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3. Vu Nam Phong
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Data

I. Hydrology Survey

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I. INVENTORY ON THE SURVEY AND DATA ANALYSIS ACTIVITIES

1.1 Survey objectives

The survey area is Quang Ninh coastal water including Ha Long and Bai Tu Long Bays. The main objective of the survey is to conduct the current measurement at three stations in the area, which have been identified with the following coordinates and depths (referred to Chart Datum):

| Station | Location | Depth (m) |
|-------------------|---|-----------|
| Cua Luc | 107 ^o 03'03", 20 ^o 57'27" | 16.0 |
| Cua Dua | 107 ^o 08'03", 20 ^o 49'21" | 11.5 |
| Cam Pha - Cua Ong | 107 ^o 20'55", 20 ^o 58'25" | 15.4 |

The locations of the stations are shown in the Figure 1.1 and the schemes of the current meter instalation are shown in the Figures 1.2 and 1.3. At each station, the measurement has been conducted at surface and bottom layers.. The current meters for bottom current measurement were fixed at the depth of 2m above the bottom, while those for surface current measurement were hung at 0.8m below the water surface at the Cua Luc and Cam Pha - Cua Ong Stations and at 10m above the bottom at the Cua Dua Station (the water depth at this Station is 13.5m referred to the Mean Sea Level)

Beside, the wind speed and direction have been recorded every three hours (at 1h, 4h, 7h, 10h, 13h, 16h, 19h and 22h) at the altitude of 3m above the water surface at the three stations during the survey time period. The measured six-hourly (at 1h, 7h, 13h and 19h) water level at Bai Chay and Cua Ong Stations during this time has been collected from the Bai Chay Hydro-meteorological Station.

1.2 Survey time

The survey team departed on 12 July and conducted the preparation work and equipment check in Bai Chay on 13 July. The measurement activity has started from 14 July and planed to be completed on 29 July. Due to the event that the boatmen got serious sea-sick on the first day of the survey at the Cua Dua

Fig. 1.1. MAP OF LOCATIONS OF STATIONS OF HYDROLOGY SURVEY, HA LONG AND BAITU LONG BAYS, 07/1998

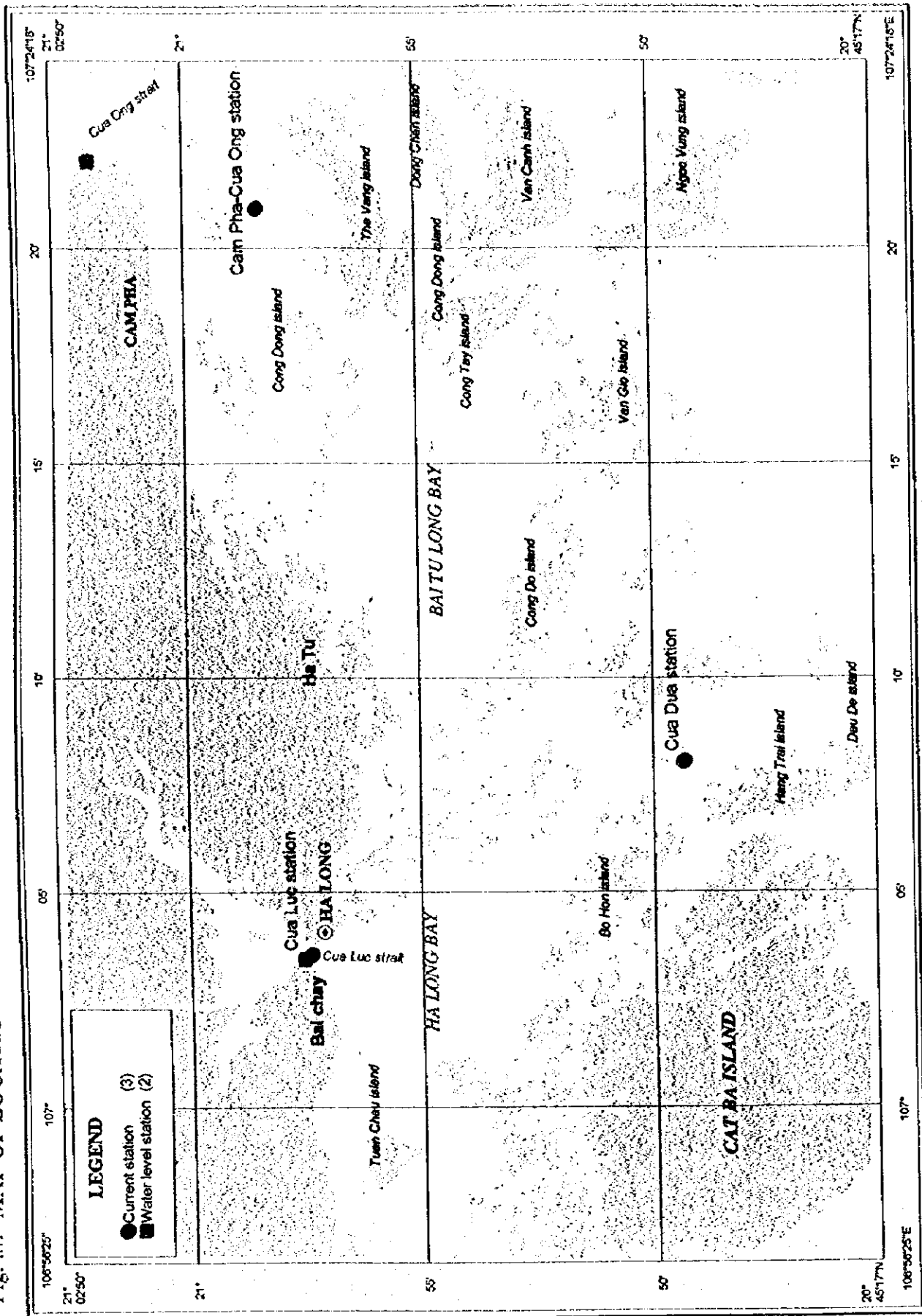
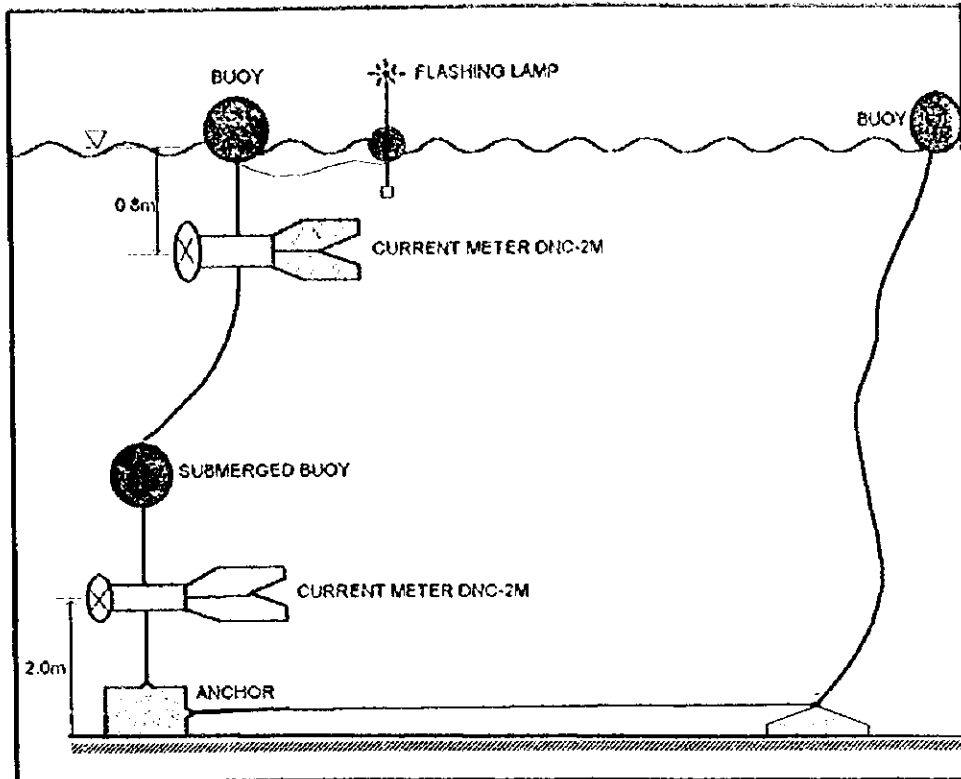
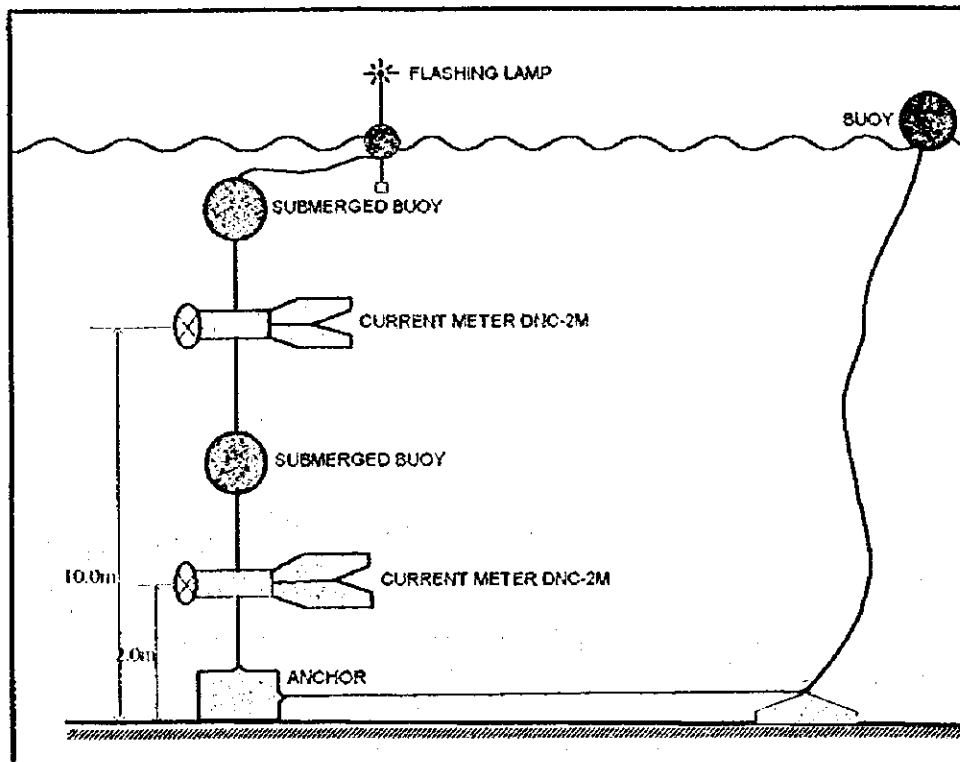


Figure 1.2: SCHEME OF INSTALLATION OF CURRENT METERS AT CUA LUC AND CAM PHA-CUA ONG STATIONS



Note: The depth (referred to Chart datum)
 At Cua Luc station: 16.0m
 At Cam Pha-Cua Ong station: 15.4m

Figure 1.3: SCHEME OF INSTALLATION OF CURRENT METERS AT CUA DUA STATION



Note: The depth (referred to Chart datum) at Cua Dua station: 11.5m

Station, the team member responsible for this boat had decided to bring them back to the shore and change the boat with boatmen capable for working in strong wave conditions. The current meters were pulled back for security purpose during the time period from 6h to 14h, 15 July at this Station. In consequence, the survey period has been extended for 1 day more in order to have 15-day continuous and synchronous data series for all three station (the measurement has been completed at 14h30, 30 July). The survey team left Bai Chay for Hanoi on 31 July.

Due to the long period of survey, for the sake of equipment, data and team members health security, the midterm mission of technical group has been conducted to check the working condition of the three stations on 21 July (from 6h40 to 7h10 at Cua Luc, 16h40 - 17h15 at Cam Pha - Cua Ong and from 10h50 to 11h15 at Cua Dua).

1.3 Survey equipment and tools

Survey equipment and tools include:

| Item | Quantity |
|---|----------|
| Self-recorded current meter DNC-2M (UK) | 6 |
| Anemometer | 3 |
| Compass | 3 |
| Global Positioning System KGP 912 (Japan) | 1 |
| Buoy for current meters | 12 |
| Security jacket, hat and attire | 9 |
| Flashing lamp | 9 |
| Other, such as leads, rope, . . . | |

All the equipment have been well checked before the survey activity started. Beside, they were also been checked again during the midterm mission of the Technical Group.

1.4 Survey results

Current: The data series were obtained with the frequency of 15 minutes. The details are as follows:

- At Cua Luc Station: Two data series were obtained: from 13h45, 14. July to 6h30, 21 July and from 7h30, 21 July to 14h30, 30 July. During the

time period from 6h40 to 7h15, 21 July, the two current meters at the Station were stopped working for midterm equipment check. The missing data at 6h45, 7h00 và 7h15, 21 July have been interpolated and added to the data series prepared for the harmonic analysis.

- At Cam Pha - Cua Ong Station: Like for the Cua Luc Station, two data series were obtained: from 14h45, 14 July to 16h30, 21 July and from 17h30, 21 July to 14h00, 30 July. The two current meters at the Station were stopped working for midterm equipment check from 16h40 to 17h15. The missing data are those at 16h45, 17h00, 17h15, 21 July and have also been interpolated for the harmonic analysis purpose.
- At Cua Dua Station: Due to the boat replacement as presented above (Survey time) and the midterm equipment check, three data series were obtained at this Station including those:
 - * from 11h00, 14 July to 4h30, 15 July
 - * from 15h15, 15 July to 10h45, 21 July
 - * from 11h30, 21 July to 14h00, 30 July

For the surface current, the missing data at 11h00 and 11h15, 21 July have been interpolated, hence the two last data series formed the continuous one of almost 15 days, which will be served for the harmonic analysis. The first series can be used for reference.

The status of data recorded by the bottom current meter is as follows:

At 10h50, 21 July, the meters were pulled back for a check. The meter of bottom layer was in normally working condition, but a little of algae had been detected on it. The algae were removed before putting down the meters again at 11h15. At 14h00 30 July, when the measurement completed, the meter was checked again and it appeared in normally working condition. However, some algae again were found on the equipment. The meter could be stuck by algae, seaweed, garbage, . . . , which could be removed after that and the weak current at this layer could be the reasons of the zero values of speed recorded from 22h15, 16.07 to 2h45, 24.07 and from 15h45, 27.07 to 14.00, 30.07, while all the other parameters were measured normally, including the current direction.

Therefore, the data collected for these periods at the bottom layer (from 22h15, 16.07 to 2h45, 24.07 and from 15h45, 27.07 to 14.00, 30.07) are recommended not to be used.

The original data on current at two layers, three stations are given in the Appendix.

Wind: As mentioned above, the wind has been measured every three hours at 1h, 4h, 7h, 10h, 13h, 16h, 19h and 22h at the three stations Cua Luc, Cua Dua, Cam Pha - Cua Ong during the period from 13h, 14 July to 13h, 30 July (except at 13h, 14 July at Cam Pha - Cua Ong Station because the boat has not been reached the station and at 7h, 10h, 13h, 15 July at the Cua Dua Station during the boat replacement time).

1.5 Some results of data analysis

Water level: The measured sea water levels on July at the Bai Chay and Cua Ong Stations are presented in the Tables 1.1 and 1.2. The tidal levels in July at the stations derived from the Tidal Table, 1998 are shown in the Table 1.3 and 1.4. The comparison of these levels during the survey time from 14 July to 30 July is illustrated in the Figures 1.4 and 1.5. It can be seen that the difference is small in general and it is larger at Bai Chay compared with that at Cua Ong.

Wind: The wind data measured during the survey period are given in the Tables 1.5, 1.6 and 1.7. The analysis on the wind roses has been conducted. The Tables 2.1 - 2.3 and Figures 2.1 - 2.3 represent the frequency tables and wind roses at the three stations for the period from 14 to 30 July 1998. It is shown that the wind direction and magnitude are in agreement with the S and SE dominant summer wind field in the study area. The direction with the highest frequency of occurrence is the S composed of 51.9% at the Cua Luc, 71.9% at Cam Pha-Cua Ong and 65.1% at Cua Dua Station. The wind magnitude increases from the shore seaward.

| Station | Vmax(m/s) | Direction |
|-------------------|-----------|-----------|
| Cua Luc | 7.8 | S |
| Cam Pha - Cua Ong | 8.1 | S |
| Cua Dua | 11.0 | S |

Current: From the data series recorded by the current meters, the current roses have been drawn. Like for the wind roses, the statistic method has been applied for calculating the frequency (%) of the velocity ranges in different directions and then the total frequency (Total %) for every direction and total frequency for velocity ranges (F%). Beside, the average and maximum current speeds (Vmed, Vmax) for the directions were also derived. Some results of analysis are given in the Tables 3.1 - 3.6 and Figures 3.1 - 3.6, which represent the frequency table and current roses at three stations and at surface and bottom layers. Due to

the morphological feature of the area, the current has two dominant contravesary directions. The flow regime is strongly affected by the tide. Current speed decreases from the surface to the bottom.

- At Cua Luc Station: The surface current was rather strong. The strongest one has been recorded of about 130cm/s during the ebb tide in SW direction. Two dominant flow direction are N and SW at the surface and N and S at the bottom (see the Tables 3.1, 3.2 and Figures 3.1, 3.2).
- At Cam Pha - Cua Ong Station: The average current speed is about 20cm/s at the bottom and 45 cm/s at the surface. The maximum value is 81.1 cm/s in SW direction at the surface and 47 cm/s at the bottom. The dominant flow directions are E, SE, N and SW (see the Tables 3.3, 3.4 and Figures 3.3, 3.4).
- At Cua Dua Station: The flow has two main directions N S with V_{max} of 65 cm/s at the surface and 35 cm/s at the bottom (see the Tables 3.5, 3.6 and Figures 3.5, 3.6)

In general, the recorded flow in the study area in the combination of tidal and non - tidal components with the main role of the tidal one. Therefore, the flow direction varies in time during a day and has two contravesary dominant directios depending on the tide phase. The current speed also varies in time and decreases from the surface to the bottom. In space, the variation level of the current speed depends on the morphological character of the locality where the station is. At the Cua Luc Station, the strong current has been recorded (130 cm/s), which is the result of the discharging water through the Cua Luc Strait

The results of current analysis for the harmonic analysis at three station and two layers are given in the Appendix. The north used in current data is the magnetic north, which has the declination to the geographic north of 0.75 degree for the Ha Long Bay and Bai Tu Long area

TABLE 1.1 MEASURED SEA WATER LEVEL IN JULY, 1998

Cua Ong Station

Unit: cm

| Day | 1h | 7h | 13h | 19h | TB | Max | Min |
|------|-----|-----|-----|-----|-----|-----|-----|
| 1 | 249 | 148 | 186 | 298 | 220 | 298 | 148 |
| 2 | 253 | 154 | 204 | 277 | 222 | 277 | 154 |
| 3 | 242 | 198 | 230 | 268 | 235 | 268 | 198 |
| 4 | 223 | 210 | 268 | 231 | 233 | 268 | 210 |
| 5 | 211 | 209 | 296 | 265 | 245 | 296 | 209 |
| 6 | 166 | 184 | 305 | 274 | 232 | 305 | 166 |
| 7 | 138 | 134 | 320 | 306 | 225 | 320 | 134 |
| 8 | 116 | 122 | 323 | 329 | 223 | 329 | 116 |
| 9 | 109 | 118 | 312 | 355 | 224 | 355 | 109 |
| 10 | 118 | 103 | 298 | 392 | 228 | 392 | 103 |
| 11 | 149 | 86 | 259 | 400 | 224 | 400 | 86 |
| 12 | 187 | 93 | 229 | 393 | 226 | 393 | 93 |
| 13 | 226 | 111 | 207 | 380 | 231 | 380 | 111 |
| 14 | 253 | 127 | 187 | 342 | 227 | 342 | 127 |
| 15 | 261 | 144 | 170 | 296 | 218 | 296 | 144 |
| 16 | 264 | 176 | 178 | 244 | 216 | 264 | 176 |
| 17 | 249 | 189 | 209 | 215 | 216 | 249 | 189 |
| 18 | 205 | 215 | 261 | 209 | 223 | 261 | 205 |
| 19 | 179 | 205 | 302 | 219 | 226 | 302 | 179 |
| 20 | 152 | 195 | 328 | 246 | 230 | 328 | 152 |
| 21 | 122 | 164 | 333 | 294 | 228 | 333 | 122 |
| 22 | 117 | 131 | 340 | 334 | 231 | 340 | 117 |
| 23 | 119 | 105 | 312 | 366 | 226 | 366 | 105 |
| 24 | 132 | 89 | 277 | 382 | 220 | 382 | 89 |
| 25 | 145 | 96 | 234 | 388 | 216 | 388 | 96 |
| 26 | 178 | 103 | 200 | 377 | 215 | 377 | 103 |
| 27 | 211 | 122 | 195 | 348 | 219 | 348 | 122 |
| 28 | 225 | 132 | 185 | 327 | 217 | 327 | 132 |
| 29 | 231 | 163 | 184 | 288 | 217 | 288 | 163 |
| 30 | 241 | 184 | 214 | 251 | 223 | 251 | 184 |
| 31 | 223 | 195 | 249 | - | - | - | - |
| MEAN | 190 | 149 | 251 | 310 | 224 | 400 | 86 |

Source: Bai Chay Hydrometeorological Station

TABLE 1.2 MEASURED SEA WATER LEVEL IN JULY, 1998

Bai Chay Station

Unit: cm

| Day | 1h | 7h | 13h | 19h | TB | Max | Min |
|------|-----|-----|-----|-----|-----|-----|-----|
| 1 | 239 | 133 | 183 | 291 | 212 | 219 | 133 |
| 2 | 234 | 144 | 196 | 272 | 212 | 272 | 144 |
| 3 | 229 | 177 | 202 | 252 | 215 | 252 | 177 |
| 4 | 216 | 194 | 220 | 236 | 217 | 236 | 194 |
| 5 | 200 | 198 | 258 | 262 | 230 | 262 | 198 |
| 6 | 182 | 164 | 294 | 274 | 229 | 294 | 164 |
| 7 | 154 | 158 | 302 | 276 | 223 | 302 | 154 |
| 8 | 136 | 134 | 310 | 306 | 222 | 310 | 134 |
| 9 | 129 | 96 | 298 | 324 | 212 | 324 | 96 |
| 10 | 132 | 79 | 286 | 332 | 207 | 332 | 79 |
| 11 | 135 | 70 | 254 | 359 | 205 | 359 | 70 |
| 12 | 150 | 75 | 232 | 388 | 211 | 388 | 75 |
| 13 | 179 | 80 | 200 | 352 | 203 | 352 | 80 |
| 14 | 206 | 111 | 184 | 336 | 209 | 336 | 111 |
| 15 | 238 | 136 | 172 | 316 | 216 | 316 | 136 |
| 16 | 255 | 144 | 179 | 284 | 216 | 284 | 144 |
| 17 | 247 | 157 | 188 | 226 | 205 | 247 | 157 |
| 18 | 216 | 180 | 200 | 198 | 199 | 216 | 180 |
| 19 | 185 | 197 | 238 | 178 | 200 | 238 | 178 |
| 20 | 150 | 185 | 280 | 226 | 211 | 280 | 150 |
| 21 | 128 | 165 | 319 | 269 | 220 | 319 | 128 |
| 22 | 122 | 142 | 346 | 296 | 227 | 346 | 122 |
| 23 | 113 | 100 | 338 | 334 | 221 | 338 | 100 |
| 24 | 128 | 79 | 316 | 346 | 217 | 346 | 79 |
| 25 | 151 | 64 | 278 | 355 | 212 | 355 | 64 |
| 26 | 166 | 99 | 256 | 346 | 217 | 346 | 99 |
| 27 | 189 | 108 | 232 | 324 | 213 | 324 | 108 |
| 28 | 206 | 148 | 200 | 270 | 206 | 270 | 148 |
| 29 | 218 | 154 | 192 | 263 | 207 | 263 | 154 |
| 30 | 216 | 166 | 186 | 254 | 206 | 254 | 166 |
| 31 | 216 | 194 | - | - | - | - | - |
| MEAN | 183 | 136 | 246 | 293 | 213 | 388 | 64 |

Source: Bai Chay Hydrometeorological Station

TABLE 1.3 TIDAL LEVEL (M) AT CUA ONG STATION
(July, 1998)

| Day | Hour | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1 | 2.8 | 2.5 | 2.3 | 2.0 | 1.7 | 1.5 | 1.4 | 1.3 | 1.4 | 1.4 | 1.6 | 1.7 | 1.8 | 2.0 | 2.1 | 2.2 | 2.4 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 | 2.9 | 2.8 |
| 2 | 2.7 | 2.5 | 2.3 | 2.1 | 1.8 | 1.6 | 1.5 | 1.5 | 1.5 | 1.6 | 1.7 | 1.9 | 2.0 | 2.1 | 2.3 | 2.3 | 2.4 | 2.5 | 2.5 | 2.5 | 2.6 | 2.6 | 2.6 | 2.6 |
| 3 | 2.5 | 2.4 | 2.2 | 2.0 | 1.9 | 1.7 | 1.6 | 1.6 | 1.6 | 1.7 | 1.9 | 2.0 | 2.2 | 2.4 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 |
| 4 | 2.2 | 2.1 | 2.0 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.7 | 2.7 | 2.7 | 2.6 | 2.4 | 2.3 | 2.2 | 2.0 | 2.0 |
| 5 | 1.9 | 1.9 | 1.8 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.8 | 1.9 | 2.1 | 2.3 | 2.6 | 2.8 | 2.9 | 3.0 | 3.0 | 2.9 | 2.7 | 2.5 | 2.3 | 2.1 | 1.9 | 1.7 |
| 6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.6 | 1.6 | 1.7 | 1.8 | 2.0 | 2.2 | 2.4 | 2.7 | 2.9 | 3.1 | 3.2 | 3.2 | 3.1 | 3.0 | 2.7 | 2.3 | 2.1 | 1.9 | 1.6 |
| 7 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.4 | 1.5 | 1.7 | 2.0 | 2.2 | 2.5 | 2.7 | 3.0 | 3.3 | 3.4 | 3.5 | 3.4 | 3.2 | 3.0 | 2.7 | 2.3 | 1.9 | 1.6 |
| 8 | 1.3 | 1.1 | 1.0 | 1.0 | 1.0 | 1.1 | 1.2 | 1.3 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.1 | 3.3 | 3.6 | 3.7 | 3.7 | 3.6 | 3.3 | 3.0 | 2.6 | 2.2 | 1.8 |
| 9 | 1.4 | 1.1 | 0.9 | 0.8 | 0.8 | 0.8 | 0.9 | 1.1 | 1.3 | 1.6 | 1.9 | 2.3 | 2.6 | 3.0 | 3.3 | 3.6 | 3.8 | 3.9 | 3.8 | 3.6 | 3.3 | 2.9 | 2.5 | 2.0 |
| 10 | 1.6 | 1.2 | 0.9 | 0.7 | 0.6 | 0.6 | 0.7 | 0.8 | 1.0 | 1.3 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 3.5 | 3.8 | 4.0 | 4.0 | 3.9 | 3.6 | 3.2 | 2.8 | 2.4 |
| 11 | 1.9 | 1.5 | 1.1 | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 1.0 | 1.3 | 1.7 | 2.1 | 2.5 | 2.9 | 3.3 | 3.6 | 3.9 | 4.0 | 4.0 | 3.8 | 3.5 | 3.1 | 2.7 |
| 12 | 2.3 | 1.8 | 1.4 | 1.0 | 0.8 | 0.7 | 0.6 | 0.6 | 0.7 | 0.8 | 1.0 | 1.4 | 1.7 | 2.2 | 2.6 | 2.9 | 3.3 | 3.6 | 3.8 | 3.9 | 3.9 | 3.7 | 3.4 | 3.0 |
| 13 | 2.6 | 2.2 | 1.8 | 1.4 | 1.1 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 1.0 | 1.2 | 1.5 | 1.8 | 2.2 | 2.6 | 2.9 | 3.2 | 3.5 | 3.7 | 3.7 | 3.6 | 3.4 | 3.2 |
| 14 | 2.8 | 2.5 | 2.1 | 1.8 | 1.5 | 1.3 | 1.1 | 1.0 | 1.0 | 1.1 | 1.2 | 1.2 | 1.4 | 1.6 | 1.9 | 2.2 | 2.5 | 2.8 | 3.0 | 3.3 | 3.3 | 3.4 | 3.3 | 3.1 |
| 15 | 2.9 | 2.6 | 2.4 | 2.1 | 1.8 | 1.6 | 1.5 | 1.4 | 1.4 | 1.3 | 1.4 | 1.4 | 1.5 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.8 | 2.9 | 3.0 | 3.0 | 2.9 |

Source: Tidal Table, 1998, Tom 1.

