

A-5 Minutes of Discussion for Draft Basic Design Study Report

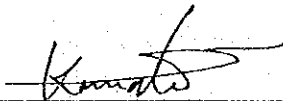
MINUTES OF DISCUSSIONS
OF
BASIC DESIGN STUDY ON THE PROJECT FOR
BALANCING, MODERNIZING, REHABILITATION & EXPANSION
OF
CHANDNIGHAT WATER TREATMENT PLANT
IN
THE PEOPLE'S REPUBLIC OF BANGLADESH
(CONSULTATION ON DRAFT REPORT)

In April, 1992 the Japan International Cooperation Agency (JICA) dispatched a basic design study team on the Project for Balancing, Modernizing, Rehabilitation & Expansion of Chandnighat Water Treatment Plant (hereinafter referred to as "the Project") to The People's Republic of Bangladesh and through discussions field survey and technical examination on the results in Japan has prepared a draft report of the study.

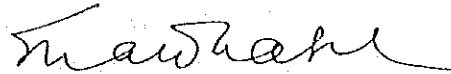
In order to explain and consult with Bangladesh side on the contents of the report. JICA sent a team to Bangladesh which was headed by Mr. Seiyo Kamata, Head of Planning Research Section, Yokosuka City Waterworks Bureau and scheduled to stay in the country from October 25 to 30, 1992.

As a result of discussions, both parties confirmed the main items as described on the attached sheets and subject to the final approval of the respective governments.

Dhaka. October 28, 1992



Mr. Seiyo Kamata
Leader
Draft Report Explanation Team
JICA



Dr. A. M. M. Shawkat Ali
Additional Secretary
Economic Relations Division
Ministry of Finance

ATTACHMENT

1. Components for Draft Report

The Government of Bangladesh has agreed and accepted the components of the Draft Report proposed by the team. Amendments if require will be done through mutual consultation.

2. Japan's Grant Aid System

- (1) The Government of Bangladesh has understood the system of Japanese Grant Aid explained by the team.
- (2) The Government of Bangladesh will take the necessary measures, describe in ANNEX I, for smooth implementation of the project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

3. Further Schedule

The team will make the Final Report in accordance with the confirmed items, and send it to the Government of Bangladesh by beginning of December, 1992.

4. Administrative Proceedings for Project Implementation.

- (1) The Bangladesh side will prepare the Project Concept Paper as soon as possible for early project approval by the Government of Bangladesh.
- (2) Considering the emergent nature of the Project and aiming at earlier commencement of the construction works, the Government of Bangladesh will examine possible arrangement to expedite the implementation.

5. Arrangement for Project Implementation

The Government of Bangladesh will take the necessary measures for execution of the confirmed items, described in Annex II, for smooth and fruitful implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

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ANNEX - I

Following necessary measures should be taken by the Government of Bangladesh in case the Project is executed under Japanese Grant Aid.

- 1) To provide data and information necessary for the Detail Design and Project implementation, and to assign exclusive counterpart personnel for execution of the Project.
- 2) To clear and level the site prior to commencement of construction, if necessary.
- 3) To bear commissions to the Japanese foreign exchange bank of the banking services based upon the Banking Agreement.
- 4) To ensure necessary taxes and to take necessary measures for customs clearance of materials and equipment brought for the Project at the port of disembarkation.
- 5) To exempt Japanese nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Bangladesh with respect to the supply of the products and the services under the verified contracts. However, the cost of duties, internal taxes and other fiscal levies to be imposed under the Bangladesh Regulations shall be borne by the relevant Ministry/Agency concerned with the project for which necessary budget provision shall be made by them.
- 6) To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contracts such facilities as may be necessary for their entry into Bangladesh and stay therein for the performance of their work.
- 7) To take necessary measures for getting permission for construction works under the Project from the authorities concerned, if necessary.
- 8) To bear all the expenses other than those to be borne by the Grant.

ANNEX - II

1. To improve the management system of DWASA as described in Appendix.
2. To promote the leakage detection control programme in the project area as described in Appendix.
3. To reinforce water quality management for conservation of the water quality of raw water for the Chandnighat water Treatment plant as described in Appendix.
4. To provide the operation and maintenance expense so as to maintain and use properly and effectively the rehabilitated plant under the Grant.

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Action plan as per recommendation of the JICA study team
for the Implementation of BMRE project for Chandnighat W.T.P.

Recommendation proposed by
the study team.

Action to be taken/already
taken.

1. Improvement of management system of Dhaka WASA for two fold desk in planning and monitoring cell.
 - (a) Planning desk for new project.
 - (b) Management desk for planning and implementing the project.

The overall responsibility of the Planning and Monitoring Division is to plan for new projects and during execution of its evaluation and monitoring. After completion of necessary approval it is implemented under direct supervision of a Project Director from outside of Planning Division.

A new set-up showing two fold desks one is for planning of new projects and other is for monitoring is expected to be approved by the GOB soon. It may be mentioned that there are one Deputy Chief, One Asstt. Chief, Two Planning Officers, Two Research Officers and 4 Research Asstt. are working now.

2. In charge of counter part Engineer.

Mr. S.D.M. Quamrul Alam Chowdhury, Executive Engineer, MODS Zone-II has been assigned as in-charge of counter part Engineer with the designation of Project Director for Chandnighat project. He will look after the project till completion of the same.

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3. Provision for operation and maintenance expenses.

After completion of the project in question, necessary budget provision for operation and maintenance to the project will be kept in DWASA Annual Revenue Budget.

4. Promotion of leak detection control programme.

Number and location of Faucets/Street Hydrant (Without stop valve) has already been indentified. Rehabilitation programme has already been started and expected to be completed by June 1993.

(a) FAUCETS (Without stop valve)

(b) Pitcher Pump.

A consumer survey has already been started in MODS Zone-II area to detect illegal pitcher pump/hand pump along with other information. At the end of this survey, warning letter or notices will be issued, to remove the same. In this regard a campaign programme for public motivation has been started through different mass media like news paper T.V. etc.

It is noted that pitcher pump is mainly used due to shortage of water. After improvement of water supply, pitcher pump automatically will go off.

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(c) Leak detection and control programme.

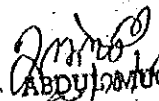
DWASA is continuously giving effort to detect the leakage in the distribution system and to control them. as a part of this effort DWASA has already rehabilitated 15 Km. water line in MODS Zone-II area. 7 Km. water line will be rehabilitated within June '93 also and this process of changing old pipe by new ones if necessary will be continued in future. Furthermore WASA personnel are given training to utilise leak detection equipments for prompt detection of leakages and remedial measure of the same.

5. Reinforcement of water quality control system.

DWASA has its own water quality control laboratory for analysing water quality as a routine work. A chemical Engineer, two micro biologists have already been appointed. On requirement Dhaka WASA will obtain the help from the Department of Environment (DOE), Atomic Energy Commission, BUET, Dhaka University etc. for ensuring the quality of water effectively.

6. To take necessary measures to obtain permission from DCC for construction work.

A general Permission for the Project work concerning Road repair, Road restoration etc. will be obtained from DCC by Dhaka WASA and submit to JICA, Bangladesh office before start of the work. Contractor will submit work schedule to DWASA. DWASA will submit work schedule to DCC to get Permission to work on the DCC Road.


ABDUL MUQEET
Member Engineer (Incharge)
and
Chief Engineer
Dhaka WASA.

OFFICE OF THE EXECUTIVE ENGINEER
WODS ZONE-II, DHAKA WASA, DHAKA

LIST OF STREET HYDRANT WITH LARAPION

| Sl.No. | Holding No. | Nos of tap | Remarks |
|--------|--|------------|---------|
| 1. | 199, Banshal Road, Dhaka. | 1(One) No. | |
| 2. | 177, -do- | 1(One) no. | |
| 3. | 161, -do- | 1(One) " | |
| 4. | 104, -do- | 1(One) " | |
| 5. | 28/6, -do- | 1(One) " | |
| 6. | 24, -do- | 1(One) " | |
| 7. | 86, Ahi Ullah Road, Dhaka. | 1(One) " | |
| 8. | 13, -do- | 1(One) " | |
| 9. | 89, K.P. Gosh street Road, Dhaka. | 1(One) " | |
| 10. | 28, -do- | 1(One) " | |
| 11. | 35, -do- | 1(One) " | |
| 12. | 51, -do- | 1(One) " | |
| 13. | 24/1, -do- | 1(One) " | |
| 14. | 24, -do- | 1(One) " | |
| 15. | 65, -do- | 1(One) " | |
| 16. | 6, -do- | 1(One) " | |
| 17. | 38/1, -do- | 1(One) " | |
| 18. | 5, -do- | 1(One) " | |
| 19. | 3, Kashgytu; i Road, Dhaka. | 1(One) " | |
| 20. | 25, -do- | 1(One) " | |
| 21. | 9, -do- | 1 (One) " | |
| 22. | 3, Kazim Uddin lane, Dhaka | 1(One) " | |
| 23. | 17, Baggdasha lane, Dhaka. | 1(One) " | |
| 24. | 47/1, -do- | 1(One) " | |
| 25. | 57, -do- | 1(One) " | |
| 26. | 11, -do- | 1(One) " | |
| 27. | Sromzibi Hoshpiliel front (Meya Bazar) | 1(One) " | |
| 28. | Nowbad Yusuf Market | 1(One) " | |
| 29. | 13, Samshabad, Dhaka. | 1(One) " | |
| 30. | 25, -do- | 1(One) " | |
| 31. | 37, Abdulla Sarkdr lane, Dhaka | 1(One) " | |
| 32. | 33, Freance Road, Dhaka | 1(One) " | |
| 33. | 1/1, Abul Hasnath Road, Dhaka | 1(One) " | |

| Sl.No. | Holding No. | Nos of tap | Remarks |
|--------|-------------------------------------|-------------|---------|
| 34. | 118, Abul Hasnath Road, Dhaka. | 1 (One) No. | |
| 35. | 121, -do- | 1 (One) " | |
| 36. | 7/2, Keder Nath dy lane, Dhaka | 1 (One) " | |
| 37. | 7/1, Golam Mostafa lane, Dhaka. | 1 (One) " | |
| 38. | 22/2, K.M. Azum lane, Dhaka. | 1 (One) " | |
| 39. | 18, Noor Box lane, Dhaka | 1 (One) " | |
| 40. | 2, Nabalque Miah lane, Dhaka | 1 (One) " | |
| 41. | 18, Hafiz Ullah Road, Dhaka | 1 (One) " | |
| 42. | 2, Molavi Bazar Road, Dhaka | 1 (One) " | |
| 43. | 13, Becharam Dewri, Dhaka | 1 (One) " | |
| 44. | 37, -do- | 1 (One) " | |
| 45. | 35, -do- | 1 (One) " | |
| 46. | 16, -do- | 1 (One) " | |
| 47. | 13/1, Ali Hossain Khan Road, Dhaka. | 1 (One) " | |
| 48. | Abul Khayrat Road, Dhaka | 1 (One) " | |
| 49. | 6/1, Agha Noowab Dewri, Dhaka. | 1 (One) " | |
| 50. | 12, S.K. Ray lane, Dhaka | 1 (One) " | |
| 51. | 3/1, D. J. Ray Road, Dhaka | 1 (One) " | |
| 52. | 35, Mitfot Road, Dhaka. | 1 (One) " | |
| 53. | 26, -do- | 1 (One) " | |
| 54. | Armanitula Mat | 1 (One) " | |
| 55. | 21/B, Armoniyam Street, Dhaka. | 1 (One) " | |
| 56. | 17/1, Syed Hashan Ali lae, Dhaka | 1 (one) " | |
| 57. | 8, -do- | 1 (One) " | |
| 58. | 37/4, Jindabahr Ist lane, Dhaka | 1 (One) " | |
| 59. | 32, -do- | 1 (One) " | |
| 60. | 4/3, -do- | 1 (One) " | |
| 61. | 28, -do- | 1 (One) " | |
| 62. | 22/3, -do- | 1 (One) " | |
| 63. | 13, Jindabahr 3rd. lane, Dhaka | 1 (One) " | |
| 64. | 4, -do- | 1 (One) " | |
| 65. | 33, Proshann Poddar Lane, Dhaka | 1 (One) " | |
| 66. | 29, -do- | 1 (One) " | |

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| Sl.No. | Holding No. | Nos of tap | Remerkes. |
|--------|---------------------------------------|-------------|-----------|
| 67. | 50, Prosham Podder lane, Dhaka | 1 (One) No. | |
| 68. | 51, Enligh Road, Dhaka. | 1(One) " | |
| 69. | 74, Tati Bazar Road, Dhaka. | 1(One) " | |
| 70. | 61/1, Radoka Mohan Bashak lane, Dhaka | 1(One) " | |
| 71. | 6, -do- | 1(One) " | |
| 72. | 27, -do- | 1(One) " | |
| 73. | 9/1, Julan Bari lane, Dhaka. | 1(One) " | |
| 74. | 31, Kazar Deweri, Dhaka. | 1(One) " | |
| 75. | 71, Ghoyal Nagor Road, Dhaka. | 1(One) " | |
| 76. | 25, -do- | 1(One) " | |
| 77. | 87, -do- | 1(One) " | |
| 78. | 25, Khot House street, Dhaka | 1(One) " | |
| 79. | 7, -do- | 1(One) " | |
| 80. | 8/1, -do- | 1(One) " | |
| 81. | 4, Ahshan Ullah Road, Dhaka | 1(One) " | |
| 82. | 9, -do- | 1(One) " | |
| 83. | 26, -do- | 1(One) " | |
| 84. | 19, -do- | 1(One) " | |
| 85. | 25/3, -do- | 1(One) " | |
| 86. | 13, -do- | 1(One) " | |
| 87. | 27, Khumartu, i Road, Dhaka | 1(One) " | |
| 88. | 9, -do- | 1(One) " | |
| 89. | 66/1, Shokari Bazar Road, Dhaka. | 1(One) " | |
| 90. | 74, -do- | 1(One) " | |
| 91. | 32/2, Panitula lane, Dhaka | 1(One) " | |
| 92. | 17, Bashabari lane, Dhaka | 1(One) " | |
| 93. | 11/1, Hayabut Nagor lane, Dhaka | 1(one) " | |
| 94. | 1/1, Kazi Riyaz Uddin Road, Dhaka | 1(One) " | |
| 95. | 22, Shahazada Hish lane, Dhaka | 1(One) " | |
| 96. | 9, Shadrghat Road, Dhaka | 1(One) " | |
| 97. | 2, Shimsen Road, Dhaka | 1(One) " | |
| 98. | 10, Ptuyatuli lane | 1(One) " | |
| 99. | 45, Akamal Khan Road (Babu bazar) | 1(One) " | |
| 100. | 16, Halgola Road, Dhaka | 1(One) " | |

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| Sl.No. | Holding No. | Nos of tap | Remarks |
|--------|------------------------------------|-------------|---------|
| 101. | 14,U Podder lane, Dhaka. | 1 (One) No. | |
| 102. | 90, Dhaka Water Works Road, Dhaka | 1 (One) " | |
| 103. | 144, -do- | 1 (One) " | |
| 104. | 28, -do- | 1 (One) " | |
| 105. | 38, -do- | 1 (One) " | |
| 106. | 2, Rahmotgong Road, Dhaka | 1 (One) " | |
| 107. | 25, -do- | 1 (One) " | |
| 108. | 46, -do- | 1 (One) " | |
| 109. | 30, Haji Ballu Road, Dhaka | 1 (One) " | |
| 110. | 31/5/A, -do- | 1 (One) " | |
| 111. | 21, -do- | 1 (One) " | |
| 112. | 44, Debi Dhasgath Road, Dhaka | 1 (One) " | |
| 113. | 9, -do- | 1 (One) " | |
| 114. | 17, -do- | 1 (One) " | |
| 115. | 30, Bar Katara Road, Dhaka | 1 (One) " | |
| 116. | 27, -do- | 1 (One) " | |
| 117. | 14, Showari Ghat Road, Dhaka | 1 (One) " | |
| 118. | 31, -do- | 1 (One) " | |
| 119. | 5/A, Champatuli lane, Dhaka | 1 (One) " | |
| 120. | 1, -do- | 1 (One) " | |
| 121. | 7, -do- | 1 (One) " | |
| 122. | 72, Khaze Dewayan Ist. lane, Dhaka | 1 (One) " | |
| 123. | 94, Hornath Ghos Road, Dhaka | 1 (One) " | |
| 124. | 17, Joynagha Road, Dhaka | 1 (One) " | |
| 125. | 11/2, -do- | 1 (One) " | |
| 126. | 28, Urdhu Road, Dhaka | 1 (One) " | |
| 127. | 16, Kaml Dhah Road, Dhaka | 1 (One) " | |
| 128. | 10, Umesh Datta Road, Dhaka | 1 (One) " | |
| 129. | 28, -do- | 1 (One) " | |
| 130. | 16, Bachshi Bazar lane, Dhaka | 1 (One) " | |
| 131. | 55, -do- | 1 (One) " | |
| 132. | 26, -do- | 1 (One) " | |

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| Sl.No. | Holding No. | Nos of tap | Remarks |
|--------|---|------------|---------|
| 133. | 31, Hosheni Dalan Road, Dhaka | 1 (One) | No. |
| 134. | 64/1, -do- | 1 (One) | " |
| 135. | 91/2, -do- | 1 (One) | " |
| 136. | 73, -do- | 1 (One) | " |
| 137. | 82, -do- | 1 (One) | " |
| 138. | 87, -do- | 1 (One) | " |
| 139. | 92/2, Nazim Uddin Road, Dhaka. | 1 (One) | " |
| 140. | 9, Hekim Habbur Rahman Road, Dhaka | 1 (One) | " |
| 141. | 10, -do- | 1 (One) | " |
| 142. | 14, -do- | 1 (One) | " |
| 143. | 33, -do- | 1 (One) | " |
| 144. | 9, Mohi Uddin lane, Dhaka | 1 (One) | " |
| 145. | 48, Nandkumar Dett Road, Dhaka. | 1 (One) | " |
| 146. | 31, Hornath Ghash Road, Dhaka | 1 (One) | " |
| 147. | 28, Haji Rahim box lane, Dhaka | 1 (One) | " |
| 148. | Sayestakhan Calley adentax Center. | 1 (One) | " |
| 149. | 25, -do- | 1 (One) | " |
| 150. | 29, Nurita lane, Dhaka | 1 (One) | " |
| 151. | 23, -do- | 1 (One) | " |
| 152. | Dhakeswari Fire Office | 1 (One) | " |
| 153. | Azimpur Road, Dhaka | 1 (One) | " |
| 154. | 40, Khajedewan 2nd. lane, Dhaka | 1 (One) | " |
| 155. | 28, -do- | 1 (One) | " |
| 156. | 88, -do- | 1 (One) | " |
| 157. | 26, -do- Ist lane | 1 (One) | " |
| 158. | 15, Kaji Kiyaz Uddin Road, Dhaka | 1 (One) | " |
| 159. | 27, -do- | 1 (One) | " |
| 160. | 30, -do- | 1 (One) | " |
| 161. | 42, -do- | 1 (One) | " |
| 162. | 5/7, Raznarayan Dhar Road, Dhaka | 1 (One) | " |
| 163. | 30/3, -do- | 1 (One) | " |
| 164. | 45, -do- | 1 (One) | " |
| 165. | 51/1, -do- | 1 (One) | " |
| 166. | 53, -do- | 1 (One) | " |

Contd.....P/6.

| Sl.No. | Holding No. | Nos of tap | Remarks. |
|--------|-----------------------------------|------------|----------|
| 167. | Raznarayan Dhar Road (Water Pump) | 1 (One) | No. |
| 168. | 28, Shahid Nagar, Dhaka | 1 (One) | " |
| 169. | 69.30/3, -do- | 1 (One) | " |
| 170. | 2/1, J.N. Shaha Road, Dhaka | 1 (One) | " |
| 171. | 4/2, -do- | 1 (One) | " |
| 172. | 19, -do- | 1 (One) | " |
| 173. | 20, -do- | 1 (One) | " |
| 174. | 204, -do- | 1 (One) | " |
| 175. | 29/2, Azghar lane, Dhaka | 1 (One) | " |
| 176. | 6, -do- | 1 (One) | " |
| 177. | 71, Chakk Circular Road, Dhaka | 1 (One) | " |
| 178. | 78, Mawlabi Bazar, Dhaka | 1 (One) | " |
| 179. | 210/1, J.N. Shaha Road, Dhaka | 1 (One) | " |
| 180. | 220, -do- | 1 (One) | " |
| 181. | 224/1, -do- | 1 (One) | " |
| 182. | 232, -do- | 1 (One) | " |
| 183. | 236, -do- | 1 (One) | " |
| 184. | 236/1/1, -do- | 1 (One) | " |
| 185. | 299, -do- | 1 (One) | " |
| 186. | 305, -do- | 1 (One) | " |
| 187. | 178, -do- | 1 (One) | " |
| 188. | 116, -do- | 1 (One) | " |
| 189. | Haji Ballu Chat lane, Dhaka | 1 (One) | " |
| 190. | 85, -do- | 1 (One) | " |
| 191. | 32, Lalbagh Road, Dhaka | 1 (One) | " |
| 192. | 324, -do- | 1 (One) | " |
| 193. | Khan Mohad Mosque | 1 (One) | " |
| 194. | 133, Lalbagh Road, Dhaka | 1 (One) | " |
| 195. | 244, -do- | 1 (One) | " |
| 196. | 132, -do- | 1 (One) | " |
| 197. | 38/5, -do- | 1 (One) | " |
| 198. | 185, -do- | 1 (One) | " |
| 199. | 210, -do- | 1 (One) | " |
| 200. | 209/A, -do- | 1 (One) | " |
| 201. | 201/gh -do- | 1 (One) | " |

Cond.....P/7.

| Sl.No. | Holding No. | Nos of tap | Remarks. |
|--------|----------------------------------|------------|----------|
| 202. | 204/1, Lalbagh Road, Dhaka | 1 (One) | No. |
| 203. | 226, -do- | 1 (One) | " |
| 204. | 212/4, -do- | 1 (One) | " |
| 205. | 234, -do- | 1 (One) | " |
| 206. | 236, -do- | 1 (One) | " |
| 207. | 155, -do- | 1 (One) | " |
| 208. | Azimpur Communitte Center. | 1 (One) | " |
| 209. | 8/1, Azimpur Road, Dhaka. | 1 (One) | " |
| 210. | 15, -do- | 1 (One) | " |
| 211. | 24/3, -do- | 1 (One) | " |
| 212. | 39, -do- | 1 (One) | " |
| 213. | 39/5, -do- | 1 (One) | " |
| 214. | 36, -do- | 1 (One) | " |
| 215. | 38, -do- | 1 (One) | " |
| 216. | 11, -do- | 1 (One) | " |
| 217. | 10, Kaz shree Nath street, Dhaka | 1 (One) | " |
| 218. | 6, Gongoram Bazar lane, Dhaka | 1 (One) | " |
| 219. | 14, -do- | 1 (One) | " |
| 220. | 23, -do- | 1 (One) | " |
| 221. | 34, -do- | 1 (One) | " |
| 222. | 5/6, Shubal Dhas Road, Dhaka | 1 (One) | " |
| 223. | 14, -do- | 1 (One) | " |
| 224. | 22, -do- | 1 (One) | " |
| 225. | 37, -do- | 1 (One) | " |
| 226. | 42, -do- | 1 (One) | " |
| 227. | 45, -do- | 1 (One) | " |
| 228. | 35, -do- | 1 (One) | " |
| 229. | 14, Kosmiretola lane, Dhaka | 1 (One) | " |
| 230. | 19, -do- | 1 (One) | " |
| 231. | 10, Duri Angu, lane, Dhaka | 1 (One) | " |
| 232. | 26, -do- | 1 (One) | " |
| 233. | 38, -do- | 1 (One) | " |
| 234. | 42, -do- | 1 (One) | " |

Contd.....P/8.

| Sl.No. | Holding No. | Nos of tap | Remarks. |
|--------|---------------------------------------|------------|----------|
| 235. | Abdul Aziz lane, Dhaka. | 1 (One) | No. |
| 236. | 59, -do- | 1 (One) | " |
| 237. | 51, -do- | 1 (One) | " |
| 238. | 44, -do- | 1 (One) | " |
| 239. | 42, -do- | 1 (one) | " |
| 240. | 13, Lalit Mohan Dhas lane | 1 (One) | " |
| 241. | 13/1, -do- | 1 (One) | " |
| 242. | 14, -do- | 1 (One) | " |
| 243. | 9, -do- | 1 (One) | " |
| 244. | 28, -do- | 1 (One) | " |
| 245. | 33, -do- | 1 (One) | " |
| 246. | 25, -do- | 1 (One) | " |
| 247. | 13, M.C. Ray lane, Dhaka | 1 (One) | " |
| 248. | 27, -do- | 1 (One) | " |
| 249. | 28, -do- | 1 (One) | " |
| 250. | 36, -do- | 1 (One) | " |
| 251. | 38, -do- | 1 (One) | " |
| 252. | 41, -do- | 1 (One) | " |
| 253. | 39, Nowbabgong Road, Dhaka | 1 (One) | " |
| 254. | 21, -do- | 1 (One) | " |
| 255. | Nowbabgong Citi Publick Toylat. | 1 (One) | " |
| 256. | -do- (Point of Park) | 1 (One) | " |
| 257. | -do- | 1 (One) | " |
| 258. | Nowbabgong Big Mosque | 1 (One) | " |
| 259. | 3, Hossin Udding Khen Ist lane, Dhaka | 1 (One) | " |
| 260. | 22, -do- | 1 (One) | " |
| 261. | 29, -do- | 1 (One) | " |
| 262. | 9, -do- 2nd. | 1 (One) | " |
| 263. | 7, -do- | 1 (One) | " |
| 264. | 30, -fo- | 1 (One) | " |
| 265. | 42, -do- | 1 (One) | " |
| 266. | 43, -do- | 1 (One) | " |
| 267. | 3, Neghur Beltli lane, Dhaka | 1 (One) | " |
| 268. | 15, -do- | 1 (One) | " |
| 269. | 21, -do- | 1 (One) | " |
| 270. | Nowbabgong Polis Jondt...P/9. | 1 (One) | " |

| Sl.No. | Holding No. | Wons of tap | Remarks |
|--------|---------------------------------|-------------|---------|
| 271. | 6/2, Ghanektuli road, Dhaka | 1 (One) No. | |
| 272. | 15/3, -do- | 1 (One) " | |
| 273. | 20, -do- | 1 (One) " | |
| 274. | 40, -do- | 1 (One) " | |
| 275. | Ghanektuli Jane Mosque | 1 (One) " | |
| 276. | Ghanektuli Sewer Calloni Mandir | 1 (One) " | |
| 277. | 50, Badda ghar lane, Dhaka. | 1 (One) " | |
| 278. | 7, -do- | 1 (One) " | |
| 279. | 48/3, -fo- | 1 (One) " | |
| 280. | 2, Nilbamar shaha Road, Dhaka | 1 (One) " | |
| 281. | 6, -do- | 1 (One) " | |
| 282. | 12, -do- | 1 (One) " | |
| 283. | 10, -do- | 1 (One) " | |
| 284. | 28, -do- | 1 (One) " | |
| 285. | 31, -do- | 1 (One) " | |
| 286. | 51, -do- | 1 (One) " | |
| 287. | 53, Anayetgong Road, Dhaka | 1 (One) " | |
| 288. | 73, Nilbamar shaha Road, Dhaka | 1 (One) " | |
| 289. | 4, Vaghapur Road, Dhaka | 1 (One) " | |
| 290. | 7, -do- | 1 (One) " | |
| 291. | 12, -do- | 1 (One) " | |
| 292. | 21, -do- | 1 (One) " | |
| 293. | 48, -do- | 1 (One) " | |
| 294. | 90, -do- | 1 (One) " | |
| 295. | 117, -do- | 1 (One) " | |
| 296. | 6, Moneswar Road, Dhaka | 1 (One) " | |
| 297. | 38, -do- | 1 (One) " | |
| 298. | 48/2, -do- | 1 (One) " | |
| 299. | 58, -do- | 1 (One) " | |
| 300. | 26/2, -do- | 1 (One) " | |
| 301. | 1, Hazaribagh Road, Dhaka | 1 (One) " | |
| 302. | 6/1, -do- | 1 (One) " | |
| 303. | 8, -do- | 1 (One) " | |
| 304. | 11, -do- | 1 (One) " | |
| 305. | 23/2, -do- | 1 (One) " | |
| 306. | 25, -do- | 1 (One) " | |
| 307. | 28, -do- | 1 (One) " | |
| 308. | 33, -do- | 1 (One) " | |
| 309. | Hazaribagh Battolar Mazar | 1 (One) " | |
| 310. | 56/4, -do- | 1 (One) " | |

Cont....P/10.

| Sl.No. | Holding No. | Nos of tap | Remarks |
|--------|---------------------------------|------------|---------|
| 311. | 118, Hazaribagh Road, Dhaka. | 1 (One) | No. |
| 312. | 127, -do- | 1 (One) | " |
| 313. | 119, -do- | 1 (One) | " |
| 314. | Hazaribagh Park | 1 (One) | " |
| 315. | 29/1, Hazeribagh lane, Dhaka | 1 (One) | " |
| 316. | 137, -do- | 1 (One) | " |
| 317. | 146, -do- | 1 (One) | " |
| 318. | 60, Moneswar Road, Dhaka. | 1 (One) | " |
| 319. | Hazaribagh (5 No. Pump). | 1 (One) | " |
| 320. | Khalil Sardar Mosque | 1 (One) | " |
| 321. | 10, Colan msk mhal, Dhaka | 1 (One) | " |
| 322. | 16, -do- | 1 (One) | " |
| 323. | 12, Nabipur, Dhaka | 1 (One) | " |
| 324. | 27, -do- | 1 (One) | " |
| 325. | 37, -do- | 1 (One) | " |
| 326. | 40, -do- | 1 (One) | " |
| 327. | 42, -do- | 1 (One) | " |
| 328. | 7/6, Ghaz Mhal, Dhaka | 1 (One) | " |
| 329. | 10, -do- | 1 (One) | " |
| 330. | 21, -do- | 1 (One) | " |
| 331. | 82, -do- | 1 (One) | " |
| 332. | 90, -do- | 1 (One) | " |
| 333. | 121, -do- | 1 (One) | " |
| 334. | 123, -do- | 1 (One) | " |
| 335. | 156, -do- | 1 (One) | " |
| 336. | Hazaribagh Dhaka Trenari, Dhaka | 1 (One) | " |
| 337. | 59, Bagda gM Naghar lane, Dhaka | 1 (One) | " |
| 338. | 18, Moneswar Ist lane, Dhaka. | 1 (One) | " |
| 339. | 20, Abdul Hadilane, Dhaka | 1 (One) | " |
| 340. | 32, -do- | 1 (One) | " |
| 341. | 23, -do- | 1 (One) | " |
| 342. | 77, Sikkatoli lane, Dhaka | 1 (One) | " |
| 343. | 6, -do- | 1 (One) | " |
| 344. | 72, -do- | 1 (One) | " |

Cond't.....F/11.

| Sl.No. | Holding no. | Nos of tap | Remarks. |
|--------|------------------------------------|------------|----------|
| 345. | 14, Shikkatoli lane, Dhaka | 1 (One) | No. |
| 346. | 51/A, -do- | 1 (One) | " |
| 347. | 49, -do- | 1 (One) | " |
| 348. | 13, Malitola lane, Dhaka | 1 (One) | " |
| 349. | 78, -do- | 1 (One) | " |
| 350. | 99/1, Haji Osman Ghani Road, Dhaka | 1 (One) | " |
| 351. | 38, -do- | 1 (One) | " |
| 352. | 5/2, Abdul Hadi lane, Dhaka | 1 (One) | " |
| 353. | 128, Siddique Bazar, Dhaka | 1 (One) | " |
| 354. | 85, -do- | 1 (One) | " |
| 355. | 48/1, -do- | 1 (One) | " |
| 356. | 133, -do- | 1 (One) | " |
| 357. | 77, Howbarketra Road, Dhaka | 1 (One) | " |
| 358. | 3, Haji Ala Uddin Road, Dhaka | 1 (One) | " |
| 359. | 12, -do- | 1 (One) | " |
| 360. | 28/A, Haji Osman Ghani Road, Dhaka | 1 (One) | " |
| 361. | 135, Agha Shadeque Road, Dhaka | 1 (One) | " |
| 362. | 32, Abul Hasnat Road, Dhaka | 1 (One) | " |
| 363. | 132, -do- | 1 (One) | " |
| 364. | 118, -do- | 1 (One) | " |
| 365. | 101, -do- | 1 (One) | " |
| 366. | 144, -do- | 1 (One) | " |
| 367. | 17/18, Jhuri Oyala Ghali | 1 (One) | " |
| 368. | 62, -do- | 1 (One) | " |
| 369. | 142, Bangladesh Lhat Pump | 1 (One) | " |
| 370. | 3, Tequer Hat, Dhaka | 1 (One) | " |
| 371. | 58, Lutfar Rahman lane, Dhaka | 1 (One) | " |
| 372. | 135, -do- | 1 (One) | " |
| 373. | 120, -do- | 1 (One) | " |
| 374. | 90/98, -do- | 1 (One) | " |
| 375. | 118, -do- | 1 (One) | " |
| 376. | 91/1, -do- | 1 (One) | " |
| 377. | 62, Gholque Pal lane, Dhaka | 1 (One) | " |
| 378. | 99, Malitola, Dhaka. | 1 (One) | " |

Cond't.....2/12.

T. T.

| Sl.No. | Holding No. | Nos of tap | Remarks |
|--------|--|------------|---------|
| 379. | 66, Malitola, Dhaka. | 1 (One) | No. |
| 380. | 24, -do- | 1 (One) | " |
| 381. | 15, -do- | 1 (One) | " |
| 382. | 29/2, -do- | 1 (One) | " |
| 383. | 27, -do- | 1 (One) | " |
| 384. | 267, Banshal Road, Dhaka | 1 (One) | " |
| 385. | 167, -do- | 1 (One) | " |
| 386. | 32, Abul Hasnat E Road, Dhaka | 1 (One) | " |
| 387. | 101, -do- | 1 (One) | " |
| 388. | 132, -do- | 1 (One) | " |
| 389. | 118, -do- | 1 (One) | " |
| 390. | 141, -do- | 1 (One) | " |
| 391. | 83, -do- | 1 (One) | " |
| 392. | 83, -do- | 1 (One) | " |
| 393. | 77, Siddique Bazar, Dhaka | 1 (One) | " |
| 394. | 19/20, -do- | 1 (One) | " |
| 395. | 20/25, -do- | 1 (One) | " |
| 396. | 40/41, -do- | 1 (One) | " |
| 397. | 173, -do- | 1 (One) | " |
| 398. | 150, -do- | 1 (One) | " |
| 399. | 49, -do- | 1 (One) | " |
| 400. | 76, -do- | 1 (One) | " |
| 401. | 86, -do- | 1 (One) | " |
| 402. | 102/1, -do- | 1 (One) | " |
| 403. | 105, -do- | 1 (One) | " |
| 404. | 66/1, -do- | 1 (One) | " |
| 405. | 62, -do- | 1 (One) | " |
| 406. | 83 -do- | 1 (One) | " |
| 407. | 96, -do- | 1 (One) | " |
| 408. | 42, Haji Osman Ghani Road, Dhaka | 1 (One) | " |
| 409. | 123, Siddique Bazar, Dhaka | 1 (One) | " |
| 410. | 2, Nowbabkatra, Dhaka. | 1 (One) | " |
| 411. | 51/1, -do- | 1 (One) | " |

Condt.....P/12.

| Sl.No. | Holding No. | Nos of tap. | Remarks. |
|--------|---------------------------------|-------------|----------|
| 412. | 54 ,Nowbabkatra, Dhaka | 1 (One) No. | |
| 413. | 49, -do- | 1 (One) " | |
| 414. | 57/1, -do- | 1 (One) " | |
| 415. | 15, -do- | 1 (One) " | |
| 416. | 62, Agha Shadeque Road, Dhaka | 1 (One) " | |
| 417. | 91, -do- | 1 (One) " | |
| 418. | 98, -do- | 1 (One) " | |
| 419. | 135, -do- | 1 (One) " | |
| 420. | 77, -do- | 1 (One) " | |
| 421. | 46, -do- | 1 (One) " | |
| 422. | 16/17, -do- | 1 (One) " | |
| 423. | 52, -do- | 1 (One) " | |
| 424. | 83, -do- | 1 (One) " | |
| 425. | 3, Kazi Alla Uddin Road, Dhaka | 1 (One) " | |
| 426. | 12, -do- | 1 (One) " | |
| 427. | 16, -do- | 1 (One) " | |
| 428. | 28, -do- | 1 (One) " | |
| 429. | 92, Agha Shadeque Road, Dhaka | 1 (One) " | |
| 430. | 43, Aghamashi lane, Dhaka | 1 (One) " | |
| 431. | 16/17, -do- | 1 (One) " | |
| 432. | 83, -do- | 1 (One) " | |
| 433. | 481, Shikkatoli Road, Dhaka | 1 (One) " | |
| 434. | 4, Abdul Hadi; lane, Dhaka | 1 (One) " | |
| 435. | 18, -do- | 1 (One) " | |
| 436. | 32, Alinequei dewri lane, Dhaka | 1 (One) " | |
| 437. | 55, Nowbabkatra Road, Dhaka | 1 (One) " | |
| 438. | 39, -do- | 1 (One) " | |
| 439. | 7, -do- | 1 (One) " | |
| 440. | 16, Kazi Alla Uddin Road, Dhaka | 1 (One) " | |
| 441. | 84, -do- | 1 (One) " | |
| 442. | 144/2, -do- | 1 (One) " | |
| 443. | 138, Aghashadeque lane, Dhaka | 1 (One) " | |
| 444. | 62, -do- | 1 (One) " | |
| 445. | 77, -do- | 1 (One) " | |
| | | 1 (One) " | |

Cond4... P/13.

| Sl.No. | Holding No. | Nos of tap | Remarks |
|--------|-------------------------------------|-------------|---------|
| 446. | 105/3, Hazi Osman Ghani Road, Dhaka | 1 (One) No. | |
| 447. | 38, -do- | 1 (One) " | |
| 448. | 23, Nazima Bazar, Dhaka . | 1 (One) " | |
| 449. | 21, -do- | 1 (One) " | |

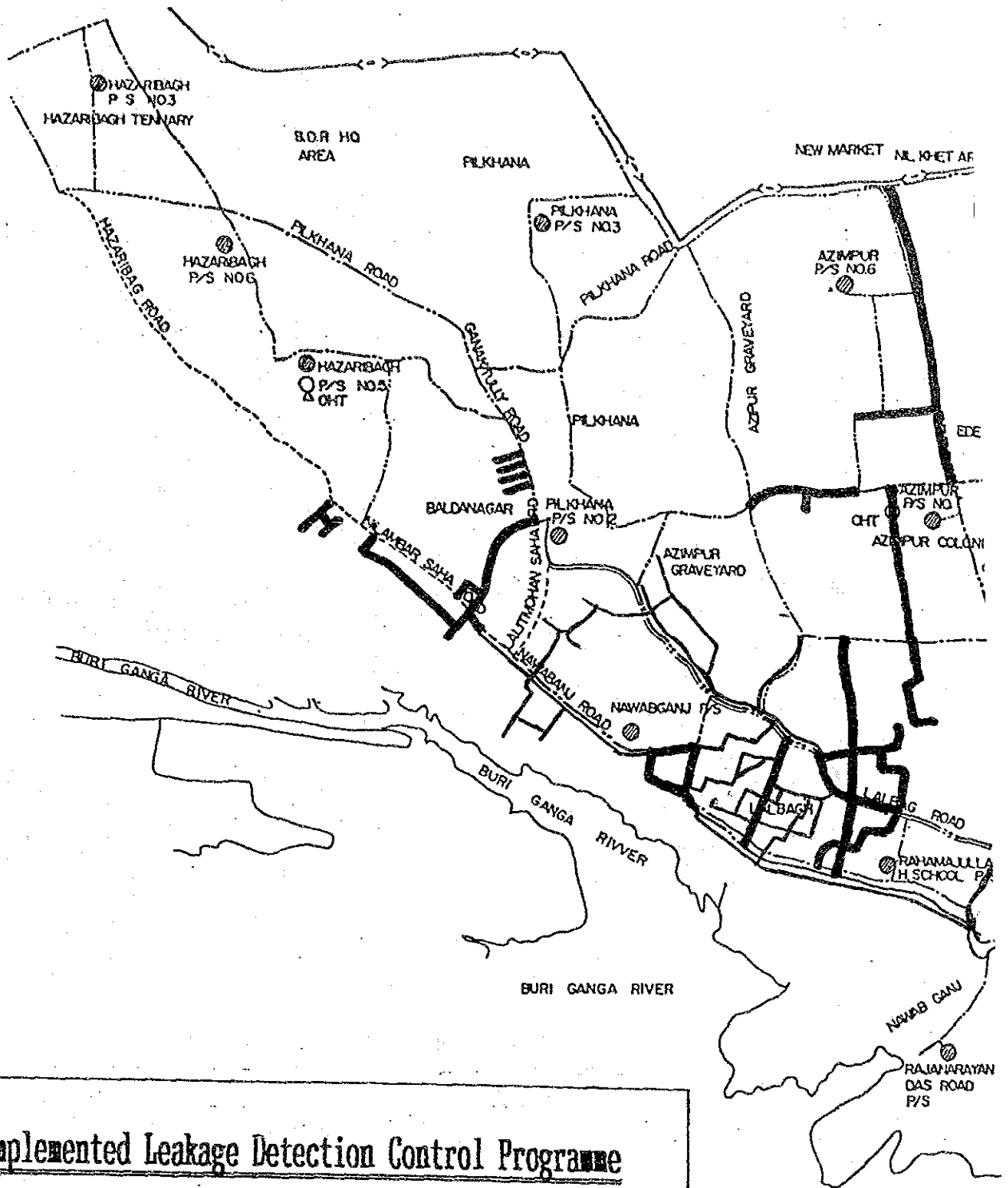
OVERALL SCHEDULE FOR MAINTENANCE OF STREET HYDRANT IN ZONE-II AREA

| Item of works | 1992 | | 1 9 9 3 | | | | | | | | | | | | | |
|------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|-----------------------|
| | Oct | Nov Dec | Jan | Feb | Mar | Apr | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| List up location of Hydrants | XXX | | | | | | | | | | | | | | | |
| Prepare for bidding | XXXXXXX | | | | | | | | | | | | | | | |
| Start repair work | | | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX | XXXXXXX |
| Maintenance | | | | | | | | | | | | | | | | XXXXXXXXXXXXXXXXXXXX* |



(for 390 units)

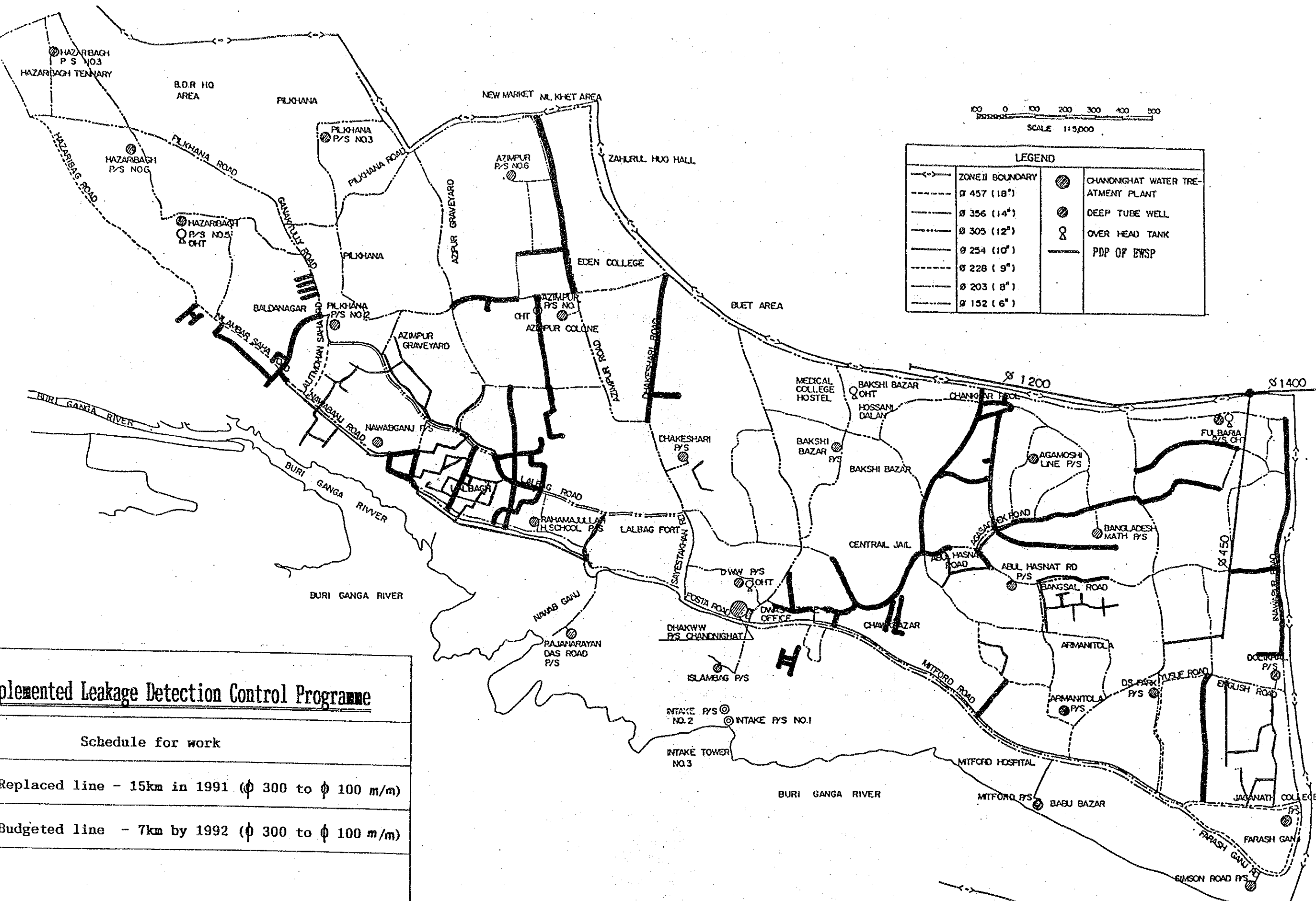
* to be continued, if necessary.

Handwritten notes:
 28/12/22
 (2-12)
 28/12/22
 28/12/22
 28/12/22



Implemented Leakage Detection Control Programme

| code | Schedule for work |
|---|--|
|  | Replaced line - 15km in 1991 (ϕ 300 to ϕ 100 m/m) |
|  | Budgeted line - 7km by 1992 (ϕ 300 to ϕ 100 m/m) |
| | |



| Implemented Leakage Detection Control Programme | |
|---|---------------------------------|
| Schedule for work | |
| Replaced line - 15km in 1991 | (ϕ 300 to ϕ 100 m/m) |
| Budgeted line - 7km by 1992 | (ϕ 300 to ϕ 100 m/m) |

Handwritten notes:
 26/30/92
 (2)
 26/30/92

A-6 Comments of DWASA on Draft Basic Design Study Report and confirmation of the Comments

Comments of DWASA on the :-

"Basic Draft Design Study Report on the Project for Balancing, Modernizing, Rehabilitation and Expansion of Chandnighat Water Treatment Plant.

- A. 1. WASA personnels should be associated from the Planning stage of this project upto the completion. This integration is necessary for conceptual understanding of the philosophy as well as techniques of the project. The consultant may furnish a set-up for WASA personnel in this regard.
- B. 1. During the implementation of this BMRE Project, the existing water supply facilities should be kept uninterrupted.
2. A more extensive raw water quality test, specially in dry season may be performed by the consultant to detect presence of heavy metal, excessive $\text{NH}_4\text{-N}$ and other harmful materials, if any.
3. Generally during dry months, there are problems of excessive algal growth in raw water near the intake point. This is to be taken into consideration during process design.
4. The intake point is to be extended further down to the river as per earlier proposal. Problems of necessary permission, if any, will be resolved by DWASA.
5. The intake water pipe starting from the intake point in the river upto the intake pump house number 1 is to be refixed/rehabilitated as required.

