Environment Monitoring Report

Adani Vizhinjam Port Pvt. Ltd.

Vizhinjam, Kerala

February – 2021
Environment Monitoring Locations:

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Environmental Attribute</th>
<th>Location</th>
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</thead>
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<tr>
<td>1.</td>
<td>Ambient Air Quality Monitoring</td>
<td>Port Site (A1)</td>
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<tr>
<td></td>
<td></td>
<td>Proposed Port Estate Area (A2)</td>
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<tr>
<td></td>
<td></td>
<td>Chani (A3)</td>
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<tr>
<td></td>
<td></td>
<td>Venganoor (A4)</td>
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<tr>
<td></td>
<td></td>
<td>Balarampuram (A5)</td>
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<tr>
<td>2.</td>
<td>Ambient Noise</td>
<td>Port Site (Industrial) (N1)</td>
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<tr>
<td></td>
<td></td>
<td>Proposed Port Estate Area (Commercial) (N2)</td>
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<tr>
<td></td>
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<td>Chani (Residential) (N3)</td>
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<tr>
<td></td>
<td></td>
<td>Venganoor (Residential) (N4)</td>
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<tr>
<td></td>
<td></td>
<td>Balarampuram (Residential) (N5)</td>
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<tr>
<td>3.</td>
<td>Marine Water</td>
<td>Near Kovalam Beach (M1)</td>
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<td></td>
<td></td>
<td>Proposed Dredging Site (M2)</td>
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<td>South of Break Water (M3)</td>
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<tr>
<td></td>
<td></td>
<td>Port Basin (M4)</td>
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<tr>
<td></td>
<td></td>
<td>Inner Approach Channel (M5)</td>
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<td>Kovalam Beach (M6)</td>
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<td>4.</td>
<td>Groundwater</td>
<td>Port Site (G1)</td>
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<td>PAF Area (G2)</td>
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<td>Proposed Port Estate Area (G3)</td>
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<td>5.</td>
<td>Surface Water</td>
<td>Poovar West Canal (S1)</td>
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<td></td>
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<td>Vizhinjam Branch Canal (S2)</td>
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<tr>
<td></td>
<td></td>
<td>Vellayani Lake (S3)</td>
</tr>
</tbody>
</table>
1. Summary

- The ambient air quality monitoring results were observed to be within National Ambient Air Quality Standards (NAAQS), 2009 at all the five locations during the month of February 2021.
- Noise readings were within limits at all the monitoring locations during the month of February 2021.
- All the parameters of groundwater were recorded within the acceptable limits at all the locations.
- Surface water results were observed to be comparable with the baseline.
2. Ambient Air Quality

**Ambient Air PM10**

![Ambient Air PM10 Chart]

**Ambient Air PM2.5**

![Ambient Air PM2.5 Chart]

**Ambient Air SO₂**

![Ambient Air SO₂ Chart]
3. Ambient Noise

### Residential Area

<table>
<thead>
<tr>
<th>Date</th>
<th>Proposed Port Estate Area</th>
<th>Chani</th>
<th>Venganoor</th>
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<tbody>
<tr>
<td>05.02.2021</td>
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<td>52</td>
<td>48</td>
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<tr>
<td>19.02.2021</td>
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<td>21.02.2021</td>
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</tbody>
</table>

- **Leq Day time**
- **Leq Night time**
- **Limit (Day time)**
- **Limit (Night time)**

### Industrial Area

<table>
<thead>
<tr>
<th>Date</th>
<th>Port Site</th>
</tr>
</thead>
<tbody>
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<td>04.02.2021</td>
<td>60</td>
</tr>
<tr>
<td>18.02.2021</td>
<td>65</td>
</tr>
</tbody>
</table>

- **Leq Day time**
- **Leq Night time**
- **Limit (Day time)**
- **Limit (Night time)**
4. Marine Survey
4 a. Marine Water Analysis

![Marine Water Temperature](image1)

- **Near Kovalam Beach**
- **Proposed Dredging site**
- **South of Break Water**
- **Port Basin**
- **Inner Approach Channel**
- **Kovalam Beach**

![High tide](blue) | ![Low tide](red)

![Marine Water Dissolved Oxygen](image2)

- **Near Kovalam Beach**
- **Proposed Dredging site**
- **South of Break Water**
- **Port Basin**
- **Inner Approach Channel**
- **Kovalam Beach**

![High tide](blue) | ![Low tide](red)

![Marine Water Biochemical Oxygen Demand](image3)

(3 days, 27°C)

- **Near Kovalam Beach**
- **Proposed Dredging site**
- **South of Break Water**
- **Port Basin**
- **Inner Approach Channel**
- **Kovalam Beach**

