

Appendix C

*Financial Analysis for
Waste Collection, Transport and
Disposal*

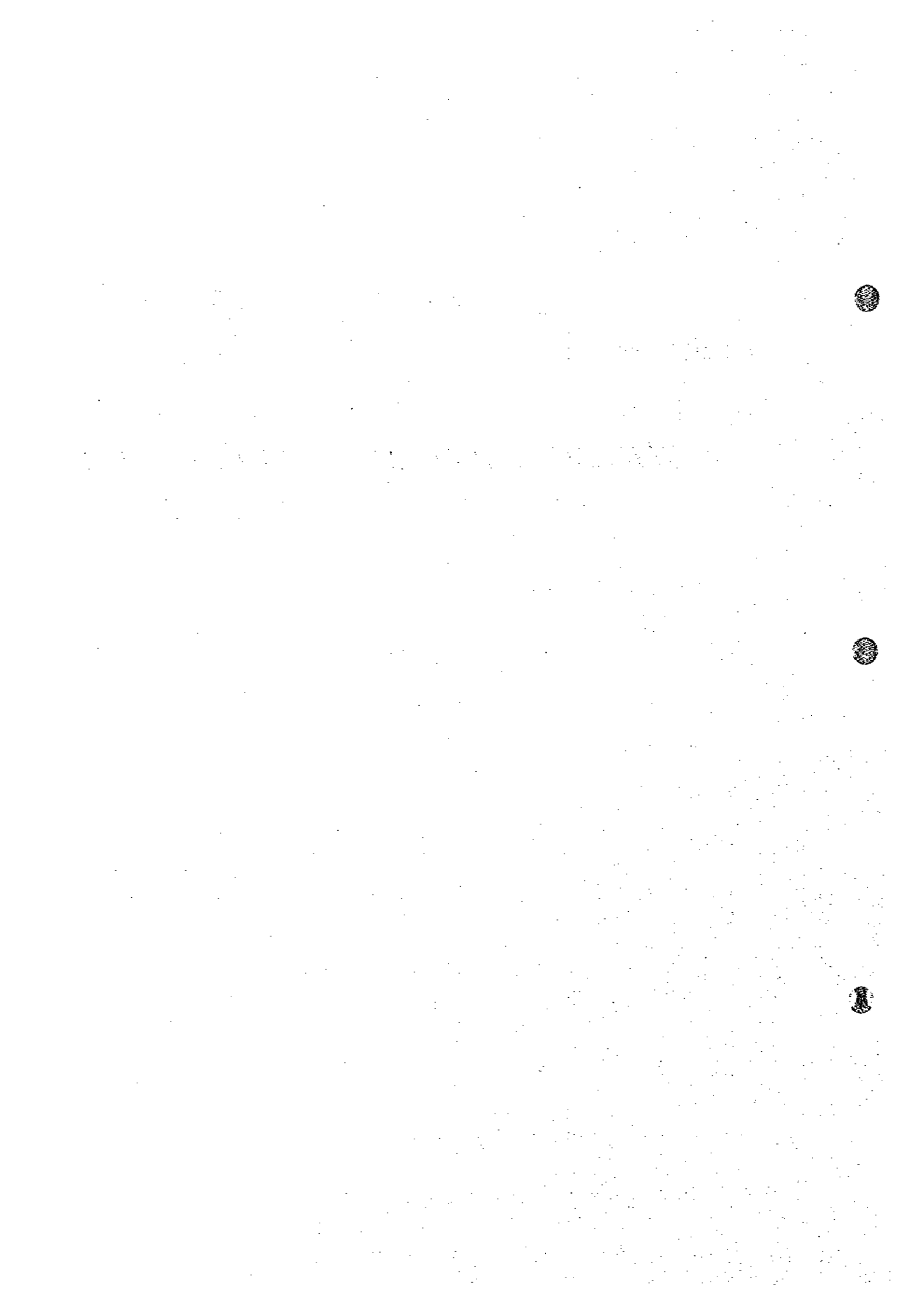


Table C-1 Results of FIRR Calculation (Typical Cases)

Cost	Billing System	Revenue Estimate	Case	FIRRs
All Loan	Tax + Joint Billing	Most Optimistic	A-1-a	2.42%
		Most Likely	A-1-b	-8.15%
		Most Pessimistic	A-1-c	-19.20%
	Tax + Special RCC	Most Optimistic	A-2-a	-1.83%
		Most Likely	A-2-b	-12.34%
		Most Pessimistic	A-2-c	-23.35%
Partial Loan (Grant for 1st Year of Final Disposal)	Tax + Joint Billing	Most Optimistic	B-1-a	8.13%
		Most Likely	B-1-b	-4.62%
		Most Pessimistic	B-1-c	-17.20%
	Tax + Special RCC	Most Optimistic	B-2-a	3.05%
		Most Likely	B-2-b	-9.42%
		Most Pessimistic	B-2-c	-21.81%
Partial Loan (Grant for 1st Year of Final Disposal and Collection of Transport)	Tax + Joint Billing	Most Optimistic	C-1-a	62.99%
		Most Likely	C-1-b	24.70%
		Most Pessimistic	C-1-c	-6.94%
	Tax + Special RCC	Most Optimistic	C-2-a	40.92%
		Most Likely	C-2-b	10.24%
		Most Pessimistic	C-2-c	-14.80%

Figure C-1 Results of FIRR Calculation (Typical Cases)