Hai Phong Institute of Oceanology
246 Da Nang Street, Hai Phong City
Tel: 84-31-846523; Fax: 84-31-846521

TABLE 1.3 TIDAL LEVEL (M) AT CUA ONG STATION (CONTINUED)
(July, 1998)

| Day | Hour | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 16 | 2.8 | 2.6 | 2.4 | 2.2 | 2.1 | 1.9 | 1.8 | 1.7 | 1.7 | 1.7 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 2.0 | 2.1 | 2.2 | 2.3 | 2.4 | 2.5 | 2.6 | 2.6 | 2.5 |
| 17 | 2.5 | 2.4 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| 18 | 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 2.0 | 2.1 | 2.2 | 2.3 | 2.5 | 2.6 | 2.7 | 2.7 | 2.7 | 2.6 | 2.5 | 2.3 | 2.2 | 2.1 | 1.9 | 1.9 | 1.8 | 1.7 |
| 19 | 1.7 | 1.7 | 1.6 | 1.6 | 1.7 | 1.7 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.8 | 3.0 | 3.1 | 3.1 | 3.0 | 2.9 | 2.7 | 2.5 | 2.2 | 2.0 | 1.8 | 1.6 | 1.5 |
| 20 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.4 | 1.5 | 1.7 | 2.0 | 2.3 | 2.6 | 2.9 | 3.1 | 3.4 | 3.5 | 3.5 | 3.4 | 3.1 | 2.9 | 2.5 | 2.2 | 1.9 | 1.6 | 1.4 |
| 21 | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 | 1.1 | 1.2 | 1.4 | 1.7 | 2.0 | 2.4 | 2.7 | 3.1 | 3.4 | 3.7 | 3.8 | 3.7 | 3.6 | 3.3 | 3.0 | 2.6 | 2.2 | 1.8 | 1.5 |
| 22 | 1.2 | 1.0 | 0.9 | 0.9 | 0.9 | 0.9 | 1.0 | 1.1 | 1.4 | 1.7 | 2.0 | 2.5 | 2.9 | 3.3 | 3.6 | 3.9 | 4.0 | 3.9 | 3.7 | 3.4 | 3.0 | 2.5 | 2.1 | 1.7 |
| 23 | 1.4 | 1.1 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 1.1 | 1.4 | 1.7 | 2.1 | 2.5 | 3.0 | 3.4 | 3.7 | 4.0 | 4.0 | 3.9 | 3.7 | 3.3 | 2.9 | 2.5 | 2.0 |
| 24 | 1.6 | 1.3 | 1.0 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 1.1 | 1.4 | 1.8 | 2.2 | 2.6 | 3.0 | 3.4 | 3.8 | 4.0 | 4.0 | 3.8 | 3.5 | 3.2 | 2.8 | 2.3 |
| 25 | 1.9 | 1.5 | 1.2 | 1.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 1.1 | 1.3 | 1.6 | 1.9 | 2.3 | 2.7 | 3.1 | 3.4 | 3.7 | 3.9 | 3.8 | 3.6 | 3.3 | 3.0 | 2.6 |
| 26 | 2.2 | 1.8 | 1.5 | 1.2 | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.1 | 1.2 | 1.5 | 1.7 | 2.0 | 2.4 | 2.7 | 3.1 | 3.4 | 3.6 | 3.7 | 3.6 | 3.4 | 3.1 | 2.8 |
| 27 | 2.4 | 2.1 | 1.7 | 1.5 | 1.3 | 1.2 | 1.2 | 1.2 | 1.2 | 1.3 | 1.3 | 1.5 | 1.7 | 1.9 | 2.2 | 2.4 | 2.7 | 3.0 | 3.3 | 3.4 | 3.4 | 3.3 | 3.1 | 2.8 |
| 28 | 2.5 | 2.2 | 1.9 | 1.7 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.5 | 1.5 | 1.6 | 1.7 | 1.9 | 2.1 | 2.3 | 2.5 | 2.7 | 2.9 | 3.1 | 3.1 | 3.1 | 3.0 | 2.8 |
| 29 | 2.5 | 2.3 | 2.1 | 1.8 | 1.6 | 1.5 | 1.5 | 1.5 | 1.6 | 1.7 | 1.7 | 1.8 | 1.9 | 2.0 | 2.1 | 2.2 | 2.3 | 2.5 | 2.6 | 2.7 | 2.8 | 2.8 | 2.8 | 2.6 |
| 30 | 2.5 | 2.3 | 2.1 | 1.9 | 1.8 | 1.7 | 1.6 | 1.7 | 1.8 | 1.9 | 1.9 | 2.0 | 2.1 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.4 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 |
| 31 | 2.3 | 2.2 | 2.1 | 2.0 | 1.9 | 1.8 | 1.8 | 1.8 | 1.9 | 2.0 | 2.1 | 2.2 | 2.3 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 |

Source: Tidal Table, 1998, Tom 1.

TABLE I.4 TIDAL LEVEL (M) AT HON GAI STATION
(July, 1998)

| Day | Hour | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 1 | 2.6 | 2.3 | 2.1 | 1.9 | 1.6 | 1.5 | 1.3 | 1.3 | 1.3 | 1.4 | 1.4 | 1.6 | 1.8 | 1.8 | 1.9 | 2.1 | 2.3 | 2.5 | 2.6 | 2.7 | 2.8 | 2.8 | 2.7 | 2.6 |
| 2 | 2.5 | 2.3 | 2.1 | 1.9 | 1.7 | 1.6 | 1.5 | 1.4 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 | 1.9 | 2.0 | 2.2 | 2.3 | 2.4 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.4 |
| 3 | 2.3 | 2.2 | 2.0 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.6 | 1.7 | 1.8 | 1.9 | 2.0 | 2.1 | 2.2 | 2.2 | 2.3 | 2.3 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 |
| 4 | 2.1 | 2.0 | 1.9 | 1.8 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.8 | 1.9 | 2.1 | 2.2 | 2.3 | 2.4 | 2.4 | 2.4 | 2.4 | 2.3 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 |
| 5 | 1.9 | 1.8 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.7 | 1.8 | 1.9 | 2.1 | 2.2 | 2.4 | 2.5 | 2.6 | 2.6 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.0 | 1.9 | 1.7 |
| 6 | 1.6 | 1.6 | 1.5 | 1.5 | 1.5 | 1.5 | 1.6 | 1.7 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.8 | 2.9 | 2.9 | 2.8 | 2.7 | 2.6 | 2.4 | 2.2 | 2.0 | 1.8 | 1.6 |
| 7 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.4 | 1.5 | 1.7 | 2.0 | 2.2 | 2.5 | 2.7 | 2.9 | 3.1 | 3.2 | 3.1 | 3.0 | 2.8 | 2.6 | 2.3 | 2.0 | 1.8 | 1.5 |
| 8 | 1.3 | 1.1 | 1.1 | 1.0 | 1.0 | 1.1 | 1.2 | 1.3 | 1.5 | 1.8 | 2.1 | 2.5 | 2.7 | 3.0 | 3.2 | 3.4 | 3.4 | 3.3 | 3.1 | 2.9 | 2.5 | 2.2 | 1.9 | 1.6 |
| 9 | 1.3 | 1.1 | 0.9 | 0.8 | 0.8 | 0.8 | 0.9 | 1.1 | 1.3 | 1.6 | 1.9 | 2.3 | 2.7 | 3.0 | 3.3 | 3.5 | 3.6 | 3.6 | 3.4 | 3.2 | 2.9 | 2.5 | 2.1 | 1.8 |
| 10 | 1.4 | 1.1 | 0.9 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 | 1.0 | 1.3 | 1.6 | 2.0 | 2.5 | 2.8 | 3.2 | 3.5 | 3.7 | 3.8 | 3.7 | 3.5 | 3.2 | 2.8 | 2.4 | 2.0 |
| 11 | 1.7 | 1.3 | 1.0 | 0.8 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 1.0 | 1.3 | 1.7 | 2.1 | 2.6 | 2.9 | 3.3 | 3.6 | 3.8 | 3.8 | 3.7 | 3.4 | 3.1 | 2.8 | 2.4 |
| 12 | 2.0 | 1.6 | 1.3 | 1.0 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 1.0 | 1.4 | 1.8 | 2.2 | 2.6 | 3.0 | 3.3 | 3.6 | 3.7 | 3.7 | 3.5 | 3.3 | 3.0 | 2.7 |
| 13 | 2.3 | 1.9 | 1.6 | 1.3 | 1.0 | 0.8 | 0.7 | 0.7 | 0.7 | 0.9 | 1.2 | 1.5 | 1.9 | 2.2 | 2.6 | 2.9 | 3.2 | 3.2 | 3.4 | 3.5 | 3.5 | 3.3 | 3.1 | 2.9 |
| 14 | 2.6 | 2.2 | 1.9 | 1.6 | 1.4 | 1.1 | 1.0 | 0.9 | 0.9 | 0.9 | 1.1 | 1.3 | 1.6 | 1.9 | 2.2 | 2.6 | 2.9 | 2.8 | 3.0 | 3.2 | 3.3 | 3.2 | 3.1 | 2.9 |
| 15 | 2.7 | 2.4 | 2.2 | 1.9 | 1.7 | 1.5 | 1.3 | 1.2 | 1.2 | 1.2 | 1.1 | 1.2 | 1.3 | 1.5 | 1.7 | 2.0 | 2.2 | 2.4 | 2.6 | 2.8 | 2.9 | 2.9 | 2.9 | 2.7 |

Source: Tidal Table, 1998, Tom 1.

Hai Phong Institute of Oceanology,
246 Da Nang Street, Hai Phong City
Tel: 84-31-846523; Fax: 84-31-846521

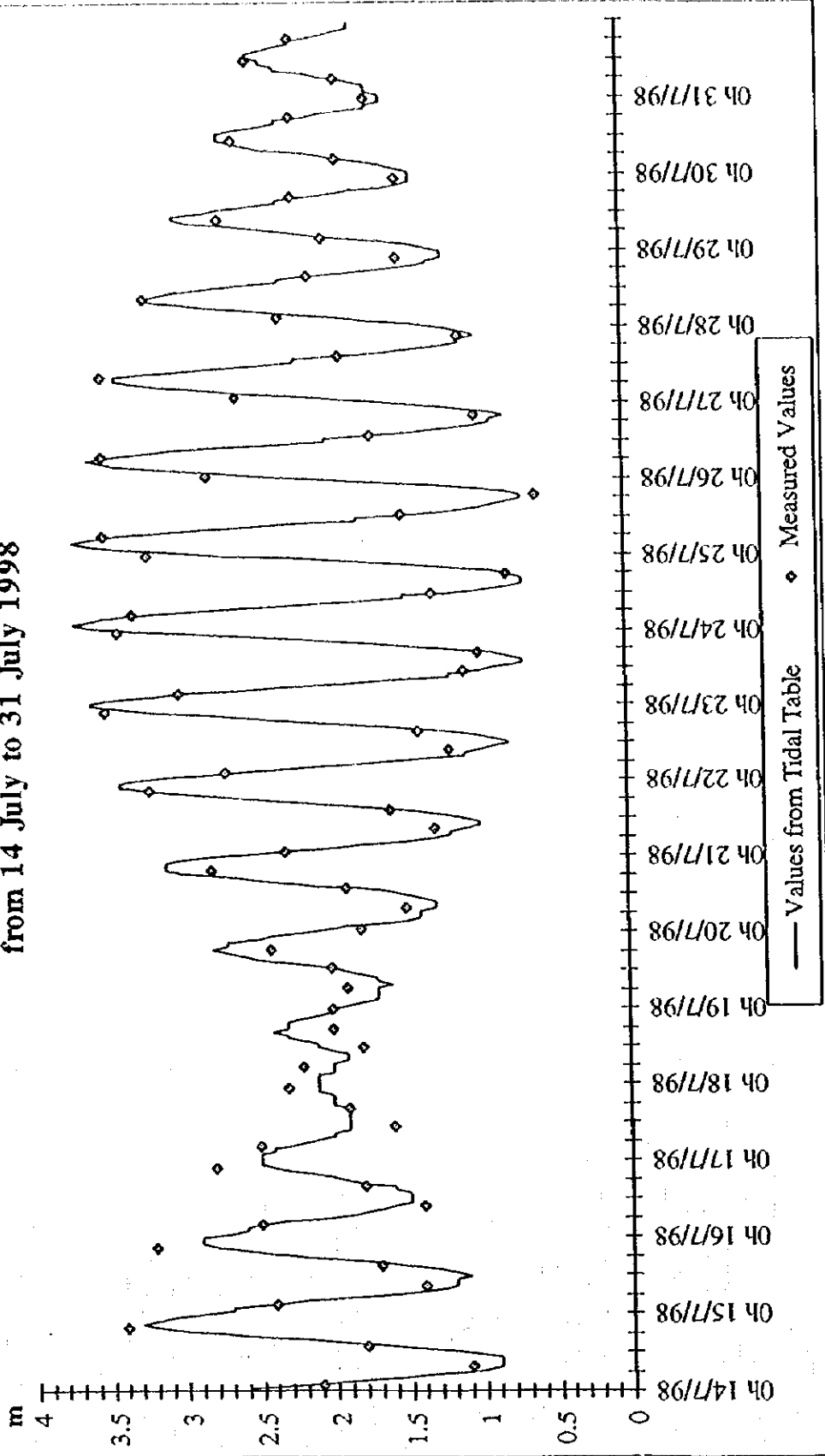
TABLE 1.4 TIDAL LEVEL (M) AT HON GAI STATION (CONTINUED)
(July, 1998)

| Day | Hour | | | | | | | | | | | | | | | | | | | | | | | |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| 16 | 2.6 | 2.5 | 2.3 | 2.1 | 1.9 | 1.8 | 1.7 | 1.6 | 1.5 | 1.5 | 1.5 | 1.6 | 1.6 | 1.6 | 1.8 | 1.9 | 2.0 | 2.1 | 2.3 | 2.4 | 2.5 | 2.5 | 2.5 | 2.5 |
| 17 | 2.4 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.0 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| 18 | 2.0 | 2.0 | 2.0 | 1.9 | 1.9 | 1.9 | 2.0 | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.4 | 2.3 | 2.3 | 2.3 | 2.2 | 2.1 | 2.0 | 2.0 | 1.9 | 1.8 | 1.7 | 1.7 |
| 19 | 1.7 | 1.7 | 1.6 | 1.7 | 1.7 | 1.8 | 1.9 | 2.0 | 2.2 | 2.3 | 2.5 | 2.6 | 2.7 | 2.8 | 2.7 | 2.7 | 2.5 | 2.4 | 2.2 | 2.0 | 1.9 | 1.7 | 1.5 | 1.4 |
| 20 | 1.4 | 1.3 | 1.3 | 1.3 | 1.4 | 1.5 | 1.6 | 1.8 | 2.1 | 2.3 | 2.5 | 2.7 | 3.0 | 3.1 | 3.1 | 3.1 | 3.0 | 2.8 | 2.5 | 2.3 | 2.0 | 1.8 | 1.5 | 1.3 |
| 21 | 1.2 | 1.1 | 1.0 | 1.0 | 1.1 | 1.2 | 1.3 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.2 | 3.4 | 3.4 | 3.3 | 3.1 | 2.9 | 2.6 | 2.3 | 2.0 | 1.7 | 1.4 |
| 22 | 1.1 | 1.0 | 0.9 | 0.8 | 0.8 | 0.9 | 1.0 | 1.2 | 1.5 | 1.8 | 2.2 | 2.5 | 2.8 | 3.2 | 3.4 | 3.6 | 3.6 | 3.5 | 3.2 | 3.0 | 2.6 | 2.3 | 1.9 | 1.6 |
| 23 | 1.2 | 1.0 | 0.9 | 0.8 | 0.7 | 0.7 | 0.8 | 0.9 | 1.2 | 1.5 | 1.8 | 2.2 | 2.6 | 3.0 | 3.3 | 3.6 | 3.7 | 3.6 | 3.5 | 3.2 | 2.9 | 2.6 | 2.2 | 1.8 |
| 24 | 1.5 | 1.2 | 1.0 | 0.8 | 0.7 | 0.7 | 0.7 | 0.8 | 0.9 | 1.2 | 1.5 | 1.9 | 2.3 | 2.7 | 3.0 | 3.4 | 3.6 | 3.7 | 3.6 | 3.4 | 3.1 | 2.8 | 2.5 | 2.1 |
| 25 | 1.8 | 1.4 | 1.2 | 1.0 | 0.9 | 0.8 | 0.7 | 0.7 | 0.8 | 1.0 | 1.3 | 1.6 | 2.0 | 2.4 | 2.7 | 3.1 | 3.4 | 3.5 | 3.6 | 3.4 | 3.2 | 3.0 | 2.7 | 2.4 |
| 26 | 2.0 | 1.7 | 1.4 | 1.2 | 1.0 | 0.9 | 0.9 | 0.8 | 0.9 | 1.0 | 1.2 | 1.5 | 1.8 | 2.1 | 2.5 | 2.8 | 3.1 | 3.3 | 3.4 | 3.4 | 3.2 | 3.0 | 2.8 | 2.5 |
| 27 | 2.2 | 1.9 | 1.6 | 1.4 | 1.2 | 1.1 | 1.1 | 1.0 | 1.0 | 1.1 | 1.2 | 1.4 | 1.7 | 1.9 | 2.2 | 2.5 | 2.8 | 3.0 | 3.2 | 3.2 | 3.1 | 3.0 | 2.8 | 2.6 |
| 28 | 2.3 | 2.1 | 1.8 | 1.6 | 1.4 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.4 | 1.6 | 1.9 | 2.1 | 2.3 | 2.5 | 2.7 | 2.9 | 3.0 | 3.0 | 2.8 | 2.7 | 2.5 |
| 29 | 2.3 | 2.1 | 1.9 | 1.8 | 1.6 | 1.5 | 1.4 | 1.4 | 1.4 | 1.4 | 1.5 | 1.6 | 1.7 | 1.9 | 2.0 | 2.2 | 2.4 | 2.5 | 2.6 | 2.7 | 2.7 | 2.7 | 2.6 | 2.4 |
| 30 | 2.3 | 2.1 | 2.0 | 1.9 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.7 | 1.7 | 1.7 | 1.8 | 1.9 | 2.0 | 2.1 | 2.3 | 2.3 | 2.4 | 2.4 | 2.5 | 2.5 | 2.4 | 2.3 |
| 31 | 2.2 | 2.1 | 2.0 | 1.9 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 2.0 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.1 |

Source: Tidal Table, 1998, Tom 1.

Fig. 1.4

COMPARISON OF WATER LEVEL AT BAICHAY STATION
 from 14 July to 31 July 1998



Hai Phong Institute of Oceanology
 246 Da Nang Street, Hai Phong City
 Tel: 84-31-846523; Fax: 84-31-846521

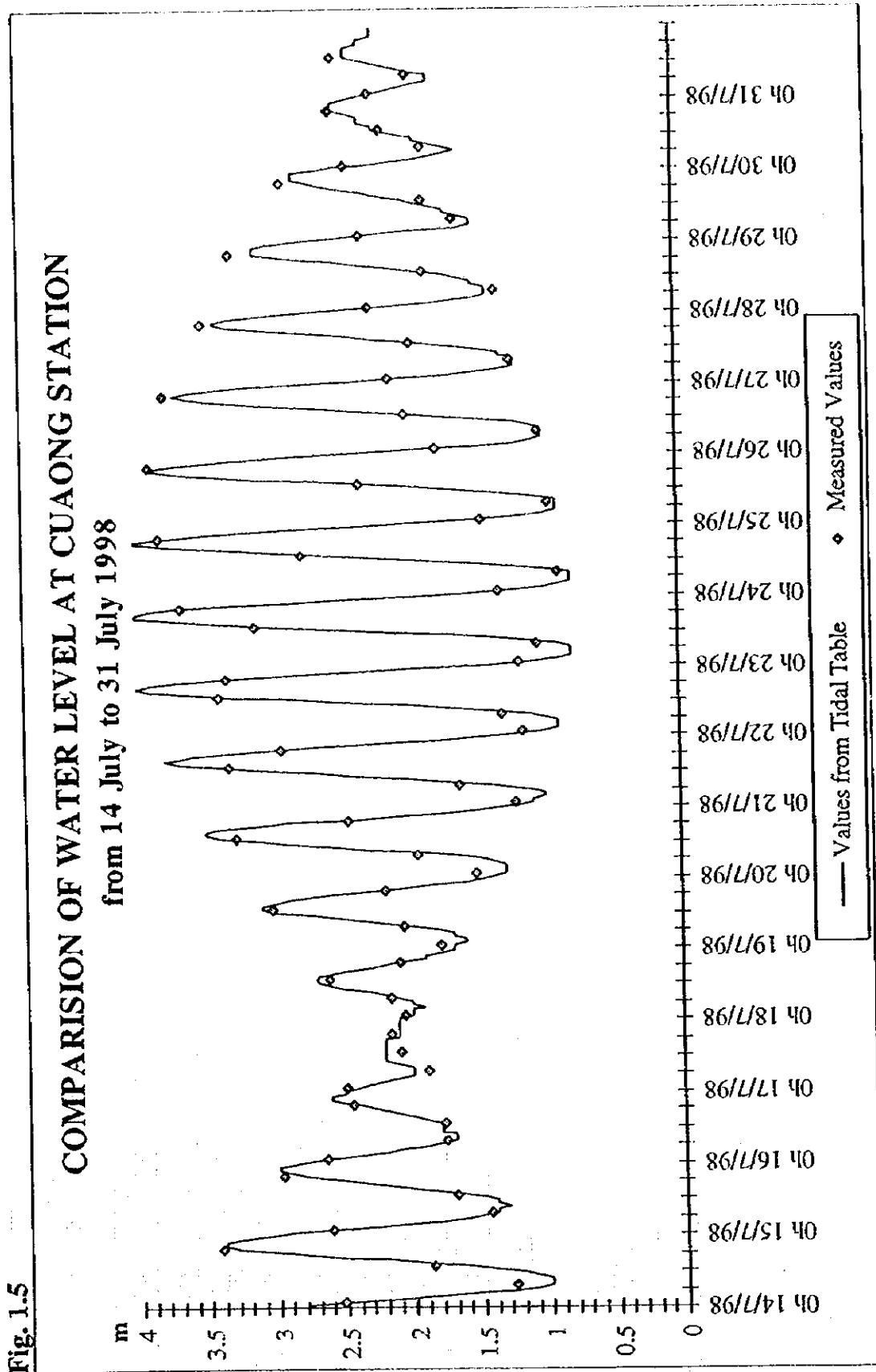


TABLE 1.5 MEASURED WIND AT THE CUA LUC STATION

| Day | 1 | | 4 | | 7 | | 10 | | 13 | | 16 | | 19 | | 22 | |
|-----|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|
| | Speed | Dir. | Speed | Dir. | Speed | Dir. | Speed | Dir. | Speed | Dir. | Speed | Dir. | Speed | Dir. | Speed | Dir. |
| 14 | | | | | | | | | 7.2 | SSE | 4.7 | SSE | 4.4 | SE | 1.7 | SE |
| 15 | 5.6 | SE | 5.2 | SE | 5.4 | SE | 4.5 | SSE | 2.5 | SSE | 4.5 | SSE | 5 | SSE | 1.4 | SE |
| 16 | 0 | 0 | 3.6 | S | 3.8 | S | 3.6 | SSE | 4 | SSE | 5 | SSE | 2.7 | S | 3.3 | SSE |
| 17 | 2.9 | SSE | 4.6 | S | 2.9 | S | 3.4 | S | 2.3 | S | 4.5 | SSE | 4.4 | SSE | 3.7 | SSE |
| 18 | 1.6 | S | 1.7 | S | 1.4 | S | 0 | 0 | 4.8 | SSE | 3.5 | SSE | 2.3 | S | 2.1 | SSE |
| 19 | 2.9 | SSE | 2.4 | SSE | 0.9 | SSE | 0.9 | S | 4.5 | SSE | 3.5 | SSE | 3.4 | SSE | 1.1 | SSE |
| 20 | 4.7 | SSE | 4.5 | SSE | 2.5 | SSE | 3.7 | S | 3.7 | SSE | 3.9 | S | 3.3 | SSE | 2.9 | S |
| 21 | 5.4 | S | 3.5 | S | 3.5 | S | 5.2 | S | 4.4 | S | 4.6 | S | 4.2 | S | 3.9 | SSE |
| 22 | 5.8 | S | 7.8 | S | 1.3 | N | 1.6 | SE | 4.6 | SSW | 4 | S | 3.2 | SSE | 2.8 | SSE |
| 23 | 5.4 | SSE | 2.7 | S | 4.4 | SSW | 6.7 | SSW | 4.7 | SSW | 3.6 | SSW | 1.9 | SSE | 0 | 0 |
| 24 | 1.4 | NNE | 2.7 | SSW | 1.9 | SSW | 3.6 | SW | 1.8 | SSW | 5 | SSW | 3.3 | SSW | 0 | 0 |
| 25 | 2.1 | NNE | 1.9 | NNE | 2.7 | N | 1.6 | SW | 2.8 | SSW | 1.5 | N | 2.6 | SSW | 1.1 | N |
| 26 | 1.4 | SSE | 4.5 | S | 3 | S | 5.9 | SSE | 4.7 | SSE | 6.2 | SSE | 2.3 | ESE | 2.8 | ESE |
| 27 | 1.3 | NNW | 1.8 | NNW | 4.7 | SSW | 4.7 | SSE | 4.3 | SSE | 4.6 | SSE | 2.8 | SSE | 1.4 | SE |
| 28 | 3.6 | SSW | 4.2 | S | 3.3 | SSE | 4.3 | SSE | 5.9 | SSE | 4.2 | SSE | 3.6 | SSE | 2.6 | SSE |
| 29 | 4.2 | S | 3.2 | S | 2.3 | S | 5.1 | SE | 6.3 | SSE | 3.9 | SSE | 4.2 | SSE | 3.9 | SSE |
| 30 | 5.3 | SSW | 4.3 | SSW | 4.7 | SSE | 4.8 | SSE | 5 | SSE | | | | | | |

TABLE 1.6 MEASURED WIND AT THE CUA DUA STATION

| Day | 1 | | 4 | | 7 | | 10 | | 13 | | 16 | | 19 | | 22 | |
|-----|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|
| | Speed | Dirac. | Speed | Dirac. | Speed | Dirac. | Speed | Dirac. | Speed | Dirac. | Speed | Dirac. | Speed | Dirac. | Speed | Dirac. |
| 14 | | | | | | | | | 4 | S | 8 | S | 4 | S | 4 | S |
| 15 | 4 | S | 7 | S | 0 | 0 | 0 | 0 | 0 | 0 | 4.5 | S | 4 | S | 3.5 | S |
| 16 | 4 | S | 8 | S | 4 | SE | 3 | SSE | 1 | SSE | 4 | SE | 4 | S | 5 | SSE |
| 17 | 5 | SE | 4 | SSE | 4 | SSE | 4 | S | 4 | SW | 3 | SW | 4 | S | 3.5 | SE |
| 18 | 1 | SE | 2 | S | 4 | S | 5 | S | 6 | S | 9 | SSW | 3 | S | 4 | S |
| 19 | 7 | S | 9 | S | 4 | S | 3 | S | 11 | S | 3 | S | 4 | S | 4 | S |
| 20 | 7 | S | 5 | S | 8 | S | 8 | S | 4 | S | 10 | S | 4 | SSE | 1 | SSE |
| 21 | 7 | SSE | 4 | SSE | 5 | S | 6 | S | 10 | S | 4 | SSW | 7 | SSE | 7 | S |
| 22 | 6 | S | 4 | W | 7 | S | 4 | S | 6 | S | 1 | S | 2 | S | 7 | S |
| 23 | 10 | S | 9 | SSW | 5 | SSW | 6 | S | 6 | S | 7 | S | 6 | S | 6 | S |
| 24 | 7 | S | 8 | S | 5 | SS | 4 | SSW | 4 | S | 4 | SW | 3 | SW | 3 | SW |
| 25 | 4 | SW | 2 | SW | 5 | SW | 2 | SW | 1 | SW | 0 | 0 | 4 | SSW | 4 | SSW |
| 26 | 1 | SSW | 2 | SW | 3.5 | SW | 6 | S | 5 | SSW | 2 | S | 2 | SE | 1 | SSW |
| 27 | 0 | 0 | 2 | S | 2 | SSE | 2 | SSW | 3 | SSW | 3 | SE | 1 | SE | 2 | SSE |
| 28 | 1 | SSW | 1 | SSW | 3 | SSE | 1 | SSE | 5 | SSE | 3 | S | 2 | S | 2 | S |
| 29 | 0 | 0 | 3 | S | 2 | S | 4 | SSE | 4 | SSE | 2 | SSE | 3 | S | 4 | S |
| 30 | 6 | S | 2 | S | 3 | SE | 5 | SE | 4 | SE | | | | | | |

TABLE 1.7 MEASURED WIND AT THE CAM PHA - CUA ONG STATION

| Day | 1 | | 4 | | 7 | | 10 | | 13 | | 16 | | 19 | | 22 | | |
|-----|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|-------|------|----|
| | Speed | Dir. | Speed | Dir. | Speed | Dir. | Speed | Dir. | Speed | Dir. | Speed | Dir. | Speed | Dir. | Speed | Dir. | |
| 14 | | | | | | | | | | | | 6 | SE | 2.3 | SE | 1.6 | SE |
| 15 | 5 | SE | 6.5 | SE | 7.8 | SE | 5.1 | SE | 4 | SE | 3.8 | SSE | 3.2 | SE | 0.8 | SE | SE |
| 16 | 0 | 0 | 5 | SE | 6.2 | SE | 5.3 | SE | 6.2 | SE | 5 | SE | 3 | SE | 1 | SE | SE |
| 17 | 4 | SE | 6 | SE | 4.5 | S | 3.6 | SE | 4 | S | 5 | S | 3.2 | S | 1.9 | S | S |
| 18 | 3.5 | S | 3.5 | S | 3.1 | S | 6 | S | 4.5 | S | 4.9 | S | 2.4 | S | 2 | S | S |
| 19 | 4.4 | S | 5.7 | S | 3.5 | S | 4 | S | 4.6 | S | 4 | S | 3.1 | S | 2 | S | S |
| 20 | 5.5 | S | 6.4 | S | 4.5 | S | 6.3 | S | 8 | S | 4.7 | S | 0.8 | S | 2.8 | S | S |
| 21 | 8.5 | S | 7 | S | 3.7 | S | 6 | S | 7 | S | 4.2 | S | 2.5 | S | 1.5 | S | S |
| 22 | 6.3 | S | 6.5 | S | 2 | S | 4 | S | 5.2 | S | 6 | S | 3.4 | S | 3 | S | S |
| 23 | 6.1 | S | 4.5 | S | 7 | S | 5.7 | S | 6 | S | 5.4 | S | 2.5 | S | 2.4 | S | S |
| 24 | 5.5 | S | 6 | S | 5 | S | 5.1 | S | 4.5 | S | 5.2 | S | 4 | S | 2.3 | S | S |
| 25 | 1.4 | S | 2.5 | S | 6.5 | S | 4.2 | W | 1.2 | W | 0 | 0 | 2.3 | S | 0 | 0 | 0 |
| 26 | 4 | S | 6 | S | 5.4 | S | 4.5 | S | 5.5 | S | 4 | S | 2.3 | S | 0 | 0 | 0 |
| 27 | 1.5 | S | 2.4 | SE | 2 | SE | 3.5 | SE | 3.4 | S | 4.5 | S | 2 | S | 3 | SE | SE |
| 28 | 3 | S | 2.5 | SE | 0 | 0 | 4.6 | S | 5.2 | S | 3 | S | 2.5 | S | 2 | S | S |
| 29 | 2.8 | S | 3 | SW | 3 | S | 4.2 | S | 4.4 | S | 2 | S | 3.5 | S | 2 | S | S |
| 30 | 3 | SW | 4 | SW | 4.2 | S | 4.2 | S | 4.5 | S | | | | | | | |

II. RESULTS OF WIND ANALYSIS



Table 2.1 JOINT FREQUENCY TABLE OF WIND VELOCITY AND DIRECTION

Station : Cua Luc
 Time : 14/7/1998 - 30/7/1998

| Wind Vel. interval (m/s) | Wind direction | | | | | | | | | | Calm | P % | N | F % |
|--------------------------------|----------------|-----|-----|------|------|-----|---|-----|-----|------|-------|--------|---|--------|
| | N | NE | E | SE | S | SW | W | NW | | | | | | |
| 1 - 5 | 4.7 | 1.6 | 0.8 | Caml | 48.1 | 7.0 | - | 0.8 | 6 | 4.7 | 100.0 | | | |
| 6 - 10 | - | - | - | 25.6 | 3.9 | 0.8 | - | - | 114 | 88.4 | 95.3 | | | |
| 11 - 15 | - | - | - | 2.3 | - | - | - | - | 9 | 7.0 | 7.0 | | | |
| 16 - 20 | - | - | - | - | - | - | - | - | - | - | - | | | |
| 21 - 25 | - | - | - | - | - | - | - | - | - | - | - | | | |
| 26 - 30 | - | - | - | - | - | - | - | - | - | - | - | | | |
| > 31 | - | - | - | - | - | - | - | - | - | - | - | | | |
| Total | 4.7 | 1.6 | 0.8 | 27.9 | 51.9 | 7.8 | - | 0.8 | 129 | 4.7 | 100.0 | | | |
| Vmed (m/s) | 1.7 | 1.6 | 2.8 | 3.7 | 3.8 | 4.0 | - | 1.8 | | | | | | |
| Vmax (m/s) | 2.7 | 1.9 | 2.8 | 6.2 | 7.8 | 6.7 | - | 1.8 | | | | | | |

Fig. 2.1

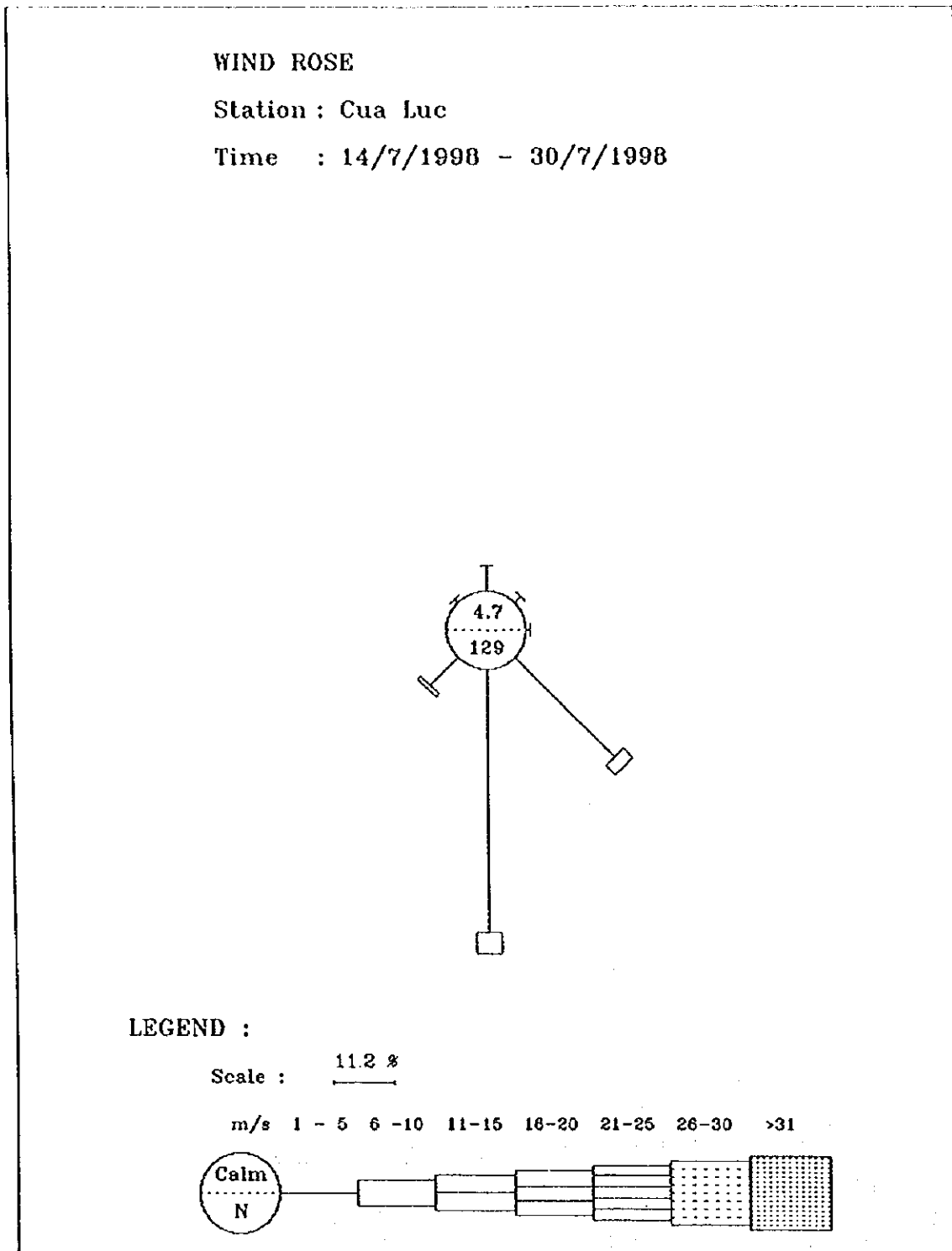


Table 2.2 JOINT FREQUENCY TABLE OF WIND VELOCITY AND DIRECTION

Station : Cua Ong
 Time : 14/7/1998 - 30/7/1998

| Wind Vel. interval (m/s) | Wind direction | | | | | | | | | | Calm | P % | N | Σ % |
|--------------------------------|----------------|----|---|------|------|-----|-----|----|---|---|------|--------|-----|--------|
| | N | NE | E | SE | S | SW | W | NW | | | | | | |
| 1 - 5 | - | - | - | Caml | 57.0 | 2.3 | 1.6 | - | - | - | 5.5 | 5.5 | 7 | 100.0 |
| 6 - 10 | - | - | - | 14.1 | 14.8 | - | - | - | - | - | - | 75.0 | 96 | 94.5 |
| 11 - 15 | - | - | - | 4.7 | - | - | - | - | - | - | - | 19.5 | 25 | 19.5 |
| 16 - 20 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 21 - 25 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 26 - 30 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| > 31 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | - | - | - | 18.8 | 71.9 | 2.3 | 1.6 | - | - | - | 5.5 | 100.0 | 128 | - |
| Vmed (m/s) | - | - | - | 4.2 | 4.2 | 3.3 | 2.7 | - | - | - | - | - | - | - |
| Vmax (m/s) | - | - | - | 7.8 | 8.5 | 4.0 | 4.2 | - | - | - | - | - | - | - |

Fig. 2.2

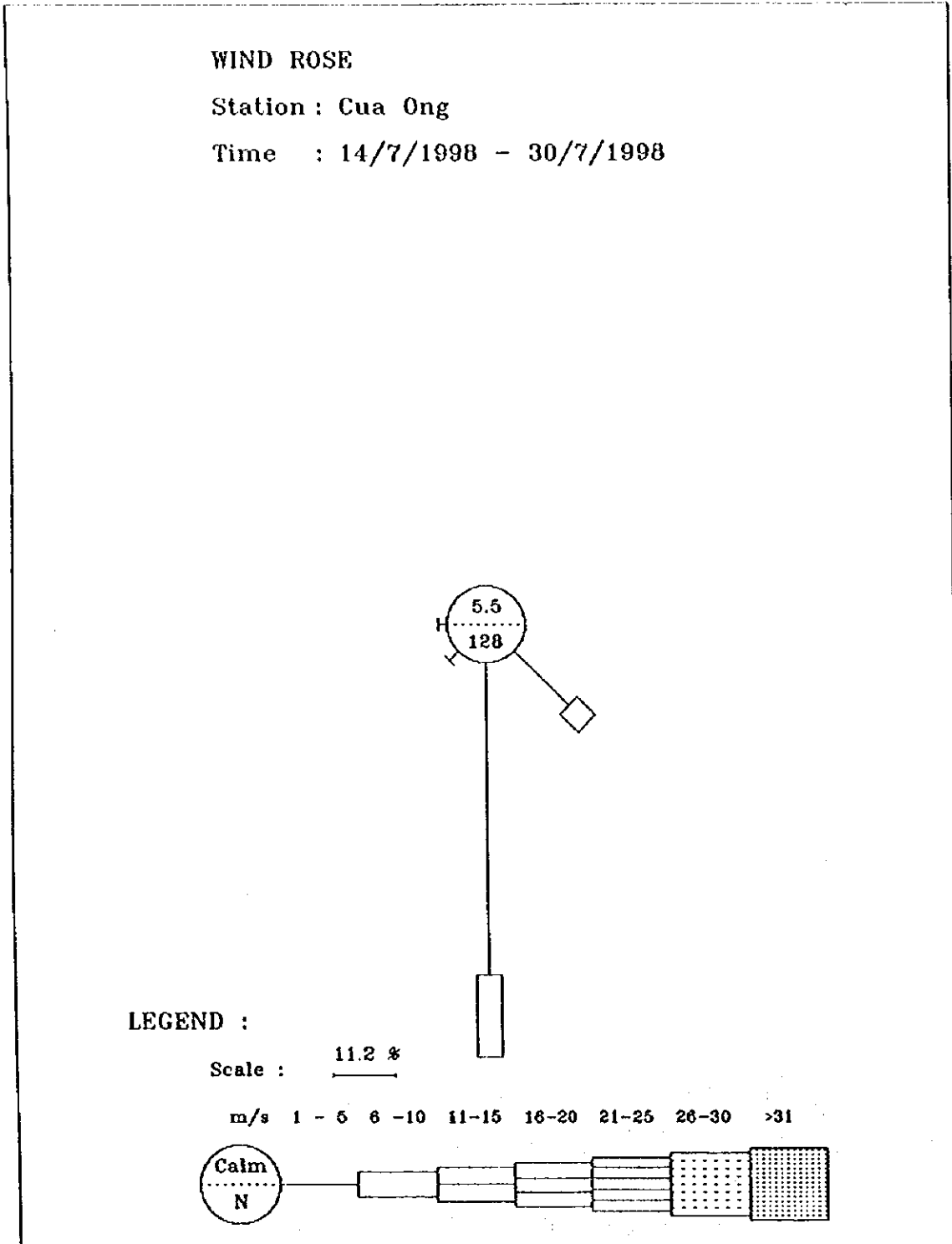
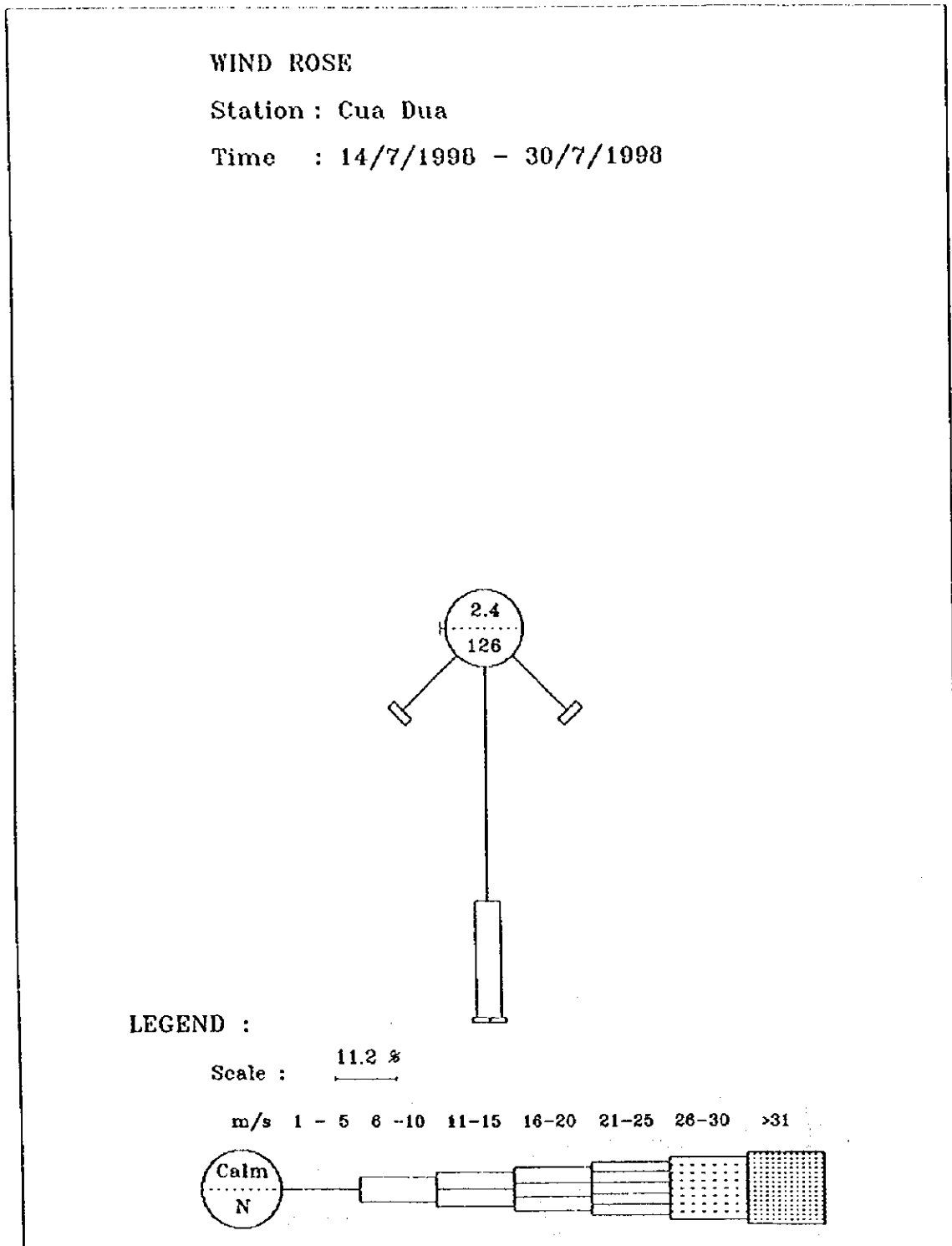


Table 2.3 JOINT FREQUENCY TABLE OF WIND VELOCITY AND DIRECTION

Station : Cua Dua
 Time : 14/7/1998 - 30/7/1998

| Wind Vel. interval (m/s) | Wind direction | | | | | | | | | | Calm | P % | N | F % |
|--------------------------------|----------------|----|---|------|------|------|-----|----|---|---|------|--------|-----|--------|
| | N | NE | E | SE | S | SW | W | NW | | | | | | |
| 1 - 5 | - | - | - | 14.3 | 42.9 | 14.3 | 0.8 | - | - | - | 2.4 | 2.4 | 3 | 100.0 |
| 6 - 10 | - | - | - | 1.6 | 21.4 | 1.6 | - | - | - | - | - | 72.2 | 91 | 97.6 |
| 11 - 15 | - | - | - | - | 0.8 | - | - | - | - | - | - | 24.6 | 31 | 25.4 |
| 16 - 20 | - | - | - | - | - | - | - | - | - | - | - | 0.8 | 1 | 0.8 |
| 21 - 25 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| 26 - 30 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| > 31 | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Total | - | - | - | 15.9 | 65.1 | 15.9 | 0.8 | - | - | - | 2.4 | 100.0 | 126 | - |
| Vmed (m/s) | - | - | - | 3.4 | 4.8 | 3.5 | 4.0 | - | - | - | - | - | - | - |
| Vmax (m/s) | - | - | - | 7.0 | 11.0 | 9.0 | 4.0 | - | - | - | - | - | - | - |

Fig. 2.3



III. RESULTS OF ANALYSIS OF THE CURRENTS



Table 3.1 THE FREQUENCY OF APPEARANCE OF THE OBSERVED CURRENT WITH A DIFFERENCE OF VELOCITY AND DIRECTION

Station : Cua Luc
 Layer : Surface
 Time : 14/7/1998 - 30/7/1998

| Interval of Vel. [cm/s] | Direction | | | | | | | | | | Still | F (%) | N | P (%) |
|-------------------------|-----------|-------|------|------|-------|-------|------|------|-----|------|-------|-------|---|-------|
| | N | NE | E | SE | S | SW | W | NW | | | | | | |
| 5 - 9 | 10.1 | 1.8 | 2.1 | 2.9 | 4.3 | 3.0 | 1.0 | 0.7 | 3.3 | 51 | 100.0 | | | |
| 10 - 19 | 13.9 | 15.0 | 5.6 | 1.4 | 3.1 | 1.4 | 0.1 | 0.1 | - | 398 | 96.7 | | | |
| 20 - 29 | 2.1 | 3.9 | 1.2 | 0.5 | 0.8 | 0.9 | - | - | - | 628 | 70.9 | | | |
| 30 - 39 | 0.6 | - | - | - | 0.5 | 0.5 | - | - | - | 146 | 30.2 | | | |
| 40 - 49 | 1.3 | 0.1 | - | - | 0.7 | 0.7 | - | - | - | 23 | 20.7 | | | |
| 50 - 74 | 2.2 | 0.2 | - | 0.1 | 0.8 | 2.9 | - | - | - | 44 | 19.2 | | | |
| 75 - 84 | 1.1 | 0.1 | - | - | 0.1 | 1.2 | - | - | - | 95 | 16.3 | | | |
| 85 - 99 | 0.3 | 0.1 | - | - | 0.3 | 1.6 | - | - | - | 39 | 10.2 | | | |
| >100 | 1.0 | 0.1 | - | - | 0.7 | 3.7 | - | - | - | 33 | 7.7 | | | |
| Total (%) | 32.5 | 21.3 | 8.9 | 4.9 | 11.3 | 15.9 | 1.1 | 0.8 | 3.3 | 1542 | 100.0 | | | |
| Vmed (cm/s) | 23.3 | 17.1 | 13.6 | 11.7 | 26.6 | 59.6 | 7.2 | 8.3 | - | - | - | | | |
| Vmax (cm/s) | 125.0 | 119.0 | 27.0 | 50.0 | 120.0 | 126.0 | 11.0 | 13.0 | - | - | - | | | |

Fig. 3.1

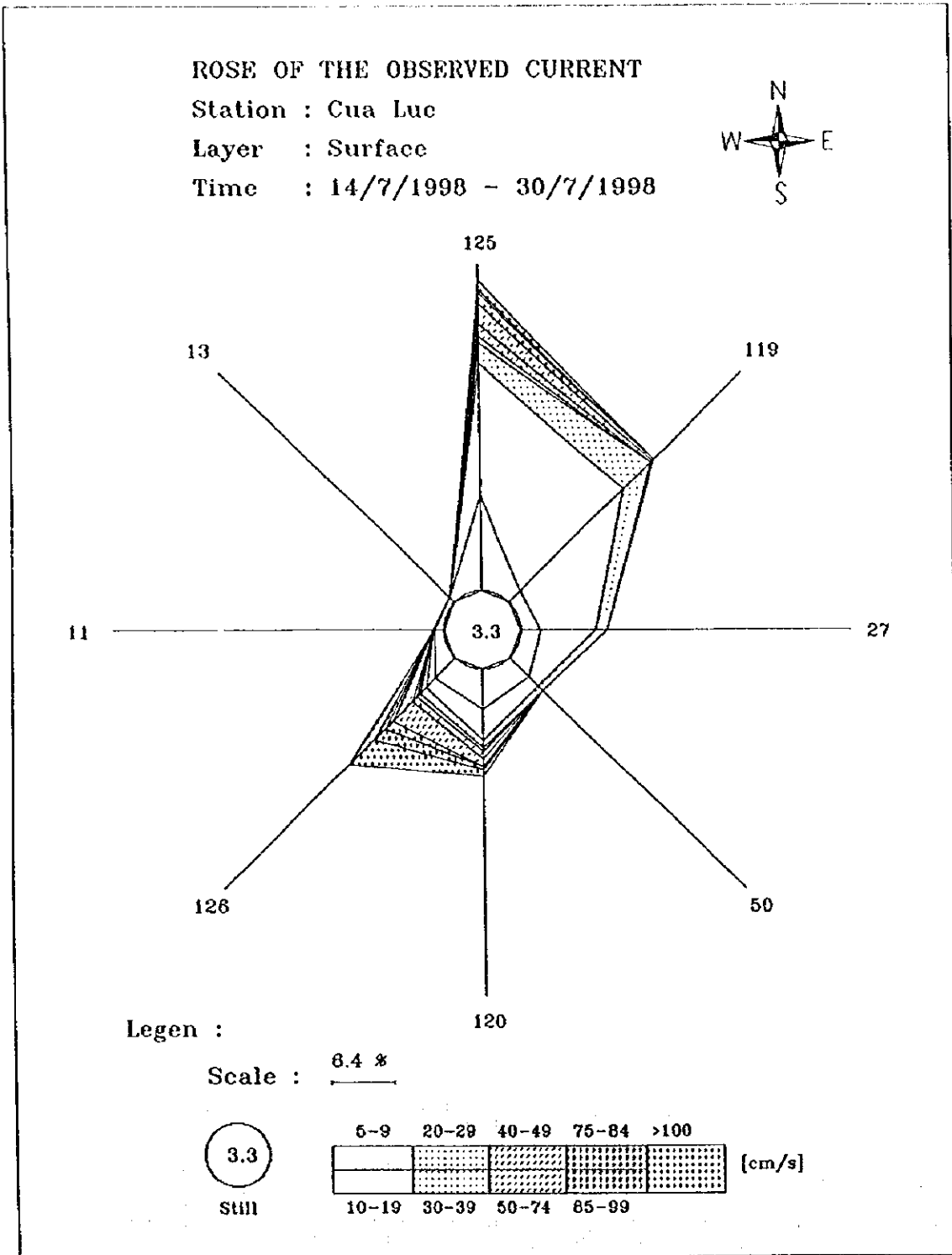


Table 3.2 THE FREQUENCY OF APPEARANCE OF THE OBSERVED CURRENT WITH A DIFFERENCE OF VELOCITY AND DIRECTION

Station : Cua Luc
 Layer : 2 meters above the bottom
 Time : 14/7/1998 - 30/7/1998

| Interval of Vel. [cm/s] | Direction | | | | | | | | | | | Still | F (%) | N | P (%) |
|-------------------------|-----------|------|-------|------|------|------|------|------|------|-------|------|-------|-------|---|-------|
| | N | NE | E | SE | S | SW | W | NW | | | | | | | |
| 5 - 9 | 8.8 | 5.4 | Still | 0.8 | 3.6 | 1.2 | 0.7 | 0.5 | 51.6 | 51.6 | 796 | 100.0 | | | |
| 10 - 19 | 5.1 | 2.7 | 0.3 | 1.0 | 4.8 | 0.9 | 0.3 | 0.5 | - | 22.5 | 347 | 48.4 | | | |
| 20 - 29 | 2.5 | 0.6 | 0.1 | 1.4 | 2.4 | 0.3 | - | 0.1 | - | 15.8 | 243 | 25.9 | | | |
| 30 - 39 | 1.4 | 0.1 | - | 0.2 | 0.6 | - | - | - | - | 7.5 | 116 | 10.1 | | | |
| 40 - 49 | 0.1 | - | - | - | 0.2 | - | - | - | - | 2.2 | 34 | 2.6 | | | |
| 50 - 74 | - | - | - | - | - | - | - | - | - | 0.3 | 5 | 0.4 | | | |
| 75 - 84 | - | - | - | - | - | - | - | - | - | - | - | 0.1 | | | |
| 85 - 99 | - | - | - | - | - | - | - | - | - | - | - | 0.1 | | | |
| >100 | - | - | - | - | - | - | - | - | - | - | - | 0.1 | | | |
| Total (%) | 18.0 | 8.9 | 1.8 | 3.5 | 11.6 | 2.5 | 1.0 | 1.1 | 51.6 | 100.0 | 1542 | | | | |
| Vmed (cm/s) | 12.8 | 9.7 | 9.3 | 17.1 | 15.0 | 11.4 | 8.6 | 10.2 | | | | | | | |
| Vmax (cm/s) | 46.0 | 32.0 | 25.0 | 31.0 | 44.0 | 26.0 | 16.0 | 20.0 | | | | | | | |

Fig. 3.2

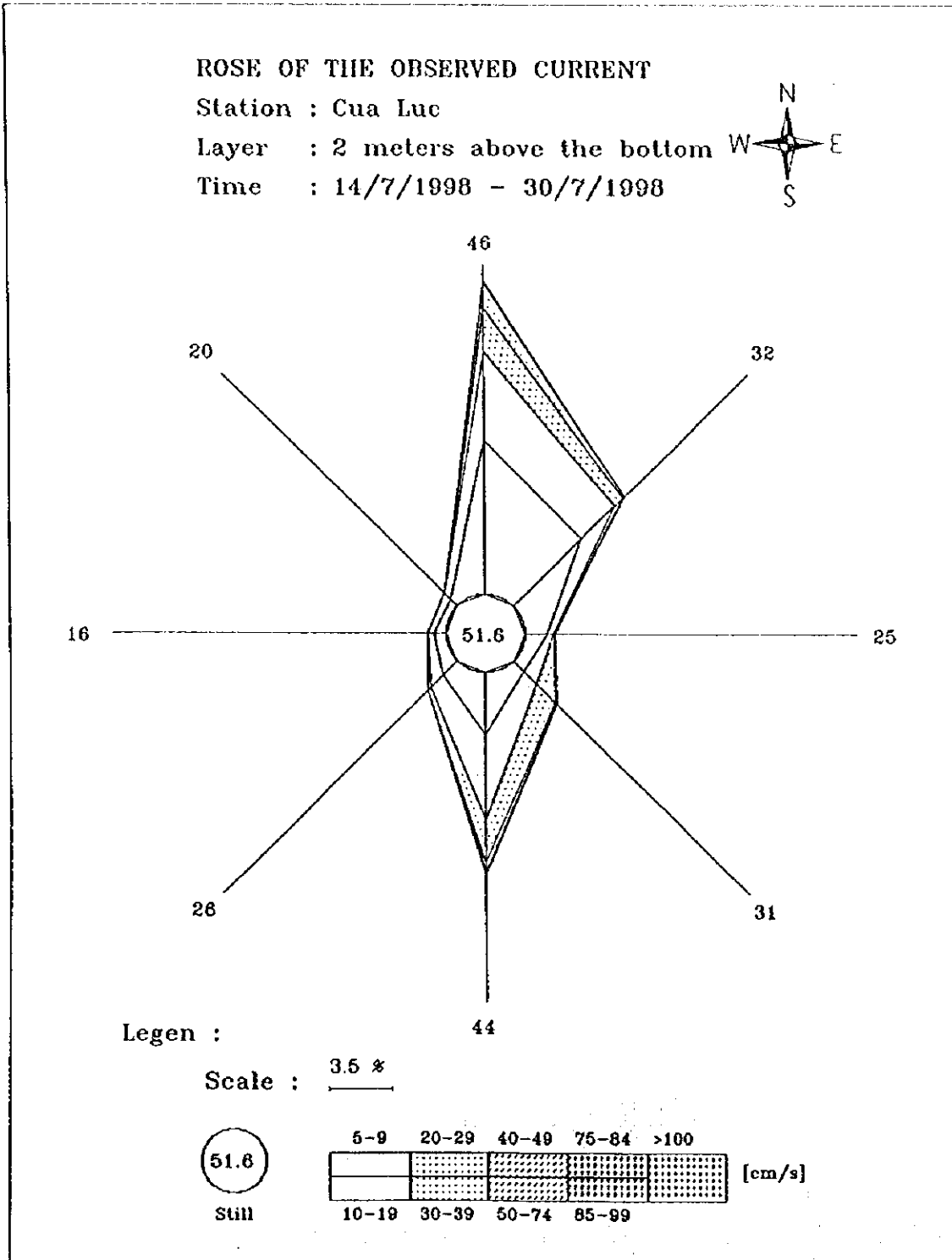


Table 3.3 THE FREQUENCY OF APPEARANCE OF THE OBSERVED CURRENT WITH A DIFFERENCE OF VELOCITY AND DIRECTION

Station : Cua Ong
 Layer : Surface
 Time : 14/7/1998 - 30/7/1998

| Interval of Vel. [cm/s] | Direction | | | | | | | | | | Still (%) | F (%) | N | P (%) |
|-------------------------|-----------|------|------|------|------|------|------|-----|-------|-----|-----------|-------|-------|-------|
| | N | NE | E | SE | S | SW | W | NW | Still | F | | | | |
| 5 - 9 | 1.0 | 3.5 | 1.1 | 1.0 | 0.8 | 0.5 | 0.1 | - | - | 5.0 | 5.0 | 77 | 100.0 | |
| 10 - 19 | 3.4 | 6.5 | 5.5 | 1.5 | 0.8 | 1.8 | 0.3 | - | - | - | 8.0 | 123 | 95.0 | |
| 20 - 29 | 3.9 | 4.4 | 7.5 | 0.4 | 0.1 | 1.3 | 0.6 | - | - | - | 19.9 | 305 | 87.0 | |
| 30 - 39 | 3.4 | 4.3 | 7.8 | - | - | 1.7 | 1.0 | - | - | - | 18.2 | 279 | 67.1 | |
| 40 - 49 | 3.7 | 2.2 | 6.2 | - | - | 2.3 | 0.6 | - | - | - | 18.2 | 279 | 48.9 | |
| 50 - 74 | 3.3 | 2.5 | 2.9 | - | - | 4.5 | 1.4 | - | - | - | 15.1 | 231 | 30.7 | |
| 75 - 84 | 0.1 | 0.1 | - | - | - | 0.8 | 0.1 | - | - | - | 24.5 | 223 | 15.6 | |
| 85 - 99 | - | - | - | - | - | - | - | - | - | - | 1.1 | 17 | 1.1 | |
| >100 | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| Total (%) | 18.8 | 23.5 | 31.0 | 2.9 | 1.8 | 13.0 | 4.0 | - | - | 5.0 | 100.0 | 1534 | | |
| Vmed (cm/s) | 34.0 | 26.2 | 31.5 | 12.9 | 10.7 | 44.8 | 41.4 | - | - | | | | | |
| Vmax (cm/s) | 78.0 | 78.0 | 63.0 | 28.0 | 25.0 | 81.0 | 75.0 | 3.0 | | | | | | |

Fig. 3.3

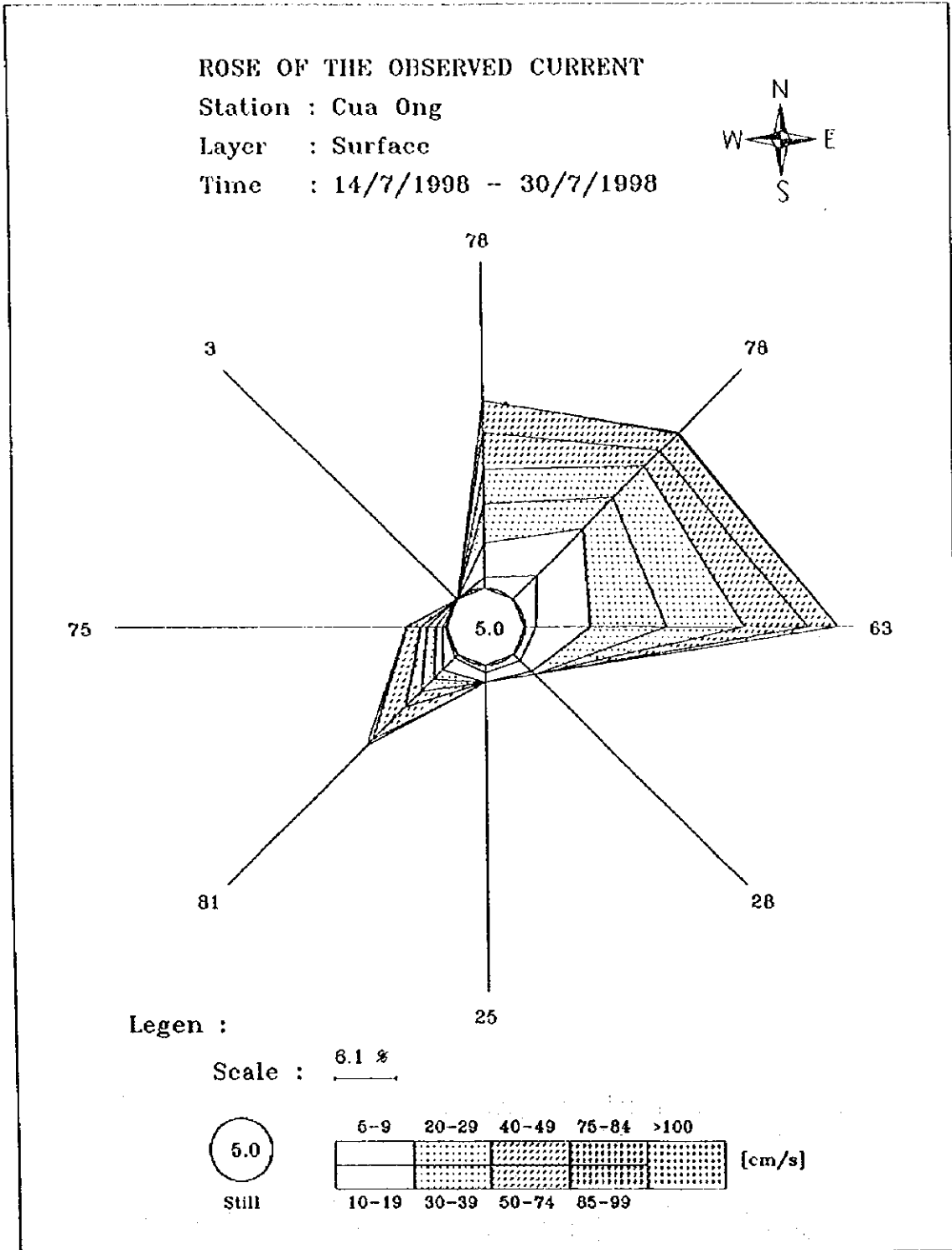


Table 3.4 THE FREQUENCY OF APPEARANCE OF THE OBSERVED CURRENT WITH A DIFFERENCE OF VELOCITY AND DIRECTION

Station : Cua Ong
 Layer : 2 meters above the bottom
 Time : 14/7/1998 - 30/7/1998

| Interval of Vel. [cm/s] | Direction | | | | | | | | | | Still | F (%) | N | Σ (%) |
|-------------------------|-----------|------|-------|------|------|------|------|------|------|-----|-------|-------|-------|-------|
| | N | NE | E | SE | S | SW | W | NW | | | | | | |
| 5 - 9 | 4.3 | 5.5 | Still | 0.1 | 0.5 | 0.8 | 0.5 | 0.3 | 0.3 | 9.9 | 9.9 | 152 | 100.0 | |
| 10 - 19 | 12.6 | 8.5 | 13.8 | - | 0.1 | 3.8 | 1.6 | 0.1 | 0.1 | - | 14.5 | 222 | 90.1 | |
| 20 - 29 | 11.4 | 4.1 | 3.7 | - | - | 3.5 | 0.3 | - | - | - | 40.3 | 618 | 75.6 | |
| 30 - 39 | 2.9 | 2.9 | 0.4 | - | - | 3.6 | 0.4 | - | - | - | 23.0 | 353 | 35.3 | |
| 40 - 49 | 0.7 | 0.1 | - | - | - | 1.2 | 0.3 | - | - | - | 10.1 | 155 | 12.3 | |
| 50 - 74 | - | - | - | - | - | - | - | - | - | - | 2.2 | 34 | 2.2 | |
| 75 - 84 | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| 85 - 99 | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| >100 | - | - | - | - | - | - | - | - | - | - | - | - | - | |
| Total (%) | 31.9 | 21.0 | 20.3 | 0.1 | 0.5 | 12.9 | 3.0 | 0.3 | 0.3 | 9.9 | 100.0 | 1534 | | |
| Vmed (cm/s) | 19.3 | 16.6 | 15.8 | 7.5 | 7.5 | 24.7 | 19.3 | 7.0 | 7.0 | | | | | |
| Vmax (cm/s) | 46.0 | 40.0 | 36.0 | 13.0 | 14.0 | 47.0 | 44.0 | 10.0 | 10.0 | | | | | |

Fig. 3.4

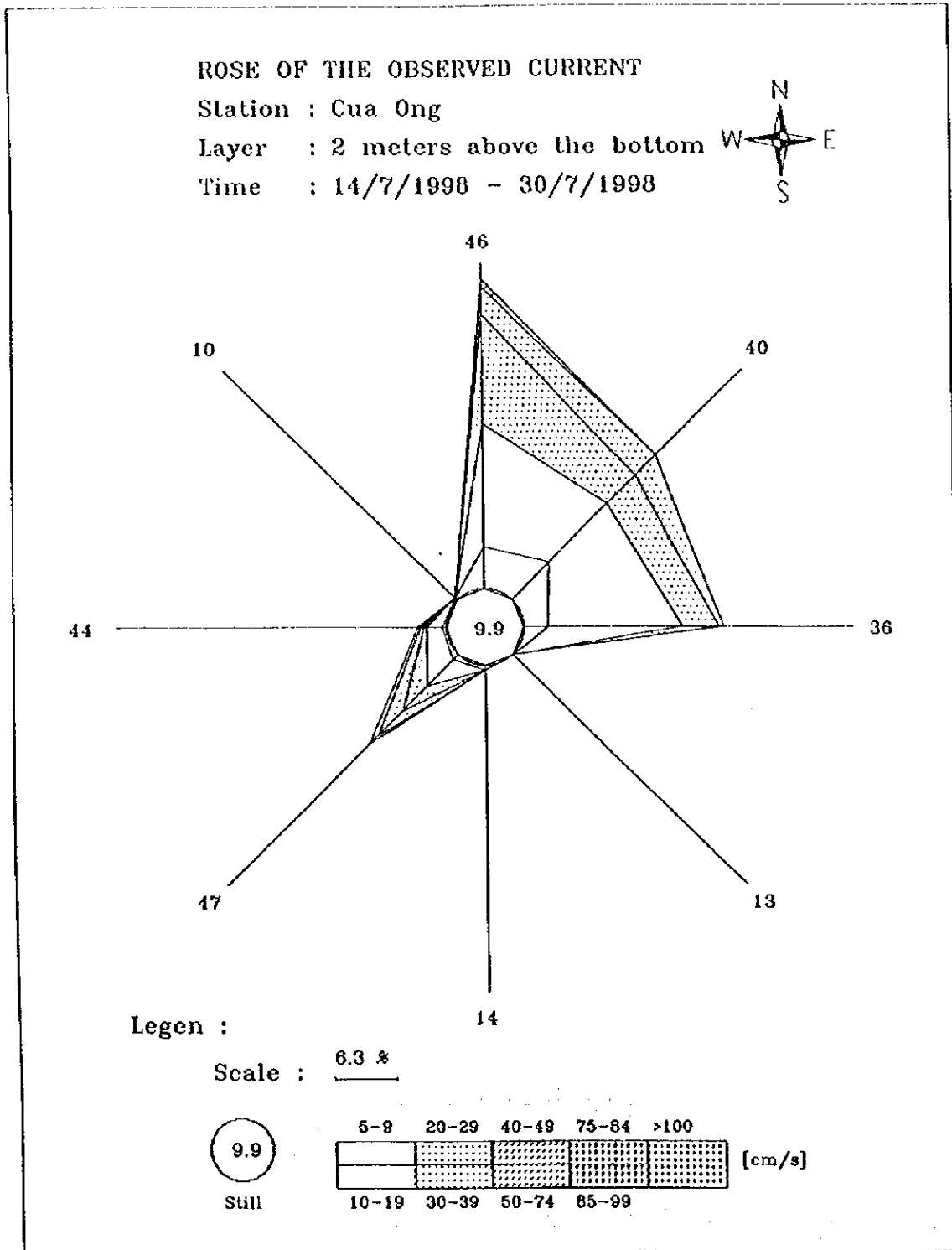


Table 3.5 THE FREQUENCY OF APPEARANCE OF THE OBSERVED CURRENT WITH A DIFFERENCE OF VELOCITY AND DIRECTION

Station : Cua Dua
 Layer : Surface
 Time : 14/7/1998 - 30/7/1998

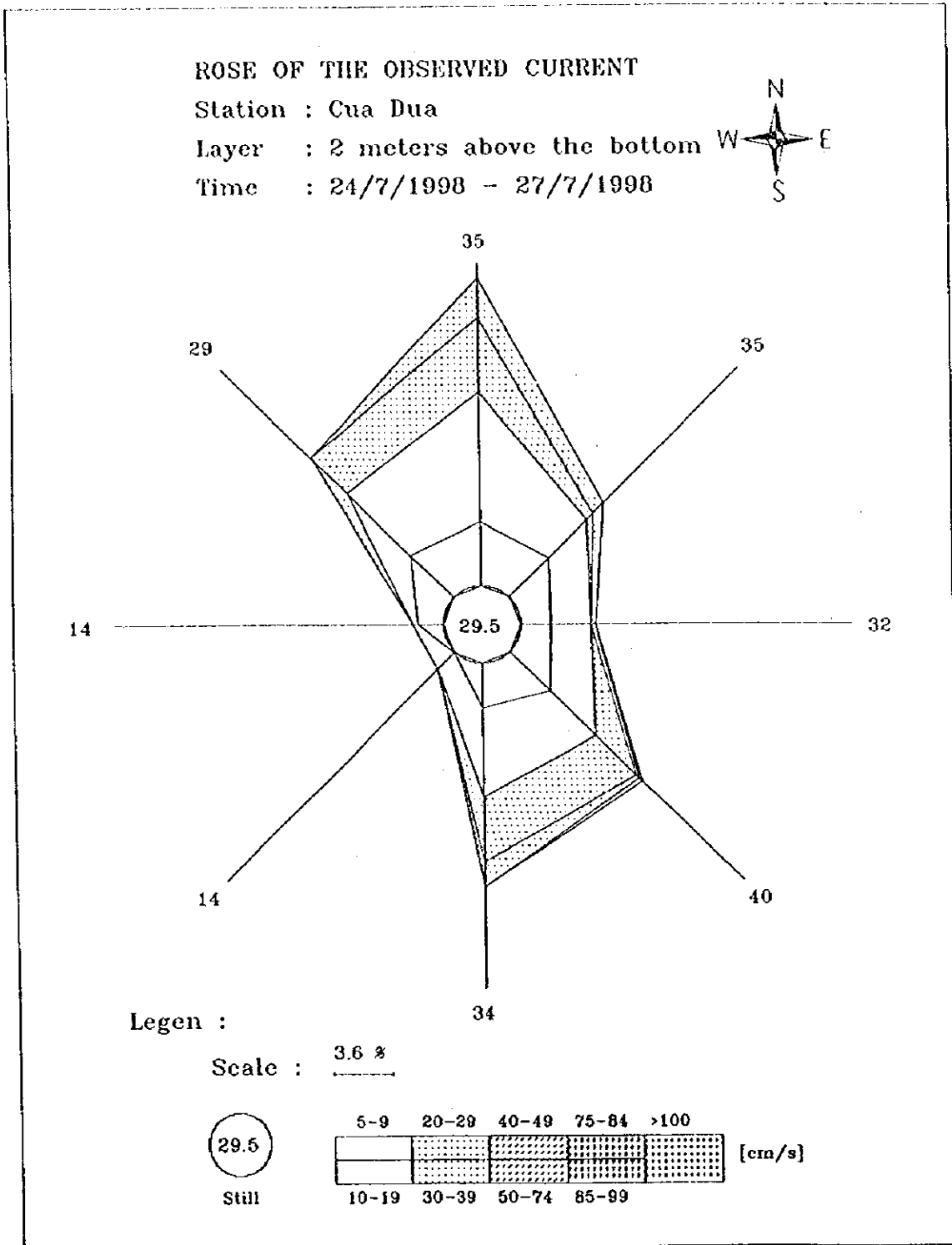
| Interval of Vel. [cm/s] | Direction | | | | | | | | | | | F (%) | N | P (%) |
|-------------------------|-----------|------|------|------|------|------|------|------|-------|-------|------|-------|---|-------|
| | N | NE | E | SE | S | SW | W | NW | Still | | | | | |
| 5 - 9 | 10.9 | 2.6 | 0.8 | 1.4 | 0.7 | 1.0 | 1.6 | 1.8 | 9.7 | 9.7 | 139 | 100.0 | | |
| 10 - 19 | 12.6 | 2.1 | 1.9 | 5.3 | 3.7 | 1.0 | 3.0 | 4.9 | - | 20.8 | 299 | 90.3 | | |
| 20 - 29 | 5.8 | 1.4 | 1.7 | 3.3 | 3.8 | 0.1 | 0.3 | 2.1 | - | 34.5 | 495 | 69.5 | | |
| 30 - 39 | 3.8 | 1.0 | 0.3 | 1.9 | 1.7 | - | - | 0.7 | - | 18.5 | 266 | 35.0 | | |
| 40 - 49 | 1.1 | - | - | 0.8 | 3.2 | - | - | 0.1 | - | 5.2 | 136 | 16.5 | | |
| 50 - 74 | 0.1 | - | - | 0.2 | 1.6 | - | - | - | - | 1.9 | 74 | 7.0 | | |
| 75 - 84 | - | - | - | - | - | - | - | - | - | - | 27 | 1.9 | | |
| 85 - 99 | - | - | - | - | - | - | - | - | - | - | - | - | | |
| >100 | - | - | - | - | - | - | - | - | - | - | - | - | | |
| Total (%) | 34.3 | 7.1 | 4.7 | 12.9 | 14.8 | 2.1 | 4.9 | 9.5 | 9.7 | 100.0 | 1436 | | | |
| Vmed (cm/s) | 16.6 | 16.3 | 17.4 | 21.5 | 30.0 | 11.0 | 12.3 | 17.0 | | | | | | |
| Vmax (cm/s) | 51.0 | 37.0 | 37.0 | 65.0 | 65.0 | 25.0 | 24.0 | 42.0 | | | | | | |

Table 3.6 THE FREQUENCY OF APPEARANCE OF THE OBSERVED CURRENT WITH A DIFFERENCE OF VELOCITY AND DIRECTION

Station : Cua Dua
 Layer : 2 meters above the bottom
 Time : 24/7/1998 - 27/7/1998

| Interval of Vel. [cm/s] | Direction | | | | | | | | | | Still | F (%) | N | P (%) |
|-------------------------|-----------|------|-------|------|------|------|------|------|------|-------|-------|-------|---|-------|
| | N | NE | E | SE | S | SW | W | NW | | | | | | |
| 5 - 9 | 3.9 | 3.3 | Still | 3.3 | 2.7 | - | 1.5 | 3.6 | 29.5 | 29.5 | 99 | 100.0 | | |
| 10 - 19 | 7.7 | 3.3 | 1.8 | 3.9 | 5.4 | 1.5 | 0.3 | 5.4 | - | 19.9 | 67 | 70.5 | | |
| 20 - 29 | 4.5 | 0.6 | 2.4 | 3.3 | 3.9 | - | - | 3.0 | - | 29.8 | 100 | 50.6 | | |
| 30 - 39 | 2.4 | 0.9 | 0.3 | 0.3 | 1.5 | - | - | - | - | 15.2 | 51 | 20.8 | | |
| 40 - 49 | - | - | - | 0.3 | - | - | - | - | - | 5.4 | 18 | 5.7 | | |
| 50 - 74 | - | - | - | - | - | - | - | - | - | 0.3 | 1 | 0.3 | | |
| 75 - 84 | - | - | - | - | - | - | - | - | - | - | - | - | | |
| 85 - 99 | - | - | - | - | - | - | - | - | - | - | - | - | | |
| >100 | - | - | - | - | - | - | - | - | - | - | - | - | | |
| Total (%) | 18.5 | 8.0 | 4.5 | 11.0 | 13.4 | 1.5 | 1.8 | 11.9 | 29.5 | 100.0 | 336 | | | |
| Vmed (cm/s) | 17.7 | 14.3 | 12.1 | 15.9 | 17.7 | 11.4 | 9.2 | 14.1 | | | | | | |
| Vmax (cm/s) | 35.0 | 35.0 | 32.0 | 40.0 | 34.0 | 14.0 | 14.0 | 29.0 | | | | | | |

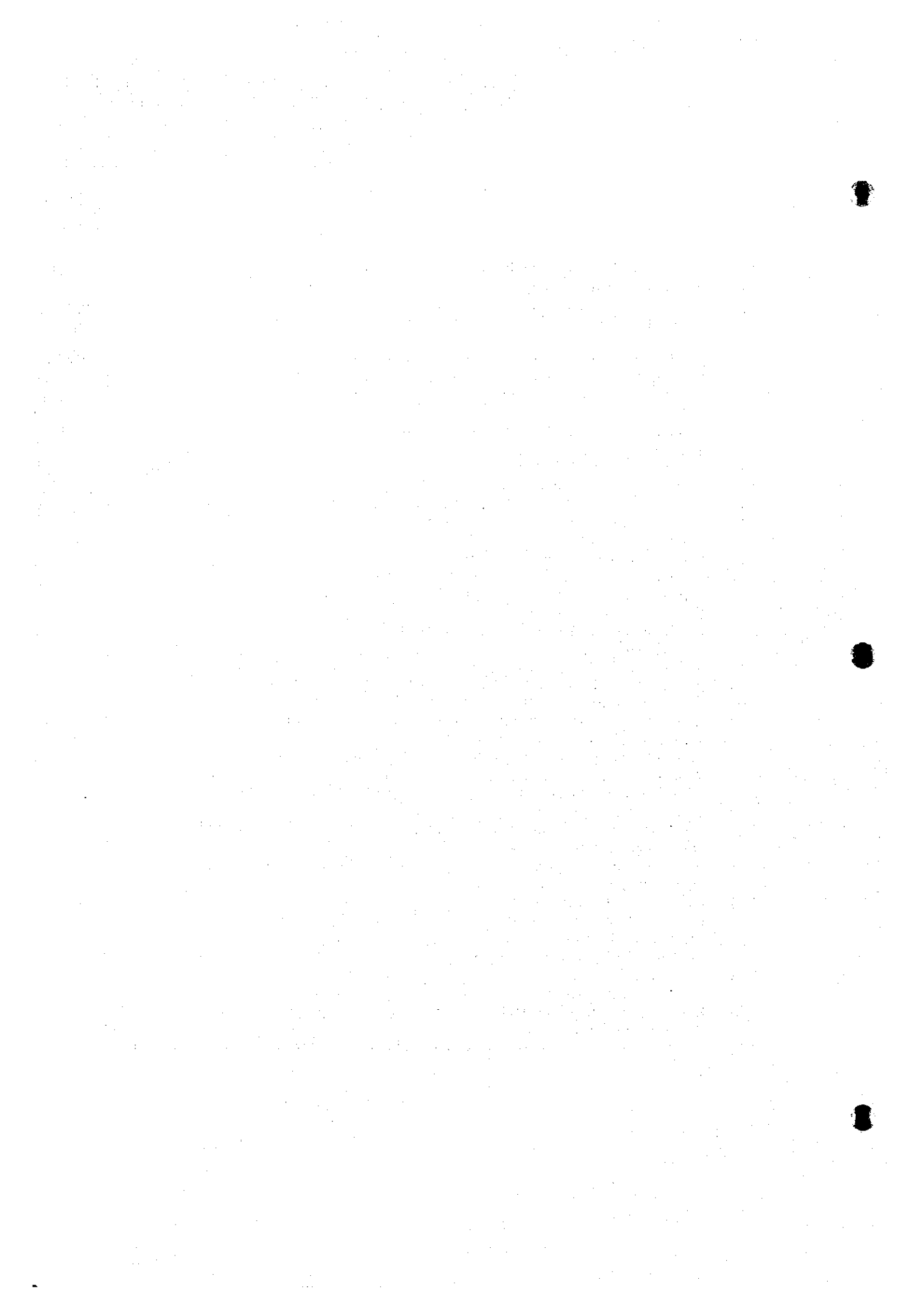
Fig. 3.6



2. Water Quality Survey

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2.1 Result of the Environmental Parameters for Ambient Water Quality in the Bays

| No. | Point | Layer | Parameters | | | | | | | |
|-----|-------|---------|------------|------|--------------|-----------|-----------------|-----------|-----------|--------|
| | | | T (°C) | pH | Salinity (‰) | DO (mg/l) | Turbidity (FTU) | SS (mg/l) | TDS (g/l) | |
| 1 | 1 | Surface | 32.0 | 7.94 | 16.5 | 5.98 | 7 | 4.16 | 18.444 | |
| | | Bottom | 31.0 | 8.09 | 22.0 | 4.04 | 13 | 14.92 | 24.104 | |
| 2 | 2 | Surface | 32.0 | 8.18 | 16.5 | 5.85 | 6 | 1.54 | 18.164 | |
| | | Bottom | 31.9 | 8.16 | 17.5 | 4.52 | 7 | 4.00 | 19.048 | |
| 3 | 3 | 3 FR | Surface | 31.2 | 8.14 | 15.5 | 6.76 | 8 | 1.27 | 17.076 |
| | | | Surface | 31.2 | 8.14 | 15.5 | 6.75 | 7 | 1.36 | 17.108 |
| | | | Bottom | 31.0 | 8.17 | 22.0 | 3.96 | 6 | 1.12 | 23.112 |
| 4 | 4 | Surface | 32.5 | 8.14 | 14.0 | 6.67 | 9 | 3.09 | 15.452 | |
| | | Bottom | 30.5 | 8.10 | 22.0 | 4.52 | 9 | 8.57 | 25.864 | |
| 5 | 5 | Surface | 31.1 | 8.16 | 4.0 | 4.05 | 20 | 9.54 | 4.620 | |
| | | Bottom | 31.3 | 8.09 | 5.0 | 3.78 | 22 | 18.87 | 5.624 | |
| 6 | 6 | Surface | 30.9 | 8.24 | 6.0 | 6.24 | 28 | 27.92 | 6.240 | |
| | | Bottom | 30.2 | 8.11 | 8.5 | 5.99 | 28 | 36.73 | 9.000 | |
| 7 | 7 | Surface | 30.3 | 8.07 | 14.0 | 6.67 | 14 | 16.00 | 15.624 | |
| | | Bottom | 31.2 | 8.09 | 16.0 | 6.98 | 15 | 16.40 | 16.972 | |
| 8 | 8 | Surface | 32.3 | 8.19 | 12.0 | 7.02 | 9 | 4.40 | 13.324 | |
| | | Bottom | 31.1 | 8.08 | 27.0 | 4.57 | 9 | 7.80 | 28.392 | |
| 9 | 9 | Surface | 31.0 | 8.25 | 15.0 | 5.98 | 8 | 7.90 | 16.548 | |
| | | Bottom | 30.9 | 8.15 | 21.5 | 3.97 | 8 | 6.00 | 24.444 | |
| 10 | 10 | Surface | 31.2 | 8.18 | 15.0 | 4.68 | 6 | 2.45 | 16.600 | |
| | | Bottom | 30.9 | 8.18 | 20.5 | 4.41 | 6 | 4.46 | 21.864 | |
| 11 | 11 | Surface | 31.3 | 8.18 | 19.5 | 6.51 | 6 | 2.18 | 19.748 | |
| | | Bottom | 31.2 | 8.15 | 21.5 | 4.98 | 5 | 2.70 | 22.516 | |
| 12 | 12 | Surface | 32.7 | 8.23 | 12.5 | 5.75 | 6 | 2.39 | 14.14 | |
| | | Bottom | 30.2 | 8.13 | 27.5 | 4.39 | 8 | 2.77 | 32.948 | |
| 13 | 13 | Surface | 32.4 | 8.22 | 17.5 | 5.06 | 8 | 1.77 | 18.708 | |
| | | Bottom | 30.0 | 8.18 | 31.0 | 4.73 | 9 | 1.46 | 30.020 | |
| 14 | 14 | Surface | 31.5 | 8.20 | 23.0 | 5.44 | 6 | 5.20 | 25.432 | |
| | | Bottom | 29.6 | 8.23 | 27.5 | 5.02 | 9 | 8.47 | 34.052 | |
| 15 | 15 | Surface | 31.3 | 8.37 | 18.7 | 4.79 | 10 | 3.22 | 18.636 | |
| | | Bottom | 29.5 | 8.28 | 30.5 | 5.23 | 14 | 9.57 | 34.580 | |
| 16 | 16 | Surface | 32.1 | 8.29 | 23.0 | 5.81 | 7 | 4.25 | 25.904 | |
| | | Bottom | 31.7 | 8.29 | 24.5 | 5.77 | 9 | 4.48 | 27.952 | |
| 17 | 17 | 17 FR | Surface | 31.6 | 8.38 | 23.0 | 4.45 | 8 | 0.62 | 27.540 |
| | | | Bottom | 31.4 | 8.37 | 24.0 | 4.12 | 9 | 0.85 | 26.920 |
| | | | Bottom | 31.4 | 8.37 | 24.0 | 4.13 | 9 | 0.89 | 26.968 |
| 18 | 18 | Surface | 31.8 | 8.31 | 23.0 | 5.76 | 7 | 0.42 | 25.784 | |
| | | Bottom | 31.8 | 8.18 | 24.0 | 5.74 | 9 | 0.81 | 26.256 | |
| 19 | 19 | Surface | 32.2 | 8.27 | 24.0 | 6.12 | 6 | 1.00 | 26.540 | |
| | | Bottom | 32.1 | 8.20 | 24.0 | 5.87 | 9 | 6.50 | 27.216 | |
| 20 | 20 | Surface | 32.0 | 8.27 | 24.0 | 5.00 | 9 | 2.20 | 26.716 | |
| | | Bottom | 32.0 | 8.27 | 24.0 | 4.75 | 11 | 2.80 | 27.104 | |
| 21 | 21 | Surface | 32.2 | 8.38 | 22.0 | 6.21 | 8 | 0.57 | 23.656 | |
| | | Bottom | 31.1 | 8.30 | 24.0 | 5.62 | 10 | 2.70 | 27.924 | |
| 22 | 22 | Surface | 31.4 | 8.37 | 21.0 | 6.65 | 8 | 2.50 | 22.452 | |
| | | Bottom | 30.1 | 8.23 | 24.0 | 4.35 | 12 | 10.64 | 32.508 | |
| 23 | 23 | Surface | 31.5 | 8.25 | 16.0 | 6.96 | 11 | 4.33 | 15.388 | |
| | | Bottom | 29.8 | 8.20 | 32.0 | 5.17 | 14 | 6.83 | 35.372 | |
| 24 | 24 | Surface | 32.3 | 8.32 | 23.5 | 5.93 | 9 | 0.62 | 25.516 | |
| | | Bottom | 31.6 | 8.26 | 24.0 | 5.82 | 12 | 1.00 | 27.004 | |
| 25 | 25 | Surface | 32.1 | 8.28 | 24.0 | 6.04 | 8 | 4.80 | 27.188 | |
| | | Bottom | 31.3 | 8.28 | 24.5 | 5.92 | 7 | 4.90 | 27.812 | |
| 26 | 26 | Surface | 32.5 | 8.12 | 23.0 | 6.29 | 5 | 1.80 | 25.780 | |
| | | Bottom | 31.8 | 8.16 | 24.0 | 5.75 | 6 | 2.90 | 26.948 | |
| 27 | 27 | Surface | 32.4 | 8.12 | 16.0 | 5.82 | 5 | 1.00 | 17.980 | |
| | | Bottom | 31.5 | 8.18 | 22.0 | 5.60 | 6 | 1.50 | 24.144 | |
| 28 | 28 | Surface | 32.1 | 8.26 | 24.0 | 3.82 | 19 | 22.30 | 26.988 | |
| 29 | 29 | Surface | 33.1 | 8.06 | 24.0 | 3.77 | 11 | 8.80 | 26.496 | |
| 30 | 30 | 30 FR | Surface | 34.2 | 8.22 | 24.0 | 4.65 | 23 | 27.10 | 26.208 |
| | | | Surface | 34.2 | 8.21 | 24.0 | 4.64 | 23 | 27.28 | 26.284 |

