 6 Stations and Depot
Contract No.: PNRN1-03
Taisei-DMCI Joint Venture (TDJV)
Location: Brgy. Bangcal, Meycauayan City
Description: Traffic Control Management
Date: May 29, 2020 11:08 AM

Installation of speed limit and traffic signages along crossings and access roads to ease traffic and avoid pedestrian accidents

**ANNEX H:
MONTHLY INSPECTION
(MALOLOS, GUIGUINTO AND BALAGTAS
OLD PNR STATIONS)**



Republic of the Philippines
DEPARTMENT OF TRANSPORTATION (DOTr)
 RAILWAYS SECTOR

ACTIVITY : Environmental Audit and Check Monitoring of Old RR Stations
 DATE : June 23, 2020
 TIME : 16:00 AM
 VENUE : CPOA Areas

| NAME | AGENCY/OFFICE | POSITION | CONTACT NO. | EMAIL ADDRESS | SIGNATURE |
|---|---------------|-----------------|--------------------------------|--|--------------------|
| GILBERT R. LACUIO | PNR | P.O. | 09175832352 | gilbert.luis@pnr.com | <i>[Signature]</i> |
| BERNARD CABRERA SOTTO Ma. Verónica Torres | PNR | P.O. II CPOA | 0995 222 4192 0995-534-8405 | gaberto.pmc@pnr.com marveronica@pnr.com | <i>[Signature]</i> |
| Ysij Gayle | PNR | Net Envr. Eng. | 915 46 3416 | ysij.gayle@pnr.com | <i>[Signature]</i> |
| Yvett Gatoy | SMCC | ENR | 0956 846 8768 | yvett.gatoy@smcc.com.ph | <i>[Signature]</i> |
| Christine Boroboro | SMCC | PCO | | | <i>[Signature]</i> |
| Japhet Gonzalez | SMCC | PNR | | pnr@smcc.com.ph | <i>[Signature]</i> |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |