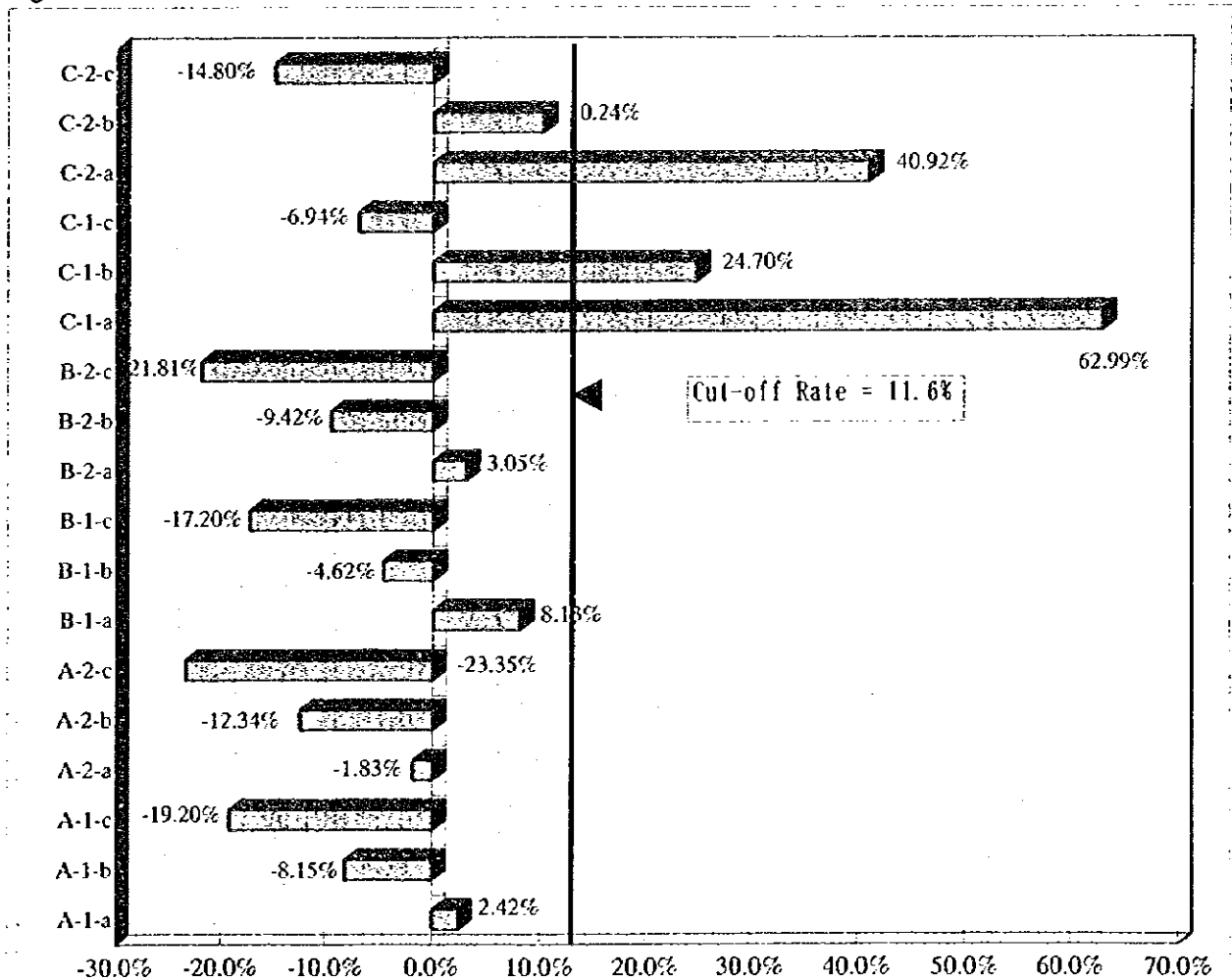


Table C-2 FIRR (Case A-1-a: Most Optimistic)						FIRR =	2.42%
Project Year	Financial Year	Investment	O & M	Cost	Benefit	Net Benefit	Cumulative Net Benefit
1	1999	5,098	536	5,634	804	-4,830	-4,830
2	2000	1,407	1,112	2,519	1,948	-571	-5,401
3	2001	1,864	1,396	3,260	2,564	-696	-6,098
4	2002	430	1,745	2,175	3,156	981	-5,117
5	2003	580	1,756	2,336	3,156	820	-4,297
6	2004	0	1,769	1,769	3,155	1,386	-2,911
7	2005	0	1,805	1,805	3,156	1,351	-1,560
8	2006	0	0	0	2,358	2,358	798

Table C-3 FIRR (Case A-1-b: Most Likely)						FIRR =	-8.15%
Project Year	Financial Year	Investment	O & M	Cost	Benefit	Net Benefit	Cumulative Net Benefit
1	1999	5,098	536	5,634	548	-5,086	-5,086
2	2000	1,407	1,112	2,519	1,480	-1,039	-6,124
3	2001	1,864	1,396	3,260	1,975	-1,285	-7,409
4	2002	430	1,745	2,175	2,591	416	-6,993
5	2003	580	1,756	2,336	2,591	255	-6,737
6	2004	0	1,769	1,769	2,591	822	-5,915
7	2005	0	1,805	1,805	2,591	786	-5,129
8	2006	0	0	0	2,358	2,358	-2,771

Table C-4 FIRR (Case A-1-c: Most Pessimistic)						FIRR =	-19.20%
Project Year	Financial Year	Investment	O & M	Cost	Benefit	Net Benefit	Cumulative Net Benefit
1	1999	5,098	536	5,634	369	-5,265	-5,265
2	2000	1,407	1,112	2,519	1,185	-1,334	-6,599
3	2001	1,864	1,396	3,260	1,512	-1,748	-8,346
4	2002	430	1,745	2,175	1,894	-281	-8,628
5	2003	580	1,756	2,336	1,893	-443	-9,070
6	2004	0	1,769	1,769	1,893	124	-8,946
7	2005	0	1,805	1,805	1,893	88	-8,858
8	2006	0	0	0	2,358	2,358	-6,500

Table C-5 FIRR (Case A-2-a: Most Optimistic)

FIRR = -1.83%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	5,098	536	5,634	804	-4,830	-4,830
2	2000	1,407	1,112	2,519	1,817	-702	-5,533
3	2001	1,864	1,396	3,260	2,364	-896	-6,429
4	2002	430	1,745	2,175	2,890	715	-5,714
5	2003	580	1,756	2,336	2,890	554	-5,160
6	2004	0	1,769	1,769	2,890	1,121	-4,040
7	2005	0	1,805	1,805	2,890	1,085	-2,955
8	2006	0	0	0	2,358	2,358	-597

Table C-6 FIRR (Case A-2-b: Most Likely)

FIRR = -12.34%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	5,098	536	5,634	548	-5,086	-5,086
2	2000	1,407	1,112	2,519	1,349	-1,170	-6,256
3	2001	1,864	1,396	3,260	1,776	-1,484	-7,740
4	2002	430	1,745	2,175	2,325	150	-7,590
5	2003	580	1,756	2,336	2,325	-11	-7,601
6	2004	0	1,769	1,769	2,325	556	-7,044
7	2005	0	1,805	1,805	2,325	520	-6,524
8	2006	0	0	0	2,358	2,358	-4,166

Table C-7 FIRR (Case A-2-c: Most Pessimistic)

FIRR = -23.35%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	5,098	536	5,634	369	-5,265	-5,265
2	2000	1,407	1,112	2,519	1,054	-1,465	-6,730
3	2001	1,864	1,396	3,260	1,313	-1,947	-8,677
4	2002	430	1,745	2,175	1,627	-548	-9,225
5	2003	580	1,756	2,336	1,627	-709	-9,933
6	2004	0	1,769	1,769	1,627	-142	-10,075
7	2005	0	1,805	1,805	1,627	-178	-10,253
8	2006	0	0	0	2,358	2,358	-7,895