Note: FR : Field replicate sample

2.2 Result of the Water-Quality Parameters for Ambient Water Quality in the Bays (1/2)

| No. | Point | Layer | Parameters | | | | | | | |
|-----|-------|---------------|-----------------------------|----------------------------|---------------|---|---------------------------------------|---|--------------|------------------|
| | | | COD _{5m} (mg/l) | BOD ₅ (mg/l) | Oil (mg/l) | Chlorophyll - a (mg/m ³) | Coliform (Col./100m ³) | Fecal- coliform (Col./100m ³) | CN (µg/l) | Phenol (µg/l) |
| 1 | 1 | Surface | 10.0 | 1.14 | 7.2 | 2.39 | 8820 | 21 | 6.8 | 1.02 |
| | | Bottom | 7.0 | 1.49 | 6.8 | 3.28 | 2160 | 13 | 6.4 | 1.3 |
| | | Blank | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 2 | Surface | 7.2 | 1.06 | 3.4 | 2.60 | 9940 | 63 | 5.5 | 1.3 |
| | | Bottom | 7.4 | 1.38 | 1.0 | 2.47 | 940 | 19 | 6.4 | 1.3 |
| 3 | 3 | Surface | 6.4 | 1.33 | 1.3 | 2.40 | 16480 | 62 | 6.4 | 1.3 |
| | | 3 FR Surface | 6.2 | 1.35 | 1.4 | 2.40 | 1940 | 59 | 6.3 | 1.3 |
| | | Bottom | 7.0 | 1.47 | 1.3 | 2.60 | 1980 | 18 | 7.8 | 1.1 |
| 4 | 4 | Surface | 7.6 | 1.12 | 1.9 | 2.47 | 40840 | 412 | 6.2 | 1.1 |
| | | 4 FR Surface | 7.6 | 1.11 | 1.8 | 2.48 | 41440 | 390 | 6.1 | 1.1 |
| | | Bottom | 7.8 | 1.91 | 1.8 | 2.40 | | 306 | 7.2 | 1.3 |
| 5 | 5 | Surface | 5.6 | 1.60 | 1.4 | 2.53 | 1620 | 7 | 6.5 | 2.1 |
| | | 5 FR Surface | 5.7 | 1.58 | 1.5 | 2.50 | 320 | 8 | 6.7 | 2.2 |
| | | Bottom | 5.2 | 1.32 | 0.7 | 2.60 | | 3 | 10.4 | 1.25 |
| 6 | 6 | Surface | 4.8 | 1.46 | 0.6 | 2.93 | 1960 | 12 | 6.9 | 1.80 |
| | | Bottom | 5.0 | 1.72 | 0.4 | 2.47 | 400 | 0 | 6.5 | 0.95 |
| 7 | 7 | Surface | 7.4 | 0.91 | 2.0 | 2.33 | 3460 | 15 | 7.6 | 1.50 |
| | | Bottom | 8.5 | 1.31 | 0.8 | 2.33 | 1920 | 8 | 7.6 | 1.50 |
| 8 | 8 | Surface | 4.8 | 1.69 | 1.1 | 2.33 | 260 | 11 | 6.9 | 2.05 |
| | | Bottom | 12.2 | 1.82 | 0.5 | 2.60 | 0 | 0 | 10.4 | 1.05 |
| 9 | 9 | Surface | 11.7 | 0.97 | 2.1 | 2.00 | 3080 | 12 | 7.6 | 1.60 |
| | | 9 LR Surface | 11.5 | 0.92 | 2.2 | 2.00 | 1260 | 11 | 7.5 | 1.60 |
| | | Bottom | 10.3 | 1.12 | 1.2 | 2.33 | | 4 | 7.2 | 1.55 |
| | | Blank | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10 | 10 | Surface | 7.8 | 1.48 | 1.4 | 2.47 | 56520 | 316 | 7.4 | 1.60 |
| | | Bottom | 8.6 | 0.31 | 1.4 | 2.53 | 37320 | 212 | 7.6 | 1.30 |
| 11 | 11 | Surface | 11.1 | 0.88 | 4.7 | 2.60 | 20260 | 96 | 7.6 | 2.45 |
| | | Bottom | 9.9 | 1.94 | 2.1 | 2.20 | 9440 | 47 | 7.6 | 1.80 |
| 12 | 12 | Surface | 5.6 | 1.59 | 2.0 | 2.40 | 960 | 7 | | |
| | | Bottom | 6.0 | 1.67 | 0.5 | 2.80 | 140 | 4 | 6.9 | 0.60 |
| 13 | 13 | Surface | 4.8 | 1.76 | 1.2 | 1.93 | 840 | 4 | 6.5 | 1.80 |
| | | 13 LR Surface | 4.8 | 1.75 | 1.2 | 1.91 | | 4 | 6.5 | 1.80 |
| | | Bottom | 8.0 | 1.86 | 0.4 | 2.60 | 60 | 0 | 6.9 | 0.35 |
| 14 | 14 | Surface | 9.6 | 2.55 | 0.9 | 2.80 | 780 | 2 | 9.1 | 2.00 |
| | | 14 FR Surface | 9.4 | 2.45 | 0.9 | 2.82 | | 2 | 9.5 | 2.10 |
| | | Bottom | 6.4 | 1.01 | 0.4 | 2.93 | 0 | 0 | 8.9 | 0.35 |
| | | 14 LR Bottom | 6.5 | 1.05 | 0.4 | 2.90 | 0 | 0 | 8.9 | 0.35 |
| | | Blank | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 15 | 15 | Surface | 6.2 | 1.73 | 0.5 | 2.47 | 120 | 3 | 6.9 | 2.00 |
| | | Bottom | 9.2 | 1.58 | 0.2 | 2.47 | 0 | 0 | 9.4 | 0.60 |
| 16 | 16 | Surface | 13.2 | 2.03 | 0.4 | 2.60 | 1300 | 6 | 9.5 | 2.00 |
| | | 16 FR Surface | 13.0 | 1.92 | 0.4 | 2.62 | | 1 | 9.4 | 2.10 |
| | | Bottom | 9.8 | 1.62 | 0.4 | 2.67 | 220 | 1 | 10.8 | 0.60 |
| | | 16 LR Bottom | 10.2 | 1.60 | 0.4 | 2.65 | | 1 | 10.09 | 0.60 |
| 17 | 17 | Surface | 4.7 | 0.88 | 0.3 | 2.47 | 820 | 6 | 6.8 | 2.0 |
| | | Bottom | 5.3 | 0.84 | 0.3 | 2.67 | 60 | 0 | 10.8 | 0.60 |
| | | 17 FR Bottom | 5.5 | 0.82 | 0.3 | 2.64 | | 0 | 11.0 | 0.60 |
| 18 | 18 | Surface | 4.3 | 0.87 | 0.7 | 2.67 | 580 | 13 | 9.5 | 2.05 |
| | | Bottom | 3.3 | 0.88 | 0.3 | 1.80 | 60 | 11 | 10.4 | 0.85 |
| 19 | 19 | Surface | 4.5 | 0.49 | 0.9 | 2.47 | 200 | 6 | 6.9 | 1.6 |
| | | Bottom | 6.0 | 0.69 | 0.5 | 2.80 | 20 | 1 | 7.4 | 1.24 |
| | | Blank | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 20 | 20 | Surface | 3.7 | 0.71 | 1.2 | 2.67 | 240 | 2 | 6.9 | 1.60 |
| | | Bottom | 3.8 | 0.76 | 0.8 | 2.67 | 0 | 0 | 10.4 | 0.90 |

2.3 Result of the Water-Quality Parameters for Ambient Water Quality in the Bays (2/2)

| No. | Point | Layer | Parameters | | | | | | | |
|-----|-------------|---------|-----------------------------|----------------------------|---------------|---|--------------------------|------------------------------------|--------------|------------------|
| | | | COD _{sb} (mg/l) | BOD ₅ (mg/l) | Oil (mg/l) | Chlorophyll - a (mg/m ³) | Coliform (Col./100ml) | Fecal- coliform (Col./100ml) | CN (µg/l) | Phenol (µg/l) |
| 21 | 21 | Surface | 4.5 | 0.90 | 0.3 | 2.87 | 60 | 0 | 9.4 | 0.8 |
| | | Bottom | 3.1 | 0.83 | 0.3 | 2.80 | 0 | 0 | 10.4 | 0.90 |
| 22 | 22 | Surface | 4.3 | 1.69 | 0.4 | 2.53 | 80 | 0 | 9.6 | 0.8 |
| | | Bottom | 3.9 | 0.77 | 0.3 | 2.53 | 0 | 0 | 6.9 | 0.90 |
| 23 | 23 | Surface | 5.1 | 1.47 | 0.5 | 2.80 | 20 | 0 | 9.6 | 1.6 |
| | | Bottom | 3.3 | 1.20 | 0.8 | 2.87 | 0 | 0 | 8.6 | 0.60 |
| 24 | 24 24 LR | Surface | 4.5 | 0.77 | 0.8 | 2.87 | 160 | 6 | 9.6 | 0.80 |
| | | Surface | 4.3 | 0.76 | 0.9 | 2.87 | | 6 | 9.5 | 0.82 |
| | | Bottom | 4.9 | 1.08 | 0.9 | 2.97 | 20 | 1 | 6.9 | 0.85 |
| 25 | 25 25 FR | Surface | 3.1 | 0.98 | 0.8 | 2.60 | 280 | 10 | 7.9 | 0.8 |
| | | Bottom | 8.1 | 0.92 | 0.8 | | 40 | 4 | 9.6 | 0.85 |
| | | Bottom | 8.8 | 0.94 | 0.8 | 2.53 | | 4 | 9.4 | 0.83 |
| 26 | 26 | Surface | 2.9 | 1.07 | 1.1 | 2.47 | 300 | 12 | 7.9 | 1.8 |
| | | Bottom | 3.7 | 0.66 | 0.5 | 2.80 | 20 | 8 | 9.6 | 0.85 |
| 27 | 27 27 LR | Surface | 3.7 | 0.86 | 0.7 | 2.37 | 520 | 17 | 7.6 | 1.6 |
| | | Surface | 3.5 | 0.87 | 0.7 | 2.36 | 140 | 17 | 7.4 | 1.5 |
| | | Bottom | 2.9 | 1.02 | 0.5 | 2.47 | | 5 | 10.4 | 0.90 |
| | | Blank | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 | 28 | Surface | 3.5 | 0.72 | 0.3 | 2.33 | 40 | 6 | 6.9 | 2.05 |
| 29 | 29 | Surface | 2.5 | 0.31 | 0.7 | 2.80 | 160 | 3 | 7.9 | 2.05 |
| 30 | 30 30 FR | Surface | 3.5 | 0.81 | 0.9 | 2.67 | 380 | 13 | 6.9 | 1.80 |
| | | Surface | 3.6 | 0.86 | 0.8 | 2.64 | 18 | 13 | 6.8 | 1.75 |

Note: - FR: Field replicate sample; - LR: Lab. replicate sample

2.4 Result of Nutrients Parameters for Ambient Water Quality in the Bays

| No. | Point | Layer | Parameters | | | | | |
|-----|--------|---------|-----------------------------|------------------------------|------------------------------|----------------|--|----------------|
| | | | N-NO ₃ (µg/l) | N-NO ₂ (µgN/l) | N-NH ₄ (µgN/l) | T-N (mgN/l) | P-PO ₄ ³⁻ (µgP/l) | T-P (mgP/l) |
| 1 | 1 | Surface | 16.76 | 106.58 | 319.5 | 1.92 | 4.1 | 0.96 |
| | | Bottom | 20.43 | 96.60 | 188.2 | 2.53 | 3.4 | 0.52 |
| 2 | 2 | Surface | 14.60 | 95.57 | 260.5 | 1.28 | 7.1 | 0.72 |
| | | Bottom | 14.95 | 93.92 | 279.5 | 1.86 | 8.9 | 0.48 |
| 3 | 3 FR | Surface | 10.95 | 91.03 | 268.0 | 1.41 | 8.5 | 0.85 |
| | | Surface | 10.98 | 95.80 | 274.5 | 1.92 | 8.7 | 0.86 |
| | | Bottom | 17.01 | 117.63 | 156.0 | 1.47 | 4.6 | 0.80 |
| 4 | 4 | Surface | 8.54 | 84.11 | 275.5 | 1.01 | 11.0 | 0.90 |
| | | Bottom | 19.43 | 55.88 | 220.0 | 1.51 | 6.2 | 1.18 |
| 5 | 5 I.R | Surface | 31.95 | 100.46 | 12.8 | 0.81 | 204 | 0.34 |
| | | Surface | 31.87 | 99.14 | 12.6 | 0.85 | 203 | 0.34 |
| | | Bottom | 34.15 | 96.53 | 13.8 | 0.80 | 47 | 0.38 |
| 6 | 6 | Surface | 32.7 | 62.16 | 26.9 | 1.06 | 51 | 0.14 |
| | | Bottom | 38.65 | 33.36 | 20.5 | 1.08 | 98.4 | 0.53 |
| 7 | 7 | Surface | 7.56 | 86.02 | 15.1 | 1.02 | 23.5 | 0.77 |
| | | Bottom | 11.16 | 69.04 | 19.0 | 1.05 | 31.0 | 0.84 |
| 8 | 8 | Surface | 8.33 | 53.95 | 16.8 | 1.56 | 30.1 | 0.29 |
| | | Bottom | 58.4 | 45.01 | 20.1 | 1.99 | 32.0 | 0.41 |
| 9 | 9 | Surface | 12.50 | 64.64 | 135.2 | 2.14 | 8.62 | 0.75 |
| | | Bottom | 5.18 | 85.04 | 164.9 | 3.18 | 7.8 | 1.12 |
| 10 | 10 | Surface | 8.71 | 101.52 | 258.0 | 1.21 | 10.7 | 0.94 |
| | | Bottom | 16.11 | 83.97 | 225.0 | 1.92 | 4.7 | 1.22 |
| 11 | 11 | Surface | 13.87 | 92.32 | 239.0 | 1.62 | 10.1 | 1.12 |
| | | Bottom | 14.64 | 86.53 | 153.0 | 1.98 | 6.9 | 1.24 |
| 12 | 12 | Surface | 5.46 | 21.02 | 23.7 | 1.55 | 14.4 | 0.67 |
| | | Bottom | 8.40 | 31.30 | 24.1 | 1.88 | 36.9 | 0.75 |
| 13 | 13 | Surface | 8.80 | 59.97 | 58.7 | 0.74 | 22.8 | 0.32 |
| | | Bottom | 25.3 | 64.14 | 57.9 | 0.82 | 30.3 | 0.48 |
| 14 | 14 FF | Surface | 14.06 | 49.25 | 25.3 | 0.45 | 59.8 | 0.36 |
| | | Surface | 14.00 | 48.82 | 25.9 | 0.53 | 59.9 | 0.35 |
| | | Bottom | 20.66 | 75.36 | 41.1 | 0.48 | 136.4 | 0.61 |
| 15 | 15 I.R | Surface | 23.20 | 58.67 | 29.4 | 1.65 | 34.3 | 0.73 |
| | | Bottom | 29.06 | 58.55 | 21.0 | 1.26 | 30.7 | 0.88 |
| | | Bottom | 28.99 | 58.58 | 20.7 | 1.26 | 29.9 | 0.89 |
| 16 | 16 | Surface | 8.31 | 20.63 | 26.4 | 1.40 | 33.9 | 0.43 |
| | | Bottom | 6.49 | 55.66 | 20.4 | 1.12 | 60.0 | 0.57 |
| 17 | 17 FR | Surface | 12.28 | 17.08 | 23.1 | 0.69 | 21.7 | 0.49 |
| | | Bottom | 7.58 | 11.85 | 19.8 | 1.08 | 66.2 | 0.68 |
| | | Bottom | 7.50 | 12.43 | 19.6 | 1.05 | 66.5 | 0.69 |
| 18 | 18 | Surface | 7.44 | 29.92 | 23.6 | 1.87 | 38.6 | 0.40 |
| | | Bottom | 6.97 | 27.79 | 22.7 | 2.91 | 24.9 | 0.48 |
| 19 | 19 | Surface | 5.69 | 56.04 | 15.1 | 0.55 | 27.8 | 0.38 |
| | | Bottom | 4.93 | 7.18 | 20.3 | 0.89 | 32.8 | 0.40 |
| 20 | 20 I.R | Surface | 6.89 | 21.19 | 29.6 | 1.28 | 30.1 | 0.63 |
| | | Bottom | 7.68 | 20.62 | 31.1 | 1.62 | 20.7 | 0.57 |
| | | Bottom | 7.71 | 20.75 | 31.7 | 1.59 | 21.0 | 0.58 |
| 21 | 21 | Surface | 7.5 | 60.16 | 19.6 | 1.14 | 23.2 | 0.26 |
| | | Bottom | 1.26 | 19.38 | 24.1 | 1.86 | 86.4 | 0.78 |
| 22 | 22 | Surface | 2.6 | 91.53 | 13.6 | 1.11 | 18.7 | 0.49 |
| | | Bottom | 3.9 | 18.64 | 8.7 | 1.48 | 16.7 | 0.59 |
| 23 | 23 | Surface | 13.67 | 15.05 | 9.0 | 0.89 | 22.5 | 0.22 |
| | | Bottom | 7.75 | 45.43 | 10.0 | 1.24 | 18.5 | 0.30 |
| 24 | 24 | Surface | 6.38 | 67.00 | 11.9 | 1.39 | 25.6 | 0.46 |
| | | Bottom | 8.67 | 58.00 | 13.4 | 2.33 | 29.5 | 0.47 |
| 25 | 25 | Surface | 10.26 | 21.11 | 19.4 | 1.82 | 20.7 | 0.82 |
| | | Bottom | 4.31 | 8.65 | 11.2 | 1.97 | 23.7 | 0.92 |
| 26 | 26 | Surface | 7.05 | 22.80 | 36.8 | 1.05 | 17.1 | 0.79 |
| | | Bottom | 8.95 | 23.23 | 18.8 | 1.37 | 31.3 | 0.90 |
| 27 | 27 | Surface | 8.95 | 22.75 | 22.3 | 0.79 | 19.6 | 0.65 |
| | | Bottom | 9.15 | 39.13 | 21.4 | 0.86 | 16.7 | 0.64 |
| 28 | 28 | Surface | 6.12 | 23.75 | 14.4 | 1.98 | 24.1 | 0.16 |
| 29 | 29 | Surface | 7.40 | 20.86 | 13.6 | 2.73 | 17.6 | 0.16 |
| 30 | 30 FR | Surface | 7.95 | 72.36 | 15.1 | 1.81 | 23.5 | 0.14 |
| | | Surface | 7.89 | 68.22 | 15.9 | 1.78 | 23.9 | 0.14 |

Note: - I.R : Laboratory replicate; - FR ; Field replicate

2.5 Result of Heavy Metal for Ambient Water Quality in the Bays

| No. | Point | Layer | Parameters ($\mu\text{g}/\text{l}$) | | | | | | | | | |
|-----|-------|---------|---------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|--|----------------------------------|----------------------------------|----------------------------------|------------------------------------|
| | | | Cu ($\mu\text{g}/\text{l}$) | Pb ($\mu\text{g}/\text{l}$) | Zn ($\mu\text{g}/\text{l}$) | Cd ($\mu\text{g}/\text{l}$) | Ni ($\mu\text{g}/\text{l}$) | Cr ^{VI} ($\mu\text{g}/\text{l}$) | Mn ($\mu\text{g}/\text{l}$) | Fe ($\mu\text{g}/\text{l}$) | As ($\mu\text{g}/\text{l}$) | T-Hg ($\mu\text{g}/\text{l}$) |
| 1 | 1 | Surface | 6.58 | 2.32 | 11.90 | 0.18 | 2.15 | 1.02 | 20.03 | 23.34 | 1.98 | 0.16 |
| | | Bottom | 6.83 | 2.88 | 13.61 | 0.25 | 3.71 | 1.42 | 26.88 | 30.21 | 2.34 | 0.36 |
| 2 | 2 | Surface | 6.81 | 2.36 | 11.94 | 0.18 | 2.31 | 1.06 | 20.81 | 23.47 | 1.97 | 0.25 |
| | | Bottom | 6.62 | 2.42 | 12.21 | 0.23 | 3.42 | 1.34 | 24.00 | 26.34 | 1.98 | 0.40 |
| 3 | 3 | Surface | 5.83 | 1.98 | 11.68 | 0.20 | 1.75 | 0.97 | 18.84 | 20.13 | 1.99 | 0.12 |
| | 3 FR | Surface | 5.91 | 2.09 | 11.70 | 0.19 | 1.72 | 0.99 | 19.67 | 21.07 | 2.04 | 0.12 |
| | | Bottom | 6.85 | 2.78 | 13.68 | 0.24 | 3.81 | 1.43 | 26.88 | 30.41 | 2.12 | 0.15 |
| 4 | 4 | Surface | 5.88 | 1.74 | 10.09 | 0.21 | 1.15 | 0.81 | 17.71 | 21.02 | 2.26 | 0.19 |
| | | Bottom | 8.31 | 3.01 | 14.30 | 0.26 | 4.24 | 1.56 | 33.04 | 31.44 | 2.37 | 0.18 |
| 5 | 5 | Surface | 3.14 | 2.98 | 5.81 | 0.10 | 2.13 | 0.87 | 15.20 | 16.19 | 2.34 | 0.21 |
| | | Bottom | 3.14 | 2.94 | 6.60 | 0.10 | 2.01 | 0.97 | 15.60 | 16.24 | 2.34 | 0.35 |
| 6 | 6 | Surface | 3.48 | 1.78 | 7.02 | 0.12 | 2.26 | 1.02 | 16.82 | 15.84 | 2.36 | 0.19 |
| | | Bottom | 3.42 | 1.98 | 8.30 | 0.18 | 2.30 | 0.98 | 18.30 | 17.18 | 2.36 | 0.82 |
| 7 | 7 | Surface | 4.09 | 1.81 | 9.80 | 0.21 | 1.34 | 0.86 | 18.38 | 20.26 | 2.04 | 0.13 |
| | | Bottom | 5.91 | 2.13 | 11.60 | 0.22 | 2.06 | 0.95 | 19.91 | 23.33 | 2.18 | 0.14 |
| 8 | 8 | Surface | 4.24 | 2.32 | 8.04 | 0.13 | 2.31 | 1.75 | 18.41 | 22.10 | 2.42 | 0.27 |
| | | Bottom | 6.81 | 2.61 | 12.21 | 0.25 | 3.16 | 1.79 | 25.10 | 28.34 | 2.58 | 0.32 |
| 9 | 9 | Surface | 5.07 | 2.02 | 11.40 | 0.18 | 1.52 | 0.78 | 16.07 | 19.91 | 2.12 | 0.23 |
| | | Bottom | 6.92 | 2.90 | 13.80 | 0.25 | 3.80 | 1.48 | 28.14 | 34.31 | 2.34 | 0.25 |
| 10 | 10 | Surface | 5.48 | 2.12 | 11.60 | 0.21 | 1.58 | 0.82 | 20.24 | 24.22 | 2.31 | 0.22 |
| | | Bottom | 6.98 | 2.81 | 13.01 | 0.24 | 3.22 | 1.42 | 20.42 | 24.68 | 2.69 | 0.27 |
| 11 | 11 | Surface | 6.44 | 2.48 | 12.70 | 0.23 | 2.98 | 1.41 | 24.32 | 25.06 | 2.08 | 0.21 |
| | | Bottom | 6.60 | 2.54 | 13.30 | 0.24 | 3.61 | 1.46 | 34.34 | 26.17 | 2.17 | 0.22 |
| 12 | 12 | Surface | 4.26 | 2.46 | 9.03 | 0.13 | 2.38 | 1.79 | 18.92 | 21.22 | 2.17 | 0.24 |
| | | Bottom | 7.02 | 3.02 | 13.20 | 0.32 | 3.12 | 1.85 | 31.02 | 33.02 | 2.18 | 0.22 |
| 13 | 13 | Surface | 5.07 | 2.51 | 10.12 | 0.11 | 1.94 | 1.12 | 17.96 | 20.19 | 1.84 | 0.21 |
| | | Bottom | 6.92 | 2.74 | 12.71 | 0.28 | 2.97 | 1.42 | 28.51 | 30.19 | 2.42 | 0.15 |
| 14 | 14 | Surface | 6.12 | 2.08 | 14.22 | 0.18 | 2.72 | 1.18 | 21.12 | 24.02 | 1.99 | 0.19 |
| | 14 FR | Surface | 6.26 | 3.07 | 14.60 | 0.21 | 2.68 | 1.17 | 21.02 | 25.31 | 2.02 | 0.24 |
| | | Bottom | 7.12 | 3.13 | 13.71 | 0.27 | 3.41 | 1.18 | 32.01 | 27.12 | 2.48 | 0.34 |
| | 14 LR | Bottom | 6.81 | 3.11 | 14.60 | 0.33 | 3.14 | 2.02 | 33.02 | 26.31 | 2.50 | 0.31 |
| 15 | 15 | Surface | 7.28 | 3.06 | 9.36 | 0.33 | 3.10 | 1.92 | 18.3 | 20.48 | 2.13 | 0.29 |
| | | Bottom | 7.34 | 4.06 | 14.91 | 0.36 | 3.72 | 1.92 | 32.61 | 34.08 | 2.97 | 0.48 |
| 16 | 16 | Surface | 5.08 | 3.11 | 10.33 | 0.17 | 2.91 | 2.86 | 21.5 | 22.62 | 2.21 | 0.30 |
| | | Bottom | 6.41 | 3.12 | 11.07 | 0.25 | 3.06 | 2.96 | 25.12 | 28.39 | 2.63 | 0.25 |
| 17 | 17 | Surface | 6.20 | 2.81 | 10.21 | 0.11 | 2.97 | 1.71 | 21.5 | 24.51 | 2.42 | 0.19 |
| | | Bottom | 6.22 | 2.86 | 10.21 | 0.24 | 3.12 | 2.12 | 24.01 | 27.20 | 2.68 | 0.27 |
| 18 | 18 | Surface | 6.24 | 2.76 | 10.42 | 0.22 | 3.12 | 1.92 | 22.43 | 27.34 | 2.61 | 0.26 |
| | | Bottom | 6.26 | 2.81 | 10.46 | 0.23 | 3.24 | 1.94 | 23.31 | 27.40 | 2.71 | 0.32 |
| 19 | 19 | Surface | 6.26 | 2.52 | 10.45 | 0.25 | 3.84 | 2.03 | 22.58 | 25.58 | 2.33 | 0.24 |
| | | Bottom | 6.43 | 2.90 | 10.18 | 0.26 | 3.22 | 2.34 | 24.34 | 27.38 | 2.42 | 0.25 |
| 20 | 20 | Surface | 6.44 | 2.72 | 10.20 | 0.24 | 3.69 | 1.91 | 22.73 | 26.12 | 1.97 | 0.19 |
| | | Bottom | 6.42 | 2.78 | 10.52 | 0.24 | 3.34 | 2.62 | 24.18 | 28.20 | 2.18 | 0.19 |
| 21 | 21 | Surface | 6.58 | 2.82 | 9.47 | 0.19 | 2.88 | 1.81 | 19.61 | 20.17 | 2.02 | 0.25 |
| | | Bottom | 6.68 | 2.86 | 10.18 | 0.25 | 3.18 | 1.86 | 24.36 | 27.10 | 2.18 | 0.34 |
| 22 | 22 | Surface | 6.62 | 3.01 | 9.50 | 0.19 | 3.01 | 3.03 | 18.74 | 21.03 | 2.36 | 0.22 |
| | | Bottom | 7.01 | 3.03 | 12.01 | 0.3 | 3.72 | 3.31 | 30.21 | 32.96 | 2.38 | 0.29 |
| 23 | 23 | Surface | 6.17 | 2.52 | 7.08 | 0.13 | 2.74 | 2.88 | 17.01 | 20.19 | 1.84 | 0.20 |
| | | Bottom | 7.35 | 2.89 | 12.18 | 0.35 | 4.02 | 3.13 | 34.02 | 36.37 | 2.78 | 0.24 |
| 24 | 24 | Surface | 6.16 | 2.54 | 10.30 | 0.21 | 3.06 | 1.92 | 16.83 | 19.18 | 2.77 | 0.27 |
| | | Bottom | 6.28 | 2.63 | 10.60 | 0.23 | 3.88 | 2.49 | 23.31 | 27.29 | 2.78 | 0.30 |
| 25 | 25 | Surface | 6.15 | 2.54 | 10.62 | 0.23 | 3.72 | 1.84 | 23.18 | 25.32 | 2.66 | 0.22 |
| | | Bottom | 6.82 | 2.57 | 10.81 | 0.24 | 3.88 | 2.17 | 24.92 | 26.04 | 2.73 | 0.23 |
| 26 | 26 | Surface | 6.44 | 2.88 | 10.51 | 0.22 | 3.14 | 1.82 | 22.51 | 25.18 | 2.01 | 0.26 |
| | | Bottom | 6.30 | 2.86 | 10.51 | 0.22 | 3.74 | 2.64 | 23.34 | 26.64 | 2.61 | 0.28 |
| 27 | 27 | Surface | 4.92 | 1.96 | 5.20 | 0.13 | 3.92 | 2.16 | 18.10 | 20.19 | 3.02 | 0.21 |
| | | Bottom | 6.20 | 2.90 | 8.72 | 0.20 | 3.96 | 2.71 | 20.18 | 22.38 | 3.33 | 0.29 |
| 28 | 28 | Surface | 6.59 | 3.02 | 10.42 | 0.22 | 3.66 | 2.15 | 22.50 | 25.34 | 2.98 | 0.23 |
| 29 | 29 | Surface | 6.47 | 2.41 | 10.08 | 0.21 | 3.68 | 2.42 | 23.06 | 26.41 | 2.76 | 0.23 |
| 30 | 30 | Surface | 6.62 | 2.73 | 10.48 | 0.22 | 3.65 | 2.44 | 22.43 | 23.31 | 2.21 | 0.22 |
| | 30 FR | Surface | 6.84 | 3.00 | 10.39 | 0.23 | 3.73 | 2.57 | 23.70 | 24.02 | 2.25 | 0.24 |

Note: - FR : Field replicate sample; - LR : Lab. replicate sample)