Contd.....P/2.

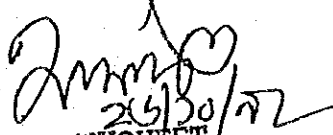
6. The structural stability and longevity of flocculation and sedimentation basins may be checked during designing stage provision for renovation of these structures, if possible, may be kept in this project.
7. Detail of alignment & sizes of transmission pipe from intake to receiving well may be furnished.
8. Prechlorination point may be indicated in the treatment flow chart.
9. Safe disposal of the sludge should be ensured in order to avoid environmental hazards and recirculation through intake.
10. Originally a 600 mm dia pipe size was discussed for treated water distribution system. In the basic design draft study report, it is proposed to be 500 mm. This may be rechecked.
11. Provision for pressure drop valve in the distribution system may be kept for structural safety of existing secondary water system.
12. Construction of distribution main from the plant to the secondary water main to be included in the scope of work.
13. Renovation of both intake and distribution pump houses to be included in this project.
14. Provision for security arrangement such as boundary wall etc. is to be kept in the scope of work.

15. Complete installation of Mechanical and Electrical Equipment for the treatment plant is to be included in the scope of work.
16. For operational necessity priming facility of intake pumps may be kept in the system.
17. Installation of a new 1000 KVA transformer & repair of the existing H.T. Switch gear should be kept in the scope of work. All electrical cables to be installed underground.
18. Specification of intake pumps to be defined more clearly. All pumps may be self primed type.
19. The Rising pump for filter may be provided with Turbine pump. Provision of standby pumps may be kept.
20. The condition of the existing pumps which will not be changed during this project is to be checked and comments may be furnished regarding their performance.
21. Existing intake & distribution pumps, electrical sub-station renovations, alterations, if necessary, may be included in the scope of work.
22. Provision for well equipped water testing laboratory to be kept in the scope of work.
23. The scope of work from GOB side should be described elaborately to avoid any future uncertainty.

24. If possible, the construction period may be reduced.
 25. The existing DTW is to be kept operational in view of meeting local water demand.
 26. At the end of construction of this project, the consultant is requested to furnish an operation & maintenance manual and proposal for a required set-up of personnel for operation and maintenance of the rehabilitated WTP.
 27. Road repairment cost is to be included in the scope of work.
- C.
1. The concept of staff house is not clear enough. More elaborate description on the same is necessary.
 2. Provision for further vertical extension of the proposed office building may be kept.
 3. Provisions for official & residential accommodation for water works maintenance staff to be kept in the project.
 4. Probable cost estimate, for consultancy service, construction cost of the project including foreign currency involvement & GOB contribution including CDST to be stated for preparation of necessary documents in Bangladesh.
 5. Authority & Responsibility of DWASA personnel involved in the project to be properly out lined.

Contd.....P/5.

6. Provision for extensive training of concerned WASA personnel for effective management of operation and maintenance of the plant is requested.
7. There is no indication of maintenance period of the working contractor. DWASA will prefer one year maintenance period.
8. Location of site office of the project may be shown well ahead of commencement of the project.
9. Provision of utility vehicles (Jeep/Pick-up) for supervision of project, operation & maintenance of the plant needs be kept.
10. The organization plan for the plant can be modified and shown shift-wise with job specification of individual staff.
11. In page 168, the comments on over all quality of water in general is not correct. Only iron (Fe.) is excessive according to table 3-5 page 52 of the Basic Design Study Report. This may be taken care of at the time of process design.


26/30/72
ABDUL MUQUEET
Member Engineer (Incharge)
and
Chief Engineer
DHAKA WASA.

*CONFIRMATION TO THE COMMENTS, FURNISHED BY DWASA ON THE BASIC DESIGN
STUDY REPORT FOR CHANDNIGHAT WTP, FROM THE CONSULTANT.*

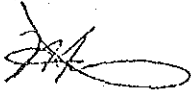
- A1. It is agreeable that before commencement of the Detail Design Work the consultant will submit a set-up for WASA personnel those will be associated with the project from its planing stage upto the completion. (ref. page No.42,170)
- B1. The same has been considered and recommended in the Basic Design Study Report (Page No.92,109,165).
- B2. The same is not agreeable, as because;
- a) The matter is entirely in the scope of DWASA's side operation.
 - b) DWASA's having its own laboratory, must be doing such testings throughout all seasons, involvement of consultant in above work is not necessary.
 - c) At present the quality of water is upto the mark, which has been incorporated in page No.52
- B3. Preservation of the enviromental conditions and to ensure the quality of raw water to be drawn from the river (at intake point) is the overall resposibility of the WTP Management at Chandnighat. However, the consultant aims to assist DWASA to take necessary action on above respect during detail design and supervisory service stage for the project,if it is required.
- B4. Recommendation on this point has been made in the Basic Design Study Report (Page No.73,173).Moreover, at present quality of water at existing intake point is allright. In future if needed intake point may be extended upto the main river by a separate project.
- B5. The same will be considered to refix as required.

- B6. The same is agreeable, considerable amount of renovation works for these structures has already been suggested in the Basic Design Study report. (ref.page No.72)
- B7. The same has already been considered in the Basic Design Study Report, for Pump stations No.1 and No.2 (ref.page No.151).
- B8. The same has been indicated in the Basic Design Study Report.. (ref.page No.150)
- B9. As the material of the sludge contents is the same as that of raw water contents (suspended solid material) therefore, recirculation of the same will not effect to river water quality. However, the discharge point for recirculation into river will be considered, in order to prevent environmental hazards.
- B10. The 600mm dia pipe, in question, was decided for 11MGD capacity, but this project decided design for 8.6MGD for which 500mm dia pipe deemed to be sufficient.
- B11. The same is not necessary because distribution pressure is max. 3.5 kg/m which is not too high pressure for distribution main. Also, the pressure control can be done by the control valve.
- B12. Said connection works are included in this project, but the number of connection points are limited and will be considered from the technical point of view. It will be included in scope of work.
- B13. Already considered in the Basic Design Study Report for minor repair works, painting, finishing ect. for the buildings only.
- B14. Only the portion of wall demolished at the time of construction will be re-constructed again, as it was, and finishing work will be done for only the part in relation to demolished wall.
- B15. Already considered for in the Basic Design Study Report. In scope of works installation for all E/M equipment will be included. (ref. page No.162)

- B16. Priming facility for the pump will be considered at detail design stage after confirmation of critical water level between river water and the pump installations.
- B17. Existing 800KVA transformer is available to maintain running, therefore, question of installation and repair is out of scope. Refer to Appendices A-4, Memorandum of Discussion, Part 2,10).
- B18. Already considered for and incorporated in the Basic Design Study Report, Page-116.
- B19. There is no space for the installation of horizontal Turbine Pump and therefore Submersible Pump has been selected. The subject in question will be clarified during Detail Design Study period. The rough cost for both kinds of pump is almost same. Standby Pump has already considered in the Report, - Page No.124.
- B20. Consultant will furnish comments on Intake pumps, as requested.
- B21. The same has already been incorporated in the Basic Design Study Report, - Page No.162.
- B22. Since DWASA has its own laboratory, general water quality analysis should be done there. To decide of the chemical dosing rate some testing equipment will be provided in the Chandighat water works, under this project, besides PH, turbidity, colour, temperature testing instrument and equipment. Provision of Lab. facilities will be included in scope of works.
- B23. The same has already been incorporated in the Basic Design Study Report, - Page No.92,164.
- B24. The same has already been incorporated in the Basic Design Study Report, - Page No.109,160,161.
- B25. The same has been considered and will be indicated on the general plan (Page No.133) of the Basic Design Study Report.

- B26. The same has already been incorporated in the Basic Design Study Report (Page No.96), as for Operation & Maintenance Manual will be presented by the contractor, as was done for USCR Project.
- B27. The same has already been included in the project cost.
- C1. The same has been considered as a resting place for on duty staff specially during night works
- C2. The same has been considered for further build up extension for 2nd floor, for future.
- C3. The same is considered as out of scope for this project.
- C4. The consultant agrees to provide the same.
- C5. As agreed earlier, during Detail Design work the consultant will provide a set-up for DWASA personnel attached to this project, it will also clarify their authority and responsibilities. Please refer to Page No.43 for implementation organisation proposed.
- C6. Training for DWASA staff on operation and maintenance of the WTP is inclusive of the scope of works for the project. Same way it was done for USCR Project.
- C7. The same will be incorporated in the tender conditions, same as the USCR PROJECT.
- C8. The same has already been incorporated in the Basic Design Study Report, Page No.97.
- C9. The same is considered as out of scope for this project.
- C10. The same has already been incorporated in terms of shift-wise with job specification by means of the existing shift organisation in the Basic Design Study Report, page No.96.
- C11. The same will be followed to your comment.

N.B.1 Communication system shall be provided by walky-talky set.



KENJI HORI

Consultant,

NIPPON JOGESUIDO SEKKEI CO.LTD.

Tokyo-Japan.

Confirmed except the
content in SL B14

August
17/11/92

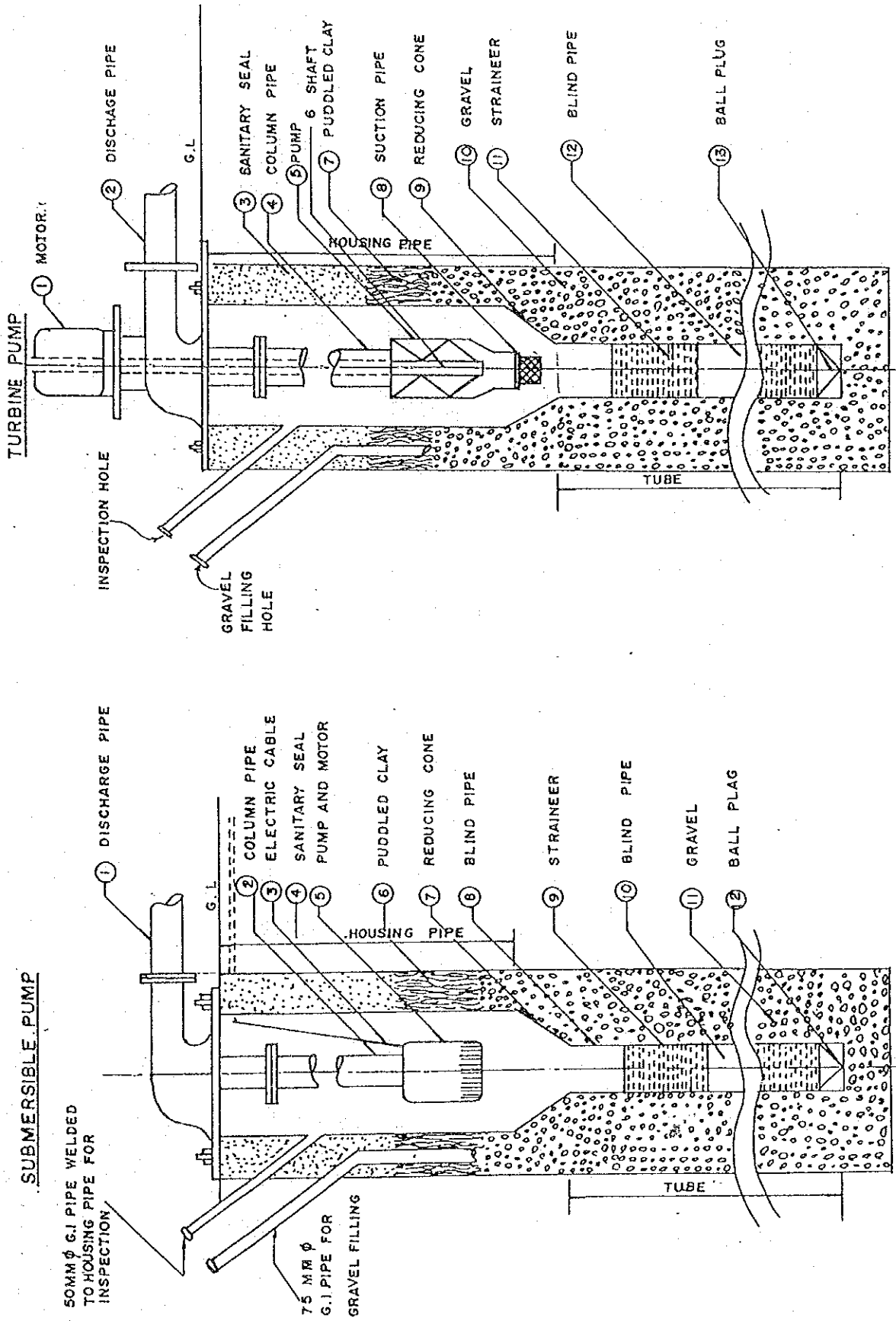
DATED : Oct. 29, 1992

APPENDICES B

- B-1 Standard Structure of DWASA Deep Tube Well**
- B-2 Specification of Deep Tube Wells in MODS Zone II**
- B-3 Static Water Level and Operating Water Level of Deep Well**
- B-4 Water Quality of Deep Tube Wells in MODS Zone II**
- B-5 MODS Zone II
Valve Control for Hour - Restricted Water Supply**
- B-6 Results of Interview Survey**
- B-7 Raw Water Quality**
- B-8 Operation of Overhead Tank**
- B-9 Single Electrical Line of Chandnighat W. T. P.**
- B-10 Result of Excavation Test Survey for Distribution Pipe Route**
- B-11 Result of Boring Test in Chandnighat W. T. P.**

B-1 Standard Structure of DWASA Deep Tube Well

B-1 Standard Structure of DWASA Deep Tube Well



B-2 Specification of Deep Tube Wells in MODS Zone II

TABLE
DEEP TUBEWELL IN ZONE-II

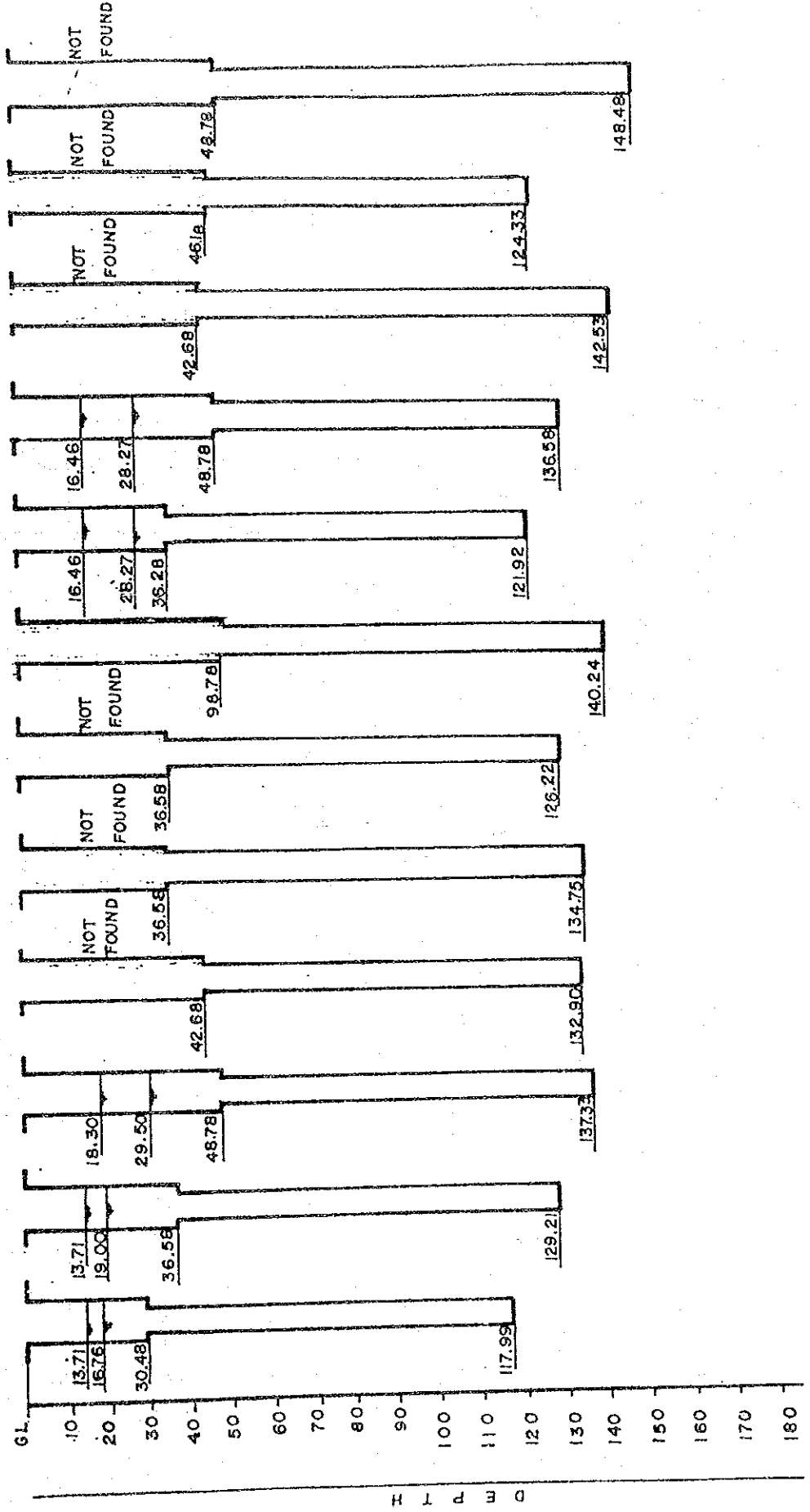
| Well No. | L O C A T I O N | W E L L S P E C I F I C A T I O N | | | R E M A R K S |
|----------|------------------------|-----------------------------------|-----------|--------------|-----------------------|
| | | Construction year | Depth (m) | φ (Tube) m/m | |
| 201 | DHAKESWARI | 1961 | 118.0 | 150 | UNDER RE-CONSTRUCTION |
| 202 | DHAKA WATER WORKS | 1971 | 129.2 | 200 | |
| 203 | BAKSHEBAZAR | 1982 | 137.3 | 200 | |
| 204 | RAHAMATULLAH | 1977 | 132.9 | 200 | |
| 205 | NAWABGANJ | 1973 | 134.8 | 200 | |
| 206 | AZIMPUR (No. 6) | 1975 | 126.2 | 200 | |
| 207 | AZIMPUR (No. 7) | 1990 | 140.2 | 200 | |
| 208 | PEELKHANA (No. 2) | 1970 | 121.9 | 200 | |
| 209 | PEELKHANA (No. 3) | 1989 | 136.6 | 200 | |
| 210 | HAZARIBAG (No. 3) | 1980 | 142.5 | 200 | |
| 211 | HAZARIBAG (No. 6) | 1991 | 124.3 | 200 | |
| 212 | HAZARIBAG (No. 5) | 1976 | 148.5 | 200 | |
| 213 | ABUL HASNAT RD. | 1973 | 86.9 | 200 | |
| 214 | FULBARIA | 1989 | 154.5 | 200 | |
| 215 | JAGANNATH COLLEGE | 1989 | 168.6 | 200 | |
| 216 | MITROD HOSPITAL | 1987 | 150.0 | 200 | |
| 217 | SIMSON ROAD | 1989 | 158.5 | 200 | |
| 219 | DHOLAI KHAL (NOWABPUR) | 1976 | 135.7 | 200 | |
| 220 | S. D. PARK | 1978 | 142.5 | 200 | |
| 221 | BANGLADESH MATH | 1977 | 135.7 | 200 | |
| 222 | ARMANITOLA | 1977 | 135.7 | 200 | |
| 223 | ISLAMBAGH | 1989 | 143.3 | 200 | |
| 224 | RAJNARAYAN DAS RD | 1990 | 131.7 | 200 | |
| | TOTAL (AVERAGE) - | <1980.6> | <131.1> | <200> | |

B-3 Static Water Level and Operating Water Level of Deep Well

B-3 STATIC WATER LEVEL & OPERATING WATER LEVEL OF DEEP WELL (1)

(NO)

WELL NO. (NO.201) (NO.202) (NO.203) (NO.204) (NO.205) (NO.206) (NO.207) (NO.208) (NO.209) (NO.210) (NO.211) (NO.212)
 SUPPLY QUANTITY (L/MINUTE) (2.200) (4.200) (2.400) (1.900) (3.000) (2.800) (4.000) (5.170) (5.230) (3.820) (4.500) (3.800)

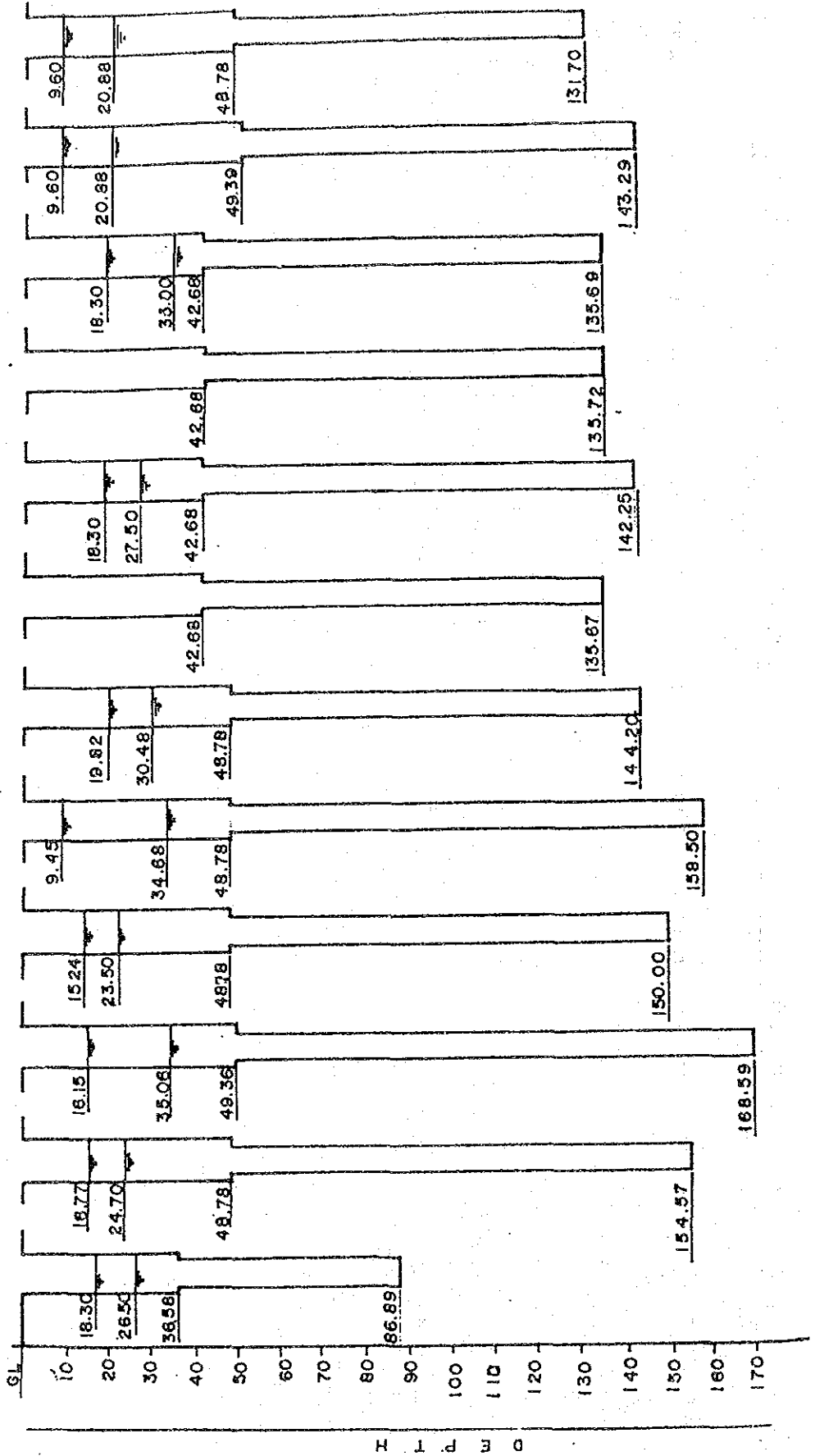


STATIC WATER LEVEL & OPERATING WATER LEVEL OF DEEP WELL (2)