Table C-8 FIRR (Case B-1-a: Most Optimistic) FIRR = 8.13%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	3,667	536	4,203	804	-3,399	-3,399
2	2000	1,407	1,112	2,519	1,948	-571	-3,970
3	2001	1,864	1,396	3,260	2,564	-696	-4,667
4	2002	430	1,745	2,175	3,156	981	-3,686
5	2003	580	1,756	2,336	3,156	820	-2,866
6	2004	0	1,769	1,769	3,155	1,386	-1,480
7	2005	0	1,805	1,805	3,156	1,351	-129
8	2006	0	0	0	2,358	2,358	2,229

Table C-9 FIRR (B-1-b: Most Likely) FIRR = -4.62%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	3,667	536	4,203	548	-3,655	-3,655
2	2000	1,407	1,112	2,519	1,480	-1,039	-4,693
3	2001	1,864	1,396	3,260	1,975	-1,285	-5,978
4	2002	430	1,745	2,175	2,591	416	-5,562
5	2003	580	1,756	2,336	2,591	255	-5,306
6	2004	0	1,769	1,769	2,591	822	-4,484
7	2005	0	1,805	1,805	2,591	786	-3,698
8	2006	0	0	0	2,358	2,358	-1,340

Table C-10 FIRR (Case B-1-c: Most Pessimistic) FIRR = -17.20%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	3,667	536	4,203	369	-3,834	-3,834
2	2000	1,407	1,112	2,519	1,185	-1,334	-5,168
3	2001	1,864	1,396	3,260	1,512	-1,748	-6,915
4	2002	430	1,745	2,175	1,894	-281	-7,197
5	2003	580	1,756	2,336	1,893	-443	-7,639
6	2004	0	1,769	1,769	1,893	124	-7,515
7	2005	0	1,805	1,805	1,893	88	-7,427
8	2006	0	0	0	2,358	2,358	-5,069

Table C-11 FIRR (Case B-2-a: Most Optimistic)

FIRR = 3.05%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	3,667	536	4,203	804	-3,399	-3,399
2	2000	1,407	1,112	2,519	1,817	-702	-4,102
3	2001	1,864	1,396	3,260	2,364	-896	-4,998
4	2002	430	1,745	2,175	2,890	715	-4,283
5	2003	580	1,756	2,336	2,890	554	-3,729
6	2004	0	1,769	1,769	2,890	1,121	-2,609
7	2005	0	1,805	1,805	2,890	1,085	-1,524
8	2006	0	0	0	2,358	2,358	834

Table C-12 FIRR (Case B-2-b: Most Likely)

FIRR = -9.42%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	3,667	536	4,203	548	-3,655	-3,655
2	2000	1,407	1,112	2,519	1,349	-1,170	-4,825
3	2001	1,864	1,396	3,260	1,776	-1,484	-6,309
4	2002	430	1,745	2,175	2,325	150	-6,159
5	2003	580	1,756	2,336	2,325	-11	-6,170
6	2004	0	1,769	1,769	2,325	556	-5,613
7	2005	0	1,805	1,805	2,325	520	-5,093
8	2006	0	0	0	2,358	2,358	-2,735

Table C-13 FIRR (Case B-2-c: Most Pessimistic)

FIRR = -21.81%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	3,667	536	4,203	369	-3,834	-3,834
2	2000	1,407	1,112	2,519	1,054	-1,465	-5,299
3	2001	1,864	1,396	3,260	1,313	-1,947	-7,246
4	2002	430	1,745	2,175	1,627	-548	-7,794
5	2003	580	1,756	2,336	1,627	-709	-8,502
6	2004	0	1,769	1,769	1,627	-142	-8,644
7	2005	0	1,805	1,805	1,627	-178	-8,822
8	2006	0	0	0	2,358	2,358	-6,464

Table C-14 FIRR (Case C-1-a: Most Optimistic)

FIRR = 62.99%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	0	194	194	804	610	610
2	2000	1,407	1,112	2,519	1,948	-571	39
3	2001	1,864	1,396	3,260	2,564	-696	-658
4	2002	430	1,745	2,175	3,156	981	323
5	2003	580	1,756	2,336	3,156	820	1,143
6	2004	0	1,769	1,769	3,155	1,386	2,529
7	2005	0	1,805	1,805	3,156	1,351	3,880
8	2006	0	0	0	2,358	2,358	6,238

Table C-15 FIRR (Case C-1-b: Most Likely)

FIRR = 24.70%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	0	194	194	548	354	354
2	2000	1,407	1,112	2,519	1,480	-1,039	-684
3	2001	1,864	1,396	3,260	1,975	-1,285	-1,969
4	2002	430	1,745	2,175	2,591	416	-1,553
5	2003	580	1,756	2,336	2,591	255	-1,297
6	2004	0	1,769	1,769	2,591	822	-475
7	2005	0	1,805	1,805	2,591	786	311
8	2006	0	0	0	2,358	2,358	2,669

Table C-16 FIRR (Case C-1-c: Most Pessimistic)

FIRR = -6.94%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	0	194	194	369	175	175
2	2000	1,407	1,112	2,519	1,185	-1,334	-1,159
3	2001	1,864	1,396	3,260	1,512	-1,748	-2,906
4	2002	430	1,745	2,175	1,894	-281	-3,188
5	2003	580	1,756	2,336	1,893	-443	-3,630
6	2004	0	1,769	1,769	1,893	124	-3,506
7	2005	0	1,805	1,805	1,893	88	-3,418
8	2006	0	0	0	2,358	2,358	-1,060

Table C-17 FIRR (Case C-2-a: Most Optimistic)

Project Year	Financial Year				FIRR = 40.92%		Cumulative Net Benefit
		Investment	O & M	Cost	Benefit	Net Benefit	
1	1999	0	194	194	801	610	610
2	2000	1,407	1,112	2,519	1,817	-702	-93
3	2001	1,864	1,396	3,260	2,364	-896	-989
4	2002	430	1,745	2,175	2,890	715	-274
5	2003	580	1,756	2,336	2,890	554	280
6	2004	0	1,769	1,769	2,890	1,121	1,400
7	2005	0	1,805	1,805	2,890	1,085	2,485
8	2006	0	0	0	2,358	2,358	4,843

Table C-18 FIRR (Case C-2-b: Most Likely)

Project Year	Financial Year				FIRR = 10.24%		Cumulative Net Benefit
		Investment	O & M	Cost	Benefit	Net Benefit	
1	1999	0	194	194	548	354	354
2	2000	1,407	1,112	2,519	1,349	-1,170	-816
3	2001	1,864	1,396	3,260	1,776	-1,484	-2,300
4	2002	430	1,745	2,175	2,325	150	-2,150
5	2003	580	1,756	2,336	2,325	-11	-2,161
6	2004	0	1,769	1,769	2,325	556	-1,604
7	2005	0	1,805	1,805	2,325	520	-1,084
8	2006	0	0	0	2,358	2,358	1,274

Table C-19 FIRR (Case C-2-c: Most pessimistic)

Project Year	Financial Year				FIRR = -14.80%		Cumulative Net Benefit
		Investment	O & M	Cost	Benefit	Net Benefit	
1	1999	0	194	194	369	175	175
2	2000	1,407	1,112	2,519	1,054	-1,465	-1,290
3	2001	1,864	1,396	3,260	1,313	-1,947	-3,237
4	2002	430	1,745	2,175	1,627	-548	-3,785
5	2003	580	1,756	2,336	1,627	-709	-4,493
6	2004	0	1,769	1,769	1,627	-142	-4,635
7	2005	0	1,805	1,805	1,627	-178	-4,813
8	2006	0	0	0	2,358	2,358	-2,455

Figure C-2 Financial Implementation Plan for Case C-1-b

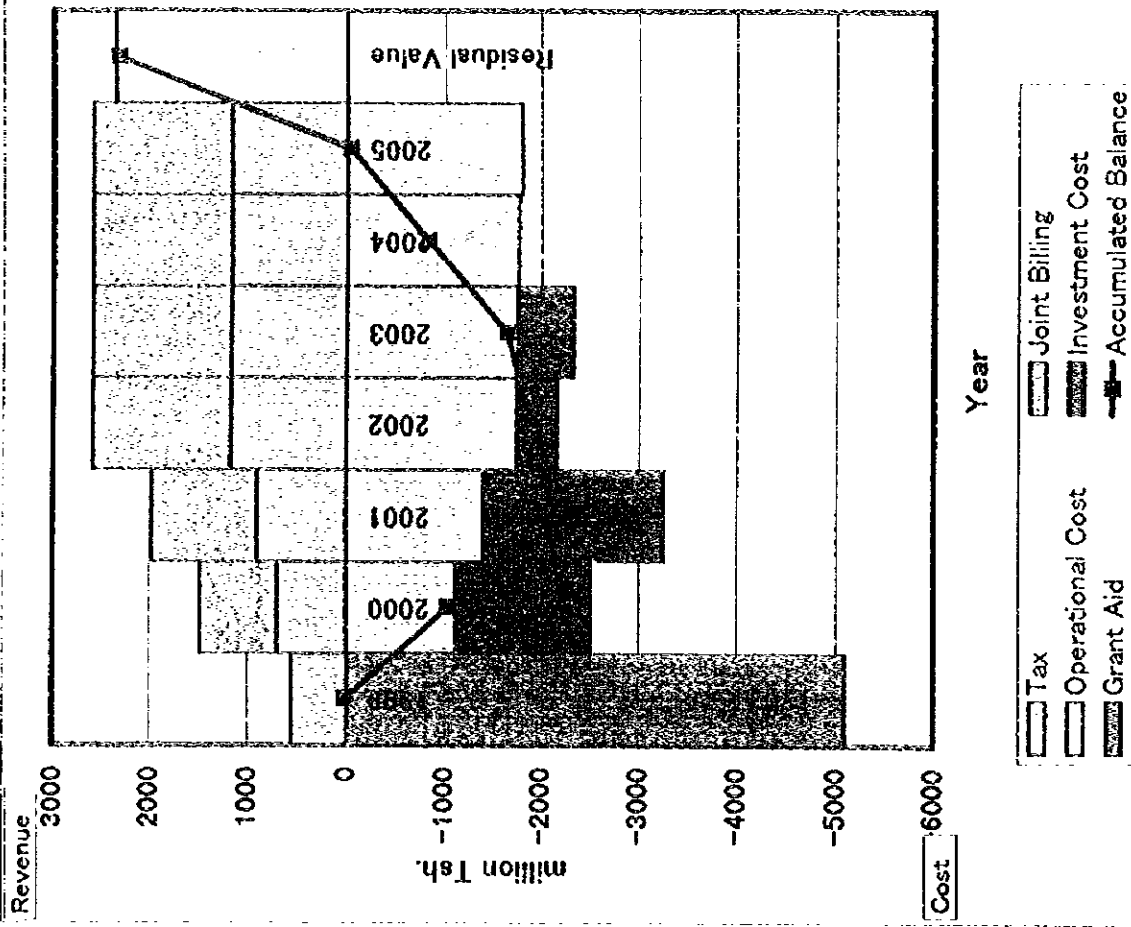
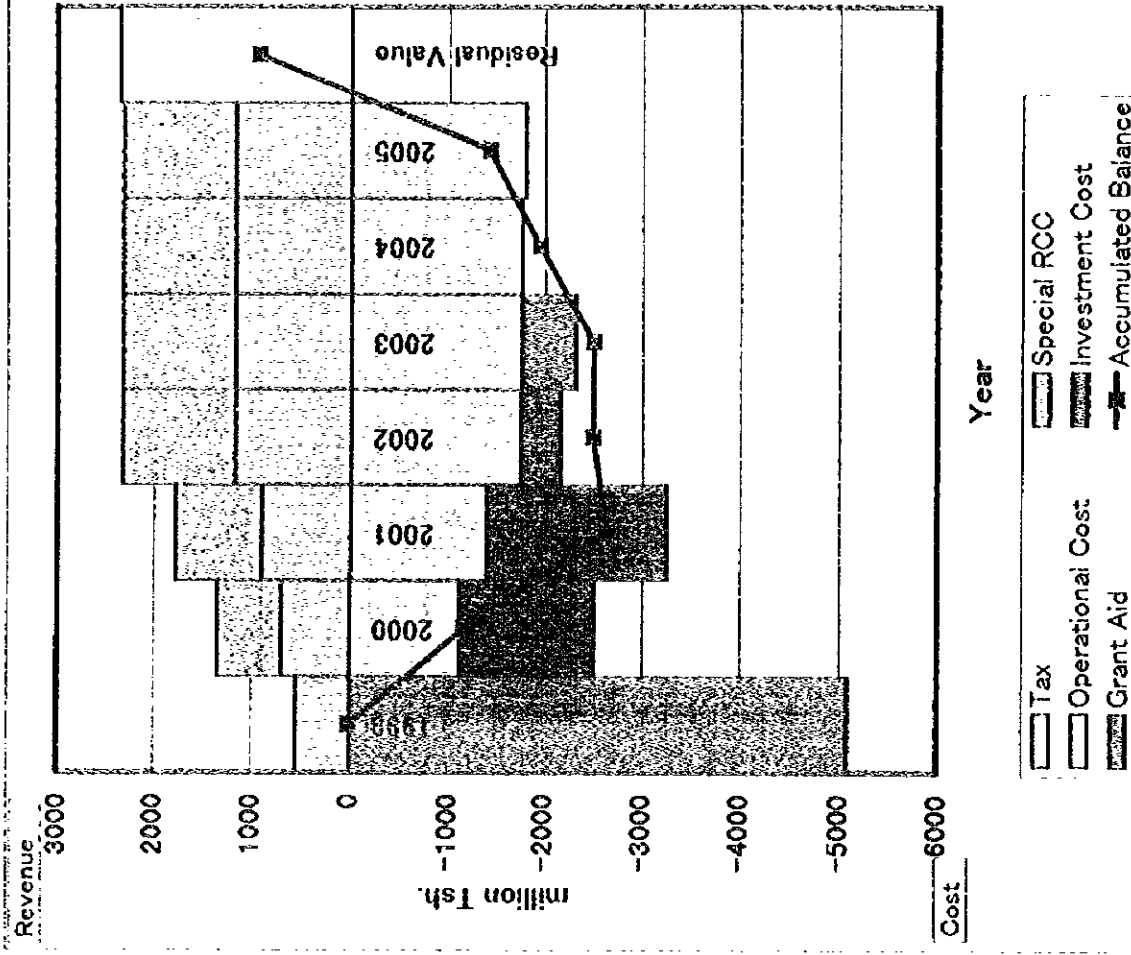


Figure C-3 Financial Implementation Plan for Case C-2-b



1. 2000-2001
 2. 2002-2003
 3. 2004-2005
 4. 2006-2007
 5. 2008-2009
 6. 2010-2011
 7. 2012-2013
 8. 2014-2015
 9. 2016-2017
 10. 2018-2019
 11. 2020-2021
 12. 2022-2023
 13. 2024-2025
 14. 2026-2027
 15. 2028-2029
 16. 2030-2031
 17. 2032-2033
 18. 2034-2035
 19. 2036-2037
 20. 2038-2039
 21. 2040-2041
 22. 2042-2043
 23. 2044-2045
 24. 2046-2047
 25. 2048-2049
 26. 2050-2051
 27. 2052-2053
 28. 2054-2055
 29. 2056-2057
 30. 2058-2059
 31. 2060-2061
 32. 2062-2063
 33. 2064-2065
 34. 2066-2067
 35. 2068-2069
 36. 2070-2071
 37. 2072-2073
 38. 2074-2075
 39. 2076-2077
 40. 2078-2079
 41. 2080-2081
 42. 2082-2083
 43. 2084-2085
 44. 2086-2087
 45. 2088-2089
 46. 2090-2091
 47. 2092-2093
 48. 2094-2095
 49. 2096-2097
 50. 2098-2099
 51. 2100-2101
 52. 2102-2103
 53. 2104-2105
 54. 2106-2107
 55. 2108-2109
 56. 2110-2111
 57. 2112-2113
 58. 2114-2115
 59. 2116-2117
 60. 2118-2119
 61. 2120-2121
 62. 2122-2123
 63. 2124-2125
 64. 2126-2127
 65. 2128-2129
 66. 2130-2131
 67. 2132-2133
 68. 2134-2135
 69. 2136-2137
 70. 2138-2139
 71. 2140-2141
 72. 2142-2143
 73. 2144-2145
 74. 2146-2147
 75. 2148-2149
 76. 2150-2151
 77. 2152-2153
 78. 2154-2155
 79. 2156-2157
 80. 2158-2159
 81. 2160-2161
 82. 2162-2163
 83. 2164-2165
 84. 2166-2167
 85. 2168-2169
 86. 2170-2171
 87. 2172-2173
 88. 2174-2175
 89. 2176-2177
 90. 2178-2179
 91. 2180-2181
 92. 2182-2183
 93. 2184-2185
 94. 2186-2187
 95. 2188-2189
 96. 2190-2191
 97. 2192-2193
 98. 2194-2195
 99. 2196-2197
 100. 2198-2199
 101. 2200-2201
 102. 2202-2203
 103. 2204-2205
 104. 2206-2207
 105. 2208-2209
 106. 2210-2211
 107. 2212-2213
 108. 2214-2215
 109. 2216-2217
 110. 2218-2219
 111. 2220-2221
 112. 2222-2223
 113. 2224-2225
 114. 2226-2227
 115. 2228-2229
 116. 2230-2231
 117. 2232-2233
 118. 2234-2235
 119. 2236-2237
 120. 2238-2239
 121. 2240-2241
 122. 2242-2243
 123. 2244-2245
 124. 2246-2247
 125. 2248-2249
 126. 2250-2251
 127. 2252-2253
 128. 2254-2255
 129. 2256-2257
 130. 2258-2259
 131. 2260-2261
 132. 2262-2263
 133. 2264-2265
 134. 2266-2267
 135. 2268-2269
 136. 2270-2271
 137. 2272-2273
 138. 2274-2275
 139. 2276-2277
 140. 2278-2279
 141. 2280-2281
 142. 2282-2283
 143. 2284-2285
 144. 2286-2287
 145. 2288-2289
 146. 2290-2291
 147. 2292-2293
 148. 2294-2295
 149. 2296-2297
 150. 2298-2299
 151. 2300-2301
 152. 2302-2303
 153. 2304-2305
 154. 2306-2307
 155. 2308-2309
 156. 2310-2311
 157. 2312-2313
 158. 2314-2315
 159. 2316-2317
 160. 2318-2319
 161. 2320-2321
 162. 2322-2323
 163. 2324-2325
 164. 2326-2327
 165. 2328-2329
 166. 2330-2331
 167. 2332-2333
 168. 2334-2335
 169. 2336-2337
 170. 2338-2339
 171. 2340-2341
 172. 2342-2343
 173. 2344-2345
 174. 2346-2347
 175. 2348-2349
 176. 2350-2351
 177. 2352-2353
 178. 2354-2355
 179. 2356-2357
 180. 2358-2359
 181. 2360-2361
 182. 2362-2363
 183. 2364-2365
 184. 2366-2367
 185. 2368-2369
 186. 2370-2371
 187. 2372-2373
 188. 2374-2375
 189. 2376-2377
 190. 2378-2379
 191. 2380-2381
 192. 2382-2383
 193. 2384-2385
 194. 2386-2387
 195. 2388-2389
 196. 2390-2391
 197. 2392-2393
 198. 2394-2395
 199. 2396-2397
 200. 2398-2399
 201. 2400-2401
 202. 2402-2403
 203. 2404-2405
 204. 2406-2407
 205. 2408-2409
 206. 2410-2411
 207. 2412-2413
 208. 2414-2415
 209. 2416-2417
 210. 2418-2419
 211. 2420-2421
 212. 2422-2423
 213. 2424-2425
 214. 2426-2427
 215. 2428-2429
 216. 2430-2431
 217. 2432-2433
 218. 2434-2435
 219. 2436-2437
 220. 2438-2439
 221. 2440-2441
 222. 2442-2443
 223. 2444-2445
 224. 2446-2447
 225. 2448-2449
 226. 2450-2451
 227. 2452-2453
 228. 2454-2455
 229. 2456-2457
 230. 2458-2459
 231. 2460-2461
 232. 2462-2463
 233. 2464-2465
 234. 2466-2467
 235. 2468-2469
 236. 2470-2471
 237. 2472-2473
 238. 2474-2475
 239. 2476-2477
 240. 2478-2479
 241. 2480-2481
 242. 2482-2483
 243. 2484-2485
 244. 2486-2487
 245. 2488-2489
 246. 2490-2491
 247. 2492-2493
 248. 2494-2495
 249. 2496-2497
 250. 2498-2499
 251. 2500-2501
 252. 2502-2503
 253. 2504-2505
 254. 2506-2507
 255. 2508-2509
 256. 2510-2511
 257. 2512-2513
 258. 2514-2515
 259. 2516-2517
 260. 2518-2519
 261. 2520-2521
 262. 2522-2523
 263. 2524-2525
 264. 2526-2527
 265. 2528-2529
 266. 2530-2531
 267. 2532-2533
 268. 2534-2535
 269. 2536-2537
 270. 2538-2539
 271. 2540-2541
 272. 2542-2543
 273. 2544-2545
 274. 2546-2547
 275. 2548-2549
 276. 2550-2551
 277. 2552-2553
 278. 2554-2555
 279. 2556-2557
 280. 2558-2559
 281. 2560-2561
 282. 2562-2563
 283. 2564-2565
 284. 2566-2567
 285. 2568-2569
 286. 2570-2571
 287. 2572-2573
 288. 2574-2575
 289. 2576-2577
 290. 2578-2579
 291. 2580-2581
 292. 2582-2583
 293. 2584-2585
 294. 2586-2587
 295. 2588-2589
 296. 2590-2591
 297. 2592-2593
 298. 2594-2595
 299. 2596-2597
 300. 2598-2599
 301. 2600-2601
 302. 2602-2603
 303. 2604-2605
 304. 2606-2607
 305. 2608-2609
 306. 2610-2611
 307. 2612-2613
 308. 2614-2615
 309. 2616-2617
 310. 2618-2619
 311. 2620-2621
 312. 2622-2623
 313. 2624-2625
 314. 2626-2627
 315. 2628-2629
 316. 2630-2631
 317. 2632-2633
 318. 2634-2635
 319. 2636-2637
 320. 2638-2639
 321. 2640-2641
 322. 2642-2643
 323. 2644-2645
 324. 2646-2647
 325. 2648-2649
 326. 2650-2651
 327. 2652-2653
 328. 2654-2655
 329. 2656-2657