2.6 Result of the Environmental Parameters for Water Quality in the River on Fine Days

| No. | Point | Layer | Parameters | | | | | | |
|-----|-------|-------------|------------|------|-----------------|--------------|--------------------|--------------|--------------|
| | | | T (°C) | pH | Salinity (‰) | DO (mg/l) | Turbidity (FTU) | SS (mg/l) | TDS (g/l) |
| 1 | 1 | First time | 30.7 | 7.46 | - | 6.65 | 11 | 0.83 | 0.032 |
| | | Second time | 31.9 | 7.30 | - | 6.34 | 36 | 18.50 | 0.063 |
| 1 | 1 FR | Second time | 31.9 | 7.30 | - | 6.35 | 36 | 18.00 | 0.066 |
| | | First time | 30.1 | 6.54 | - | 7.62 | 29 | 26.81 | 0.170 |
| 2 | 2 | First time | 30.1 | 6.52 | - | 7.61 | 35 | 25.90 | 0.174 |
| | | Second time | 33.1 | 6.68 | - | 6.35 | 30 | 38.00 | 0.165 |
| 2 | 2 FR | Second time | 33.1 | 6.68 | - | 6.35 | 30 | 38.00 | 0.165 |
| | | First time | 29.5 | 7.22 | 0.1 | 6.14 | 13 | 9.40 | 0.188 |
| 3 | 3 | Second time | 32.1 | 7.32 | - | 6.70 | 13 | 6.00 | 0.129 |
| | | First time | 27.3 | 7.40 | - | 6.81 | 7 | 0.40 | 0.078 |
| 4 | 4 | Second time | 29.6 | 7.45 | - | 6.84 | 8 | 0.50 | 0.074 |
| | | First time | 30.4 | 7.42 | - | 7.00 | 7 | 1.60 | 0.048 |
| 5 | 5 | Second time | 35.6 | 7.28 | - | 6.68 | 7 | 1.73 | 0.039 |
| | | First time | 30.2 | 7.62 | - | 6.62 | 8 | 7.30 | 0.126 |
| 6 | 6 | Second time | 31.9 | 7.65 | - | 6.25 | 7 | 0.93 | 0.125 |
| | | First time | 30.2 | 7.49 | - | 8.20 | 13 | 6.00 | 0.052 |
| 7 | 7 | Second time | 32.9 | 7.34 | - | 6.35 | 7 | 0.30 | 0.048 |
| | | First time | 31.0 | 6.85 | - | 7.20 | 14 | 5.40 | 0.228 |
| 8 | 8 | Second time | 31.2 | 6.94 | - | 6.28 | 11 | 5.13 | 0.362 |
| | | First time | 29.2 | 3.82 | - | 7.30 | 42 | 57.60 | 0.176 |
| 9 | 9 | Second time | 32.8 | 3.84 | - | 6.45 | 10 | 30.79 | 0.178 |
| | | First time | 35.8 | 2.68 | 0.2 | 4.64 | 24 | 82.62 | 0.878 |
| 10 | 10 | Second time | 34.9 | 6.64 | 0.3 | 4.25 | 84 | 162.40 | 1.015 |
| | | First time | 30.2 | 7.17 | 0.4 | 9.93 | 24 | 40.83 | 0.782 |
| 11 | 11 | Second time | 34.9 | 7.08 | 0.4 | 4.45 | 15 | 28.40 | 0.700 |
| | | First time | 28.5 | 6.91 | - | 7.25 | 60 | 156.00 | 0.336 |
| 12 | 12 | Second time | 30.4 | 6.80 | - | 5.20 | 288 | 463.83 | 0.302 |
| | | First time | 34.2 | 7.68 | 0.2 | 7.01 | 26 | 44.00 | 0.352 |
| 13 | 13 | Second time | 37.1 | 8.10 | 0.4 | 6.75 | 16 | 10.10 | 0.460 |
| | | First time | 33.2 | 3.20 | - | 6.30 | 51 | 91.80 | 0.778 |
| 14 | 14 | Second time | 33.1 | 6.05 | 0.4 | 4.72 | 20 | 58.00 | 0.661 |
| | | First time | 29.6 | 3.56 | - | 6.25 | 72 | 111.40 | 0.208 |
| 15 | 15 | Second time | 30.6 | 3.80 | - | 6.8 | 39 | 67.10 | 0.199 |

Note: FR: Field replicate sample, - : < 0.1

2.7 Result of the Environmental Parameters for Water Quality in the River on Rainy Days

| No. | Point | Layer | Parameters | | | | | | |
|-----|-------|-------------|------------|------|--------------|-----------|-----------------|-----------|-----------|
| | | | T (°C) | pH | Salinity (%) | DO (mg/l) | Turbidity (FTU) | SS (mg/l) | TDS (g/l) |
| 1 | 1 | First time | 27.4 | 7.41 | - | 6.85 | 25 | 0.0529 | 0.9150 |
| | | Second time | 26.1 | 7.10 | - | 7.53 | 37 | 0.0675 | 1.657 |
| 2 | 2 | First time | 29.4 | 6.90 | - | 5.27 | 94 | 0.1368 | 0.5790 |
| | | Second time | 26.3 | 5.65 | - | 7.37 | 219 | 0.2483 | 0.1000 |
| 3 | 3 | First time | 31.0 | 7.24 | - | 6.82 | 19 | 0.0345 | 2.4880 |
| | | Second time | 25.6 | 6.36 | - | 7.40 | 162 | 0.1935 | 0.2030 |
| 4 | 4 | First time | 30.2 | 6.77 | - | 7.53 | 16 | 0.0107 | 0.0640 |
| | | Second time | 25.6 | 7.03 | - | 7.86 | 49 | 0.0725 | 0.0775 |
| | 4 FR | Second time | | | | | | 0.0624 | 0.085 |
| 5 | 5 | First time | 31.4 | 7.14 | - | 6.55 | 27 | 0.0043 | 0.0750 |
| | | 5 FR | First time | | | | | | 0.0079 |
| | | Second time | 26.1 | 6.83 | - | 8.10 | 84 | 0.1066 | 0.0690 |
| 6 | 6 | First time | 29.3 | 6.80 | - | 5.07 | 15 | 0.0248 | 0.2120 |
| | | Second time | 27.1 | 7.04 | - | 7.41 | 39 | 0.0597 | 0.1180 |
| 7 | 7 | First time | 30.1 | 5.95 | - | 5.70 | 18 | 0.0243 | 0.0540 |
| | | Second time | 26.5 | 6.43 | - | 7.58 | 21 | 0.0341 | 0.0720 |
| 8 | 8 | First time | 30.9 | 7.35 | - | 5.22 | 19 | 0.0397 | 6.7330 |
| | | Second time | 26.0 | 4.49 | - | 7.43 | 1755 | 1.9779 | 0.2730 |
| 9 | 9 | First time | 31.4 | 3.25 | - | 5.57 | 27 | 0.0131 | 0.187 |
| | | Second time | 27.3 | 3.38 | - | 7.54 | 1015 | 2.0537 | 0.1510 |
| 10 | 10 | First time | 32.8 | 6.45 | - | 6.45 | 29 | 0.0376 | 1.4690 |
| | | Second time | 26.4 | 4.11 | - | 5.58 | 694 | 1.2677 | 0.5350 |
| 11 | 11 | First time | 30.8 | 6.75 | - | 6.22 | 26 | 0.0414 | 0.0806 |
| | | Second time | 27.3 | 7.42 | - | 4.18 | 678 | 0.8517 | 0.3740 |
| 12 | 12 | First time | 26.3 | 7.15 | - | 6.30 | 461 | 0.0751 | 0.2450 |
| | | Second time | 27.6 | 6.80 | - | 5.83 | 504 | 0.2027 | 0.1620 |
| 13 | 13 | First time | 28.7 | 7.68 | - | 3.03 | 220 | 0.2215 | 0.6060 |
| | | Second time | 26.8 | 6.96 | - | 4.68 | 540 | 0.8423 | 0.2930 |
| 14 | 14 | First time | 27.3 | 4.32 | - | 6.92 | 3765 | 27.4489 | 0.7330 |
| | | Second time | 29.6 | 3.4 | - | 5.20 | 584 | 0.3561 | 0.8700 |
| 15 | 15 | First time | 28.7 | 7.15 | - | 5.99 | 111 | 0.1037 | 0.2120 |
| | | Second time | 27.0 | 4.42 | - | 5.58 | 633 | 1.1168 | 0.1470 |

Note: FR: Field replicate sample, -: < 0.1

2.8 Result of Water Quality Parameters in the Rivers on Fine Days

| No. | Point | Time | Parameters | | | | | | |
|-----|-------|-------------|-----------------------------|-----------------------------|----------------------------|---------------|-------------------------|--------------|------------------|
| | | | COD _{Mn} (mg/l) | COD _{Cr} (mg/l) | BOD ₅ (mg/l) | Oil (mg/l) | Coliform (Col/100ml) | CN (µg/l) | Phenol (µg/l) |
| 1 | 1 | First time | 2.60 | 3.03 | 0.49 | 2.4 | 7480 | 0.36 | 0.16 |
| 2 | 1 LR | First time | 2.50 | 3.15 | 0.50 | 2.3 | | 0.35 | 0.15 |
| | | Second time | 5.70 | 6.25 | 2.04 | 1.2 | 7840 | 6.50 | 1.32 |
| 3 | 1 LR | Second time | 5.80 | 6.30 | 2.06 | 1.1 | | 7.10 | 1.26 |
| 4 | 1 FR | Second time | 5.80 | | 2.26 | 1.3 | | 7.12 | 1.28 |
| 5 | 2 | First time | 4.65 | 5.84 | 0.35 | 1.1 | 36580 | 6.80 | 0.60 |
| 6 | 2 FR | First time | 6.10 | 5.78 | 0.36 | 1.2 | 38360 | 6.75 | 0.65 |
| 7 | | Second time | 6.40 | 7.25 | 3.54 | 0.7 | 38720 | 13.0 | 1.25 |
| 8 | 3 | First time | 4.46 | 4.84 | 1.10 | 1.7 | 72500 | 6.80 | 0.60 |
| | | Second time | 4.30 | 5.16 | 1.75 | 0.8 | 73500 | 10.50 | 0.90 |
| 9 | 4 | First time | 1.91 | 2.45 | 0.71 | 1.6 | 12240 | 0.40 | 0.22 |
| | | Second time | 3.40 | 3.54 | 1.20 | 0.6 | 10960 | 9.80 | 0.90 |
| 10 | 5 | First time | 1.64 | 1.98 | 0.64 | 2.0 | 10360 | 0.40 | 0.30 |
| | 5 FR | First time | 1.68 | 2.01 | 0.65 | 2.1 | 10160 | 0.40 | 0.32 |
| | | Second time | 1.40 | 1.78 | 0.82 | 2.4 | 10560 | 9.80 | 0.92 |
| 11 | 6 | First time | 2.19 | 2.80 | 1.40 | 0.5 | 7840 | 6.80 | 0.60 |
| | 6 FR | First time | 2.17 | 2.84 | 1.45 | 0.6 | 6320 | 6.76 | 0.65 |
| | | Second time | 1.80 | 2.02 | 0.91 | 1.3 | 8040 | 13.60 | 0.90 |
| 12 | 7 | First time | 3.19 | 3.78 | 1.53 | 2.4 | 4360 | 0.40 | 0.30 |
| | | Second time | 1.60 | 2.43 | 0.84 | | 4320 | 9.80 | 0.92 |
| 13 | 8 | First time | 5.19 | 5.33 | 0.18 | 3.1 | 7520 | 6.80 | 0.60 |
| | | Second time | 2.00 | 2.34 | 0.95 | 1.7 | 7680 | 9.80 | 0.60 |
| 14 | 9 | First time | 4.19 | 5.79 | 0.13 | 1.3 | 3280 | 5.20 | 1.20 |
| | | Second time | 0.80 | 0.98 | 0.69 | 2.6 | 3640 | 9.50 | 0.66 |
| 15 | 10 | First time | 5.47 | 8.63 | 0.13 | 0.5 | 4220 | 6.40 | 1.90 |
| | 10 LR | First time | 5.52 | 8.60 | 0.14 | 0.6 | | 6.45 | 1.87 |
| | | Second time | 11.70 | 12.81 | 1.96 | 1.0 | 4120 | 13.00 | 0.62 |
| 16 | 11 | First time | 6.10 | 6.84 | 0.77 | 0.6 | 21600 | 6.80 | 1.20 |
| | | Second time | 4.10 | 5.25 | 1.80 | 0.9 | 25600 | 9.80 | 0.60 |
| 17 | 12 | First time | 7.56 | 8.94 | 0.50 | 0.8 | 6380 | 6.40 | 1.30 |
| | | Second time | 11.20 | 13.46 | 2.07 | 1.1 | 6960 | 10.50 | 0.60 |
| 18 | 13 | First time | 8.84 | 8.90 | 1.51 | 1.0 | 16500 | 6.80 | 1.50 |
| | | Second time | 3.20 | 4.68 | 2.06 | 0.8 | 16800 | 10.50 | 0.85 |
| 19 | 14 | First time | 7.93 | 8.90 | 0.23 | 1.4 | 640 | 6.40 | 2.20 |
| | | Second time | 7.90 | 8.97 | 1.98 | 1.0 | 840 | 13.60 | 0.65 |
| 20 | 15 | First time | 7.38 | 8.83 | 1.01 | 1.2 | 1680 | 5.40 | 1.10 |
| | | Second time | 5.70 | 6.32 | 1.37 | 0.6 | 1720 | 10.20 | 0.85 |

Note: - FR : Field replicate sample; LR : Laboratory replicate sample
 - B : Blank sample

2.9 Result of Water Quality Parameters in the Rivers on Rainy Days

| No. | Point | Time | Parameters | | | | | | |
|-----|-------|-------------|-----------------------------|-----------------------------|----------------------------|---------------|-------------------------|--------------|------------------|
| | | | COD _{Mn} (mg/l) | COD _{Cr} (mg/l) | BOD ₅ (mg/l) | Oil (mg/l) | Coliform (Col/100ml) | CN (µg/l) | Phenol (µg/l) |
| 1 | 1 | First time | 3.12 | 4.20 | 0.54 | 2.5 | 8480 | 6.2 | 0.30 |
| 2 | | 1 LR | 3.14 | 4.22 | 0.56 | 2.6 | | | |
| 3 | 1 | Second time | 4.51 | 4.64 | 0.90 | 2.3 | 87200 | 7.3 | 0.60 |
| 4 | | 1 LR | 4.50 | 4.66 | 0.88 | 2.4 | | | |
| 5 | 2 | First time | 7.21 | 8.62 | 2.13 | 3.0 | 44320 | 7.3 | 0.32 |
| 6 | | 2 LR | 9.52 | 9.87 | 2.04 | 2.0 | 44800 | 6.2 | 0.65 |
| 7 | 3 | First time | 3.91 | 6.95 | 1.23 | 1.3 | 78500 | 7.3 | 0.34 |
| 8 | | 3 LR | 9.72 | 9.73 | 1.32 | 2.9 | 79360 | 8.1 | 0.62 |
| 9 | 4 | First time | 2.51 | 7.25 | 1.50 | 2.2 | 13720 | 6.2 | 0.30 |
| 10 | | 4 LR | 6.31 | 6.66 | 0.96 | 1.7 | 12730 | 7.3 | 0.45 |
| 11 | 4 FR | Second time | 6.40 | 6.54 | 0.64 | 2.7 | 12720 | 7.3 | 0.60 |
| 12 | 5 | First time | 2.21 | 8.95 | 1.76 | 1.8 | 12240 | 7.4 | 0.39 |
| 13 | | 5 FR | 2.32 | 8.84 | 0.91 | 1.9 | 12280 | 7.6 | 0.30 |
| 14 | 5 FR | Second time | 8.12 | 11.52 | 1.30 | 1.3 | 12360 | 7.4 | 0.60 |
| 15 | 6 | First time | 2.31 | 8.90 | 0.80 | 1.9 | 9600 | 7.8 | 0.30 |
| 16 | | 6 LR | 4.91 | 5.66 | 0.55 | 1.5 | 10400 | 7.8 | 0.66 |
| 17 | 7 | First time | 2.91 | 8.50 | 1.57 | 2.4 | 6480 | 7.3 | 0.36 |
| 18 | | 7 LR | 5.31 | 5.65 | 1.08 | 2.2 | 6720 | 7.8 | 0.76 |
| 19 | 8 | First time | 5.71 | 8.70 | 0.75 | 2.2 | 9920 | 6.2 | 0.34 |
| 20 | | 8 LR | 13.79 | 14.66 | 1.13 | 2.4 | 10320 | 8.1 | 0.22 |
| 21 | 9 | First time | 1.20 | 9.25 | 0.31 | 2.0 | 4240 | 7.3 | 0.30 |
| 22 | | 9 LR | 18.54 | 20.11 | 1.17 | 2.6 | 4640 | 7.8 | 0.92 |
| 23 | 10 | First time | 4.21 | 8.20 | 1.26 | 2.6 | 4840 | 6.2 | 0.34 |
| 24 | | 10 LR | 4.27 | 8.24 | 1.28 | 2.5 | | | |
| 25 | 10 | Blank | 0 | 0 | 0 | 0 | | | |
| 26 | | 10 LR | 16.53 | 18.20 | 1.50 | 2.7 | 5600 | 8.2 | 0.80 |
| 27 | 11 | First time | 2.81 | 9.11 | 0.81 | 2.2 | 25600 | 6.0 | 0.30 |
| 28 | | 11 LR | 16.53 | 23.25 | 1.12 | 1.8 | 24640 | 8.4 | 0.90 |
| 29 | 12 | First time | 21.7 | 22.8 | 1.34 | 1.8 | 8400 | 7.3 | 0.60 |
| 30 | | 12 LR | 5.91 | 6.46 | 1.65 | 1.9 | 8640 | 8.4 | 0.60 |
| 31 | 13 | First time | 21.10 | 23.81 | 8.1 | 2.4 | 20200 | 7.8 | 0.68 |
| 32 | | 13 LR | 15.53 | 16.66 | 4.26 | 1.7 | 20500 | 9.8 | 0.86 |
| 33 | 14 | First time | 29.50 | 30.85 | 0.54 | 2.0 | 1240 | 7.3 | 0.60 |
| 34 | | 14 LR | 29.84 | 31.69 | 0.58 | 1.8 | 1360 | 10.8 | 0.40 |
| 35 | 15 | First time | 7.91 | 8.45 | 0.95 | 2.5 | 2160 | 6.2 | 0.30 |
| 36 | | 15 LR | 16.73 | 17.18 | 0.90 | 1.9 | 2400 | 7.8 | 0.65 |

Note: - FR : Field replicate sample; LR : Laboratory replicate sample

- B : Blank sample

2.10 Result of Nutrients Parameters for Water Quality in the River on Fine Days

| No. | Point | Layer | Parameters | | | | | |
|-----|-------|-------------|--|---|---|----------------|--|----------------|
| | | | N-NO ₂ ⁻ (µg/l) | N-NO ₃ ⁻ (µgN/l) | N-NH ₄ ⁺ (µgN/l) | T-N (mgN/l) | P-PO ₄ ⁻³ (µgP/l) | T-P (mgP/l) |
| 1 | 1 | First time | 16.93 | 150.16 | 268.0 | 2.20 | 21.2 | 0.69 |
| 2 | 1 LR | First time | 16.87 | 105.69 | 271.0 | 2.27 | 20.9 | 0.71 |
| | | Second time | 16.54 | 145.89 | 263.5 | 2.75 | 34.2 | 0.86 |
| 3 | 1 LR | Second time | 15.99 | 147.37 | 270.1 | 2.67 | 33.9 | 0.85 |
| 4 | 1 FR | Second time | 17.01 | 115.04 | 263.9 | 2.50 | 30.8 | 0.87 |
| 5 | 2 | First time | 24.24 | 119.63 | 337.5 | 2.11 | 25.9 | 0.87 |
| 6 | 2 FR | First time | 28.08 | 125.44 | 322.7 | 2.23 | 26.8 | 0.84 |
| 7 | 2 B | First time | 22.83 | 121.19 | 323.9 | 2.20 | 27.1 | 0.85 |
| | | Second time | 23.27 | 122.67 | 330.5 | 2.10 | 38.3 | 0.89 |
| 8 | 3 | First time | 10.08 | 127.70 | 147.5 | 3.57 | 36.4 | 0.43 |
| | | Second time | 8.88 | 112.66 | 96.4 | 11.59 | 32.2 | 0.67 |
| 9 | 4 | First time | 27.16 | 75.79 | 365.0 | 2.20 | 25.4 | 0.78 |
| | | Second time | 24.98 | 71.34 | 351.9 | 2.12 | 36.7 | 0.77 |
| 10 | 5 | First time | 15.20 | 74.20 | 165.4 | 2.24 | 26.5 | 0.48 |
| | | Second time | 6.12 | 97.34 | 147.9 | 2.64 | 52.0 | 0.68 |
| 11 | 6 | First time | 10.98 | 88.13 | 164.2 | 1.70 | 23.9 | 0.52 |
| | | Second time | 7.80 | 78.57 | 159.7 | 1.70 | 62.6 | 0.75 |
| 12 | 7 | First time | 9.79 | 116.87 | 102.0 | 1.92 | 34.2 | 0.39 |
| | | Second time | 6.54 | 106.11 | 99.1 | 2.81 | 68.6 | 0.33 |
| 13 | 8 | First time | 8.93 | 66.62 | 14.5 | 2.09 | 25.1 | 0.28 |
| | | Second time | 6.70 | 71.54 | 19.9 | 1.99 | 33.1 | 0.39 |
| 14 | 9 | First time | 21.32 | 65.10 | 215.0 | 5.12 | 23.8 | 0.79 |
| | | Second time | 14.57 | 71.90 | 187.3 | 2.99 | 34.5 | 0.82 |
| 15 | 10 | First time | 25.94 | 117.07 | 639.0 | 2.79 | 11.6 | 1.12 |
| | | Second time | 21.89 | 130.56 | 509.7 | 2.18 | 29.0 | 1.37 |
| 16 | 11 | First time | 26.02 | 103.66 | 373.5 | 2.62 | 17.7 | 0.98 |
| | | Second time | 23.12 | 109.87 | 343.6 | 2.26 | 72.4 | 1.16 |
| 17 | 12 | First time | 20.98 | 110.32 | 252.5 | 2.05 | 21.3 | 0.88 |
| | | Second time | 18.09 | 98.03 | 254.1 | 6.67 | 33.6 | 0.99 |
| 18 | 13 | First time | 735.50 | 504.93 | 1645.0 | 12.49 | 87.6 | 1.37 |
| | | Second time | 808.00 | 432.20 | 1209.4 | 11.05 | 12.45 | 1.44 |
| 19 | 14 | First time | 19.54 | 77.21 | 486.0 | 11.26 | 18.8 | 0.91 |
| | | Second time | 21.70 | 75.82 | 431.7 | 11.48 | 29.0 | 0.58 |
| 20 | 15 | First time | 25.71 | 97.56 | 492.5 | 3.19 | 39.4 | 0.97 |
| | | Second time | 24.09 | 93.86 | 403.9 | 2.60 | 24.2 | 0.57 |

Note : - FR : Field replicate sample; LR : Laboratory replicate sample; B : Blank sample

2.11 Result of Nutrients Parameters for Water Quality in the River on Rainy Days

| No. | Point | Layer | Parameters | | | | | | |
|-----|-------|-------------|-----------------------------|------------------------------|------------------------------|----------------|--|----------------|------|
| | | | N-NO ₂ (µg/l) | N-NO ₃ (µgN/l) | N-NH ₄ (µgN/l) | T-N (mgN/l) | P-PO ₄ ³⁻ (µgP/l) | T-P (mgP/l) | |
| 1 | 1 | First time | 19.93 | 166.7 | 242.5 | 2.95 | 19.8 | 0.73 | |
| 2 | | Second time | 25.51 | 179.67 | 347.5 | 3.5 | 23.7 | 0.94 | |
| 3 | 2 | First time | 25.60 | 95.2 | 293.0 | 3.13 | 24.1 | 1.02 | |
| 4 | | Second time | 27.13 | 141.74 | 316.5 | 2.62 | 35.3 | 1.06 | |
| 6 | 3 | First time | 17.30 | 160.0 | 161.0 | 3.10 | 32.1 | 0.57 | |
| 8 | | Second time | 28.91 | 120.16 | 203.2 | 3.68 | 41.7 | 1.19 | |
| 9 | 4 | First time | 21.27 | 86.97 | 294.5 | 3.95 | 29.3 | 0.92 | |
| 10 | | Second time | 29.73 | 79.97 | 345.0 | 3.67 | 33.9 | 1.37 | |
| 11 | 4 FR | Second time | 29.90 | 80.01 | 344.5 | 3.64 | 34.5 | 1.41 | |
| 12 | 5 | First time | 19.90 | 81.9 | 262.5 | 9.17 | 21.9 | 0.69 | |
| 13 | | 5 FR | First time | 20.03 | 82.10 | 264.0 | 9.21 | 22.10 | 0.70 |
| 14 | | Second time | 28.07 | 76.59 | 310.6 | 8.82 | 27.8 | 1.85 | |
| 15 | 6 | First time | 14.51 | 82.8 | 205.0 | 2.64 | 24.7 | 0.74 | |
| 16 | | Second time | 24.96 | 78.51 | 219.5 | 2.88 | 21.9 | 1.37 | |
| 17 | 7 | First time | 18.39 | 104.4 | 203.0 | 2.18 | 37.6 | 0.49 | |
| 18 | | Second time | 19.28 | 142.24 | 236.0 | 4.10 | 39.1 | 0.84 | |
| 19 | 8 | First time | 25.73 | 142.5 | 297.1 | 1.87 | 20.0 | 0.37 | |
| 20 | | Second time | 39.27 | 101.03 | 368.5 | 4.32 | 27.3 | 0.89 | |
| 21 | 9 | First time | 18.93 | 68.2 | 309.3 | 2.24 | 24.9 | 0.90 | |
| 22 | | Second time | 16.51 | 80.65 | 334.7 | 5.77 | 27.7 | 1.16 | |
| 23 | 10 | First time | 27.20 | 140.9 | 386.5 | 3.20 | 27.7 | 1.37 | |
| 24 | | 10 LR | First time | 27.84 | 142.6 | 379.8 | 3.24 | 27.9 | 1.32 |
| 25 | | Second time | 25.74 | 152.96 | 500.5 | 3.90 | 29.4 | 1.88 | |
| 26 | 11 | First time | 30.12 | 110.18 | 364.5 | 5.19 | 21.9 | 1.44 | |
| 27 | | Second time | 20.01 | 122.32 | 390.0 | 4.46 | 25.1 | 1.83 | |
| 28 | 12 | First time | 25.98 | 130.03 | 291.0 | 4.32 | 34.5 | 1.20 | |
| 29 | | Second time | 37.29 | 122.9 | 317.0 | 6.23 | 37.2 | 1.86 | |
| 30 | 13 | First time | 799.3 | 527.4 | 899.1 | 10.95 | 163.0 | 1.98 | |
| 31 | | Second time | 878.0 | 1292.1 | 993.0 | 13.12 | 197.7 | 2.07 | |
| 32 | 14 | First time | 24.59 | 81.53 | 493.0 | 9.79 | 25.6 | 1.50 | |
| 33 | | Second time | 99.1 | 111.33 | 700.6 | 11.42 | 34.9 | 1.95 | |
| 34 | 15 | First time | 31.27 | 117.49 | 297.5 | 3.29 | 43.4 | 1.17 | |
| 35 | | Second time | 14.67 | 124.92 | 396.0 | 5.33 | 49.1 | 1.87 | |

Note : - FR : Field replicate sample; LR : Laboratory replicate sample; B : Blank sample

2.12 Result of Heavy Metal in River on Fine Days

| No. | Point | Time | Parameters | | | | | | | | | |
|-----|-----------|-------------|--------------|----------------------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | | Ni (µg/l) | Cr ⁶⁺ (µg/l) | T-Hg (µg/l) | As (µg/l) | Pb (µg/l) | Zn (µg/l) | Cd (µg/l) | Mn (µg/l) | Cu (µg/l) | Fe (µg/l) |
| 1 | 1 | First time | 3.42 | 1.86 | 0.18 | 1.54 | 4.51 | 7.51 | 0.32 | 82 | 5.62 | 606 |
| | | Second time | 3.18 | 1.98 | 0.49 | 1.81 | 4.79 | 7.24 | 0.32 | 90 | 6.22 | 1250 |
| 2 | 2 2 FR | First time | 3.12 | 2.12 | 0.18 | 1.92 | 2.32 | 2.92 | 0.24 | 105 | 3.27 | 1532 |
| | | Second time | 3.26 | 2.34 | 0.16 | 2.07 | 3.32 | 2.94 | 0.26 | 103 | 3.02 | 1549 |
| 3 | 3 | First time | 3.48 | 2.42 | 0.19 | 1.76 | 3.75 | 9.32 | 0.38 | 119 | 4.98 | 230 |
| | | Second time | 3.21 | 2.13 | 0.33 | 2.32 | 4.08 | 6.42 | 0.42 | 29 | 6.33 | 292 |
| 4 | 4 | First time | 3.4 | 2.46 | 0.18 | 2.31 | 4.83 | 8.91 | 0.34 | 119 | 4.94 | 116 |
| | | Second time | 3.47 | 2.18 | 0.48 | 3.26 | 4.21 | 8.48 | 0.38 | 96 | 6.98 | 281 |
| 5 | 5 | First time | 3.43 | 3.01 | 0.25 | 1.8 | 3.12 | 8.73 | 0.39 | 126 | 5.18 | 98 |
| | | Second time | 4.02 | 2.41 | 0.26 | 2.15 | 5.06 | 8.64 | 0.37 | 16 | 7.12 | 225 |
| 6 | 6 | First time | 2.96 | 2.96 | 0.27 | 1.85 | 3.47 | 9.34 | 0.42 | 143 | 5.02 | 137 |
| | | Second time | 3.94 | 2.17 | 0.29 | 1.84 | 5.09 | 8.62 | 0.41 | 60 | 7.34 | 275 |
| 7 | 7 | First time | 3.12 | 2.13 | 0.28 | 2.54 | 4.41 | 9.62 | 0.44 | 145 | 5.61 | 186 |
| | | Second time | 3.86 | 3.02 | 0.41 | 2.11 | 4.55 | 8.22 | 0.4 | 37 | 6.31 | 186 |
| 8 | 8 | First time | 3.15 | 2.42 | 0.22 | 2.14 | 5.57 | 11.9 | 0.41 | 237 | 6.02 | 1267 |
| | | Second time | 3.25 | 2.18 | 0.4 | 1.73 | 4.86 | 18.64 | 0.43 | 60 | 8.08 | 471 |
| 9 | 9 | First time | 26.5 | 3.01 | 0.96 | 1.85 | 6.16 | 661 | 0.38 | 1373 | 5.84 | 2297 |
| | | Second time | 4.18 | 3.12 | 0.42 | 2.13 | 7.26 | 553.1 | 0.46 | 1220 | 7.12 | 1533 |
| 10 | 10 | First time | 1715 | 3.86 | 27.6 | 2.25 | 8.75 | 2675 | 0.46 | 4909 | 6.14 | 28790 |
| | | Second time | 4.02 | 2.41 | 0.22 | 2.03 | 4.83 | 369.21 | 0.42 | 567 | 6.93 | 3148 |
| 11 | 11 | First time | 29.7 | 3.12 | 0.28 | 2.11 | 3.85 | 263 | 0.40 | 1257 | 5.78 | 20700 |
| | | Second time | 3.94 | 2.69 | 0.34 | 2.28 | 6.67 | 693.34 | 0.58 | 1416 | 7.21 | 1678 |
| 12 | 12 | First time | 23.1 | 2.96 | 0.25 | 3.05 | 6.19 | 236 | 0.45 | 1442 | 5.46 | 18130 |
| | | Second time | 2.06 | 1.54 | 0.14 | 2.05 | 3.96 | 124.16 | 0.30 | 68 | 4.17 | 0206 |
| 13 | 13 | First time | 18.2 | 2.84 | 0.25 | 2.14 | 3.64 | 1134 | 0.34 | 249 | 4.37 | 1150 |
| | | Second time | 3.13 | 2.98 | 0.28 | 2.3 | 6.07 | 696.42 | 0.42 | 1215 | 6.02 | 36071 |
| 14 | 14 | First time | 56.9 | 2.72 | 0.26 | 2.25 | 3.73 | 1632 | 0.35 | 2189 | 6.92 | 11310 |
| | | Second time | 3.21 | 1.92 | 0.15 | 2.27 | 6.25 | 56.01 | 0.38 | 1303 | 6.15 | 10640 |
| 15 | 15 | First time | 49.1 | 3.03 | 0.21 | 2.15 | 3.17 | 978 | 0.41 | 1151 | 5.11 | 4841 |
| | | Second time | 3.81 | 2.31 | 0.25 | 2.46 | 3.89 | 583.2 | 0.44 | 871 | 7.21 | 3889 |