(NO.213) (NO.214) (NO.215) (NO.216) (NO.217) (NO.218) (NO.219) (NO.220) (NO.221) (NO.222) (NO.223) (NO.224)

SUPPLY QUANTITY

(L / MINUTE) (2,400) (4,000) (3,400) (3,500) (3,900) (4,400) (3,800) (3,900) (2,800) (3,400) (3,300) (3,400)



B-4 Water Quality of Deep Tube Wells in MODS Zone II

WATER QUALITY OF DEEP TUBE-WELL IN ZONE 2

APPENDICES B-4

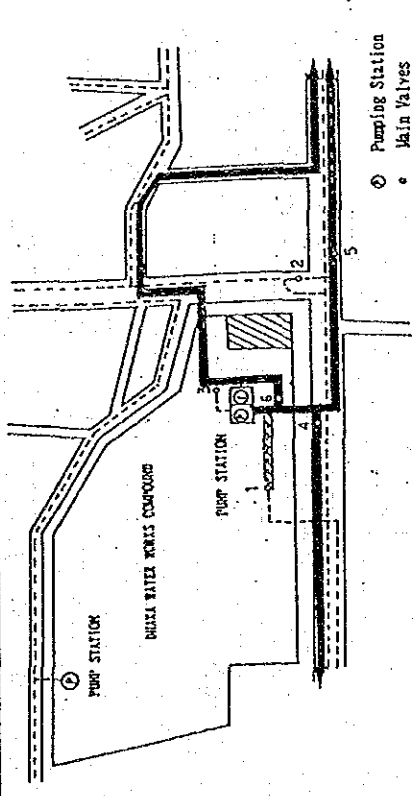
| WELL NO | WELL NAME | E.C | ALKALINITY | CHLORIDE | CALCIUM | HARDNESS | COLIFORMS | NOTE |
|---------|--------------------|-------|-------------------------|----------|---------|----------|-----------|---|
| | | uS/cm | (as CaCO ₃) | mg/l | mg/l | mg/l | | |
| 201 | DBAKESWARI | - | - | - | - | - | - | UPPER: APRIL 1989 UNDER: NOVEMBER 1989 |
| 202 | DBAKA WATER WORKS | 1,000 | 155 | 192 | 76.15 | 220 | 27 | |
| 203 | BAKSIBAZAR | 600 | 110 | 83 | 54.50 | 240 | 37 | |
| 204 | BARMATULLAH | 460 | 120 | 73 | 48.09 | 194 | - | |
| 205 | NAWABGANJI | 500 | 105 | 110 | 52.10 | 238 | 48 | |
| 206 | AZIMPUR NO 6 | 600 | 90 | 101 | 48.09 | 180 | - | |
| 207 | AZIMPUR NO 7 | 650 | 90 | 132 | 60.92 | 198 | - | |
| 208 | PEEL KHANA NO 2 | 640 | 95 | 36 | 28.05 | 148 | 14 | |
| 209 | PEEL KHANA NO 3 | 470 | 110 | 80 | 55.31 | 180 | 2 | |
| 210 | HAZARIBAGH NO 4 | 500 | 155 | 80 | 36.07 | 100 | 12 | |
| 211 | HAZARIBAGH NO 3 | 600 | 95 | 98 | 38.87 | 132 | - | |
| 212 | HAZARIBAGH NO 5 | 500 | 150 | 80 | 44.08 | 120 | - | |
| 213 | ABUL HASNAT ROAD | 700 | 140 | 199 | 30.46 | 100 | 80 | |
| 214 | FULBARIA | 700 | 110 | 125 | 60.92 | 236 | 20 | |
| 215 | JAGANNATH COLLEGE | 700 | 155 | 95 | 28.05 | 236 | - | |
| 216 | MITFORD HOSPITAL | 250 | 110 | 82 | 50.50 | 183 | 31 | |
| 217 | SIMSON ROAD | 390 | 100 | 42 | 48.09 | 136 | 35 | |
| 218 | AGAMACHI LANE | - | - | - | - | - | - | |
| 219 | DHOLAIKHAL | 825 | 115 | 195 | 64.93 | 254 | 4 | |
| 220 | S. D. PARK | 625 | 130 | 65 | 50.50 | 250 | - | |
| 221 | BANGLADESHI MATH | 700 | 135 | 68 | 45.69 | 446 | 0 | |
| 222 | ARMANITOLA MATH | 450 | 85 | 80 | 55.30 | 64 | 6 | |
| 223 | ISLAMBAHI | - | - | - | - | - | - | |
| 224 | RAJNARAYANDAS ROAD | - | - | - | - | - | - | |

**B-5 MODS Zone II
Valve Control for Hour - Restricted Water Supply**

Water Supply Systematic Diagram

Valve operation for every distribution period

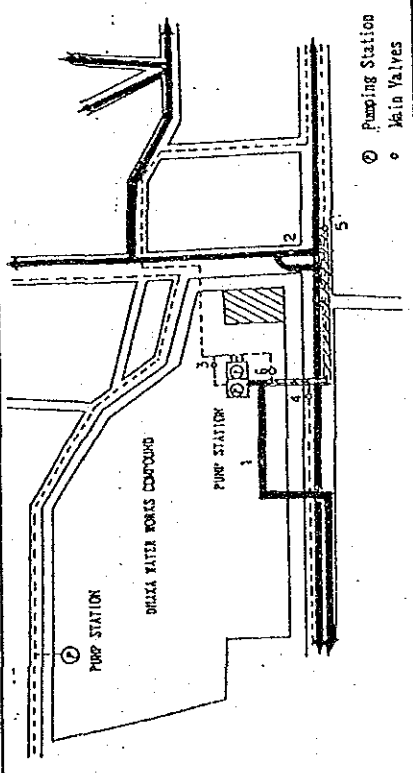
TYPE I



| Operational period | Status of valve | | | | | | Served area |
|---|-----------------|---|---|---|---|---|---|
| | ① | ② | ③ | ④ | ⑤ | ⑥ | |
| AM 11.00 ~ PM 2.00 PM 7.00 ~ PM 1.30 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | Serve to East/West area by rising supply main |

(○: Fully open, ⊗: Fully close)

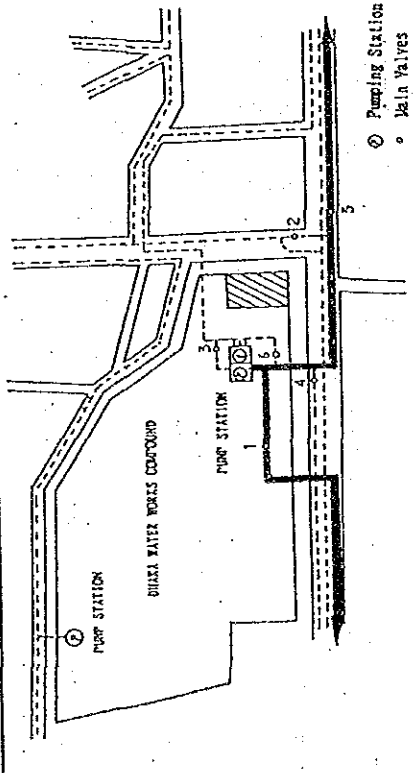
II



| Operational period | Status of valve | | | | | | Served area |
|--|-----------------|---|---|---|---|---|---|
| | ① | ② | ③ | ④ | ⑤ | ⑥ | |
| AM 4.00 ~ AM 9.30 PM 2.00 ~ PM 7.00 | ● | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | Serve to East/West area by town supply main |

(○: Fully open, ●: Partly open, Fully close)

III

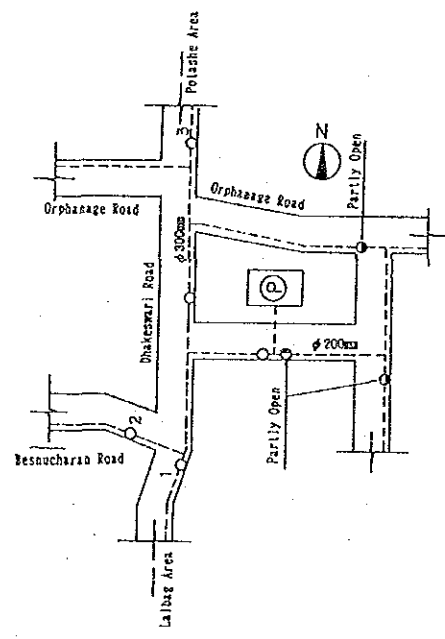


| Operational period | Status of valve | | | | | | Served area |
|--------------------|-----------------|---|---|---|---|---|---|
| | ① | ② | ③ | ④ | ⑤ | ⑥ | |
| AM 9.30 ~ AM 11.00 | ● | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | Serve to East area by rising supply main, West area by town supply main |

(○: Fully open, ●: Partly open, Fully close)

Well

Water Supply Systematic Diagram

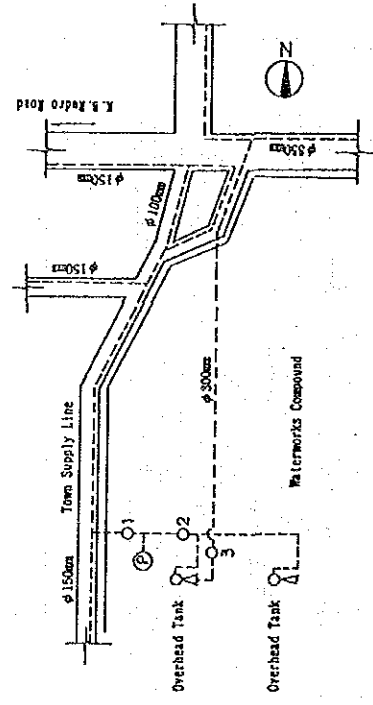


DHAKESWARI P/S NO. 201

Valve Operation for every Distribution Period

| Operation period | Status of valves | | | | | Served area |
|-------------------|------------------|---|---|---|---|--|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 5.00 ~ 9.00 | ○ | ○ | ○ | ○ | ○ | Lalbag, Besnucharan Road Azimpool Polashe area Same to (1) above Same to (3) above Stop the pump operation Same to (2) above |
| ② 9.00 ~ 12.00 | ○ | ○ | ○ | ○ | ○ | |
| ③ 12.00 ~ PM 2.00 | ○ | ○ | ○ | ○ | ○ | |
| ④ PM 2.00 ~ 6.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑤ 6.00 ~ 8.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑥ 8.00 ~ 10.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑦ 10.00 ~ AM 5.00 | ○ | ○ | ○ | ○ | ○ | |

DHAKA WATER WORKS P/S NO. 202



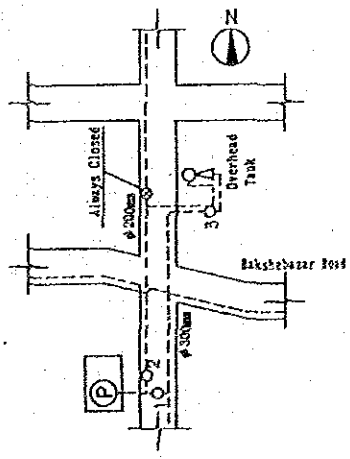
| Operation period | Status of valves | | | | | Served area |
|-------------------|------------------|---|---|---|---|--|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 4.00 ~ 10.00 | ○ | ○ | ○ | ○ | ○ | North/East area of W. T. P. (serve by pump directly and through O. H. T.) Serve to O. H. T. in W. T. P. Serve to O. H. T. Same to (1) above Same to (2) above Same to (3) above |
| ② 10.00 ~ 12.00 | ○ | ○ | ○ | ○ | ○ | |
| ③ 12.00 ~ PM 4.00 | ○ | ○ | ○ | ○ | ○ | |
| ④ PM 4.00 ~ 7.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑤ 7.00 ~ 9.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑥ 9.00 ~ AM 4.00 | ○ | ○ | ○ | ○ | ○ | |

Well

Water Supply Systematic Diagram

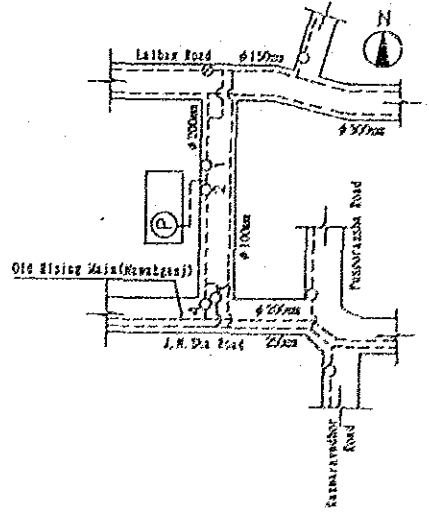
Valve Operation for every Distribution Period

BAKSHERBAZAR P/S NO. 203



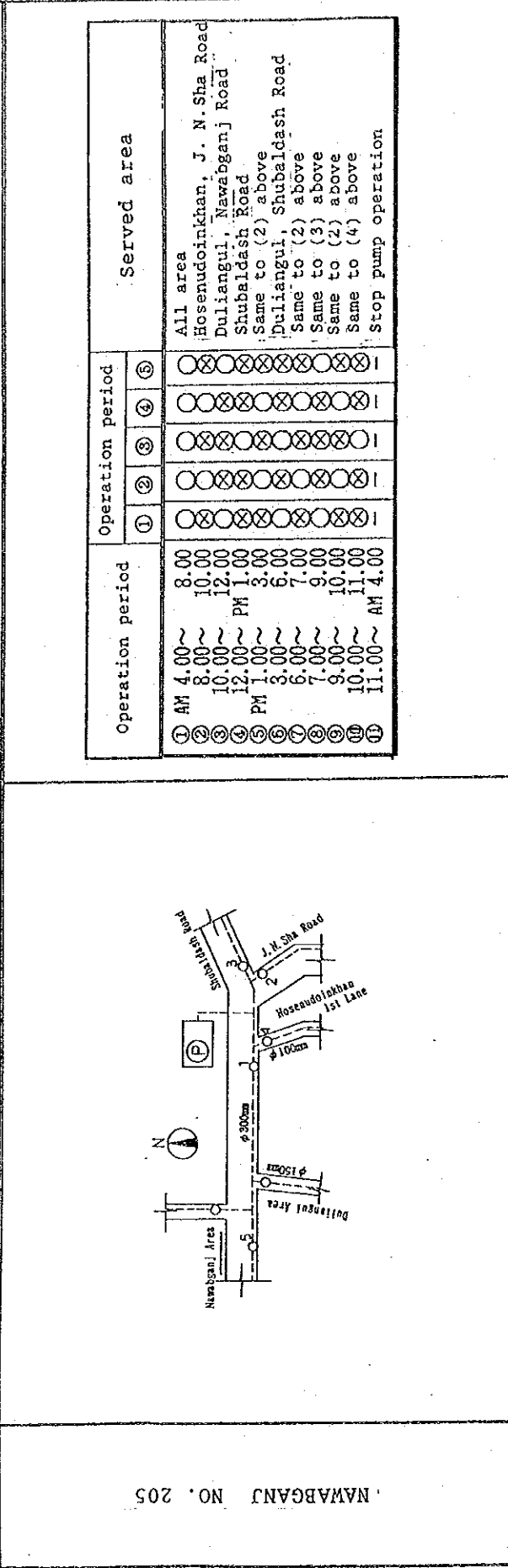
| Operation period | Status of Values | | | | | Served area |
|-------------------|------------------|---|---|---|---|--|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 4.00 ~ 6.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | Serve to O. H. T. Serve to East, South and East Same to (1) above Same to (2) above Same to (1) above Same to (2) above Same to (1) above Stop the pump operation |
| ② 6.00 ~ 8.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ③ 8.00 ~ 12.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ④ PM 3.00 ~ 7.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑤ PM 7.00 ~ 10.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑥ 10.00 ~ 12.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑦ 12.00 ~ AM 4.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑧ AM 4.00 ~ 6.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |

BAKSHERBAZAR P/S NO. 204



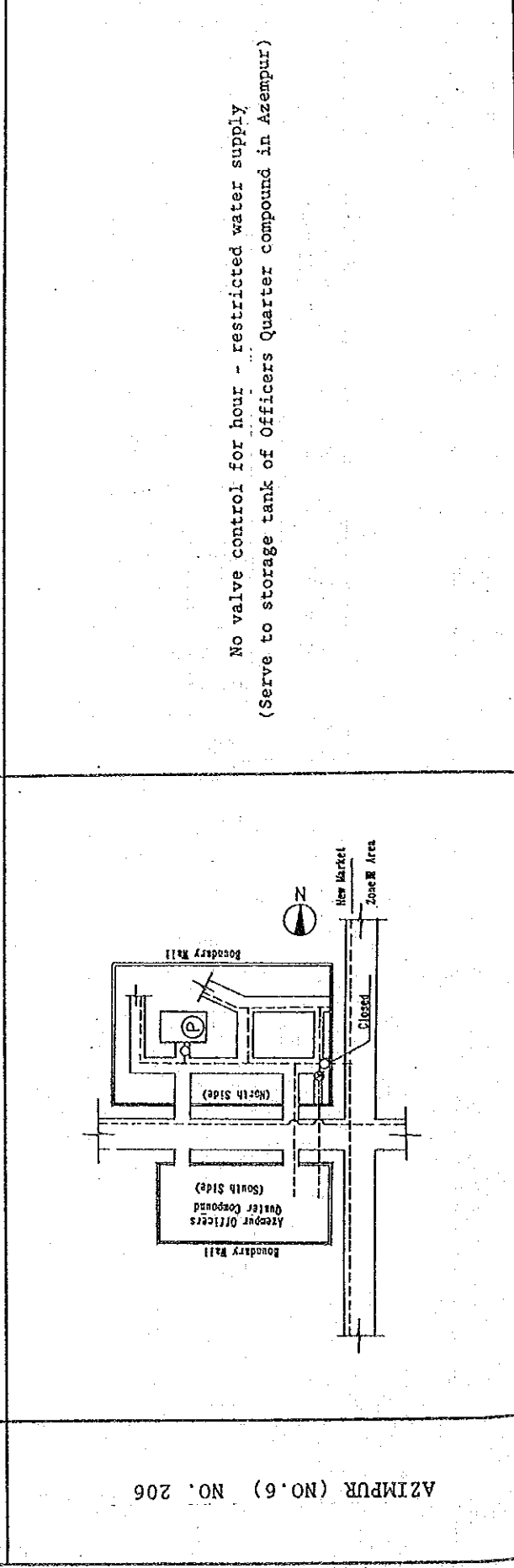
| Operation period | Status of Values | | | | | Served area |
|-------------------|------------------|---|---|---|---|---|
| | ① | ② | ③ | ⊗ | ⑤ | |
| ① AM 4.00 ~ 9.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | Lalbag Road J. N. Sha Road (250 m/m) J. N. Sha Road (200 m/m) Same to (1) above Same to (2) above Same to (3) above Stop the pump operation |
| ② 9.00 ~ 11.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ③ PM 1.00 ~ 5.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ④ PM 5.00 ~ 8.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑤ 8.00 ~ 12.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑥ 12.00 ~ AM 4.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑦ AM 4.00 ~ 9.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑧ 9.00 ~ 11.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |

Well : NAWABGANJ NO. 205



Valve Operation for every Distribution Period

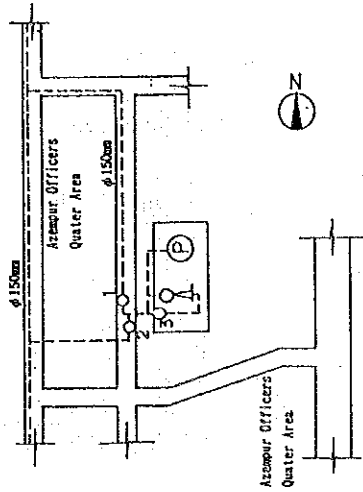
| Operation period | Operation period | | | | | Served area |
|--------------------|------------------|---|---|---|---|--|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 4.00 ~ 8.00 | ○ | ○ | ○ | ○ | ○ | All area Hosenuddin Khan, J. N. Sha Road Duliangul, NAWABGANJ Road Shubaldash Road Same to (2) above Duliangul, Shubaldash Road Same to (2) above Same to (3) above Same to (4) above Stop pump operation |
| ② AM 8.00 ~ 10.00 | ○ | ○ | ○ | ○ | ○ | |
| ③ AM 10.00 ~ 12.00 | ○ | ○ | ○ | ○ | ○ | |
| ④ PM 12.00 ~ 1.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑤ PM 1.00 ~ 3.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑥ PM 3.00 ~ 6.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑦ PM 6.00 ~ 7.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑧ PM 7.00 ~ 9.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑨ PM 9.00 ~ 10.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑩ PM 10.00 ~ 11.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑪ AM 11.00 ~ 4.00 | ○ | ○ | ○ | ○ | ○ | |



No valve control for hour - restricted water supply
(Serve to storage tank of Officers Quarter compound in Azempur)

Well

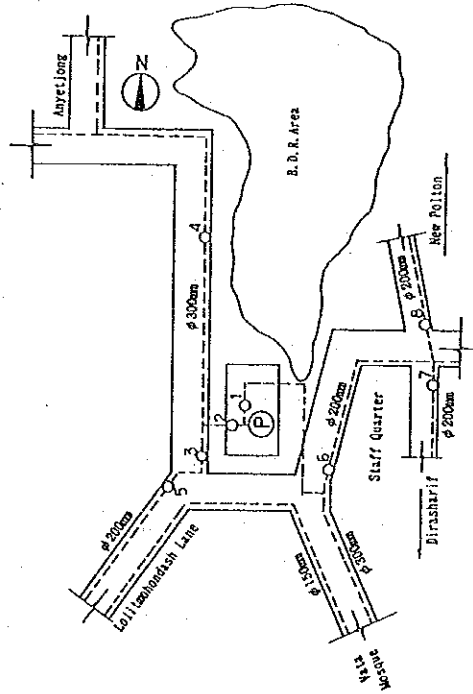
Water Supply Systematic Diagram



AZIMPUR (NO.7) NO. 207

Valve Operation for every Distribution Period

| Operation period | Status of Values | | | | | Served area |
|-------------------|------------------|---|---|---|---|--|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 5.00 ~ 6.00 | ○ | ○ | ○ | ○ | ○ | Stop the pump operation Serve by pump directly and through o. h. r. Serve to O. H. T. Same to (2) above Same to (3) above Stop the pump operation Same to (3) above Same to (2) above Same to (3) above Same to (2) above |
| ② 6.00 ~ 8.00 | ○ | ○ | ○ | ○ | ○ | |
| ③ 8.00 ~ 11.00 | ○ | ○ | ○ | ○ | ○ | |
| ④ 11.00 ~ PM 2.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑤ PM 2.00 ~ 3.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑥ 3.00 ~ 5.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑦ 5.00 ~ 6.30 | ○ | ○ | ○ | ○ | ○ | |
| ⑧ 6.30 ~ 8.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑨ 8.00 ~ 11.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑩ 11.00 ~ AM 5.00 | ○ | ○ | ○ | ○ | ○ | |



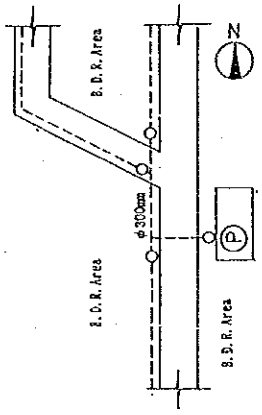
PEELKHANA (NO.2) NO. 208

| Operation period | Status of Values | | | | | | | | | | Served area | |
|-------------------|------------------|---|---|---|---|---|---|---|---|---|-------------|--|
| | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ | ⑩ | | |
| ① AM 5.00 ~ 7.00 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | Staff quater; Dirasharif area Lalit Mohondash Lane area New Polton area Anyetjong area Dirasharif area Same to (4) above Same to (3) above Same to (4) above Same to (5) above Same to (3) above Same to (4) above |
| ② 7.00 ~ 8.30 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| ③ 8.30 ~ 11.00 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| ④ 11.00 ~ 12.00 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| ⑤ 12.00 ~ PM 1.30 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| ⑥ PM 1.30 ~ 3.00 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| ⑦ 3.00 ~ 5.00 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| ⑧ 5.00 ~ 6.00 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| ⑨ 6.00 ~ 8.00 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| ⑩ 8.00 ~ 10.00 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |
| ⑪ 10.00 ~ AM 5.00 | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | |

Well

PEELKHANA (NO.3) NO. 209

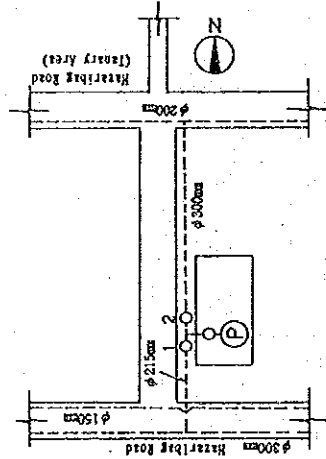
Water Supply Systematic Diagram



Valve Operation for every Distribution Period

No valve control for hour - restricted water supply
 (Serve water to B. D. R area)
 Stop pump operation for PM 8:00 to AM 11:00

HAZARIBAG (NO.3) NO. 210

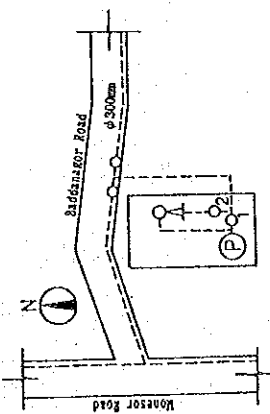


| Operation period | Status of values | | | | | Served area |
|------------------|------------------|---|---|---|---|-----------------------------|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 5.00 ~ 8.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | Tanary area, Hazaribag area |
| ② 8.00 ~ 9.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | Same to (1) above |
| ③ 9.00 ~ 12.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | Same to (2) above |
| ④ PM 2.00 ~ 4.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | Same to (1) above |
| ⑤ PM 4.00 ~ 8.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | Same to (2) above |

Well

HAZARIBAG (NO.6) NO. 211

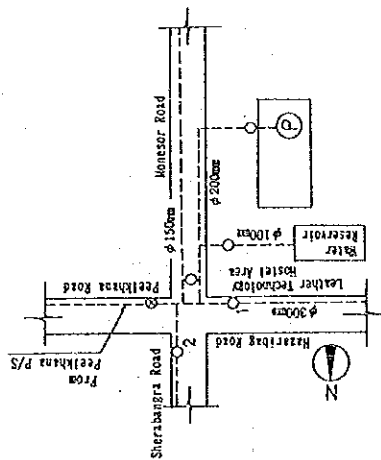
Water Supply Systematic Diagram



Valve Operation for every Distribution Period

| Operation period | Status of valves | | | | | Served area |
|-------------------|------------------|---|---|---|---|---|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 5.00 ~ 8.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | serve by pump directly and through o. R. T. Serve to O. H. T. Same to (1) above Same to (2) above Same to (1) above Same to (2) above Stop the pump operation |
| ② AM 8.00 ~ 12.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ③ PM 1.00 ~ 5.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ④ PM 1.00 ~ 5.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑤ AM 5.00 ~ 7.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑥ AM 5.00 ~ 7.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑦ AM 5.00 ~ 12.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |

HAZARIBAG (NO.5) NO. 212



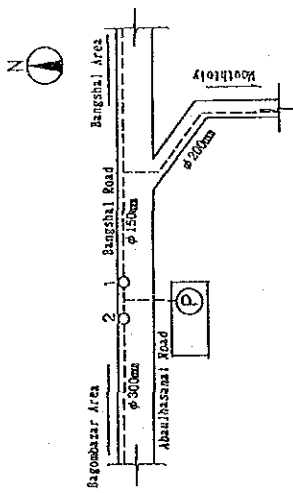
| Operation period | Status of valves | | | | | Served area |
|-------------------|------------------|---|---|---|---|--|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 5.00 ~ 9.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | Sherabangra Road Hazaribag Road Same to (1) above Same to (2) above Same to (1) above Same to (2) above |
| ② AM 9.00 ~ 12.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ③ PM 2.00 ~ 4.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ④ PM 2.00 ~ 4.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑤ AM 8.00 ~ 8.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑥ AM 8.00 ~ 8.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |
| ⑦ AM 5.00 ~ 5.00 | ⊗ | ⊗ | ⊗ | ⊗ | ⊗ | |

Well

Water Supply Systematic Diagram

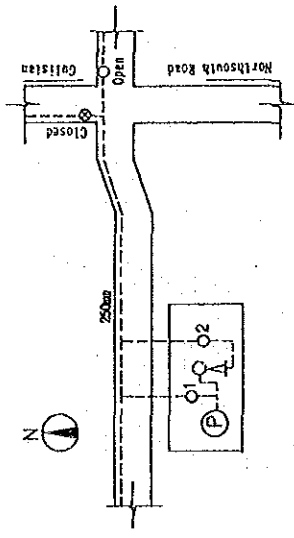
Valve Operation for every Distribution Period

ABUL HASNAT RD. NO. 213



| Operation period | Status of values. | | | | | Served area |
|------------------|-------------------|---|---|---|---|---|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 3.00~ | ○ | ○ | ○ | ○ | ○ | Bangshal area Bagombazar area Same to (1) above Same to (2) above Same to (1) above Same to (2) above Same to (1) above Same to (2) above Same to (1) above Same to (2) above Same to (1) above Same to (2) above Stop the pump operation |
| ② 6.00~ | ○ | ○ | ○ | ○ | ○ | |
| ③ 8.00~ | ○ | ○ | ○ | ○ | ○ | |
| ④ 10.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑤ 12.00~ PM 2.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑥ PM 2.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑦ 4.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑧ 6.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑨ 8.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑩ 10.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑪ 12.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑫ AM 3.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑬ | ○ | ○ | ○ | ○ | ○ | |
| ⑭ | ○ | ○ | ○ | ○ | ○ | |

FULBARIA NO. 214



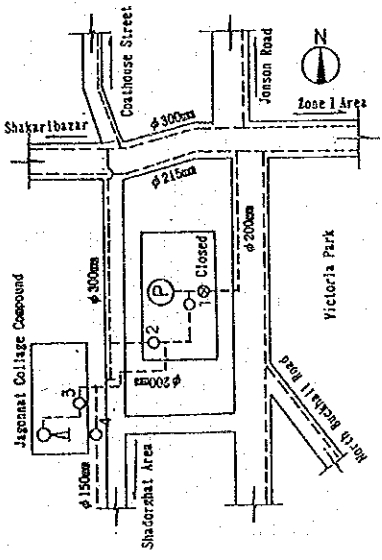
| Operation period | Status of Values | | | | | Served area |
|------------------|------------------|---|---|---|---|---|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 4.30~ | ○ | ○ | ○ | ○ | ○ | Shadakhazar, Kazzauden Road, Nawapur Road Serve by pump directly and through o. s. r. Serve to O. H. P. Same to (1) above Same to (2) above Same to (3) above Same to (1) above Same to (2) above Stop the pump operation same to (3) above |
| ② 6.00~ | ○ | ○ | ○ | ○ | ○ | |
| ③ 8.00~ | ○ | ○ | ○ | ○ | ○ | |
| ④ 12.00~ PM 2.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑤ PM 2.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑥ 3.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑦ 7.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑧ 9.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑨ 10.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑩ 12.00~ | ○ | ○ | ○ | ○ | ○ | |
| ⑪ 4.30 | ○ | ○ | ○ | ○ | ○ | |
| ⑫ | ○ | ○ | ○ | ○ | ○ | |
| ⑬ | ○ | ○ | ○ | ○ | ○ | |
| ⑭ | ○ | ○ | ○ | ○ | ○ | |

Well

Water Supply Systematic Diagram

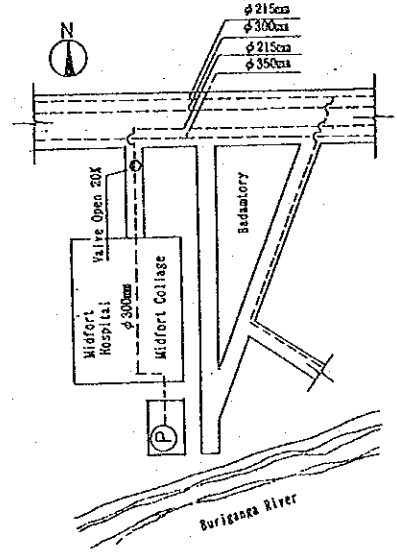
Valve Operation for every Distribution Period

JAGANNATH COLLEGE NO. 215



| Operation period | Status of valves | | | | | Served area |
|-------------------|------------------|---|---|---|---|-------------------------------|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 4.00 ~ 6.00 | ○ | ○ | ○ | ○ | ○ | Coathouse Street, Shadorghat |
| ② 6.00 ~ 7.00 | ○ | ○ | ○ | ○ | ○ | O. H. T. in Jagannath College |
| ③ 7.00 ~ 9.00 | ○ | ○ | ○ | ○ | ○ | Coathouse Street |
| ④ 9.00 ~ 11.00 | ○ | ○ | ○ | ○ | ○ | Same to (1) above |
| ⑤ 11.00 ~ 12.00 | ○ | ○ | ○ | ○ | ○ | Same to (2) above |
| ⑥ 12.00 ~ PM 3.00 | ○ | ○ | ○ | ○ | ○ | Same to (1) above |
| ⑦ 3.00 ~ 5.00 | ○ | ○ | ○ | ○ | ○ | Shadorghat |
| ⑧ 5.00 ~ 6.00 | ○ | ○ | ○ | ○ | ○ | Same to (2) above |
| ⑨ 6.00 ~ 9.00 | ○ | ○ | ○ | ○ | ○ | Same to (3) above |
| ⑩ 9.00 ~ 12.00 | ○ | ○ | ○ | ○ | ○ | Same to (1) above |
| ⑪ 12.00 ~ AM 4.00 | ○ | ○ | ○ | ○ | ○ | Stop the pump operation |

MITFORD HOSPITAL NO. 216



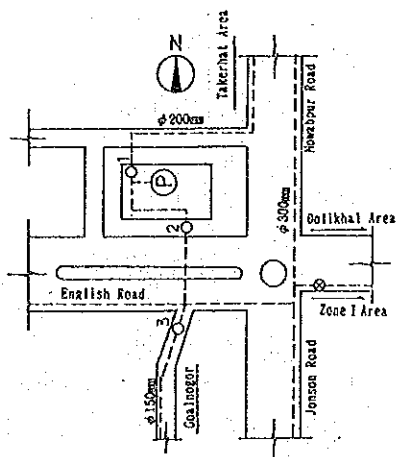
No valve control for hour - restricted water supply

| Well | Water Supply Systematic Diagram | Valve Operation for every Distribution Period |
|--------------------------------|---------------------------------|---|
| SIMSON ROAD NO. 217 | | No valve control for hour - restricted water supply |
| DHOLAI KHAL (NOWABPUR) NO. 218 | | No valve control for hour - restricted water supply |

Well

DHOLAI KHAL (NOWAPUR) NO. 219

Water Supply Systematic Diagram

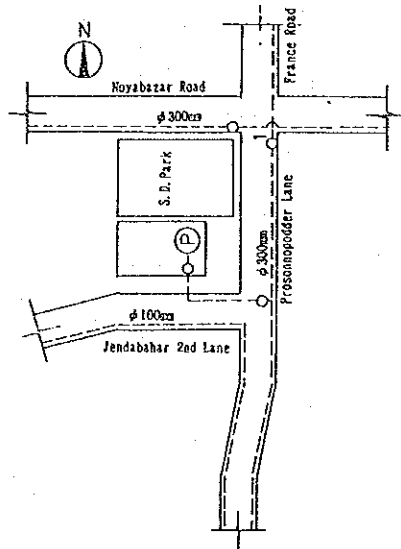


Valve Operation for every Distribution Period

| Operation period | Status of valves | | | | | Served area |
|--------------------|------------------|---|---|---|---|---|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 2.00 ~ 4.00 | ○ | ○ | ○ | ○ | ○ | Takerhat, Goalnoger area Takerhat area Goalnoger area Same to (2) above Same to (1) above Same to (3) above Same to (2) above Same to (1) above Same to (3) above Same to (2) above Same to (3) above Same to (2) above Stop the pump operation |
| ② AM 4.00 ~ 6.30 | ○ | ○ | ○ | ○ | ○ | |
| ③ AM 6.30 ~ 10.30 | ○ | ○ | ○ | ○ | ○ | |
| ④ AM 10.30 ~ 12.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑤ PM 12.00 ~ 1.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑥ PM 1.00 ~ 2.30 | ○ | ○ | ○ | ○ | ○ | |
| ⑦ PM 2.30 ~ 5.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑧ PM 5.00 ~ 7.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑨ PM 7.00 ~ 9.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑩ PM 9.00 ~ 11.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑪ PM 11.00 ~ 12.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑫ AM 12.00 ~ 2.00 | ○ | ○ | ○ | ○ | ○ | |

Well

S. D. PARK NO. 220



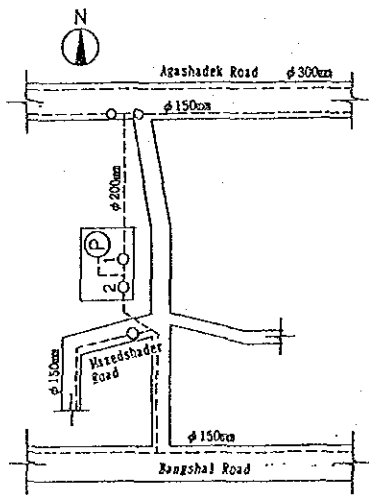
| Operation period | Status of valves | | | | | Served area |
|-------------------|------------------|---|---|---|---|--|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 4.00 ~ 6.00 | ● | ○ | ○ | ○ | ○ | France Road, Bangshal, Islampur France Road, Bangshal Islampur Same to (1) above Same to (3) above Same to (2) above Same to (3) above Stop the pump operation |
| ② AM 6.00 ~ 9.00 | ○ | ○ | ○ | ○ | ○ | |
| ③ AM 9.00 ~ 11.00 | ○ | ○ | ○ | ○ | ○ | |
| ④ AM 11.00 ~ 3.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑤ PM 3.00 ~ 6.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑥ PM 6.00 ~ 9.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑦ PM 9.00 ~ 12.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑧ AM 12.00 ~ 4.00 | ○ | ○ | ○ | ○ | ○ | |

Well

Water Supply Systematic Diagram

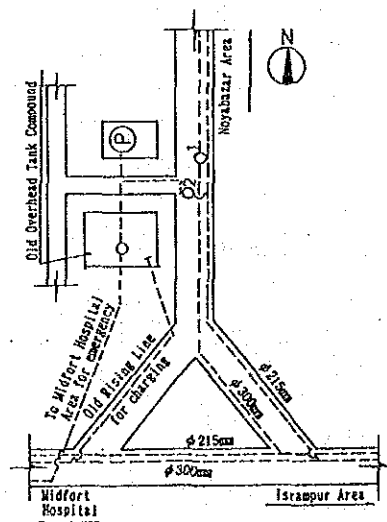
Valve Operation for every Distribution Period

BANGLADESH MATH NO. 221



| Operation period | Status of valves | | | | | Served area |
|------------------|------------------|---|---|---|---|----------------------------|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 4.00 ~ 6.00 | ⊗ | ⊗ | | | | Bangshal, Mazedshader Road |
| ② 6.00 ~ 8.00 | ⊗ | ⊗ | | | | Agashadek Road |
| ③ 8.00 ~ 10.00 | ⊗ | ⊗ | | | | Same to (1) above |
| ④ 10.00 ~ 12.00 | ⊗ | ⊗ | | | | Same to (2) above |
| ⑤ PM 2.00 ~ 4.00 | ⊗ | ⊗ | | | | Same to (1) above |
| ⑥ 4.00 ~ 6.00 | ⊗ | ⊗ | | | | Same to (2) above |
| ⑦ 6.00 ~ 8.00 | ⊗ | ⊗ | | | | Same to (1) above |
| ⑧ 8.00 ~ 10.00 | ⊗ | ⊗ | | | | Same to (2) above |
| ⑨ 10.00 ~ 12.00 | ⊗ | ⊗ | | | | Same to (1) above |
| ⑩ AM 4.00 ~ 6.00 | ⊗ | ⊗ | | | | Same to (2) above |
| ⑪ | | | | | | Stop the pump operation |

ARMANITOLA NO. 222

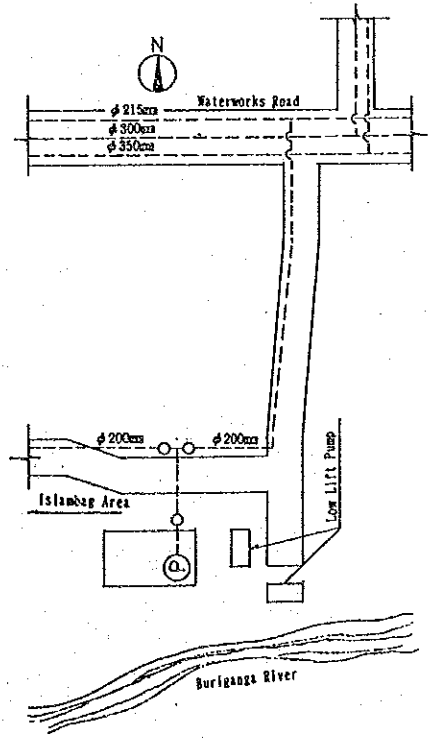


| Operation period | Status of valves | | | | | Served area |
|-------------------|------------------|---|---|---|---|------------------------------|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 3.00 ~ 6.00 | ⊗ | ⊗ | | | | Noyabazar, Islampur, Midford |
| ② 6.00 ~ 9.00 | ⊗ | ⊗ | | | | Noyabazar |
| ③ 9.00 ~ PM 3.00 | ⊗ | ⊗ | | | | Same to (1) above |
| ④ PM 3.00 ~ 6.00 | ⊗ | ⊗ | | | | Same to (2) above |
| ⑤ 6.00 ~ 12.00 | ⊗ | ⊗ | | | | Same to (1) above |
| ⑥ 12.00 ~ AM 3.00 | ⊗ | ⊗ | | | | Stop the pump operation |

Well

ISLAMBAGH NO. 223

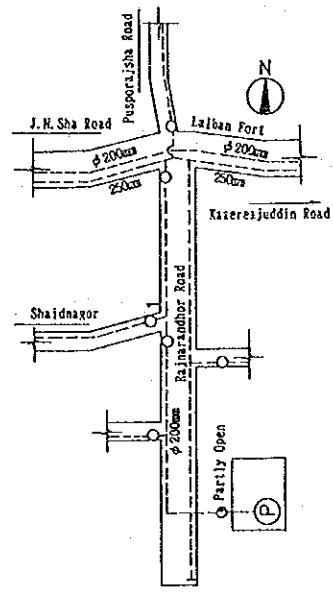
Water Supply Systematic Diagram



No valve control for hour - restricted water supply

Valve Operation for every Distribution Period

RAJNARAYAN DAS RD NO. 224



| Operation period | Status of valves | | | | | Served area |
|-------------------|------------------|---|---|---|---|---|
| | ① | ② | ③ | ④ | ⑤ | |
| ① AM 4.00 ~ 9.00 | ○ | ○ | ○ | ○ | ○ | Shaidnagar area J. N. Sha Road Same to (1) above Same to (2) above Same to (1) above Stop the pump operation |
| ② 9.00 ~ 12.00 | ○ | ○ | ○ | ○ | ○ | |
| ③ 12.00 ~ PM 5.00 | ○ | ○ | ○ | ○ | ○ | |
| ④ PM 5.00 ~ 8.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑤ 8.00 ~ 11.00 | ○ | ○ | ○ | ○ | ○ | |
| ⑥ 11.00 ~ AM 4.00 | ○ | ○ | ○ | ○ | ○ | |

B-6 Results of Interview Survey

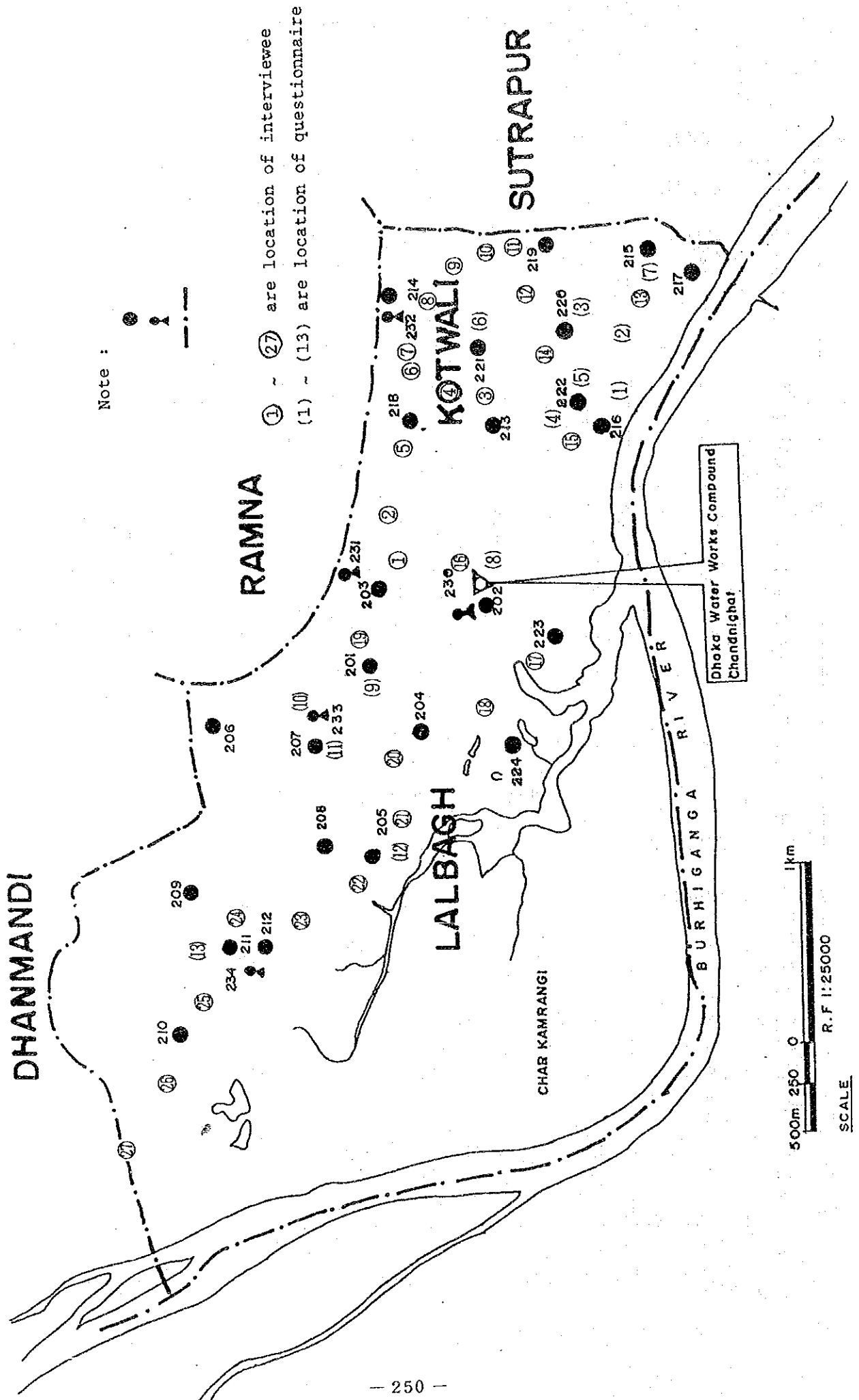
(1) Address of Interviewee for Questionnaire Survey

| No. | RESIDENCE ADDRESS | | | Remarks |
|------|-------------------|------|-------------------------------|---------------|
| | THANA | WARD | ADDRESS | |
| ① | LALBAGH | | 26 BAKSHI BAZAR | |
| ② | " | | 48/2 BAKSHI BAZAR | |
| ③ | KOTWALI | 32 | 120/6 BANGSHAL ROAD | |
| ④ | " | 32 | 34 ABUL HASANAT ROAD | |
| ⑤ | " | 32 | 29 B. K. GANGULY LANE | |
| ⑥ | " | 32 | 35 NOWAB KATRA | |
| ⑦ | " | 32 | 25 NOWAB KATRA | |
| ⑧ | " | 33 | 146/6 SIDDEQUE BAZAR | |
| ⑨ | " | 33 | 154 SIDDEQUE BAZAR | |
| ⑩ | " | 33 | 244 NOWABPUR ROAD | LOCALE HOTEL |
| ⑪ | " | 33 | 263 NOWABPUR ROAD | |
| ⑫ | " | 34 | 50 MALITOLA | |
| ⑬ | " | 34 | 124 SHANKARI BAZAR | |
| ⑭ | " | 31 | 21 HAZI ABDUR RASHID LANE | TINPLATE SHOP |
| ⑮ | " | 31 | 218 MITFORD ROAD | PERFUME SHOP |
| ⑯ | LALBAGH | 27 | 30/2 CHANDNIGHAT | |
| ⑰ | " | 28 | 35 ISLAMBAG | |
| ⑱ | " | 29 | 259 JAGONNATH SHAHA ROAD | |
| ⑲ | " | 27 | 6/1/ ORPHANAGE ROAD | |
| ⑳ | " | 22 | 5 NOWABGANJ | |
| ㉑ | " | 22 | 26/ NOWABGANJ | |
| ㉒ | " | 21 | 30/4 MONESHOR ROAD | |
| ㉓ | " | 21 | 40/ /A MONESHOR ROAD | |
| ㉔ | " | 21 | 35 HAZARIBAG ROAD | |
| ㉕ | " | 21 | 26/8/A MONESHOR ROAD | |
| ㉖ | " | 24 | 15 MONESHOR ROAD | |
| ㉗ | DHANMONDY | | 40 SHEKARITOLA | |
| (1) | KOTWALI | | 13/2 BABU BAZAR | |
| (2) | " | | ASHEK JAN OLD O. H. T COMP | |
| (3) | " | 34 | S. D. PARK P/S COMPOUND | |
| (4) | " | | 10 NO M. C. RAY ROAD | |
| (5) | " | 29 | 17/D P. K. GHOSH STREET | |
| (6) | " | 32 | 34 SHIKATULI LANE | |
| (7) | " | 33 | 82 NO SHAKARI BAZAR | |
| (8) | LALBAGH | | CHANDNIGHAT W/T/P COMP | |
| (9) | " | 28 | DHAKESWARI WASA STAFF QUA | |
| (10) | " | | AZIMPUR 3 WASA STAFF QUA | |
| (11) | " | 28 | 4 NO AZIMPUR OFFICERS RUARTER | |
| (12) | " | | 60 DURIANGUAL LANE | |
| (13) | " | | 10/1 BADDANPARA LANE | |

Note : 1 ~ 2 are interview survey.