 330. 2658-2659
 331. 2660-2661
 332. 2662-2663
 333. 2664-2665
 334. 2666-2667
 335. 2668-2669
 336. 2670-2671
 337. 2672-2673
 338. 2674-2675
 339. 2676-2677
 340. 2678-2679
 341. 2680-2681
 342. 2682-2683
 343. 2684-2685
 344. 2686-2687
 345. 2688-2689
 346. 2690-2691
 347. 2692-2693
 348. 2694-2695
 349. 2696-2697
 350. 2698-2699
 351. 2700-2701
 352. 2702-2703
 353. 2704-2705
 354. 2706-2707
 355. 2708-2709
 356. 2710-2711
 357. 2712-2713
 358. 2714-2715
 359. 2716-2717
 360. 2718-2719
 361. 2720-2721
 362. 2722-2723
 363. 2724-2725
 364. 2726-2727
 365. 2728-2729
 366. 2730-2731
 367. 2732-2733
 368. 2734-2735
 369. 2736-2737
 370. 2738-2739
 371. 2740-2741
 372. 2742-2743
 373. 2744-2745
 374. 2746-2747
 375. 2748-2749
 376. 2750-2751
 377. 2752-2753
 378. 2754-2755
 379. 2756-2757
 380. 2758-2759
 381. 2760-2761
 382. 2762-2763
 383. 2764-2765
 384. 2766-2767
 385. 2768-2769
 386. 2770-2771
 387. 2772-2773
 388. 2774-2775
 389. 2776-2777
 390. 2778-2779
 391. 2780-2781
 392. 2782-2783
 393. 2784-2785
 394. 2786-2787
 395. 2788-2789
 396. 2790-2791
 397. 2792-2793
 398. 2794-2795
 399. 2796-2797
 400. 2798-2799
 401. 2800-2801
 402. 2802-2803
 403. 2804-2805
 404. 2806-2807
 405. 2808-2809
 406. 2810-2811
 407. 2812-2813
 408. 2814-2815
 409. 2816-2817
 410. 2818-2819
 411. 2820-2821
 412. 2822-2823
 413. 2824-2825
 414. 2826-2827
 415. 2828-2829
 416. 2830-2831
 417. 2832-2833
 418. 2834-2835
 419. 2836-2837
 420. 2838-2839
 421. 2840-2841
 422. 2842-2843
 423. 2844-2845
 424. 2846-2847
 425. 2848-2849
 426. 2850-2851
 427. 2852-2853
 428. 2854-2855
 429. 2856-2857
 430. 2858-2859
 431. 2860-2861
 432. 2862-2863
 433. 2864-2865
 434. 2866-2867
 435. 2868-2869
 436. 2870-2871
 437. 2872-2873
 438. 2874-2875
 439. 2876-2877
 440. 2878-2879
 441. 2880-2881
 442. 2882-2883
 443. 2884-2885
 444. 2886-2887
 445. 2888-2889
 446. 2890-2891
 447. 2892-2893
 448. 2894-2895
 449. 2896-2897
 450. 2898-2899
 451. 2900-2901
 452. 2902-2903
 453. 2904-2905
 454. 2906-2907
 455. 2908-2909
 456. 2910-2911
 457. 2912-2913
 458. 2914-2915
 459. 2916-2917
 460. 2918-2919
 461. 2920-2921
 462. 2922-2923
 463. 2924-2925
 464. 2926-2927
 465. 2928-2929
 466. 2930-2931
 467. 2932-2933
 468. 2934-2935
 469. 2936-2937
 470. 2938-2939
 471. 2940-2941
 472. 2942-2943
 473. 2944-2945
 474. 2946-2947
 475. 2948-2949
 476. 2950-2951
 477. 2952-2953
 478. 2954-2955
 479. 2956-2957
 480. 2958-2959
 481. 2960-2961
 482. 2962-2963
 483. 2964-2965
 484. 2966-2967
 485. 2968-2969
 486. 2970-2971
 487. 2972-2973
 488. 2974-2975
 489. 2976-2977
 490. 2978-2979
 491. 2980-2981
 492. 2982-2983
 493. 2984-2985
 494. 2986-2987
 495. 2988-2989
 496. 2990-2991
 497. 2992-2993
 498. 2994-2995
 499. 2996-2997
 500. 2998-2999
 501. 3000-3001
 502. 3002-3003
 503. 3004-3005
 504. 3006-3007
 505. 3008-3009
 506. 3010-3011
 507. 3012-3013
 508. 3014-3015
 509. 3016-3017
 510. 3018-3019
 511. 3020-3021
 512. 3022-3023
 513. 3024-3025
 514. 3026-3027
 515. 3028-3029
 516. 3030-3031
 517. 3032-3033
 518. 3034-3035
 519. 3036-3037
 520. 3038-3039
 521. 3040-3041
 522. 3042-3043
 523. 3044-3045
 524. 3046-3047
 525. 3048-3049
 526. 3050-3051
 527. 3052-3053
 528. 3054-3055
 529. 3056-3057
 530. 3058-3059
 531. 3060-3061
 532. 3062-3063
 533. 3064-3065
 534. 3066-3067
 535. 3068-3069
 536. 3070-3071
 537. 3072-3073
 538. 3074-3075
 539. 3076-3077
 540. 3078-3079
 541. 3080-3081
 542. 3082-3083
 543. 3084-3085
 544. 3086-3087
 545. 3088-3089
 546. 3090-3091
 547. 3092-3093
 548. 3094-3095
 549. 3096-3097
 550. 3098-3099
 551. 3100-3101
 552. 3102-3103
 553. 3104-3105
 554. 3106-3107
 555. 3108-3109
 556. 3110-3111
 557. 3112-3113
 558. 3114-3115
 559. 3116-3117
 560. 3118-3119
 561. 3120-3121
 562. 3122-3123
 563. 3124-3125
 564. 3126-3127
 565. 3128-3129
 566. 3130-3131
 567. 3132-3133
 568. 3134-3135
 569. 3136-3137
 570. 3138-3139
 571. 3140-3141
 572. 3142-3143
 573. 3144-3145
 574. 3146-3147
 575. 3148-3149
 576. 3150-3151
 577. 3152-3153
 578. 3154-3155
 579. 3156-3157
 580. 3158-3159
 581. 3160-3161
 582. 3162-3163
 583. 3164-3165
 584. 3166-3167
 585. 3168-3169
 586. 3170-3171
 587. 3172-3173
 588. 3174-3175
 589. 3176-3177
 590. 3178-3179
 591. 3180-3181
 592. 3182-3183
 593. 3184-3185
 594. 3186-3187
 595. 3188-3189
 596. 3190-3191
 597. 3192-3193
 598. 3194-3195
 599. 3196-3197
 600. 3198-3199
 601. 3200-3201
 602. 3202-3203
 603. 3204-3205
 604. 3206-3207
 605. 3208-3209
 606. 3210-3211
 607. 3212-3213
 608. 3214-3215
 609. 3216-3217
 610. 3218-3219
 611. 3220-3221
 612. 3222-3223
 613. 3224-3225
 614. 3226-3227
 615. 3228-3229
 616. 3230-3231
 617. 3232-3233
 618. 3234-3235
 619. 3236-3237
 620. 3238-3239
 621. 3240-3241
 622. 3242-3243
 623. 3244-3245
 624. 3246-3247
 625. 3248-3249
 626. 3250-3251
 627. 3252-3253
 628. 3254-3255
 629. 3256-3257
 630. 3258-3259
 631. 3260-3261
 632. 3262-3263
 633. 3264-3265
 634. 3266-3267
 635. 3268-3269
 636. 3270-3271
 637. 3272-3273
 638. 3274-3275
 639. 3276-3277
 640. 3278-3279
 641. 3280-3281
 642. 3282-3283
 643. 3284-3285
 644. 3286-3287
 645. 3288-3289
 646. 3290-3291
 647. 3292-3293
 648. 3294-3295
 649. 3296-3297
 650. 3298-3299
 651. 3300-3301
 652. 3302-3303
 653. 3304-3305
 654. 3306-3307
 655. 3308-3309
 656. 3310-3