Note: - FR : Field replicate sample; LR : Laboratory replicate sample
 - B : Blank sample

2.13 Result of Heavy Metal in River on Rainy Days

| No. | Point | Time | Parameters | | | | | | | | | |
|-----|-------|-------------|--------------|----------------------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| | | | Ni (µg/l) | Cr ⁶⁺ (µg/l) | T-Hg (µg/l) | As (µg/l) | Pb (µg/l) | Zn (µg/l) | Cd (µg/l) | Mn (µg/l) | Cu (µg/l) | Fe (µg/l) |
| 1 | 1 | First time | 2.13 | 1.03 | 0.31 | 2.30 | 2.94 | 15.00 | 0.42 | 21.4 | 5.32 | 1132 |
| | | Second time | 2.02 | 1.28 | 0.31 | 1.60 | 2.76 | 8.06 | 0.42 | 53.3 | 4.26 | 2964 |
| 2 | 2 | First time | 1.89 | 0.98 | 0.46 | 1.59 | 3.04 | 15.14 | 0.50 | 16.2 | 4.34 | 2497 |
| | | Second time | 1.94 | 1.96 | 0.33 | 1.88 | 2.98 | 10.23 | 0.37 | 43.1 | 5.11 | 3205 |
| 3 | 3 | First time | 2.02 | 0.67 | 0.28 | 1.41 | 2.19 | 14.85 | 0.47 | 27.6 | 3.91 | 40.7 |
| | | Second time | 1.86 | 0.87 | 0.19 | 2.70 | 3.01 | 8.17 | 0.42 | 52.2 | 3.94 | 2996 |
| 4 | 4 | First time | 2.71 | 1.34 | 0.21 | 1.31 | 3.12 | 14.79 | 0.51 | 17.1 | 3.62 | 70.9 |
| | | Second time | 2.14 | 0.91 | 0.14 | 2.11 | 3.10 | 8.71 | 0.42 | 48.2 | 3.62 | 2110 |
| | FR | Second time | 2.12 | 0.86 | 0.20 | 1.96 | 2.97 | 8.96 | 0.41 | 50.0 | 3.81 | 2120 |
| 5 | 5 | First time | 2.64 | 1.26 | 0.26 | 2.21 | 2.84 | 14.89 | 0.43 | 22.9 | 4.78 | 49.3 |
| | | FR | First time | 2.38 | 1.08 | 0.27 | 1.36 | 4.01 | 15.18 | 0.39 | 25.6 | 3.84 |
| | FR | Second time | 2.96 | 0.79 | 0.17 | 1.58 | 3.04 | 9.03 | 0.39 | 49.2 | 4.18 | 2104 |
| 6 | 6 | First time | 2.33 | 0.88 | 0.26 | 1.51 | 3.88 | 14.70 | 0.32 | 24.7 | 4.15 | 70.8 |
| | | Second time | 2.38 | 0.61 | 0.18 | 2.11 | 3.16 | 9.41 | 0.40 | 49.7 | 5.15 | 2043 |
| 7 | 7 | First time | 2.49 | 1.26 | 0.23 | 1.16 | 3.16 | 14.75 | 0.51 | 31.3 | 4.21 | 34.5 |
| | | Second time | 3.02 | 0.88 | 0.24 | 2.32 | 3.27 | 8.39 | 0.31 | 179 | 4.02 | 6939 |
| 8 | 8 | First time | 2.81 | 1.25 | 0.34 | 1.26 | 4.04 | 1144 | 0.40 | 1484 | 5.15 | 1959 |
| | | Second time | 2.87 | 1.31 | 0.24 | 1.80 | 4.13 | 8.32 | 0.52 | 1068 | 4.81 | 4815 |
| 9 | 9 | First time | 3.01 | 1.31 | 0.22 | 1.43 | 3.98 | 806 | 0.43 | 1055 | 5.20 | 2431 |
| | | Second time | 2.92 | 1.28 | 0.24 | 2.31 | 4.21 | 943 | 0.43 | 2981 | 4.26 | 8527 |
| 10 | 10 | First time | 3.12 | 1.12 | 0.15 | 1.31 | 3.92 | 830 | 0.50 | 1820 | 4.86 | 2378 |
| | | Second time | 2.30 | 0.88 | 0.20 | 1.66 | 4.01 | 1991 | 0.32 | 851 | 4.74 | 8303 |
| 11 | 11 | First time | 3.86 | 1.18 | 0.24 | 1.46 | 3.81 | 13.62 | 0.51 | 733 | 4.72 | 13875 |
| | | Second time | 1.82 | 1.44 | 0.13 | 1.41 | 3.84 | 11.79 | 0.40 | 59.0 | 3.97 | 4198 |
| 12 | 12 | First time | 2.19 | 0.96 | 0.16 | 1.26 | 3.67 | 15.70 | 0.38 | 28.9 | 3.78 | 1772 |
| | | Second time | 1.81 | 1.31 | 0.15 | 1.85 | 3.67 | 10.32 | 0.51 | 44.3 | 4.88 | 3046 |
| 13 | 13 | First time | 3.13 | 1.21 | 0.32 | 1.46 | 4.26 | 3974 | 0.49 | 3744 | 4.92 | 24166 |
| | | Second time | 3.02 | 0.98 | 0.13 | 1.31 | 4.02 | 2709 | 0.53 | 3049 | 5.02 | 33933 |
| 14 | 14 | First time | 2.71 | 1.13 | 0.21 | 1.34 | 3.94 | 776 | 0.51 | 802 | 3.76 | 2246 |
| | | Second time | 2.36 | 1.17 | 0.16 | 1.52 | 4.09 | 13.28 | 0.51 | 973 | 4.84 | 6319 |
| 15 | 15 | First time | 1.81 | 1.24 | 0.26 | 1.38 | 2.84 | 12.9 | 0.50 | 29.9 | 4.18 | 94.8 |
| | | Second time | 1.92 | 1.16 | 0.18 | 2.03 | 4.03 | 18.12 | 0.43 | 141 | 4.79 | 1857 |

Note: - FR : Field replicate sample; LR : Laboratory replicate sample

- B : Blank sample

2.14 Result of the Environmental Parameters for Water Quality in Industrial Wastewater

| No. | Point | Layer | Parameters | | | | | | |
|-----|-------|---------|------------|------|--------------|-----------|-----------------|-----------|-----------|
| | | | T (°C) | pH | Salinity (%) | DO (mg/l) | Turbidity (FTU) | SS (mg/l) | TDS (g/l) |
| 1 | 1 | Surface | 32.7 | 5.76 | < 0.1 | 6.09 | 817 | 6811.80 | 0.128 |
| 2 | 2 | Surface | 31.1 | 3.36 | 0.4 | 5.92 | 20 | 77.80 | 0.704 |
| 3 | 3 | Surface | 28.2 | 7.74 | 0.2 | 6.05 | 1 | 12.20 | 0.230 |
| 4 | 4 | Surface | 31.1 | 7.48 | 1.1 | 2.02 | 586 | 712.13 | 1.592 |
| 5 | 5 | Surface | 31.2 | 5.31 | 0.1 | 4.58 | 101 | 245.27 | 0.552 |
| 6 | 6 | Surface | 33.8 | 8.00 | 19.0 | 6.32 | 15 | 66.13 | 24.514 |
| 8 | 7 | Surface | 33.6 | 7.35 | 2.8 | 2.80 | 34 | 116.07 | 3.188 |
| 9 | 8 | Surface | 34.7 | 6.44 | 0.3 | 5.80 | 406 | 212.33 | 0.636 |
| 10 | 9 | Surface | 32.4 | 7.35 | 0.1 | 5.58 | 115 | 329.27 | 0.254 |
| 11 | 9D | Surface | 32.4 | 7.36 | 0.1 | 5.56 | 116 | 353.60 | 0.308 |
| 12 | 10 | Surface | 32.8 | 7.47 | 0.5 | 6.40 | 610 | 617.40 | 0.932 |
| 13 | 11 | Surface | 37.0 | 7.79 | 0.3 | 5.60 | 35 | 22.00 | 0.196 |
| 14 | 12 | Surface | 32.3 | 7.74 | 0.2 | 2.30 | 128 | 36.13 | 0.386 |
| 15 | 13 | Surface | 31.1 | 7.37 | 0.2 | 2.85 | 19 | 71.13 | 0.458 |
| 16 | 14 | Surface | 30.7 | 7.36 | 0.2 | 0.75 | 68 | 60.40 | 0.644 |
| 17 | 15 | Surface | 31.2 | 5.73 | 0.7 | 1.15 | 186 | 154.40 | 1.044 |
| 18 | 16 | Surface | 30.5 | 7.42 | 0.1 | 3.86 | 23 | 25.27 | 0.492 |
| 19 | 16D | Surface | 30.5 | 7.44 | 0.1 | 3.86 | 24 | 28.20 | 0.518 |
| 20 | 17 | Surface | 29.4 | 7.59 | 10.3 | 4.21 | 110 | 362.13 | 12.052 |
| 21 | 18 | Surface | 31.1 | 7.48 | 0.1 | 11.25 | 7 | 22.20 | 0.366 |
| 22 | 19 | Surface | 33.8 | 8.01 | 11.2 | 5.20 | 23 | 42.67 | 13.080 |
| 23 | 20 | Surface | 30.8 | 7.56 | 0.1 | 1.32 | 17 | 26.73 | 0.358 |

Note: F : First time S : Second time D : Duplicate sample

2.15 Result of the Water Quality Parameters in Industrial Wastewater

| No. | Point | Layer | Parameters | | | | | | |
|-----|-------|---------|--------------------------|--------------------------|-------------------------|------------|----------------------|-----------|---------------|
| | | | COD _{Mn} (mg/l) | COD _{Cr} (mg/l) | BOD ₅ (mg/l) | Oil (mg/l) | Coliform (Col/100ml) | CN (µg/l) | Phenol (µg/l) |
| 1 | 1 | Surface | 367.81 | 741.65 | 197.4 | 3.6 | 4400 | 6.0 | 7.2 |
| 2 | 2 | Surface | 36.04 | 98.08 | 6.20 | 2.3 | 3200 | 12.0 | 15.0 |
| 3 | 3 | Surface | 12.12 | 18.82 | 6.01 | 3.3 | 5080 | 18.0 | 12.0 |
| 4 | 4 | Surface | 425.42 | 531.28 | 215.0 | 3.1 | 130000 | 360.0 | 185.0 |
| 5 | 5 | Surface | 550.54 | 766.27 | 275.1 | 2.1 | 24200 | 60.0 | 69.0 |
| 6 | 6 | Surface | 6.51 | 49.04 | 2.17 | 2.2 | 14400 | 6.6 | 18.0 |
| 7 | 7 | Surface | 43.04 | 59.26 | 5.54 | 0.9 | 16800 | 6.8 | 15.0 |
| 8 | 8 | Surface | 42.04 | 64.52 | 6.74 | 2.0 | 3720 | 40.0 | 15.0 |
| 9 | 9 | Surface | 13.01 | 132.82 | 5.24 | 1.1 | 4800 | 16.2 | 18.0 |
| 10 | 9 FR | Surface | 12.55 | 138.13 | 5.23 | 1.1 | 4480 | 16.0 | 17.0 |
| 11 | 10 | Surface | 52.05 | 69.47 | 8.97 | 2.4 | 3040 | 840 | 339.0 |
| 12 | 11 | Surface | 24.34 | 31.63 | 7.13 | 2.0 | 4680 | 6.6 | 15.0 |
| 13 | 12 | Surface | 50.05 | 73.56 | 28.55 | 0.9 | 120000 | 43.2 | 110.0 |
| 14 | 13 | Surface | 12.61 | 16.35 | 9.93 | 0.5 | 340000 | 10.2 | 8.0 |
| 15 | 14 | Surface | 21.69 | 28.39 | 13.94 | 1.3 | 220000 | 11.8 | 57.0 |
| 16 | 15 | Surface | 324.91 | 386.07 | 120.0 | 1.0 | 58300 | 66.0 | 102.0 |
| 17 | 16 | Surface | 44.04 | 81.74 | 4.98 | 1.5 | 51250 | 9.6 | 54.0 |
| 18 | 16 FR | Surface | 42.54 | 84.86 | 4.62 | 1.4 | 52000 | 9.2 | 54.0 |
| 19 | 16 LR | Surface | 43.54 | 83.75 | 4.74 | 1.5 | | 9.3 | 54.0 |
| 20 | 17 | Surface | 74.17 | 79.52 | 36.0 | 6.5 | 9320 | 7.2 | 36.0 |
| 21 | 18 | Surface | 14.54 | 19.17 | 7.54 | 0.8 | 8440 | 6.6 | 12.0 |
| 22 | 19 | Surface | 10.54 | 16.13 | 4.57 | 2.0 | 14960 | 6.6 | 48.0 |
| 23 | 19LR | Surface | 10.04 | 16.13 | 4.52 | 2.1 | | 6.5 | 47.0 |
| 24 | 20 | Surface | 18.07 | 19.13 | 9.88 | 0.3 | 1680 | 13.2 | 36.0 |

Note: - LR : Laboratory replicate sample
 - FR : Field replicate sample

2.16 Result of Nutrients Parameters for Water Quality in Industrial Wastewater

| No. | Point | Layer | Parameters | | | | | |
|-----|-------|---------|------------------------------|------------------------------|------------------------------|----------------|--|----------------|
| | | | N-NO ₂ (mgN/ℓ) | N-NO ₃ (mgN/ℓ) | N-NH ₄ (mgN/ℓ) | T-N (mgN/ℓ) | P-PO ₄ ³⁻ (mgP/ℓ) | T-P (mgP/ℓ) |
| 1 | 1 | Surface | 0.018 | 0.114 | 0.18 | 15.52 | 0.60 | 1.20 |
| 2 | 2 | Surface | 0.026 | 0.081 | 1.38 | 12.82 | 0.13 | 0.23 |
| 3 | 3 | Surface | 0.046 | 0.062 | 0.45 | 2.87 | 0.40 | 0.94 |
| 4 | 4 | Surface | 0.129 | 0.457 | 14.0 | 124.84 | 3.48 | 4.84 |
| 5 | 5 | Surface | 0.037 | 0.053 | 0.59 | 20.83 | 3.36 | 4.96 |
| 6 | 6 | Surface | 0.026 | 0.068 | 0.42 | 5.47 | 0.05 | 1.04 |
| 7 | 7 | Surface | 0.038 | 0.272 | 1.43 | 6.83 | 0.46 | 1.32 |
| 8 | 8 | Surface | 0.026 | 0.059 | 0.83 | 4.68 | 0.05 | 0.61 |
| 9 | 9 | Surface | 0.174 | 0.241 | 0.63 | 4.26 | 0.06 | 0.30 |
| 10 | 9 FR | Surface | 0.178 | 0.259 | 0.67 | 4.23 | 0.05 | 0.31 |
| 11 | 10 | Surface | 0.018 | 0.068 | 0.44 | 4.13 | 0.02 | 0.84 |
| 12 | 11 | Surface | 0.022 | 0.072 | 0.38 | 3.75 | 0.32 | 1.58 |
| 13 | 12 | Surface | 0.035 | 0.047 | 3.96 | 29.98 | 4.0 | 5.42 |
| 14 | 13 | Surface | 0.095 | 0.122 | 1.96 | 19.15 | 1.57 | 2.21 |
| 15 | 14 | Surface | 0.035 | 0.058 | 2.66 | 35.58 | 1.10 | 1.65 |
| 16 | 15 | Surface | 0.032 | 0.063 | 0.97 | 28.55 | 1.90 | 2.54 |
| 17 | 16 | Surface | 0.085 | 0.081 | 7.68 | 30.87 | 0.01 | 0.39 |
| 18 | 16 FR | Surface | 0.086 | 0.206 | 7.73 | 30.76 | 0.01 | 0.41 |
| 19 | 17 | Surface | 0.062 | 0.102 | 2.75 | 129.45 | 2.75 | 3.10 |
| 20 | 18 | Surface | 0.023 | 0.079 | 0.34 | 30.47 | 0.51 | 0.61 |
| 21 | 19 | Surface | 0.023 | 0.078 | 0.20 | 2.37 | 0.47 | 0.69 |
| 22 | 20 | Surface | 0.020 | 0.078 | 1.59 | 26.55 | 0.10 | 1.38 |

Note: FR : Field replicate sample

2.17 Result of Heavy Metal in Industrial Wastewater

| No. | Point | Layer | Parameters | | | | | | | | | |
|-----|-------|---------|--------------|--------------|--------------|--------------|--------------|----------------|--------------|--------------|----------------------------|--------------|
| | | | Zn (µg/ℓ) | Mn (µg/ℓ) | Cu (µg/ℓ) | Fe (µg/ℓ) | Pb (µg/ℓ) | T-Hg (µg/ℓ) | Cd (µg/ℓ) | Ni (µg/ℓ) | Cr ⁶⁺ (µg/ℓ) | As (µg/ℓ) |
| 1 | 1 | Surface | 1208 | 441 | 9.81 | 51822 | 3.26 | 0.19 | 0.34 | 2.88 | 2.12 | 1.38 |
| 2 | 2 | Surface | 1834 | 784 | 8.12 | 36175 | 3.84 | 0.39 | 0.41 | 3.12 | 2.19 | 2.09 |
| 3 | 3 | Surface | 592 | 25.3 | 6.18 | 45.1 | 2.91 | 0.32 | 0.34 | 2.18 | 2.03 | 2.48 |
| 4 | 4 | Surface | 448 | 28.2 | 6.32 | 3203 | 3.13 | 0.27 | 0.36 | 3.03 | 1.96 | 3.02 |
| 5 | 5 | Surface | 816 | 26.1 | 6.34 | 3178 | 3.02 | 0.2 | 0.28 | 2.24 | 2.42 | 1.68 |
| 6 | 6 | Surface | 14.2 | 26.2 | 6.42 | 42.3 | 2.86 | 0.28 | 0.37 | 2.13 | 1.84 | 2.11 |
| 7 | 7 | Surface | 18.8 | 28.3 | 5.98 | 43.4 | 2.75 | 0.18 | 0.41 | 3.01 | 1.42 | 1.71 |
| 8 | 8 | Surface | 1770 | 945 | 7.32 | 11445 | 3.13 | 0.21 | 0.34 | 8.12 | 2.38 | 3.38 |
| 9 | 9 | Surface | 13.3 | 38.1 | 6.45 | 36.5 | 3.19 | 0.28 | 0.28 | 2.94 | 1.94 | 2.10 |
| 10 | 9 FR | Surface | 12.9 | 38.1 | 6.61 | 35.9 | 3.14 | 0.28 | 0.26 | 2.82 | 1.86 | 1.97 |
| 11 | 10 | Surface | 409 | 29.2 | 6.96 | 40.1 | 2.89 | 0.17 | 0.26 | 3.27 | 0.98 | 1.92 |
| 12 | 11 | Surface | 12.6 | 181 | 7.03 | 27.2 | 2.84 | 0.19 | 0.39 | 2.34 | 1.47 | 1.71 |
| 13 | 12 | Surface | 509 | 21.3 | 6.15 | 36.2 | 3.16 | 0.2 | 0.36 | 2.84 | 1.47 | 1.23 |
| 14 | 13 | Surface | 323 | 160 | 6.31 | 32.7 | 2.68 | 0.22 | 0.26 | 3.36 | 1.43 | 2.45 |
| 15 | 14 | Surface | 14.0 | 39.7 | 7.62 | 4050 | 3.29 | 0.33 | 0.33 | 2.94 | 1.86 | 2.05 |
| 16 | 15 | Surface | 705 | 24.5 | 9.82 | 1886 | 3.18 | 0.18 | 0.31 | 2.96 | 1.41 | 3.00 |
| 17 | 16 | Surface | 14.8 | 117 | 6.98 | 6019 | 2.88 | 0.35 | 0.35 | 3.08 | 2.13 | 1.95 |
| 18 | 16 FR | Surface | 14.6 | 116 | 6.96 | 6038 | 2.86 | 0.34 | 0.34 | 3.03 | 2.12 | 1.96 |
| 19 | 17 | Surface | 339 | 328 | 7.34 | 6492 | 4.02 | 0.19 | 0.29 | 3.13 | 2.02 | 1.96 |
| 20 | 18 | Surface | 10.5 | 23.6 | 6.98 | 40.6 | 3.21 | 0.24 | 0.24 | 2.77 | 2.31 | 1.30 |
| 21 | 19 | Surface | 13.8 | 25.9 | 7.13 | 38.3 | 3.17 | 0.31 | 0.31 | 2.78 | 1.64 | 1.87 |
| 22 | 20 | Surface | 561 | 142 | 5.84 | 2262 | 3.15 | 0.28 | 0.28 | 2.96 | 2.41 | 2.21 |

Note: - FR : Field replicate sample

**2.18 Result of the Environmental Parameters for Water Quality in Domestic Wastewater
(4 times sampling points)**

| No. | Point | Time | Parameters | | | | |
|-----|-----------|-------------|------------|------|--------------|--------------|--------------|
| | | | T (°C) | pH | DO (mg/l) | SS (mg/l) | TDS (g/l) |
| 1 | 1 | First time | 31.1 | 7.18 | 1.56 | 26.47 | 0.734 |
| 2 | | Second time | 29.1 | 7.21 | 1.55 | 30.07 | 0.744 |
| 3 | | Third time | 28.2 | 7.25 | 1.48 | 41.80 | 0.952 |
| 4 | | Fourth time | 28.2 | 7.30 | 1.20 | 211.27 | 0.912 |
| 5 | 2 2 FR | First time | 36.8 | 7.47 | 2.82 | 38.40 | 0.866 |
| 6 | | Second time | 31.4 | 7.39 | 1.14 | 18.13 | 0.908 |
| 7 | | Second time | 31.4 | 7.40 | 1.15 | 19.53 | 0.914 |
| 8 | | Third time | 28.7 | 7.27 | 1.28 | 28.80 | 0.844 |
| 9 | | Fourth time | 30.0 | 7.28 | 2.18 | 19.20 | 0.858 |
| 10 | 3 | First time | 36.9 | 6.48 | 1.90 | 14.60 | 0.462 |
| 11 | | Second time | 27.7 | 5.29 | 5.15 | 368.73 | 4.420 |
| 12 | | Third time | 27.5 | 5.03 | 6.24 | 259.87 | 0.450 |
| 13 | | Fourth time | 27.3 | 4.96 | 6.18 | 152.47 | 0.490 |
| 14 | 4 4 FR | First time | 29.2 | 7.23 | 0.96 | 32.27 | 0.620 |
| 15 | | Second time | 29.9 | 7.08 | 0.80 | 61.53 | 0.552 |
| 16 | | Third time | 31.3 | 6.94 | 0.54 | 90.40 | 0.566 |
| 17 | | Third time | 31.3 | 6.98 | 0.56 | 94.53 | 0.502 |
| 18 | | Fourth time | 29.7 | 6.93 | 0.82 | 63.60 | 0.612 |
| 19 | 5 | First time | 29.1 | 7.58 | 0.50 | 49.67 | 0.452 |
| 20 | | Second time | 29.7 | 7.55 | 0.74 | 81.13 | 0.512 |
| 21 | | Third time | 29.1 | 7.50 | 0.84 | 65.33 | 0.438 |
| 22 | | Fourth time | 29.5 | 7.46 | 0.53 | 67.00 | 0.894 |
| 23 | 6 | First time | 27.2 | 7.28 | 3.78 | 36.60 | 0.348 |
| 24 | | Second time | 28.1 | 7.15 | 3.18 | 32.47 | 0.402 |
| 25 | | Third time | 28.1 | 7.16 | 2.93 | 60.13 | 0.386 |
| 26 | | Fourth time | 27.6 | 7.11 | 2.28 | 38.33 | 0.348 |

Note: FR : Field replicate sample

**2.19 Results of the Environmental Parameters for Water Quality in Domestic Wastewater
(2 times sampling points)**

| No. | Point | Time | Parameters | | | | |
|-----|-----------|-------------|------------|------|--------------|--------------|--------------|
| | | | T (°C) | pH | DO (mg/l) | SS (mg/l) | TDS (g/l) |
| 1 | 1 | First time | 31.5 | 5.90 | 5.25 | 231.67 | 0.454 |
| 2 | | Second time | 29.7 | 5.59 | 5.58 | 199.20 | 0.404 |
| 3 | 2 | First time | 32.8 | 7.24 | 0.40 | 141.27 | 0.666 |
| 4 | | Second time | 30.9 | 7.45 | 0.38 | 178.60 | 0.574 |
| 5 | 3 | First time | 32.2 | 4.68 | 5.08 | 152.60 | 0.420 |
| 6 | | Second time | 29.7 | 4.12 | 5.71 | 191.27 | 0.404 |
| 7 | 4 | First time | 29.4 | 6.99 | 1.14 | 253.67 | 14.552 |
| 8 | | Second time | 31.6 | 7.18 | 0.92 | 168.87 | 10.714 |
| 9 | 5 | First time | 30.0 | 7.18 | 0.30 | 62.13 | 3.126 |
| 10 | | Second time | 30.6 | 7.07 | 0.26 | 41.33 | 2.960 |
| 11 | 6 6 FR | First time | 31.2 | 7.51 | 2.77 | 239.80 | 9.810 |
| 12 | | First time | 31.2 | 7.52 | 2.76 | 226.73 | 9.940 |
| 13 | | Second time | 31.4 | 7.88 | 6.04 | 197.40 | 9.560 |
| 14 | 7 7 FR | First time | 29.7 | 7.23 | 1.26 | 223.47 | 10.092 |
| 15 | | First time | 29.7 | 7.22 | 1.28 | 202.41 | 10.294 |
| 16 | | Second time | 30.1 | 7.25 | 0.94 | 184.60 | 8.910 |
| 17 | 8 | First time | 30.2 | 7.63 | 3.09 | 201.40 | 5.886 |
| 18 | | Second time | 30.3 | 7.25 | 0.70 | 141.20 | 4.244 |

Note : FR. Field replicate sample

**2.20 Result of the Environmental Parameters for Water Quality in Domestic Wastewater
(4 times sampling points)**

| No. | Point | Time | Parameters | | | | |
|-----|-------|-------------|-----------------------------|-----------------------------|----------------------------|---------------|--------------------------------|
| | | | COD _{Mn} (mg/l) | COD _{Cr} (mg/l) | BOD ₅ (mg/l) | Oil (mg/l) | Fecal coliform (col./100ml) |
| 1 | 1 | First time | 18.02 | 18.39 | 10.21 | 1.4 | 44000 |
| 2 | | Second time | 17.02 | 23.50 | 6.33 | 1.2 | 48000 |
| 3 | | Third time | 19.02 | 20.20 | 5.20 | 2.0 | 52000 |
| 4 | | Fourth time | 28.03 | 30.43 | 13.67 | 1.3 | 52000 |
| 5 | 2 | First time | 14.95 | 16.43 | 5.18 | 0.8 | 13400 |
| 6 | | Second time | 15.95 | 17.11 | 5.27 | 0.8 | 22200 |
| 7 | | 2 FR | 15.86 | 17.40 | 5.29 | 0.7 | 22200 |
| 8 | | Third time | 15.95 | 22.59 | 6.63 | 0.9 | 22600 |
| 9 | | Fourth time | 14.95 | 16.27 | 6.32 | 0.6 | 22000 |
| 10 | 3 | First time | 7.98 | 8.16 | 5.99 | 1.3 | 15800 |
| 11 | | Second time | 31.9 | 37.51 | 10.21 | 1.6 | 12200 |
| 12 | | Third time | 29.85 | 32.86 | 7.75 | 3.0 | 13400 |
| 13 | | Fourth time | 16.95 | 18.32 | 8.54 | 3.0 | 16600 |
| 14 | 4 | First time | 12.96 | 15.40 | 7.87 | 2.6 | 76000 |
| 15 | | 4 LR | 16.96 | 18.38 | 7.72 | 2.5 | |
| 16 | | Second time | 47.86 | 63.67 | 17.62 | 2.6 | 92000 |
| 17 | 4 FR | Third time | 83.75 | 102.04 | 23.48 | 4.9 | 84400 |
| 18 | | Fourth time | 83.78 | 98.59 | 21.50 | 3.8 | 84400 |
| 19 | | | Fourth time | 93.72 | 172.52 | 27.55 | 4.2 |
| 20 | 5 | First time | 21.02 | 28.61 | 9.31 | 0.9 | 36000 |
| 21 | | Second time | 76.07 | 175.73 | 20.54 | 1.4 | 52000 |
| 22 | | Third time | 37.04 | 57.21 | 14.49 | 1.5 | 68000 |
| 23 | | Fourth time | 52.05 | 59.04 | 16.73 | 1.9 | 44000 |
| 24 | 6 | First time | 18.51 | 19.39 | 11.07 | 0.9 | 64000 |
| 25 | | 6 LR | 30.51 | 32.26 | 17.22 | 0.5 | 84000 |
| 26 | | Second time | 30.01 | 32.26 | 17.08 | 0.6 | |
| 27 | | Third time | 37.04 | 77.65 | 17.66 | 1.3 | 68000 |
| | | Fourth time | 37.54 | 38.80 | 16.41 | 2.5 | 36000 |