(1) ~ (13) are questionnaire survey.

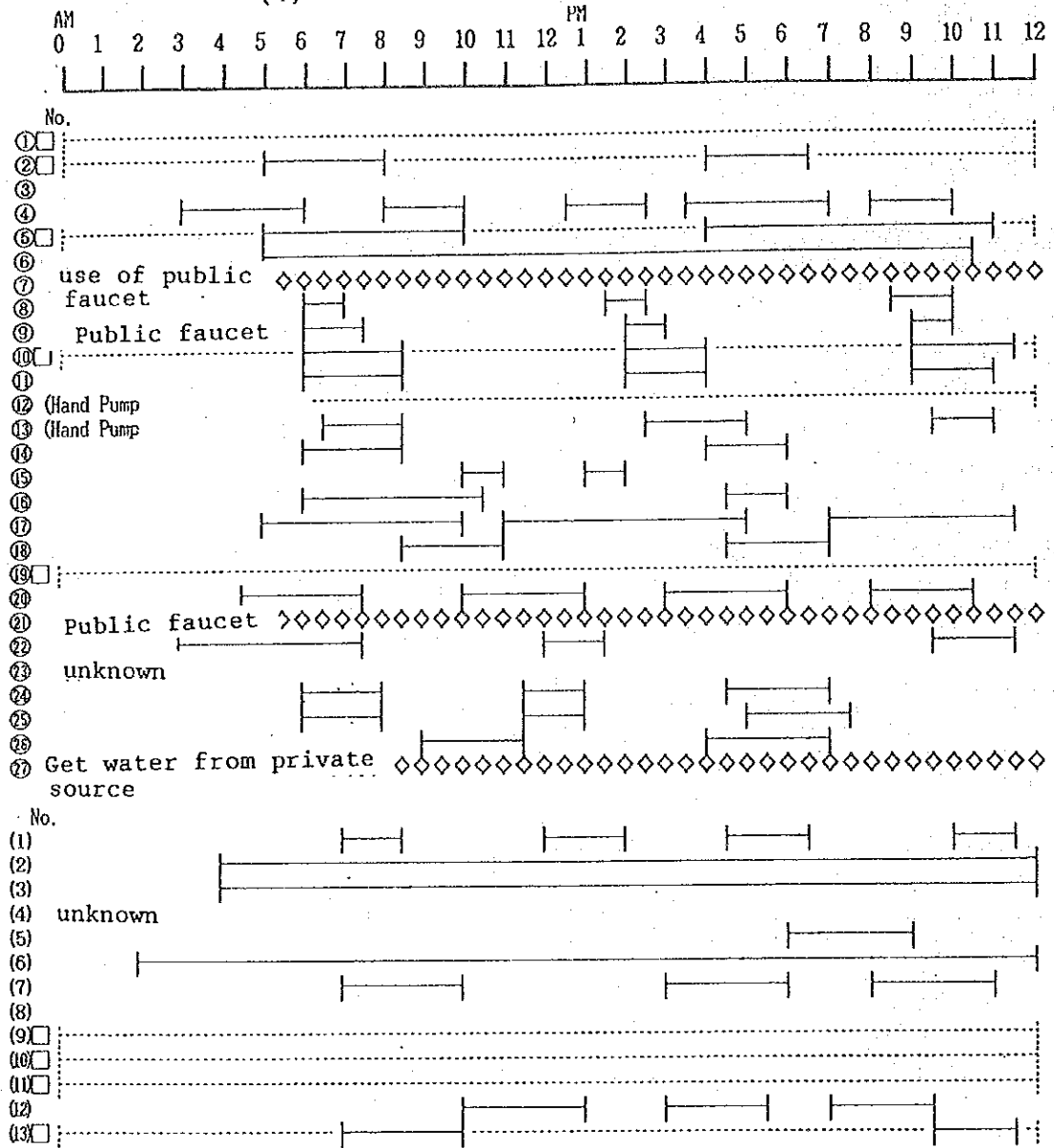
(2) Location Map of Interview Survey



(3) Classification of water Service

| Question | answers | | | | | | | | | | | | | | | | | | | | | | |
|---|---------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 |
| ① Type of water supply i) House connection w meter ii) " without meter iii) Common house connection with meter iv) " without meter v) Public faucet vi) Hand pump vii) Others | | | | | | | | | | | | | | | | | | | | | | | |
| ② Water Consumption and fee i) Consumption of no. of a) 20 b) 21 ~50 c) 51 ~100 d) 101 | | | | | | | | | | | | | | | | | | | | | | | |
| ii) Consumption of water a) less than 20 b) 20 - 50 c) 51 - 100 d) More than 100 (m ³ /Mt) | | | | | | | | | | | | | | | | | | | | | | | |
| iii) Water fee (TK/Mt) less than TK100 TK101 - 200 TK201 - 300 TK301 - 400 More than 401 | | | | | | | | | | | | | | | | | | | | | | | |
| ③ Claim to DWASA i) No ii) Yes a) Shortage of Water b) Low pressure c) Hour-restricted d) Others | | | | | | | | | | | | | | | | | | | | | | | |
| ④ Others i) No. of faucet in House a) None b) One c) Two d) Three e) Four f) More than five | | | | | | | | | | | | | | | | | | | | | | | |
| ii) No. of person in Family a) less than 5 b) 6 - 10 c) 11 - 20 d) More than 20 | | | | | | | | | | | | | | | | | | | | | | | |
| iii) No. of room in House a) One b) Two c) Three d) Four e) Five f) More than six | | | | | | | | | | | | | | | | | | | | | | | |
| iv) Income (TK/Mt) a) Less than TK2,000 b) TK 2,000 - 5,000 c) TK 5,000 - 10,000 d) TK10,000 - 20,000 e) More than TK20,000 | | | | | | | | | | | | | | | | | | | | | | | |

(4) Time of Water Supply



- - - - Any time available to use water
 - - - - Hour-restrict
 ◇ No answer

B-7 Raw Water Quality

ANNEX-V WATER QUALITY ANALYSIS GIVEN BY DWASA

WATER ANALYSIS

The following table shows the water quality of the raw water from the Buriganga river, which is intake place for the project. The water quality tests are done by WASA personnel at the WASA laboratory. Compared with the WHO recommendation for the drinking water, it is confirmed that water of ^{the} Buriganga river is acceptable for intake water.

| | <u>Buriganga River</u> | <u>WHO</u> |
|--|------------------------|------------|
| 1. Turbidity | 10 NTU | 5 |
| 2. Total hardness (mg/l as CaCO_3) | 80 mg/l | 500 |
| 3. Calcium (mg/l as CaCO_3) | 23.25 mg/l | - |
| 4. Chloride (mg/l as cl) | 80 mg/l | 250 |
| 5. PH value | 7.18 | 6.5-8.5 |
| 6. Total Alkalinity (mg/l as CaCO_3) | 95 mg/l | - |
| 7. Conductivity (Micro mho/cm) | 260 | 500 |
| 8. Total dissolved solids | 156 mg/l | 1000 mg/l |
| 9. Nitrate nitrogen (mg/l as NO_3) | 1.18 mg/l | 10 mg/l |
| 10. Nitrite nitrogen (mg/l as NO_2) | 0.00 mg/l | 0.1 mg/l |

| Date | | 7-4-87 | 7-4-87 | 6-6-89 | 19-6-89 | 3-7-89 | 1-8-89 |
|--|---------|--------|--------|--------|---------|--------|--------|
| Hour | | - | - | 3:00pm | 3:35pm | 2:45pm | 1:45pm |
| Sampling point | | 12 | 13 | Bur | Bur | Bur | Bur |
| Temperature | °C | 31 | 32 | 30.5 | 30.2 | 29.5 | 28.5 |
| pH | | 7.7 | 7.7 | 9.10 | 8.90 | 7.30 | 8.00 |
| Resistivity | μs/cm | | | | | | |
| Conductivity | μMho-cm | 360 | 440 | | | | |
| Colour | Hatch | | | 140 | 190 | 120 | 180 |
| Turbidity | NTU | 6 | 8 | 31.0 | 35.0 | 15.0 | 37.0 |
| Turbidity | Hatch | | | 30 | 40 | 22 | 38 |
| Total solids | mg/l | 230 | 238 | 330 | 27 | 66 | 112 |
| Tot.sol.after filtr. | mg/l | | | 318 | 20 | 21 | 102 |
| Suspended solids | mg/l | 10 | 7 | 12.0 | 7.0 | 45.0 | 10.0 |
| CO ₂ (KMnO ₄) | mg/l | | | | | | |
| Dissolved oxygen | mg/l | 4.2 | 4.8 | | | | |
| BOD | mg/l | 3.6 | 6.6 | 1.50 | 1.90 | 1.50 | 2.90 |
| CO ₂ | mg/l | | | | | | |
| Total hardness | mg/l | | | 60 | 40 | 52 | 44 |
| Total alkalinity | mg/l | 170 | 192 | 50 | 35 | 50 | 50 |
| Ammonia (NH ₃) | mg/l | ND | ND | 1.098 | 0.854 | 0.915 | 1.464 |
| Ammonium (NH ₄ ⁺) | mg/l | | | 1.161 | 0.903 | 0.968 | 1.548 |
| Chloride | mg/l | 14 | 26 | | | | |
| Fluoride | mg/l | 0.21 | 0.4 | | | | |
| Nitrate | mg/l | 0.7 | 0.8 | | 0.24 | 0.12 | |
| Nitrite | mg/l | ND | 1.4 | | | | |
| Phosphate | mg/l | 8 | 9 | 0.88 | 0.06 | 0.00 | 0.00 |
| Sulfate | mg/l | 4 | 4 | | | | |
| Chlorophyl | mg/l | | | | | | |
| Arsenic | mg/l | | | | | | |
| Chromium | mg/l | | | | | | |
| Mercury | mg/l | | | | | | |
| Cadmium | mg/l | | | | | | |
| Magnesium | mg/l | | | | | | |
| Manganese | mg/l | ND | ND | | | | |
| Iron | mg/l | 0.02 | ND | | | | |
| Copper | mg/l | 0.1 | 0.12 | | | | |
| Lead | mg/l | | | | | | |
| Zinc | mg/l | | | | | | |
| Coliforms | n/100ml | | | | | | |
| Faecal coliforms | n/100ml | | | 194 | 120 | 80 | 100 |

Sources of analyses : University of Dhaka (Department of Chemistry)

WASA Laboratory

Institute of Public Health Mohakhali

Department of Environment

Atomic Energy Center

CDM-Mac Donald

Source : From UWSP report on Water quality of Brighanga river

ANNEX Water Analysis Results

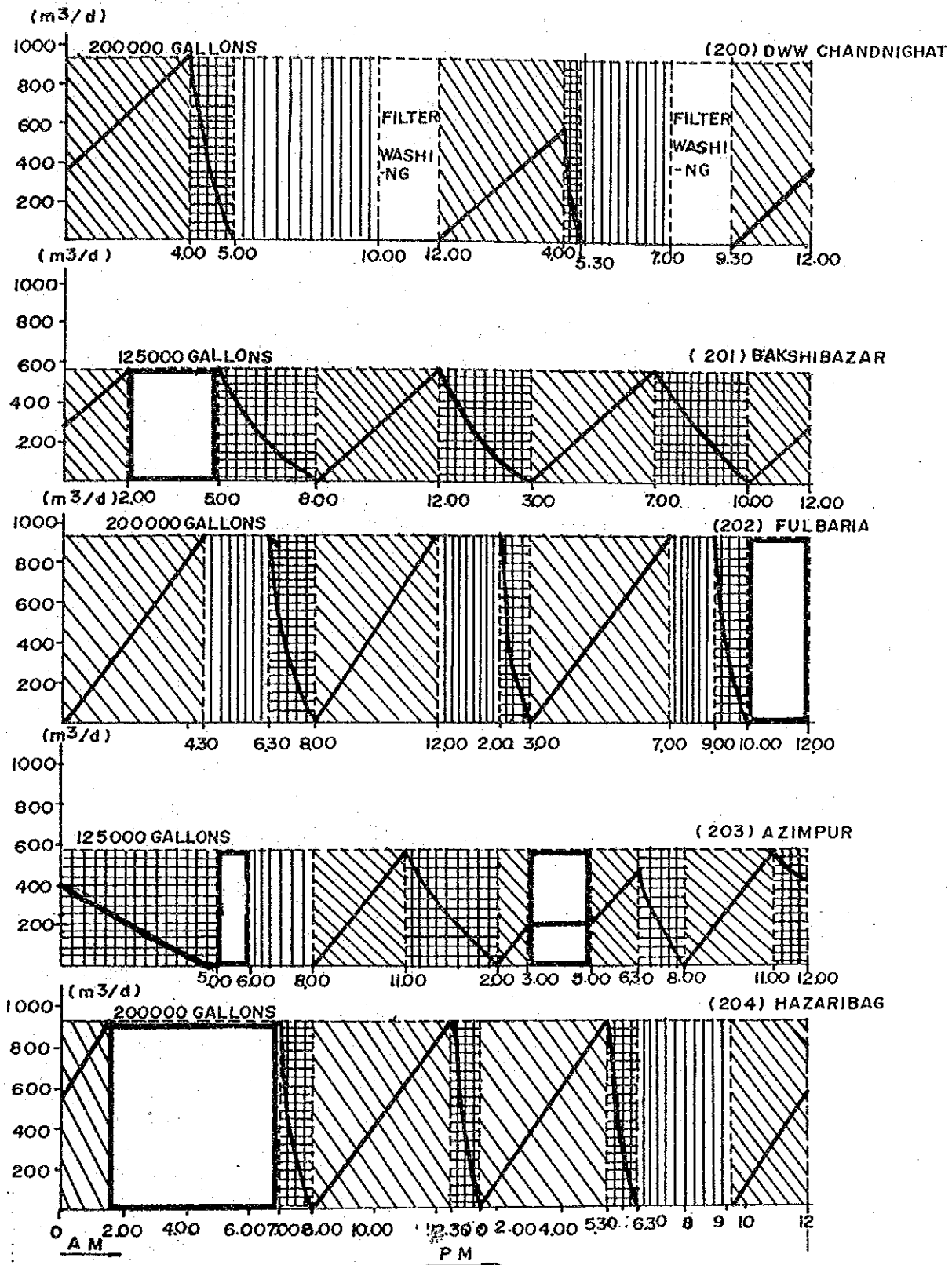
| 1 Sample | Raw Water | | | Raw Water | Treated Water | Raw Water | Filtered Water | | | Raw Water | Treated Water | |
|---|-------------------------|---------|---------|-----------|---------------|-----------|----------------|------|------|-----------|---------------|---------|
| | №1 | №2 | №3 | | | | №7 | №8 | №9 | | | №10 |
| 2 Sampling place | PK 4:30 PK 4:00 PK 5:30 | | | | | | | | | | | |
| 3 Date / Time | PK 4:30 PK 4:00 PK 5:30 | | | | | | | | | | | |
| 4 Weather / Temp. | Cloudy 30°C | | | | | | | | | | | |
| 5 Quality | 30°C | | | | | | | | | | | |
| Water temp. (°C) | 27 | | | | | | | | | | | |
| Turbidity (degree) | 120 | 120 | 100 | — | — | — | — | — | — | — | — | — |
| Color (degree) | 15 | 15 | 15 | — | — | — | — | — | — | — | — | — |
| pH | 7.34 | 7.09 | 7.01 | 7.0 | 7.0 | 7.0 | 7.0 | — | — | — | — | — |
| Ammonia nitrogen (as N mg/l) | 0.8 | 0.59 | 0.64 | 0.4 | 0.4 | 0.4 | 0.4 | <0.4 | <0.4 | <0.4 | — | — |
| Nitrite nitrogen (as N mg/l) | <0.01 | <0.01 | <0.01 | 0.03 | <0.01 | <0.01 | — | — | — | <0.01 | <0.01 | <0.01 |
| Chloride ion (mg/l) | 1.2 | 3.6 | 4.3 | — | — | — | — | — | — | 1.3 | — | 1.6 |
| Potassium permanganate consumption (mg/l) | 4.0 | 4.0 | 3.6 | — | — | — | — | — | — | 4.3 | 6.1 | 2.7 |
| Cyanide ion (mg/l) | <0.01 | <0.01 | <0.01 | — | — | — | — | — | — | <0.01 | <0.01 | <0.01 |
| Mercury (mg/l) | <0.0005 | <0.0005 | <0.0005 | — | — | — | — | — | — | <0.0005 | <0.0005 | <0.0005 |
| Cadmium (mg/l) | <0.005 | <0.005 | <0.005 | — | — | — | — | — | — | <0.005 | <0.005 | <0.005 |
| Arsenic (mg/l) | <0.005 | <0.005 | <0.005 | — | — | — | — | — | — | <0.005 | <0.005 | <0.005 |
| Lead (mg/l) | <0.02 | <0.02 | <0.02 | — | — | — | — | — | — | <0.02 | <0.02 | <0.02 |
| Iron (mg/l) | — | — | 3.3 | — | — | — | — | — | — | — | 3.4 | 0.15 |
| Manganese (mg/l) | — | — | 0.05 | — | — | — | — | — | — | — | — | <0.01 |
| Fluoride (mg/l) | — | — | — | — | — | — | — | — | — | — | — | 0.14 |
| Hexavalent chromium (mg/l) | — | — | <0.02 | — | — | — | — | — | — | — | — | — |
| Calcium hardness (as CaCo, mg/l) | — | — | 37 | — | — | — | — | — | — | — | — | — |
| Magnesium hardness (as CaCo, mg/l) | — | — | 15 | — | — | — | — | — | — | — | — | — |
| Residual chlorine (mg/l) | — | — | — | — | — | — | — | — | — | — | — | — |





Remarks:

1. Sampling place is as follows:
 - №1: Main stream of river, approx. 1 km upstream from the water intake towers
 - №2: Sub-stream of river, approx. 2 km upstream from the water intake towers
 - №3: Water intake tower (New)
 - №4: Mixing well
 - №5: Outlet of clear water reservoir
 - №6: Mixing well
 - №7: Outlet of coagulation/sedimentation basin
 - №8: Outlet of sedimentation basin
 - №9: Outlet of Javel filter
 - №10: Outlet of Paterson filter (small)
 - №11: Outlet of Paterson filter (large)
 - №12: Main stream of river, approx. 1 km upstream from the water intake towers
 - №13: Water intake tower (Old)
 - №14: Outlet of clear water reservoir

B-8 Operation of Overhead Tank

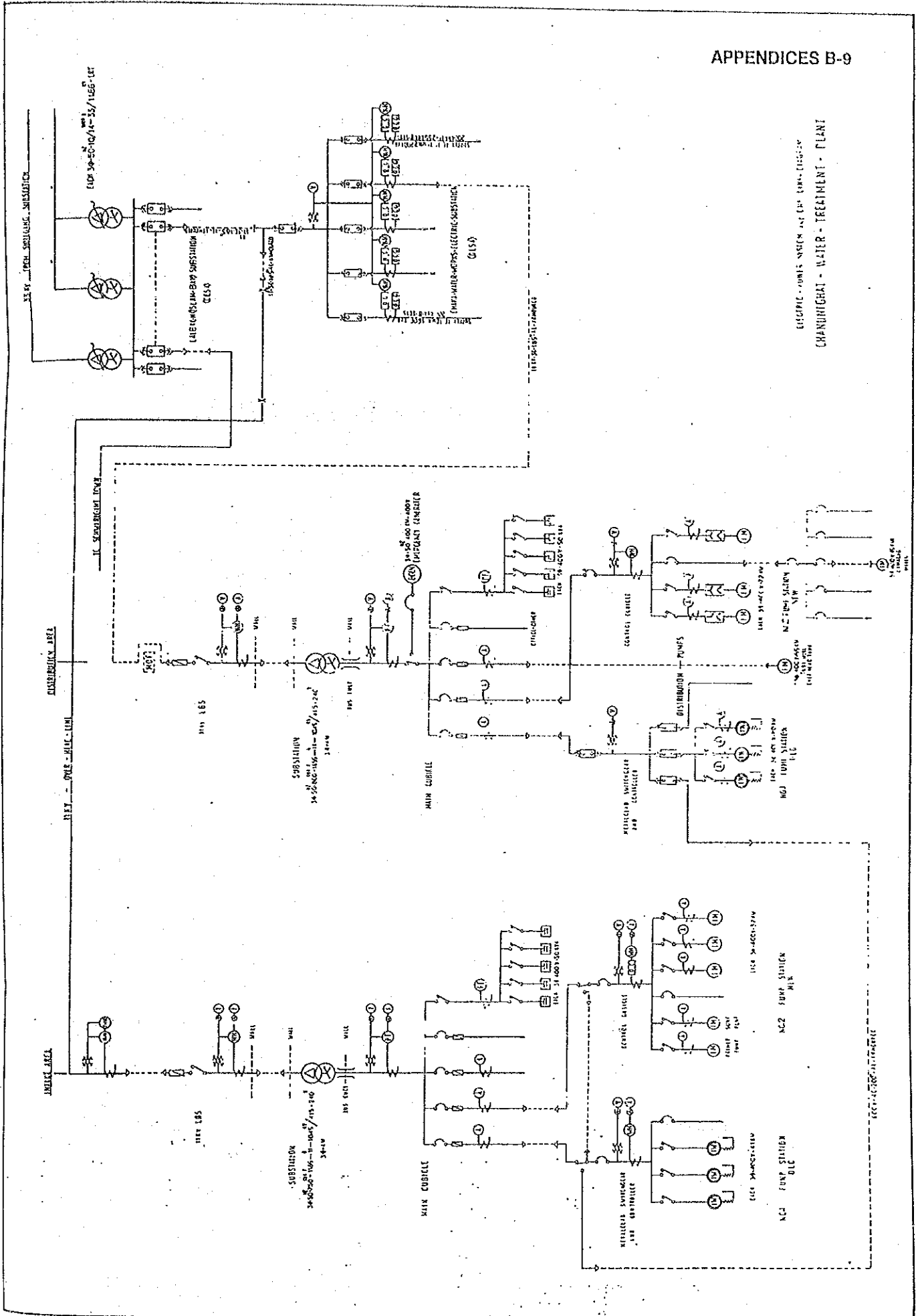
FIG. OPERATION OF OVERHEAD TANK



| LEGEND | |
|---|----------------------------------|
|  | TANK CHARGE |
|  | TANK SUPPLY & PUMP DIRECT SUPPLY |
|  | PUMP DIRECT SUPPLY |
|  | PUMP STOP |

B-9 Single Electrical Line of Chandnihat W. T. P.