Table C-20 Conversion Factors for Investment, Operation & Maintenance and Indirect Cost

Cost Items	1 Share(%)	Traded Good & Service	Non-traded Good & Service	Skilled Labour	Unskilled Labour	Transferred Values	2 Conversion Factor for Each Cost Item	1 X 2
Investment Cost	100.0	1.000	0.9347	0.9201	0.611	0	n.r.	0.751
(1) Collection and Transportation	59.3	65.0	0.0	5.0	20.0	10.0	100.0	
	n.r.	0.650	0.000	0.046	0.122	0.000	0.818	0.485
(2) Final Disposal	40.3	10.0	10.0	10.0	60.0	10.0	100.0	
	n.r.	0.100	0.093	0.092	0.367	0.000	0.652	0.263
(3) Road Sweeping	0.4	65.0	0.0	5.0	20.0	10.0	100.0	
	n.r.	0.650	0.000	0.046	0.122	0.000	0.818	0.003
Operation & Maintenance Cost	100.0	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	0.759
(1) Labour	21.5	0.0	0.0	20.0	70.0	10.0	100.0	
	n.r.	0.000	0.000	0.184	0.428	0.000	0.612	0.132
(2) Fuel and Materials	33.9	60.0	0.0	5.0	25.0	10.0	100.0	
	n.r.	0.600	0.000	0.046	0.153	0.000	0.799	0.271
(3) Repair	44.6	60.0	0.0	5.0	25.0	10.0	100.0	
	n.r.	0.600	0.000	0.046	0.153	0.000	0.799	0.356
Indirect Cost	100.0	n.r.	n.r.	n.r.	n.r.	n.r.	n.r.	0.748
(1) Work Shop	48.3	20.0	10.0	10.0	50.0	10.0	100.0	
	n.r.	0.200	0.093	0.092	0.306	0.000	0.691	0.334
(2) Motor Pool	2.4	20.0	10.0	10.0	50.0	10.0	100.0	
	n.r.	0.200	0.093	0.092	0.306	0.000	0.691	0.017
(3) Administration	49.3	10.0	10.0	60.0	10.0	10.0	100.0	
	n.r.	0.100	0.093	0.552	0.061	0.000	0.807	0.398