![High tide](blue) | ![Low tide](red)
4 b. Sediment Analysis

**Sediment Analysis_Organic Matter**

- Organic Matter (%)
- Near Kovalam Beach
- Proposed Dredging site
- South of Break Water
- Port Basin
- Inner Approach Channel
- Kovalam Beach

**Sediment Analysis_Total Phosphorus (as P)**

- Total Phosphorus (as P) (mg/kg)
- Near Kovalam Beach
- Proposed Dredging site
- South of Break Water
- Port Basin
- Inner Approach Channel
- Kovalam Beach

**Sediment Analysis_Lead (as Pb)**

- Lead (as Pb) (mg/kg)
- Near Kovalam Beach
- Proposed Dredging site
- South of Break Water
- Port Basin
- Inner Approach Channel
- Kovalam Beach
Sediment Analysis_Alabiuminium (as Al)

- Near Kovalam Beach
- Proposed Dredging site
- South of Break Water
- Port Basin
- Inner Approach Channel
- Kovalam Beach

Aluminium (as Al) (mg/kg)

Sediment Analysis_Iron (as Fe)

- Near Kovalam Beach
- Proposed Dredging site
- South of Break Water
- Port Basin
- Inner Approach Channel
- Kovalam Beach

Iron (as Fe) (mg/kg)

Sediment Analysis_Zinc (as Zn)

- Near Kovalam Beach
- Proposed Dredging site
- South of Break Water
- Port Basin
- Inner Approach Channel
- Kovalam Beach

Zinc (as Zn) (mg/kg)
Sediment Analysis Manganese (as Mn)

- **Near Kovalam Beach**
- **Proposed Dredging site**
- **South of Break Water**
- **Port Basin**
- **Inner Approach Channel**
- **Kovalam Beach**

Manganese (as Mn) (mg/kg)

Sediment Analysis Benthic Organisms

- **Near Kovalam Beach**
- **Proposed Dredging site**
- **South of Break Water**
- **Port Basin**
- **Inner Approach Channel**
- **Kovalam Beach**

Micro Benthic Organism /m2
Macro Benthic Organism /m2
Total Organism /m2
4 c. Phytoplankton Analysis from Marine Samples

![Phytoplankton Analysis Chart]

4 d. Zooplankton Analysis from Marine Sample

![Zooplankton Analysis Chart]
5. Groundwater Analysis

Ground Water pH

Ground Water_Total Dissolved Solids

Ground Water_Calcium & Magnesium
Ground Water_Total Alkalinity & Total Hardness

- Port Site (Open well)
- Proposed Port Estate Area (Open well)
- PAF Area (Open well)

- Total Alkalinity (as CaCO3) (mg/L)
- Total Hardness (as CaCO3) (mg/L)

Ground Water_Chloride (as Cl)

- Port Site (Open well)
- Proposed Port Estate Area (Open well)
- PAF Area (Open well)

- Chloride (as Cl) (mg/L)

Ground Water_Sulphate (as SO4)

- Port Site (Open well)
- Proposed Port Estate Area (Open well)
- PAF Area (Open well)

- Sulphate (as SO4) (mg/L)
6. Surface Water Analysis

**Surface Water pH**

- Poovar West Canal: 6.7
- Vizhinjam Branch Canal: 6.9
- Vellayani Lake: 6.5

**Surface Water Electrical Conductivity**

- Poovar West Canal: 3200 mg/L
- Vizhinjam Branch Canal: 0 mg/L
- Vellayani Lake: 0 mg/L

**Surface Water Total dissolved Solids**

- Poovar West Canal: 1550 mg/L
- Vizhinjam Branch Canal: 50 mg/L
- Vellayani Lake: 50 mg/L
Surface Water Dissolved Oxygen

Results (mg/L)

Poovar West Canal: 6.5
Vizhinjam Branch Canal: 5.0
Vellayani Lake: 5.5

Dissolved Oxygen (mg/L)

Surface Water Chloride

Results (mg/L)

Poovar West Canal: 825
Vizhinjam Branch Canal: 25
Vellayani Lake: 25

Chloride (as Cl) (mg/L)

Surface Water Sulphate

Results (mg/L)

Poovar West Canal: 60
Vizhinjam Branch Canal: 10
Vellayani Lake: 10

Sulphate (as SO4) (mg/L)
Surface Water_Nitrate

Nitrate (as NO3) (mg/L)

Surface Water_Calcium & Magnesium

Calcium (as Ca) (mg/L)  Magnesium (as Mg) (mg/L)

Surface Water

Total Alkalinity (as CaCO3) (mg/L)
Total Hardness (as CaCO3) (mg/L)
Calcium Hardness (as CaCO3)