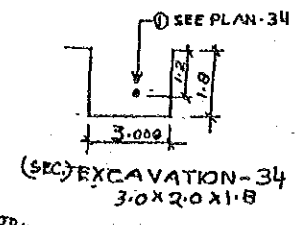
SCHEMATIC - POWER SYSTEM AND CONTROL SYSTEMS
 CHANUNGHAI - WATER TREATMENT PLANT



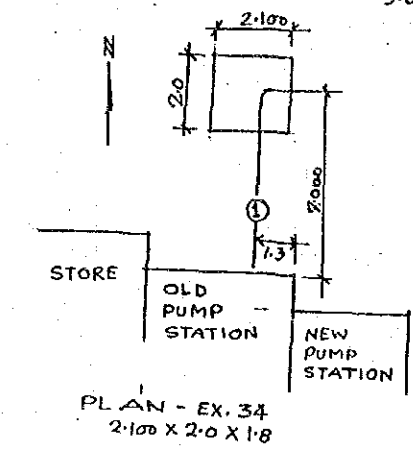
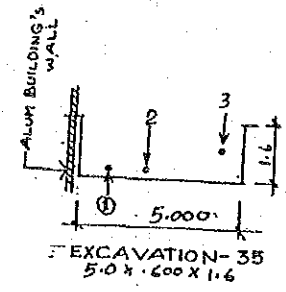
B-10 Result of Excavation Test Survey for Distribution Pipe Route

**EXCAVATION RESULT
WATER WORKS PLANT SITE
TO VICTORIA PARK.**

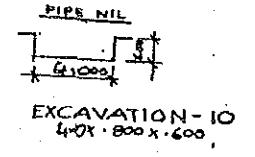
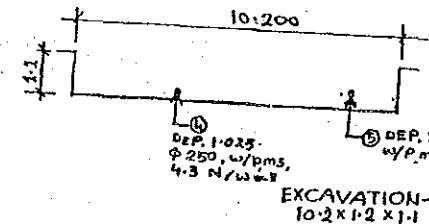
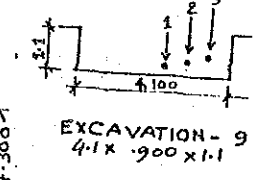
NOTE:
DISTANCE OF EXCAVATION
FROM WATER WORKS



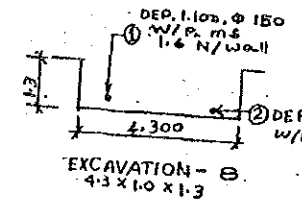
- EX-35**
1. DEP. 1.550, ϕ 450 A.C. intake pipe
800 Alum Bldg. wall
 2. DEP. 1.550, ϕ 450, A.C. intake pipe
1.7 Alum Bldg. wall
 3. DEP. 750, ϕ 350, w/p, ms.
4. 100 Alum Bldg wall



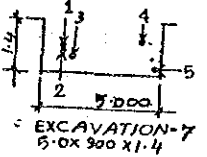
- EX-9**
1. DEP. 900, ϕ 250
w/p ms, 4.000 w/wall
 2. DEP. 950, ϕ 150, w/p (c-1)
4.580 w/wall
 3. DEP. 650, ϕ 150 (damaged line) c.1,
5.3 w/wall



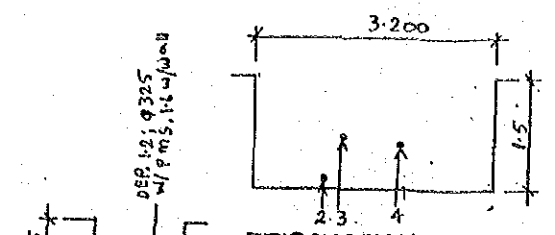
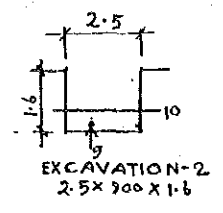
- EX-7**
1. DEP. 700, T/C.
600 N/wall
 2. DEP. 750, ϕ 75 G/R
600 N/wall
 3. DEP. 950, ϕ 325 w/p ms,
850 N/wall
 4. DEP. 600, ϕ 100
1 PVC sand line,
100 N/wall
 5. DEP. 1.2, ϕ 250
w/p ms,
3.4 N/wall



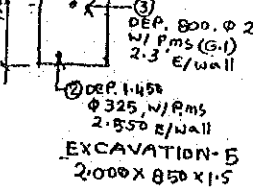
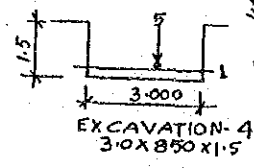
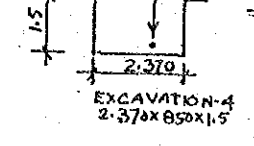
- EXCAVATION-6**
1. DEP. 700, T/C
900 N/wall
 2. DEP. 1.100
 ϕ 350, w/p ms
1.050 E/wall
 3. DEP. 750, w/p ms
1.7 E/wall



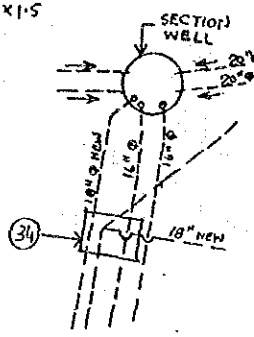
- EX-2**
1. DEP. 500, ϕ 35
T/C. N/wall 600
 2. DEP. 550, ϕ 75
ELEC. cable - 4 nos.
800 N/wall
 3. DEP. 1.275, ϕ 250
w/p ms, 1.1 N/wall
 4. DEP. 1.050, ϕ 325
w/p ms, 1.6 N/wall
 5. DEP. 375, ϕ 350.
w/p ms, 5.4 N/wall
 6. DEP. 800, ϕ 100, G/P
6.2 N/wall
 7. DEP. 1.100, ϕ 67
6.3 N/wall
 8. DEP. 1.150, ϕ 67,
6.500 N/wall
 9. DEP. 1.5, ϕ 250
w/p ms, 6.2 N/wall,
1.250 E/wall
 10. DEP. 1.050, ϕ 25,
T/C. 6.8 N/wall



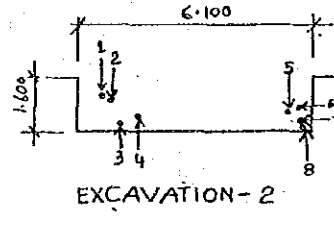
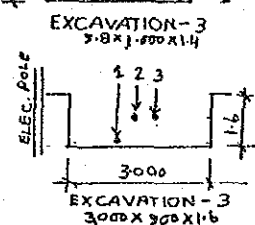
- EX-5**
2. DEP. 1.450, ϕ 200
w/p ms, 2.550 E/wall
 3. DEP. 800, ϕ 25, w/p ms,
2.3 E/wall
 4. DEP. 850, ϕ 37, w/p ms
1.2 E/wall



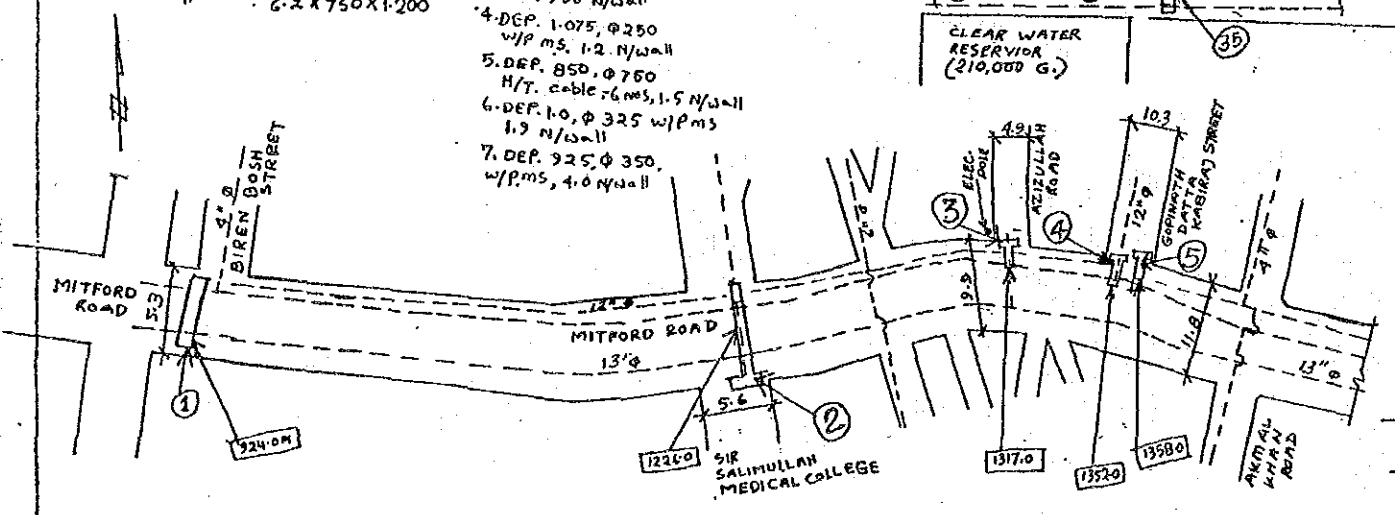
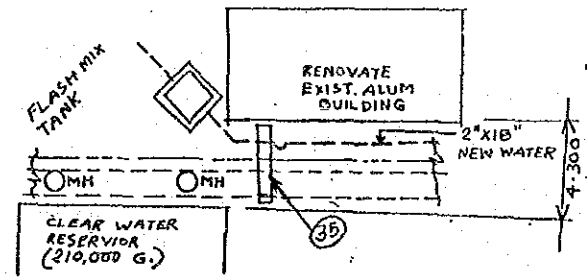
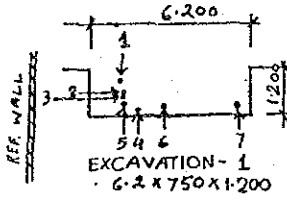
- EX-4**
1. DEP. 1.2, ϕ 325
w/p ms, 1.6 w/wall
 5. DEP. 1.2, ϕ 325, w/p ms
1.9 N/wall

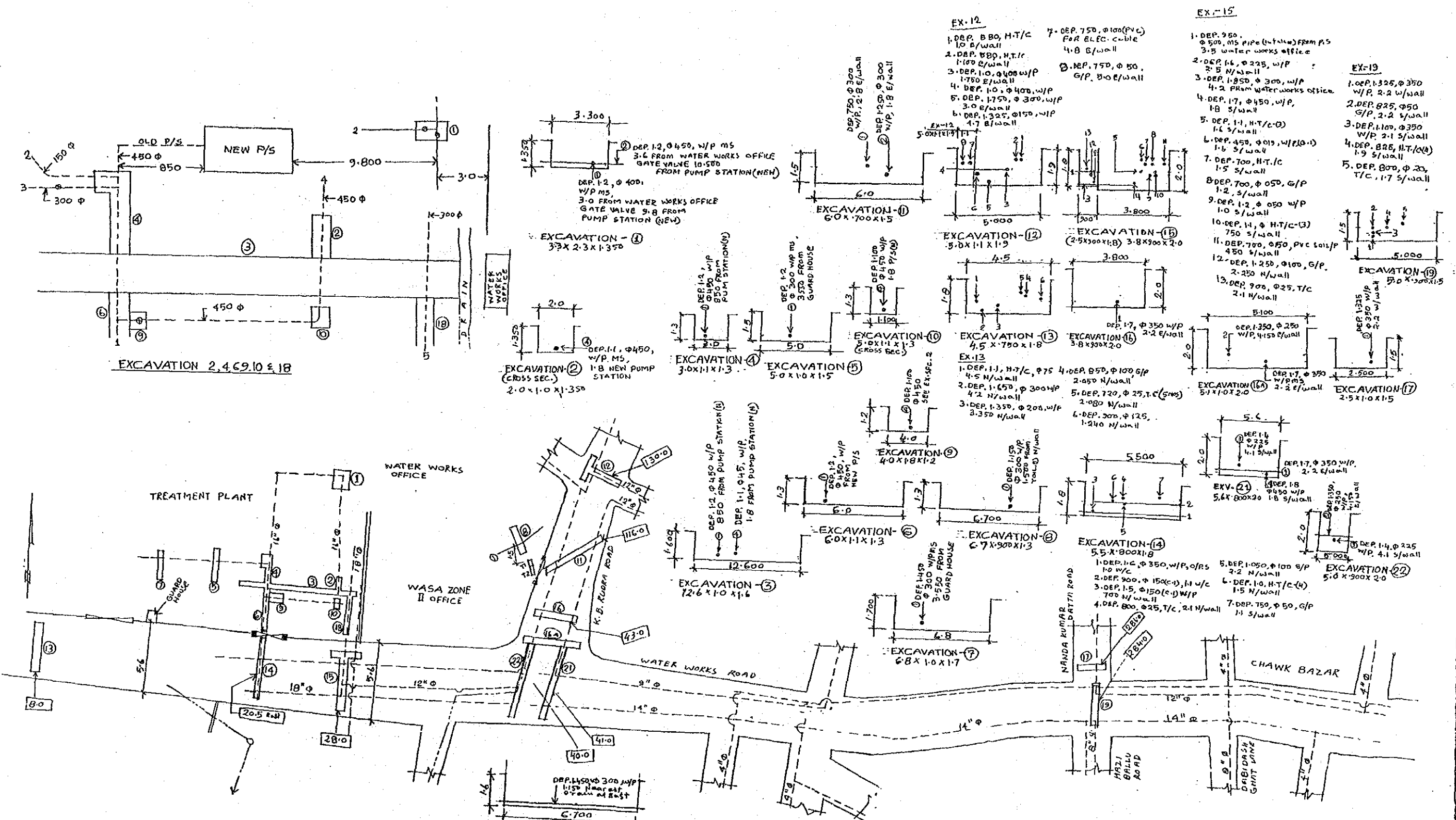


- EX-3**
1. DEP. 1.350, ϕ 325
w/p ms, 1.9 T/pole
 2. DEP. 600, cable
2.5 T/pole
 3. DEP. 600, ϕ 37
w/p, 3.0 T/pole
 4. DEP. 1.350, ϕ 325
w/p ms, 9.5 S/wall



- EX-1**
1. DEP. 350, ϕ 35
T/C. N/wall 750
 2. DEP. 600, ϕ 25
T/C. - 3 nos, 900 N/w
 3. DEP. 700, ϕ 100
G/P, 900 N/wall
 4. DEP. 1.075, ϕ 250
w/p ms, 1.2 N/wall
 5. DEP. 850, ϕ 750
H/T. cable, 6 ms, 1.5 N/wall
 6. DEP. 1.0, ϕ 325 w/p ms
1.9 N/wall
 7. DEP. 925, ϕ 350,
w/p ms, 4.0 N/wall





EX-12

1. DEP. 880, H.T./C
2. DEP. 880, H.T./C
3. DEP. 110, 450 w/p
4. DEP. 1750, 450 w/p
5. DEP. 1750, 450 w/p
6. DEP. 1325, 450 w/p
7. DEP. 750, 450 (PVC) FOR EL. C. cable
8. DEP. 750, 450 G/P. 800 w/wall

EX-15

1. DEP. 950, 450 MS PIPE (4" dia) FROM P/S
2. DEP. 16, 450 w/p
3. DEP. 1850, 450 w/p
4. DEP. 17, 450 w/p
5. DEP. 11, H.T./C (D)
6. DEP. 450, 450 w/p (D)
7. DEP. 700, H.T./C
8. DEP. 700, 450 G/P
9. DEP. 12, 450 w/p
10. DEP. 11, H.T./C (3)
11. DEP. 700, 450 PVC SOIL/P
12. DEP. 1250, 450 G/P
13. DEP. 900, 450 T/C

EX-19

1. DEP. 1325, 450 w/p
2. DEP. 875, 450 G/P
3. DEP. 1100, 450 w/p
4. DEP. 825, H.T./C (A)
5. DEP. 800, 450 T/C

EX-13

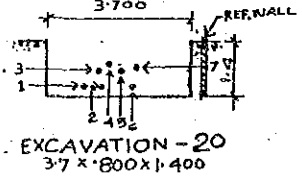
1. DEP. 11, H.T./C, 475
2. DEP. 1650, 450 w/p
3. DEP. 1350, 450 w/p
4. DEP. 850, 450 G/P
5. DEP. 720, 450 T/C (5ms)
6. DEP. 300, 450 w/p
7. DEP. 1250, 450 w/p

NOTE:
DISTANCE OF EXCAVATION FROM WATER WORKS

EXCAVATION RESULT WATER WORKS PLANT SITE TO CHAWK BAZAR.

E-20

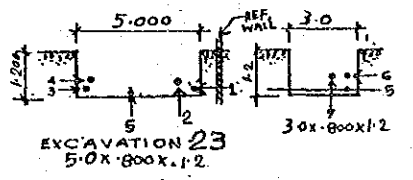
1. DEP. 1.2, ϕ 100, G/P
- 2.17 FROM E/WALL
2. DEP. 1.2, ϕ 300, W/P MS
- 2.3 FROM E/WALL
3. DEP. 1.750, ϕ 150, PVC W/P
- 2.4 E/W
4. DEP. 1.650, ϕ 16, T/C
- 2.1 E/WALL
5. DEP. 1.925, ϕ 200, R.C.C. SOIL-P
- 1.9 E/WALL
6. DEP. 1.780, ϕ 075, PVC-P (E/C)
- 1.5 E/WALL
7. DEP. 1.950, ϕ 1050, M.S. LINE
- 1.350 E/WALL



EXCAVATION-20
3.7 X 800 X 1.400

EX-23

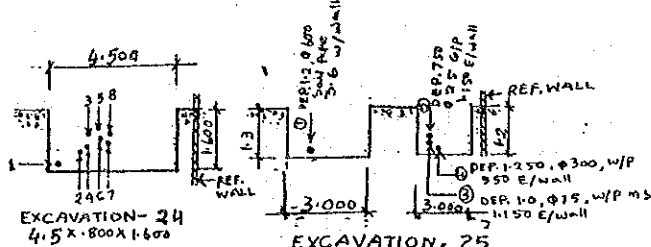
1. DEP. 1.020, ϕ 200, W/P MS
- 1.800 S/WALL, 1.600 W/WALL
2. DEP. 1.500, ϕ 25, T/C (3MS)
- 1.500 S/WALL
3. DEP. 1.050, ϕ 125, W/P
- 4.150 S/WALL
4. DEP. 1.800, ϕ 50, G/P
- 4.350 S/WALL
5. DEP. 1.1, ϕ 250, W/P (A.C. LINE)
- 2.850 S/WALL
6. DEP. 650, ϕ 25, T/C (3MS)
- 6.1 E/WALL
7. DEP. 650, ϕ 75, L.T. CABLE LINE; 7.3 E/WALL
- 8.



EXCAVATION-23
5.0 X 800 X 1.2

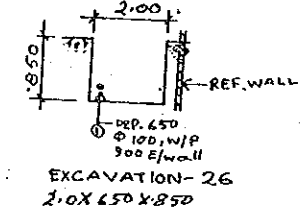
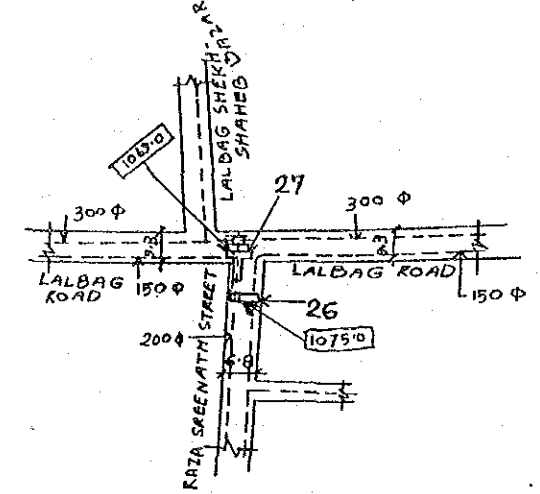
EX-24

1. DEP. 1.500, ϕ 300, W/P (Asbestos cement)
- 3.1 C S/WALL
2. DEP. 1.125, ϕ 150, W/P MS, 2.6 S/WALL
3. DEP. 600, ϕ 75, G-1, 2.500 S/WALL
4. DEP. 300, HT. CABLE, 2.500 S/WALL
5. DEP. 500, T/C, 2.2 S/WALL
6. DEP. 800, ϕ 150, W/P (C-1)
- 2.1 S/WALL
7. DEP. 870, EIE. CABLE,
- 1.950 S/WALL
8. DEP. 600, ϕ 20, G/P,
- 1.8 S/WALL

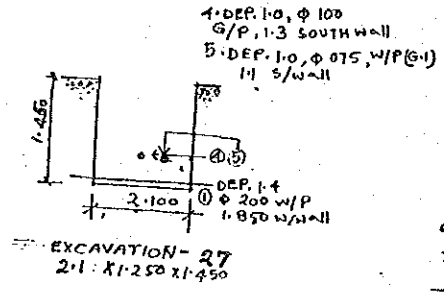


EXCAVATION-24
4.5 X 800 X 1.600

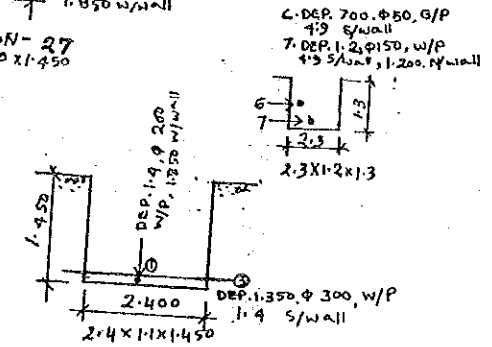
EXCAVATION-25
(3.0 X 800 X 1.3) (3.0 X 800 X 1.2)



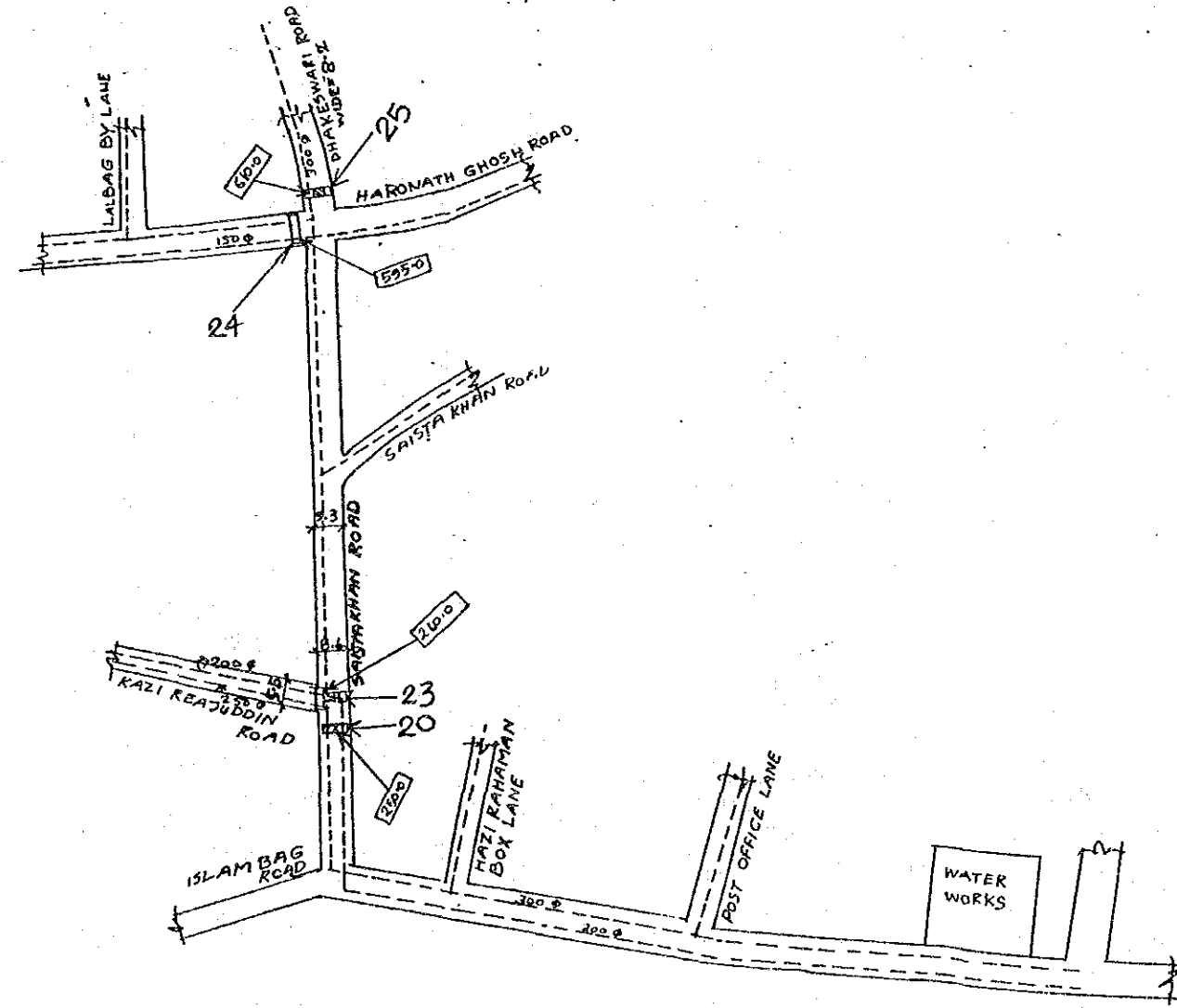
EXCAVATION-26
2.0 X 450 X 850



EXCAVATION-27
2.1 X 250 X 1.450



EXCAVATION-28
2.3 X 1.2 X 1.3



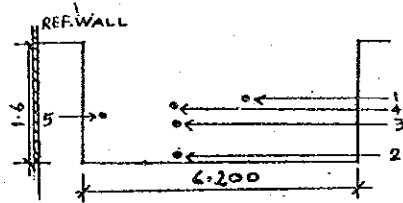
EXCAVATION RESULT
WATER WORKS PLANT SITE
TO PILKHANA.