Note: FR : Field replicate sample
LR : Laboratory replicate sample

**2.21 Result of the Environmental Parameters for Water Quality in Domestic Wastewater
(2 times sampling points)**

| No. | Point | Time | Parameters | | | | |
|-----|-------|-------------|-----------------------------|-----------------------------|----------------------------|---------------|--------------------------------|
| | | | COD _{Mn} (mg/l) | COD _{Cr} (mg/l) | BOD ₅ (mg/l) | Oil (mg/l) | Fecal coliform (col./100ml) |
| 1 | 1 | First time | 18.13 | 19.20 | 7.42 | 0.4 | 18600 |
| 2 | | Second time | 20.14 | 24.09 | 7.56 | 1.0 | 22000 |
| 3 | 2 | First time | 86.60 | 99.41 | 18.73 | 2.0 | 84000 |
| 4 | | Second time | 92.65 | 102.11 | 19.26 | 2.0 | 88000 |
| 5 | | Blank | 0 | 0 | 0 | 0 | 0 |
| 6 | 3 | First time | 56.18 | 68.17 | 21.31 | 1.2 | 28000 |
| 7 | | Second time | 55.39 | 64.12 | 19.34 | 1.0 | 34000 |
| 8 | 4 | First time | 14.10 | 16.02 | 6.31 | 0.6 | 76000 |
| 9 | | Second time | 22.66 | 25.33 | 11.07 | 2.2 | 94000 |
| 10 | 5 | First time | 26.12 | 27.13 | 12.05 | 3.3 | 36600 |
| 11 | | Second time | 11.08 | 11.24 | 5.14 | 2.0 | 40200 |
| 12 | 6 | First time | 10.57 | 11.24 | 5.03 | 2.1 | 38800 |
| 13 | | 6 FR | 15.11 | 17.15 | 4.17 | 2.6 | 38800 |
| 14 | | Second time | 15.08 | 17.15 | 4.04 | 2.5 | 41200 |
| 15 | 7 | First time | 14.10 | 15.19 | 6.24 | 1.9 | 68000 |
| 16 | | 7 FR | 19.13 | 23.28 | 10.35 | 1.0 | |
| 17 | | Second time | 43.30 | 53.50 | 11.06 | 2.6 | 76300 |
| 18 | 8 | First time | 20.57 | 21.02 | 8.17 | 0.8 | 52000 |
| 19 | | Second time | 43.23 | 45.24 | 15.86 | 2.4 | 108000 |

Note: FR. Field replicate sample

**2.22 Result of Nutrients Parameters for Water Quality in Domestic Wastewater
(4 times sampling points)**

| No. | Point | Time | Parameters | | | | | |
|-----|-----------|-------------|------------------------------|------------------------------|------------------------------|----------------|---|----------------|
| | | | N-NO ₂ (mgN/l) | N-NO ₃ (mgN/l) | N-NH ₄ (mgN/l) | T-N (mgN/l) | P-PO ₄ ³ (mgP/l) | T-P (mgP/l) |
| 1 | 1 | First time | 0.030 | 0.124 | 3.99 | 16.99 | 2.97 | 3.16 |
| 2 | | Second time | 0.039 | 0.131 | 3.28 | 17.82 | 3.12 | 3.60 |
| 3 | | Third time | 0.029 | 0.126 | 3.87 | 18.62 | 2.69 | 3.70 |
| 4 | | Fourth time | 0.033 | 0.193 | 2.98 | 26.90 | 3.01 | 3.60 |
| 5 | 2 2 FR | First time | 0.296 | 0.342 | 1.75 | 13.37 | 0.97 | 2.94 |
| 6 | | Second time | 0.293 | 0.360 | 1.97 | 9.23 | 0.87 | 2.56 |
| 7 | | Second time | 0.271 | 0.249 | 1.95 | 9.31 | 0.85 | 2.58 |
| 8 | | Third time | 0.167 | 0.151 | 0.81 | 7.85 | 0.70 | 1.94 |
| 9 | | Fourth time | 0.301 | 0.455 | 1.17 | 9.85 | 0.61 | 1.98 |
| 10 | 3 | First time | 0.154 | 0.272 | 0.93 | 12.23 | 0.07 | 1.36 |
| 11 | | Second time | 0.137 | 0.306 | 1.29 | 6.25 | 0.10 | 1.08 |
| 12 | | Third time | 0.117 | 0.269 | 1.02 | 6.33 | 0.09 | 0.34 |
| 13 | | Fourth time | 0.191 | 0.261 | 1.37 | 6.94 | 0.12 | 0.46 |
| 14 | 4 4 FR | First time | 0.045 | 0.302 | 3.08 | 19.13 | 1.52 | 2.74 |
| 15 | | Second time | 0.101 | 1.009 | 5.78 | 25.80 | 2.03 | 3.94 |
| 16 | | Third time | 0.079 | 0.877 | 7.81 | 40.14 | 1.55 | 1.91 |
| 17 | | Third time | 0.071 | 0.858 | 7.76 | 41.03 | 1.54 | 1.90 |
| 18 | | Fourth time | 0.098 | 0.753 | 5.91 | 27.66 | 1.78 | 2.11 |
| 19 | 5 | First time | 0.042 | 0.222 | 3.92 | 30.31 | 1.00 | 2.46 |
| 20 | | Second time | 0.061 | 0.218 | 4.72 | 29.09 | 2.69 | 3.28 |
| 21 | | Third time | 0.088 | 1.367 | 3.80 | 18.54 | 2.19 | 2.89 |
| 22 | | Fourth time | 0.049 | 0.257 | 7.12 | 44.83 | 3.14 | 3.32 |
| 23 | 6 | First time | 0.090 | 0.621 | 4.84 | 9.87 | 0.97 | 1.81 |
| 24 | | Second time | 0.087 | 1.341 | 7.77 | 7.94 | 0.90 | 1.64 |
| 25 | | Third time | 0.108 | 0.570 | 4.86 | 10.40 | 0.70 | 1.58 |
| 26 | | Fourth time | 0.102 | 0.232 | 1.26 | 10.26 | 0.81 | 1.62 |

Note: - FR : Field replicate sample

**2.23 Result of Nutrients Parameters for Water Quality in Domestic Wastewater
(2 times sampling points)**

| No. | Point | Time | Parameters | | | | | |
|-----|-------------|-------------|------------------------------|------------------------------|------------------------------|----------------|---|----------------|
| | | | N-NO ₂ (mgN/l) | N-NO ₃ (mgN/l) | N-NH ₄ (mgN/l) | T-N (mgN/l) | P-PO ₄ ³ (mgP/l) | T-P (mgP/l) |
| 1 | 1 | First time | 0.590 | 0.310 | 1.38 | 3.42 | 0.03 | 1.4 |
| 2 | | Second time | 0.670 | 0.303 | 1.54 | 3.53 | 0.09 | 1.29 |
| 3 | 2 | First time | 0.130 | 0.197 | 4.38 | 39.60 | 5.20 | 5.97 |
| 4 | | Second time | 0.157 | 0.310 | 4.05 | 72.45 | 4.87 | 5.01 |
| 5 | 3 | First time | 0.152 | 0.502 | 1.04 | 14.09 | 0.21 | 1.50 |
| 6 | | Second time | 0.129 | 0.452 | 1.17 | 12.42 | 0.09 | 1.07 |
| 7 | 3 FR | Second time | 0.130 | 0.459 | 1.17 | 12.32 | 0.09 | 1.08 |
| 8 | 4 | First time | 0.159 | 0.732 | 3.62 | 20.59 | 1.49 | 1.66 |
| 9 | | Second time | 0.187 | 0.573 | 4.07 | 29.55 | 1.57 | 1.12 |
| 10 | 5 | First time | 0.036 | 0.257 | 2.8 | 15.68 | 1.66 | 1.66 |
| 11 | | Second time | 0.091 | 0.250 | 3.37 | 16.24 | 1.59 | 1.98 |
| 12 | 6 | First time | 0.089 | 0.350 | 1.46 | 8.65 | 0.09 | 1.42 |
| 13 | | 6FR | First time | 0.087 | 0.357 | 1.48 | 8.50 | 0.10 |
| 14 | Second time | | 0.138 | 0.841 | 1.81 | 6.08 | 0.73 | 1.86 |
| 15 | 7 | First time | 0.054 | 0.227 | 3.36 | 21.60 | 2.28 | 1.62 |
| 16 | | Second time | 0.087 | 0.352 | 1.96 | 45.07 | 2.39 | 1.57 |
| 17 | 8 | First time | 0.069 | 0.191 | 2.56 | 21.29 | 1.33 | 1.68 |
| 18 | | Second time | 0.055 | 0.234 | 3.60 | 31.45 | 2.45 | 2.27 |

Note: FR : Field replicate sample

2.24 Industrial Wastewater Discharge

| No. | Date | Time | Sample ID | Point | Name of pollution source | Flow | | | Wind | | Remarks |
|-----|---------|---------------------|-----------------|-------|--------------------------------------|---------------------|---------|-----------------------|-----------|---------|--------------|
| | | | | | | S (m ³) | V (m/s) | Q (m ³ /s) | Direction | V (m/s) | |
| 1 | July 27 | 10 ^h 15' | I ₂ | 2 | Coc 6 and Deo Nai Coal Mines | 6.0938 | 0.775 | 4.7227 | SW | 2.5 | |
| 2 | July 22 | 15 ^h 50' | I ₃ | 3 | Cam Pha Center Mechanical Co. | 0.0875 | 0.023 | 0.0021 | SE | 0.6 | |
| 3 | July 27 | 11 ^h 40' | I ₄ | 4 | Cam Pha Center Market | 0.0048 | 0.143 | 0.0007 | SW | 0.4 | |
| 4 | July 27 | 13 ^h 30' | I ₅ | 5 | Cam Pha Beer Factory | 0.0051 | 0.091 | 0.0005 | SW | 1.3 | |
| 5 | July 27 | 14 ^h 10' | I ₇ | 7 | Quang Hanh Mineral Water Plant | 0.0245 | 0.125 | 0.0031 | SW | 0.4 | |
| 6 | July 27 | 14 ^h 50' | I ₈ | 8 | Tan Lap Coal Mine | 0.1465 | 0.357 | 0.0523 | SW | 0.6 | |
| 7 | July 27 | 16 ^h 00' | I ₉ | 9 | Ha Lam Coal Mine | 0.0928 | 0.588 | 0.0546 | SW | 1.2 | |
| 8 | July 27 | 15 ^h 22' | I ₁₀ | 10 | Ha Tu coal Mine | 0.4053 | 0.625 | 0.2533 | SW | 1.1 | |
| 9 | July 27 | 16 ^h 40' | I ₁₂ | 12 | QNPC Guest House | 0.0104 | 0.140 | 0.0015 | SW | 0.6 | |
| 10 | July 23 | 10 ^h 00' | I ₁₃ | 13 | QN Provincial Hospital | 0.0159 | 1.000 | 0.0159 | SE | 1.8 | |
| 11 | July 24 | 9 ^h 45' | I ₁₄ | 14 | Vuon Dao Market | 0.0197 | 0.044 | 0.0009 | SE | 0.5 | |
| 12 | July 23 | 11 ^h | I ₁₅ | 15 | QN Beer Factory | 0.0378 | 0.255 | 0.0096 | SE | 0.8 | |
| 13 | July 26 | 18 ^h 20' | I ₁₆ | 16 | Deo Sen Waste Dumping Site | 0.0174 | 0.144 | 0.0025 | SW | 0.5 | two profiles |
| 14 | July 24 | 15 ^h | I ₁₈ | 18 | Ha Long Ship Building Fac. (1) | 0.0020 | 0.118 | 0.0002 | E | 1.4 | |
| 15 | July 24 | 10 ^h 45' | I ₂₀ | 20 | VINAFOUR Wheat Powder Mill | 0.0182 | 0.107 | 0.0020 | E | 1.0 | |
| 16 | July 23 | 14 ^h 20' | I ₁₁ | 11 | Nam Cau Trang Coal Processing Fac. | | | 0.0125 | SE | 2.0 | |
| 17 | July 24 | 17 ^h 15' | I ₁₇ | 17 | Frozen sea Products Processing Plant | | | 0.0005 | E | 1.1 | |
| 18 | July 22 | 12 ^h 00' | I ₁ | 1 | Cua Ong Coal Processing Plant | | | NA | | | |
| 19 | July 27 | 11 ^h 05' | I ₆ | 6 | Vung Duc Coal Shipping Port | | | NA | | | |
| 20 | July 24 | 15 ^h 45' | I ₁₉ | 19 | Ha Long Ship Building Factory (2) | | | NA | | | |

2.25 Domestic Wastewater Discharge

| No. | Date | Time | Sample ID | Point | Name of pollution source | Flow | | | Wind | |
|-----|---------|---------------------|------------------|-------|--|---------------------|---------|-----------------------|-----------|---------|
| | | | | | | S (m ³) | V (m/s) | Q (m ³ /s) | Direction | V (m/s) |
| 1 | July 28 | 11 ^h 24' | D _{1,1} | 1 | Cua Ong, fishing harbour - Lo Voi | 0.0219 | 0.480 | 0.0105 | SW | 5.2 |
| 2 | July 28 | 17 ^h 30' | D _{1,2} | | lake area, near-by Cua Ong market | 0.0266 | 0.600 | 0.0159 | SW | 2.0 |
| 3 | July 28 | 22 ^h 45' | D _{1,3} | | | 0.0270 | 0.600 | 0.0162 | | 0.0 |
| 4 | July 29 | 6 ^h 15' | D _{1,4} | | | 0.0104 | 0.250 | 0.0026 | | 0.0 |
| 5 | July 28 | 11 ^h 50' | D _{2,1} | 2 | Cam Pha, Coc 6 Bridge, near-by the Cam Pha market | 0.0082 | 0.100 | 0.0008 | SW | 1.3 |
| 6 | July 28 | 17 ^h 55' | D _{2,2} | | | 0.0094 | 0.179 | 0.0017 | SW | 0.1 |
| 7 | July 28 | 23 ^h 15' | D _{2,3} | | | 0.0311 | 0.227 | 0.0071 | | 0.0 |
| 8 | July 29 | 6 ^h 50' | D _{2,4} | | | 0.0188 | 0.250 | 0.0047 | SW | 1.2 |
| 9 | July 28 | 12 ^h 20' | D _{3,1} | 3 | Cam Pha, Trang Bridge on the old 18 Road | 0.1794 | 0.392 | 0.1645 | SW | 0.4 |
| 10 | July 28 | 18 ^h 25' | D _{3,2} | | | 0.1104 | 0.222 | 0.0245 | | 0.0 |
| 11 | July 28 | 23 ^h 40' | D _{3,3} | | | 0.1826 | 0.211 | 0.0385 | | 0.0 |
| 12 | July 29 | 7 ^h 20' | D _{3,4} | | | 0.1676 | 0.250 | 0.0419 | SW | 0.1 |
| 13 | July 26 | 5 ^h 15' | D _{4,1} | 4 | Hon Gai near-by Halong II Market | 0.0930 | 0.107 | 0.0100 | | 0.0 |
| 14 | July 26 | 12 ^h 00' | D _{4,2} | | | 0.0848 | 0.094 | 0.0080 | SW | 2.1 |
| 15 | July 26 | 17 ^h 10' | D _{4,3} | | | 0.0836 | 0.100 | 0.0084 | SW | 1.0 |
| 16 | July 26 | 23 ^h 00' | D _{4,4} | | | 0.0691 | 0.100 | 0.0069 | | 0.0 |
| 17 | July 25 | 5 ^h 30' | D _{5,1} | 5 | Bai chay, near by the Post Office | 0.0718 | 0.100 | 0.0072 | SW | 0.4 |
| 18 | July 25 | 11 ^h 00' | D _{5,2} | | | 0.0772 | 0.093 | 0.0071 | | 0.0 |
| 19 | July 25 | 17 ^h 45' | D _{5,3} | | | 0.0898 | 0.114 | 0.0102 | SW | 2.8 |
| 20 | July 25 | 23 ^h 30' | D _{5,4} | | | 0.0557 | 0.100 | 0.0056 | | 0.0 |
| 21 | July 25 | 5 ^h 5' | D _{6,1} | 6 | Bai chay, near by the Thanh Nien Hotel | 0.0084 | 0.333 | 0.0028 | | 0.0 |
| 22 | July 25 | 11 ^h 35' | D _{6,2} | | | 0.0116 | 0.600 | 0.0070 | | 0.0 |
| 23 | July 25 | 17 ^h 15' | D _{6,3} | | | 0.0088 | 0.500 | 0.0044 | SW | 0.5 |
| 24 | July 25 | 22 ^h 50' | D _{6,4} | | | 0.0081 | 0.430 | 0.0035 | | 0.0 |
| 25 | July 28 | 10 ^h 36' | H _{1,1} | 1 | Cam Pha, Cau 1 gate on the 18 Road | 0.0311 | 0.556 | 0.0450 | SW | 0.8 |
| 26 | July 28 | 16 ^h 40' | H _{1,2} | | | 0.0772 | 0.526 | 0.0406 | SW | 0.7 |
| 27 | July 28 | 12 ^h 45' | H _{2,1} | 2 | Cam Pha, far from Center cross 100m | 0.0565 | 0.050 | 0.0028 | SW | 0.4 |
| 28 | July 28 | 18 ^h 50' | H _{2,2} | | | 0.0537 | 0.046 | 0.0025 | | 0.0 |
| 29 | July 28 | 10 ^h 10' | H _{3,1} | 3 | Cam Pha, Ba Toa Bridge, near by the Sport Ground of the Cam Pha town | 0.0405 | 0.367 | 0.0149 | SW | 0.5 |
| 30 | July 28 | 16 ^h 20' | H _{3,2} | | | 0.0430 | 0.393 | 0.0169 | SW | 0.6 |
| 31 | July 26 | 6 ^h 40' | H _{4,1} | 4 | Inside the Children Culture Hall area | 0.1770 | 0.033 | 0.0059 | | 0.0 |
| 32 | July 26 | 10 ^h 20' | H _{4,2} | | | 0.1875 | 0.110 | 0.0206 | SW | 1.3 |
| 33 | July 26 | 7 ^h 15' | H _{5,1} | 5 | Hon Gai, Bridge I, Cao Xanh street | 0.1872 | 0.083 | 0.0156 | | 0.0 |
| 34 | July 26 | 11 ^h 25' | H _{5,2} | | | 0.1872 | 0.078 | 0.0146 | SW | 2.2 |
| 35 | July 26 | 7 ^h 50' | H _{6,1} | 6 | Hon Gai, Bridge II, Cao Xanh street | 0.1235 | 0.111 | 0.0137 | | 0.0 |
| 36 | July 26 | 11 ^h 00' | H _{6,2} | | | 0.1065 | 0.086 | 0.0091 | | 2.1 |
| 37 | July 26 | 5 ^h 50' | H _{7,1} | 7 | Hon Gai, inside the Hon Gai harbour | 0.0794 | 0.071 | 0.0057 | SW | 1.1 |
| 38 | July 26 | 10 ^h 00' | H _{7,2} | | | 0.0850 | 0.111 | 0.0094 | SW | 1.7 |
| 39 | July 25 | 6 ^h 20' | H _{8,1} | 8 | Bai Chay, Opposite the Heritage | 0.0139 | 0.286 | 0.0040 | SW | 0.8 |
| 40 | July 25 | 12 ^h 30' | H _{8,2} | | Halong Hotel | 0.0086 | 0.750 | 0.0065 | SW | 1.6 |

2.26 River Water Discharge

| No | Date | Time | Sample ID | Point | Name of pollution source | Flow | | | Wind | | Remarks |
|----|----------|---------------------|-------------------|-------|-------------------------------|---------------------|---------|-----------------------|-----------|---------|----------------|
| | | | | | | S (m ³) | V (m/s) | Q (m ³ /s) | Direction | V (m/s) | |
| 1 | July 13 | 15 ^h | P _{1.1} | 1 | Yen Lap Dam | 12.0648 | 1.023 | 12.3387 | | | two profiles |
| 2 | July 18 | 15 ^h 20' | P _{1.2} | | | 0.0648 | 0.300 | 0.0195 | S | 2.3 | |
| 3 | August 7 | 8 ^h 30' | P _{1.3} | | | 0.0648 | 0.300 | 0.0195 | | 0.0 | |
| 4 | August 8 | 9 ^h 30' | P _{1.4} | | | 1.6520 | 0.463 | 0.7614 | | 0.0 | two profiles |
| 5 | July 16 | 9 ^h 30' | P _{2.1} | 2 | Buyt Xe Bridge | 0.3901 | 0.860 | 0.3355 | | 0.0 | |
| 6 | July 18 | 11 ^h 00' | P _{2.2} | | | 0.3901 | 0.316 | 0.1233 | S | 1.8 | |
| 7 | August 7 | 9 ^h 35' | P _{2.3} | | | - | - | - | | 0.0 | Not flowing |
| 8 | August 8 | 10 ^h 30' | P _{2.4} | | | 26.4000 | 0.538 | 14.1900 | | 0.0 | |
| 9 | July 13 | 13 ^h | P _{3.1} | 3 | Troi Bridge | 9.8488 | 0.559 | 5.5063 | | 0.0 | nine profiles |
| 10 | July 18 | 10 ^h 15' | P _{3.2} | | | 6.9023 | 0.527 | 3.6431 | SE | 1.7 | nine profiles |
| 11 | August 7 | 10 ^h 25' | P _{3.3} | | | 14.0153 | 0.114 | 1.5991 | | 0.0 | seven profiles |
| 12 | August 8 | 11 ^h 25' | P _{3.4} | | | 66.9540 | 2.148 | 143.8107 | | 0.0 | nine profiles |
| 13 | July 13 | 10 ^h 00' | P _{4.1} | 4 | Da Trang over-flowing Dam | 3.0469 | 0.580 | 1.7672 | | 0.0 | |
| 14 | July 18 | 9 ^h 10' | P _{4.2} | | | 3.6269 | 0.232 | 0.8427 | SE | 2.7 | two profiles |
| 15 | August 7 | 14 ^h 25' | P _{4.3} | | | 15.7184 | 0.054 | 0.8439 | | 0.0 | three profiles |
| 16 | August 8 | 14 ^h 15' | P _{4.4} | | | 36.6720 | 0.182 | 6.7572 | | 0.0 | three profiles |
| 17 | July 15 | 17 ^h 00' | P _{5.1} | 5 | Da Trang Cho over flowing Dam | 0.7039 | 0.978 | 0.6884 | | 0.0 | two profiles |
| 18 | July 19 | 15 ^h 10' | P _{5.2} | | | 0.6453 | 0.881 | 0.5682 | SE | 0.7 | two profiles |
| 19 | August 7 | 14 ^h 00' | P _{5.3} | | | 1.2817 | 0.645 | 0.8266 | NW | 1.9 | two profiles |
| 20 | August 8 | 15 ^h 15' | P _{5.4} | | | 11.1048 | 0.139 | 15.4693 | | 0.0 | two profiles |
| 21 | July 15 | 16 ^h 00' | P _{6.1} | 6 | Dong Vai | 6.9180 | 0.144 | 0.9976 | N-NW | 1.0 | |
| 22 | July 19 | 15 ^h 05' | P _{6.2} | | | 5.2520 | 0.086 | 0.4517 | N-NW | 1.0 | |
| 23 | August 7 | 16 ^h 00' | P _{6.3} | | | 3.0176 | 0.170 | 0.5130 | | 0.0 | |
| 24 | August 8 | 16 ^h 45' | P _{6.4} | | | 10.9180 | 0.600 | 6.5508 | | 0.0 | |
| 25 | July 15 | 14 ^h 30' | P _{7.1} | 7 | Vu Oai over-flowing Dam | 3.1641 | 0.505 | 1.5987 | S | 2.3 | |
| 26 | July 19 | 14 ^h 25' | P _{7.2} | | | 2.2695 | 0.443 | 1.0043 | S | 2.7 | |
| 27 | August 7 | 15 ^h 5' | P _{7.3} | | | 1.3027 | 0.350 | 0.4556 | | 0.0 | |
| 28 | August 8 | 15 ^h 50' | P _{7.4} | | | 12.1641 | 1.800 | 21.8954 | | 0.0 | |
| 29 | July 15 | 12 ^h 00' | P _{8.1} | 8 | Vu Oai Coal Harbour | 59.4920 | 0.045 | 2.7039 | SE | 1.9 | |
| 30 | July 19 | 10 ^h 15' | P _{8.2} | | | 140.9180 | 0.015 | 2.1420 | SE | 2.6 | |
| 31 | August 7 | 12 ^h 10' | P _{8.3} | | | 151.3590 | 0.011 | 1.5999 | | | |
| 32 | August 8 | 12 ^h 45' | P _{8.4} | | | 176.9340 | 0.450 | 79.6203 | | | |
| 33 | July 16 | 16 ^h 45' | P _{9.1} | 9 | Ha Khanh River | 0.1904 | 0.580 | 0.1105 | E | 1.3 | |
| 34 | July 19 | 11 ^h 20' | P _{9.2} | | | 0.1665 | 0.590 | 0.0982 | E | 0.8 | |
| 35 | August 7 | 13 ^h 00' | P _{9.3} | | | 0.1157 | 0.390 | 0.0451 | E | 2.1 | |
| 36 | August 8 | 13 ^h 35' | P _{9.4} | | | 3.8369 | 1.800 | 6.9065 | E-SE | 3.1 | |
| 37 | July 16 | 14 ^h 00' | P _{10.1} | 10 | Hoa Chat Bridge | 0.0981 | 0.520 | 0.0510 | SE | 2.5 | |
| 38 | July 17 | 16 ^h 30' | P _{10.2} | | | 0.0844 | 0.480 | 0.0405 | SE | 3.5 | |
| 39 | August 7 | 10 ^h 55' | P _{10.3} | | | 0.0319 | 0.120 | 0.0038 | | 0.0 | |
| 40 | August 8 | 10 ^h 30' | P _{10.4} | | | 1.8496 | 0.920 | 1.7016 | SE | 1.1 | |
| 41 | July 14 | 18 ^h 00' | P _{11.1} | 11 | Ha Phong Bridge | 0.8091 | 0.667 | 0.5397 | S | 1.4 | |
| 42 | July 17 | 15 ^h 20' | P _{11.2} | | | 0.7129 | 0.739 | 0.5268 | SE | 2.2 | |
| 43 | August 7 | 11 ^h 45' | P _{11.3} | | | 0.4507 | 0.320 | 0.1442 | | 0.0 | |
| 44 | August 8 | 16 ^h 30' | P _{11.4} | | | 0.4879 | 1.900 | 0.9270 | | 0.0 | |
| 45 | July 14 | 16 ^h 50' | P _{12.1} | 12 | Khe Sim Bridge | 0.1031 | 0.700 | 0.0722 | NW | 0.5 | |
| 46 | July 17 | 14 ^h 15' | P _{12.2} | | | 0.1028 | 0.654 | 0.0672 | S | 0.2 | |
| 47 | August 7 | 16 ^h 35' | P _{12.3} | | | 0.0488 | 0.350 | 0.0171 | | 0.0 | |
| 48 | August 8 | 16 ^h 00' | P _{12.4} | | | 0.1023 | 1.077 | 0.1102 | | 0.0 | |
| 49 | July 14 | 14 ^h 50' | P _{13.1} | 13 | Nam Cong Gate | 0.2388 | 0.310 | 0.0741 | S | 3.1 | two profiles |
| 50 | July 17 | 13 ^h 10' | P _{13.2} | | | 0.1226 | 0.241 | 0.0295 | SE | 2.8 | two profiles |
| 51 | August 7 | 15 ^h 50' | P _{13.3} | | | 1.7500 | 0.100 | 0.1750 | | 0.0 | |
| 52 | August 8 | 15 ^h 30' | P _{13.4} | | | 1.7422 | 0.637 | 1.1094 | | 0.0 | two profiles |
| 53 | July 14 | 13 ^h 10' | P _{14.1} | 14 | Bridge N° 5 | 1.6045 | 0.476 | 0.7642 | SE | 4.9 | two profiles |
| 54 | July 17 | 10 ^h 45' | P _{14.2} | | | 1.1846 | 0.270 | 0.3199 | SE | 4.4 | two profiles |
| 55 | August 7 | 15 ^h 00' | P _{14.3} | | | 9.5098 | 0.251 | 2.3837 | | 0.0 | two profiles |
| 56 | August 8 | 15 ^h 00' | P _{14.4} | | | 4.3331 | 0.265 | 1.1463 | | 0.0 | two profiles |
| 57 | July 14 | 10 ^h 30' | P _{15.1} | 15 | Mong Duong Bridge | 9.9613 | 0.237 | 2.3608 | SE | 1.1 | |
| 58 | July 17 | 9 ^h 20' | P _{15.2} | | | 14.4038 | 0.183 | 2.6359 | SE | 3.1 | |
| 59 | August 7 | 14 ^h 15' | P _{15.3} | | | 12.3538 | 0.165 | 2.0384 | | 0.0 | |
| 60 | August 8 | 14 ^h 30' | P _{15.4} | | | 18.0913 | 0.375 | 6.7842 | NE | 2.1 | |