NOTE:
DISTANCE OF EXCAVATION
FROM WATER WORKS

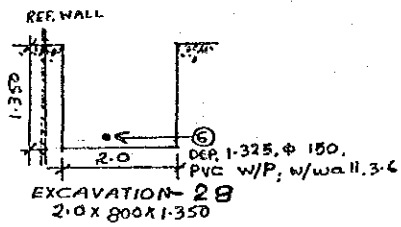
SHEET NO.- 3

EX. 29

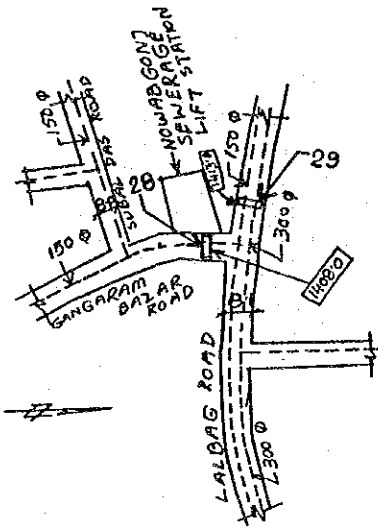
1. DEP. 700, ϕ 25
T/C, 1.4 N/wall
2. DEP. 15, ϕ 300, w/p
2.3 N/wall
3. DEP. 1.075, ϕ 150, w/p/MS
2.3 N/wall
4. DEP. 800, ϕ 40, L.T. cable line
2.3 N/wall
5. DEP. 1.8, ϕ 100, G/P
4.300 N/wall



EXCAVATION-29
6.2 X 750 X 1.600

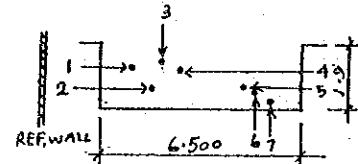


EXCAVATION-28
2.0 X 800 X 1.350



EX. - 31

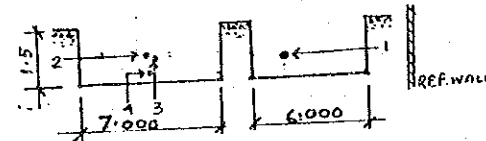
1. DEP. 650, L.T. cable
300 w/wall
2. DEP. 1.2, ϕ 200, G/P
1.4 w/wall
3. DEP. 500, ϕ 19, T/C
1.7 w/wall
4. DEP. 700, L.T. cable, 2.1 w/wall
5. DEP. 1.025, ϕ 80, G/P, 1.450 E/wall
6. DEP. 1.1, ϕ 100, G/P, 1.350 E/wall
7. DEP. 1.5, ϕ 300, w/p, 350 E/wall



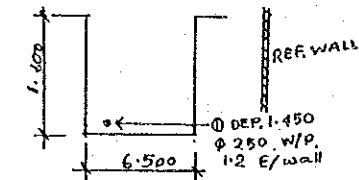
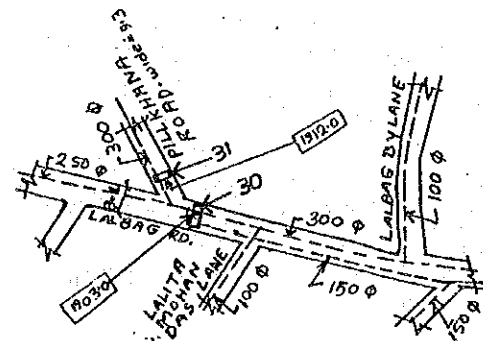
EXCAVATION-31
6.5 X 800 X 1.7

EX. - 30

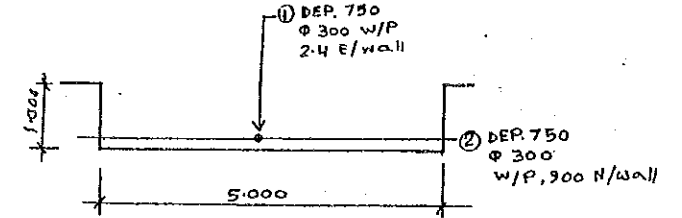
1. DEP. 950, ϕ 75, G/P, 3.2 S/wall
2. DEP. 800, ϕ 25, w/p(G-1), 1.8 N/wall
3. DEP. 900, ϕ 50, G/P, 1.9 N/wall
4. DEP. 1.300, ϕ 250
w/p.(MS), 3.9 N/wall



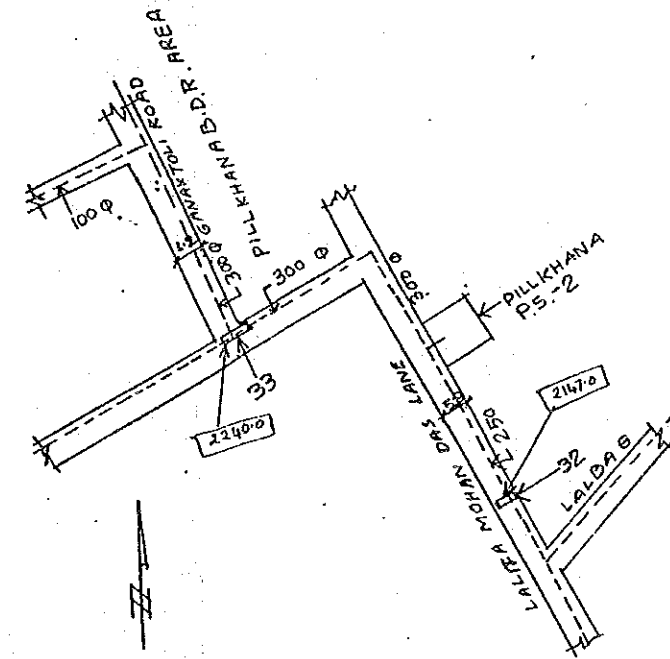
EXCAVATION-30
(7.0 X 800 X 1.5) (6.0 X 800 X 1.5)



EXCAVATION-32
6.5 X 800 X 1.6

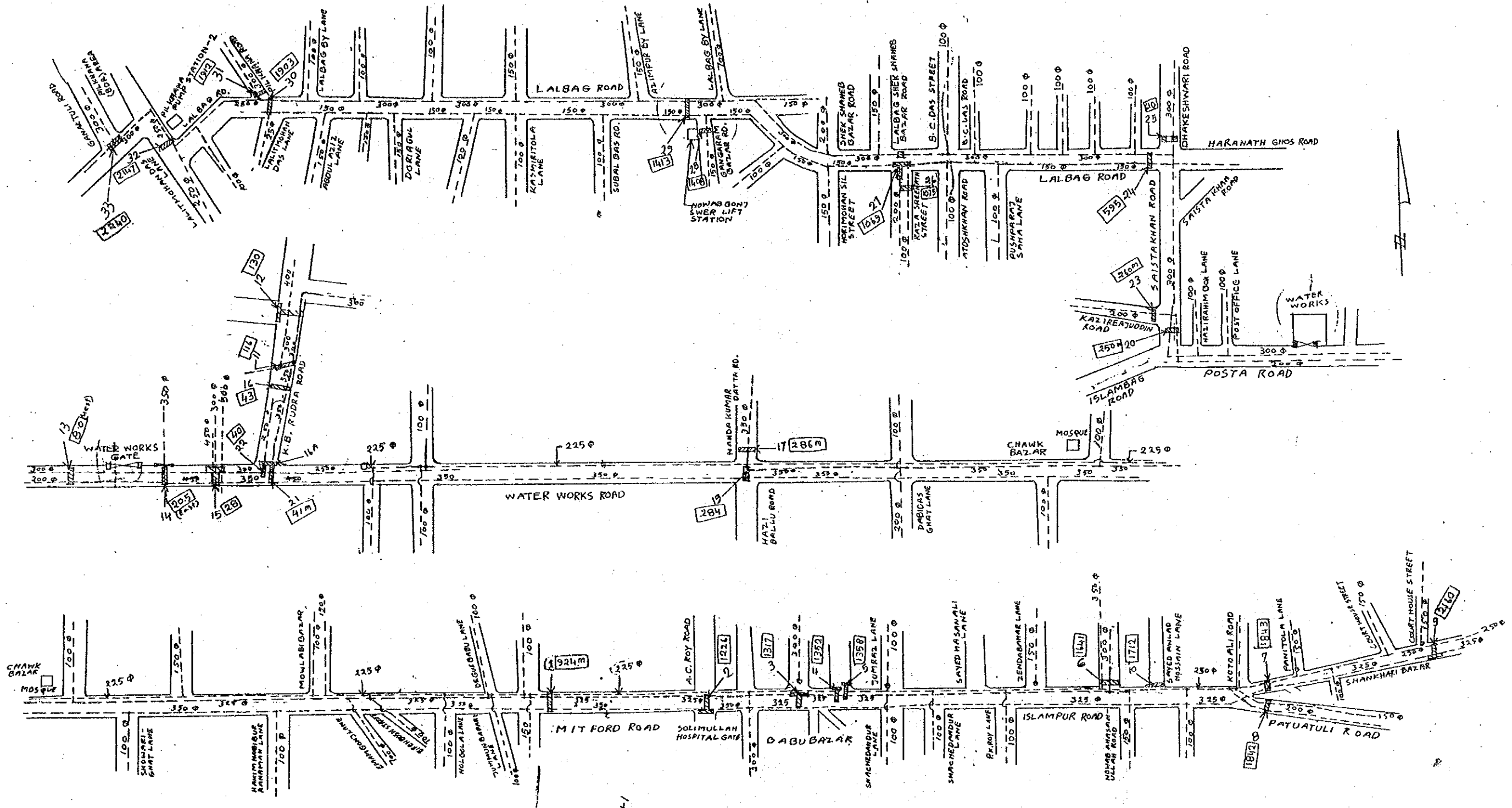


EXCAVATION - 33
5.0 X 1.0 X 1.0



EXCAVATION RESULT
WATER PLANT SITE
TO PILKHANA

NOTE: DISTANCE OF EXCAVATION
FROM WATER WORKS



NOTE:
 DISTANCE OF EXCAVATION
 FROM WATER WORKS.

MENTION WATER SUPPLY PIPELINE
 AND DISTANCE OF EXCAVATION

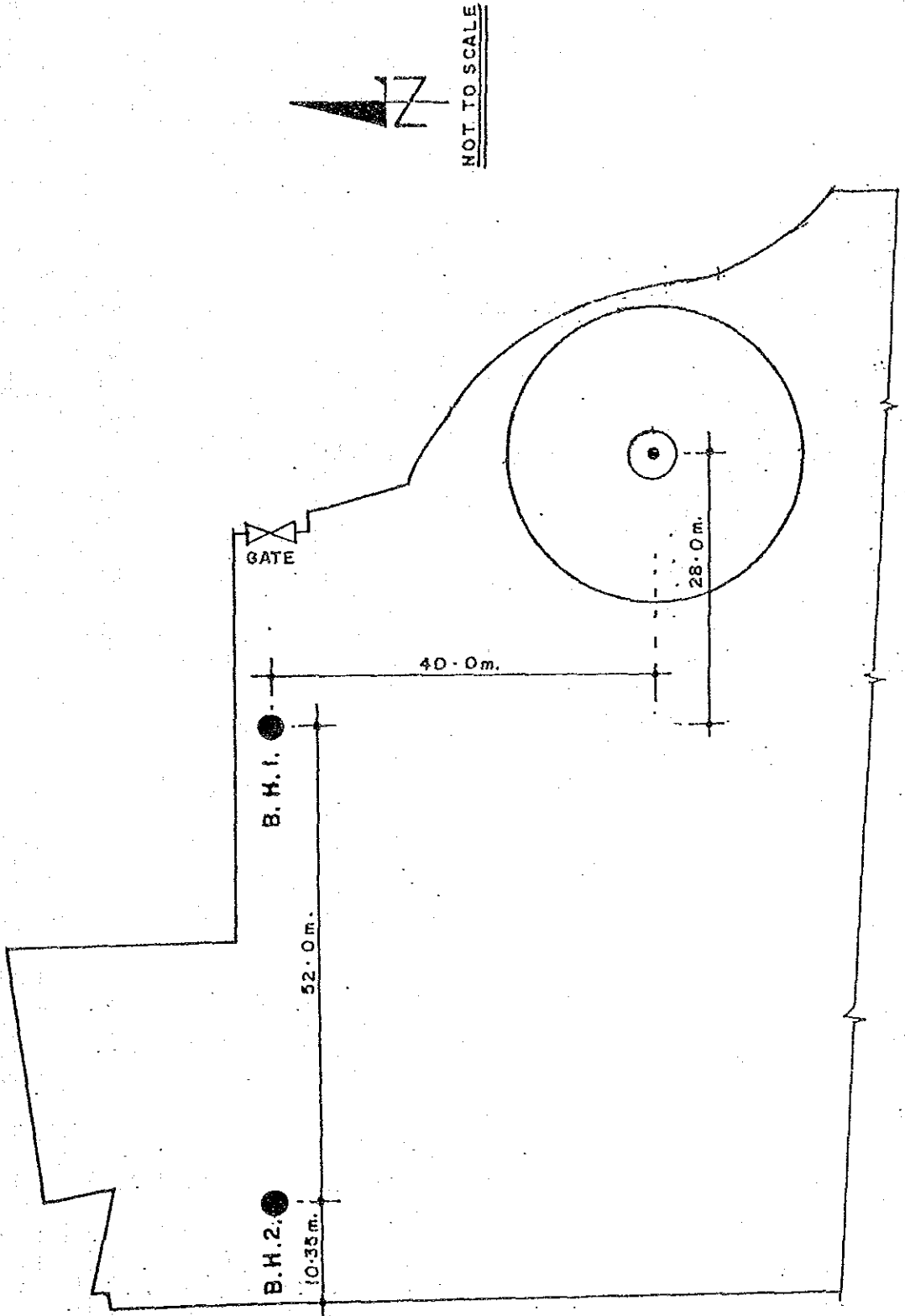
SHEET NO.- 5

B-11 Result of Boring Test in Chandnighat W. T. P.

SUBSOIL ENGINEERING
& CONSTRUCTION CO. LTD.
DHAKA.

PLAN SHOWING LOCATION OF BORE HOLE POINTS

CLIENT: WASA DHAKA
SITE : WATER TREATMENT PLANT, CHANDRIGHAT
DHAKA.



SUBSOIL ENGINEERING & CONSTRUCTION CO. LTD.

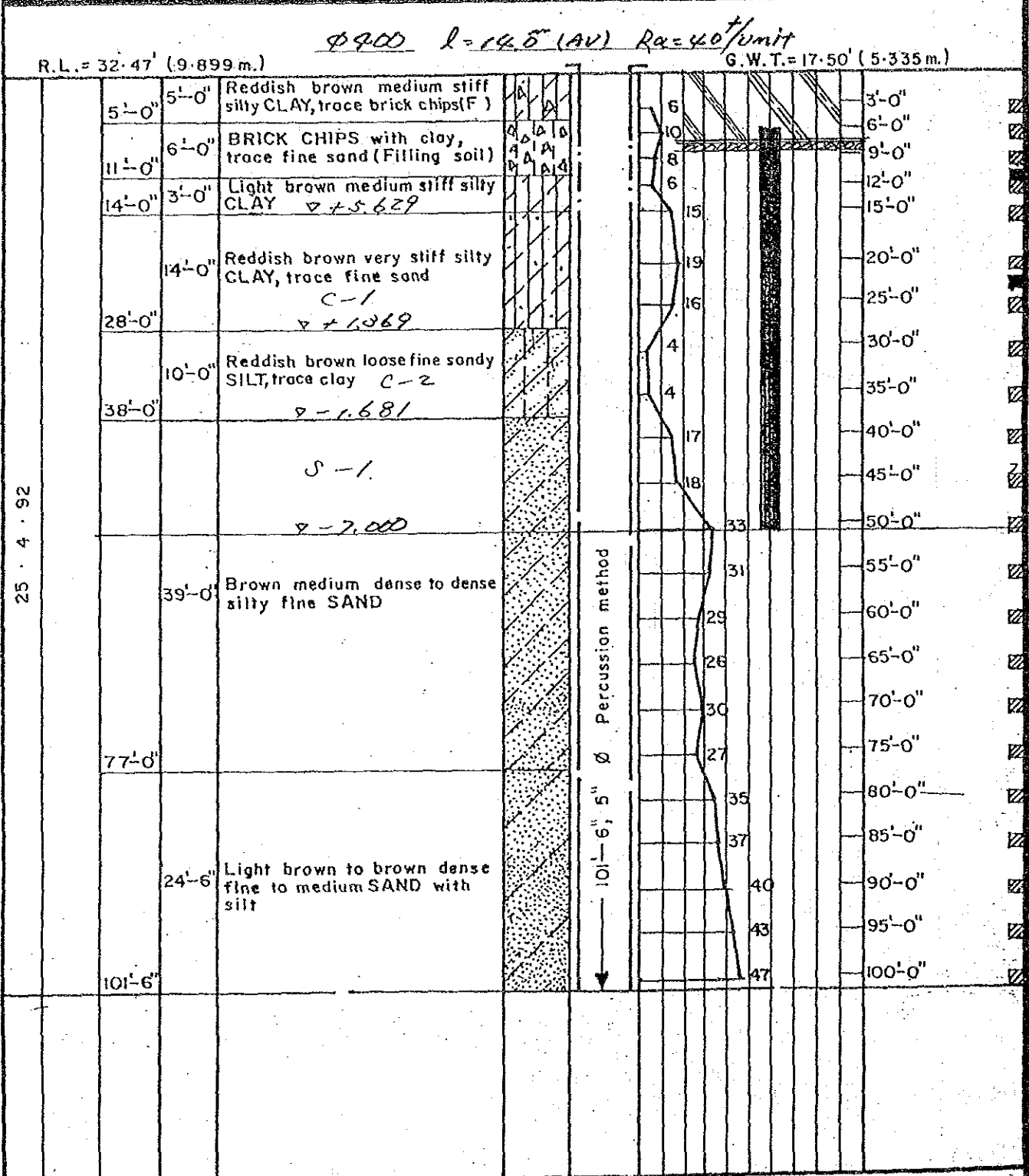
DR. N. A. HASHEM

DATE: 29. 4. 92

PLAN NO. 2220.

| | |
|---|--|
| SUB SOIL ENGINEERING CONSTRUCTION CO. LTD. DHAKA | Client:- WASA, DHAKA. Site:- WATER TREATMENT PLANT CHANDNIGHAT DHAKA. Bore chart of Boring No. B. H. I. |
|---|--|

| DATE | REDUCED ELEVATION | DEPTH IN FEET | THICKNESS | STRATA ENCOUNTERED | LOG | DIA. OF BORING | STANDARD PENETRATION TESTS Blows/ft. 10 20 30 40 50 60 70 80 90 | REMARKS (G.W.T. SOIL SAMPLES) VANE SHEAR TESTS Lbs./sq in. |
|------|-------------------|---------------|-----------|--------------------|-----|----------------|---|---|
|------|-------------------|---------------|-----------|--------------------|-----|----------------|---|---|



| | | |
|-----------------------|--------------------|-------------------------|
| DRN:- MAMOON | DATE:- 27 · 4 · 92 | SCALE:- 1"=16'-0" |
| DISTURBED SAMPLE..... | | UNDISTURBED SAMPLE..... |
| | | PLAN No. 2221 |

SUBSOIL ENGINEERING
CONSTRUCTION CO. LTD.
DHAKA

Client:- **WASA, DHAKA.**
 Site:- **WATER TREATMENT PLANT CHANDNIGAT**
DHAKA.

Bore chart of Boring No. **B. H. 2.**

| DATE | REDUCED ELEVATION | DEPTH IN FEET | THICKNESS | STRATA ENCOUNTERED | LOG | STANDARD PENETRATION TESTS | | | | | | | | | | REMARKS (G.W.T. SOIL SAMPLES) VANE SHEAR TESTS Lbs./sq in. | | | | | | | | | | | | | | |
|---------------------------------------|--------------------------|---------------|-----------|---|-------------------|---|---|---|---|----|----|----|---|---|----------------------------|---|----|----|----|----|----|----|----|----|----|----|----|--|--|--|
| | | | | | | Blows/ft. 10 20 30 40 50 60 70 80 90 | | | | | | | | | | | | | | | | | | | | | | | | |
| <i>φ 400, D=14.0" (ØV) Ra=40/unit</i> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | R.L. = 30.85' (9.406 m.) | | | | | | | | | | | | | | G.W.T. = 21.01' (6.406 m.) | | | | | | | | | | | | | | | |
| 21.4.92 | | 14'-0" | 14'-0" | <i>Bc-1</i> Dark grey medium stiff to soft silty CLAY with brick chips (Filling soil) <i>▽ +5.103</i> | Percussion method | 6 | 4 | 2 | 2 | 15 | 18 | 12 | 8 | 9 | 11 | 24 | 32 | 34 | 27 | 26 | 27 | 25 | 39 | 38 | 41 | 46 | 45 | | | |
| | | 14'-0" | 14'-0" | <i>C-1</i> Reddish brown very stiff to stiff silty CLAY, trace fine sand <i>▽ +0.876</i> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | 28'-0" | 14'-0" | <i>C-2</i> Reddish brown loose fine sandy SILT, trace clay <i>▽ -2.784</i> | Percussion method | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 40'-0" | 12'-0" | <i>S-1</i> <i>▽ -2.000</i> | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 23.4.92 | | 39'-0" | 39'-0" | Brown medium dense to dense silty fine SAND | Percussion method | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 79'-0" | 22'-0" | Light brown to brown dense fine SAND with silt | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 101'-6" | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

DISTURBED SAMPLE... UNDISTURBED SAMPLE...

DRN:- A. RAZZAK

DATE:- 24.4.92

SCALE:- 1"=16'-0"

PLAN No. 2222

JICA