Table C-21 Financial Planning for Economic Evaluation

Year	1999	2000	2001	2002	2003	2004	2005	2006
1. Costs								
1.1 Investment Cost	4231	1899	2457	1645	1766	1340	1366	0
1.1.1 Collection and Transportation	3830	1057	1400	323	436	0	0	0
1.1.1.1 Final Disposal	2738	1040	1270	0	0	0	0	0
1.1.1.2 Final Disposal	1075	0	113	323	436	0	0	0
1.1.1.3 Road Sweeping	17	17	17	0	0	0	0	0
1.2 Operation and Maintenance	0	736	935	1193	1193	1193	1193	0
1.2.1 Labour	0	182	216	254	254	254	254	0
1.2.2 Fuel and Materials	0	246	319	420	420	420	420	0
1.2.3 Repair	0	308	399	519	519	519	519	0
1.3 Indirect Cost	401	106	122	128	137	146	173	0
1.3.1 Workshop	256	40	48	60	68	78	89	0
1.3.2 Motor Pool	0	5	5	5	5	5	5	0
1.3.3 Administration	145	61	70	64	64	64	79	0
2. Revenues								
2.1 Special Account from DCC Tax	548	1833	2461	3232	3232	3232	3232	2358
2.2 Joint Billing (Household)	548	693	893	1165	1165	1165	1165	0
2.2.1 Tariff	0	566	796	1052	1052	1051	1052	0
2.2.2 Number of Households	0	1250	1250	1250	1250	1250	1250	0
2.2.3 Waste Collection Rate	0	607771	655162	708474	768942	837490	916628	0
2.2.4 RCC Collection Rate	0.0	20.7	27.0	33.0	30.4	27.9	25.5	0.0
2.3 Joint Billing (Others)	0.0	30.0	30.0	30.0	30.0	30.0	30.0	0.0
2.3.1 Tariff	0	574	772	1016	1016	1016	1016	0
2.3.2 Waste Collection Amount	0	20000	20000	20000	20000	20000	20000	0
2.3.3 RCC Collection Rate	0	41019	55170	72542	72542	72542	72542	0
2.4 Special RCC with Business License	0.0	70.0	70.0	70.0	70.0	70.0	70.0	0.0
2.4.1 Tariff	0	0	0	0	0	0	0	0
2.4.2 Waste Collection Amount	0	0	0	0	0	0	0	0
2.4.3 RCC Collection Rate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2.5 Scrap Value	0	0	0	0	0	0	0	2358
3. Balance								
	-3683	-66	4	1588	1467	1892	1866	2358

Table C-22 Economic Internal Rate of Return

FIRR = 19.56%

Project Year	Financial Year				Benefit	Net Benefit	Cumulative Net Benefit
		Investment	O & M	Cost			
1	1999	3,830	401	4,231	548	-3,683	-3,683
2	2000	1,057	842	1,899	1,833	-66	-3,748
3	2001	1,400	1,057	2,457	2,461	4	-3,744
4	2002	323	1,322	1,645	3,232	1,588	-2,157
5	2003	436	1,330	1,766	3,232	1,467	-690
6	2004	0	1,340	1,340	3,232	1,892	1,202
7	2005	0	1,366	1,366	3,232	1,866	3,067
8	2006	0	0	0	2,358	2,358	5,425

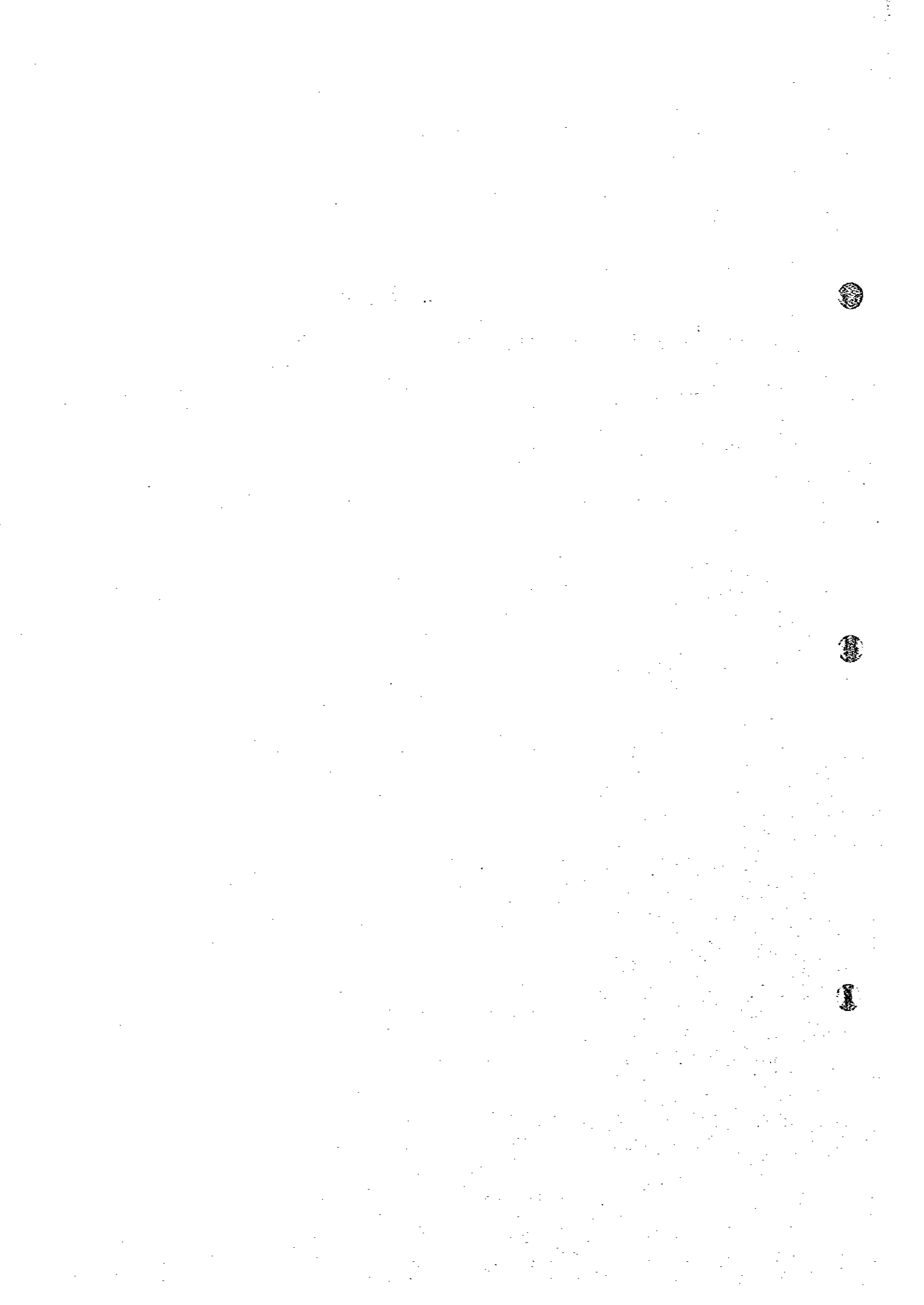


Small vertical text or mark on the right edge of the page.

Small vertical text or mark on the right edge of the page.

Appendix D

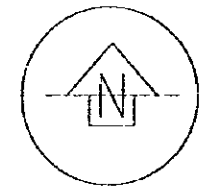
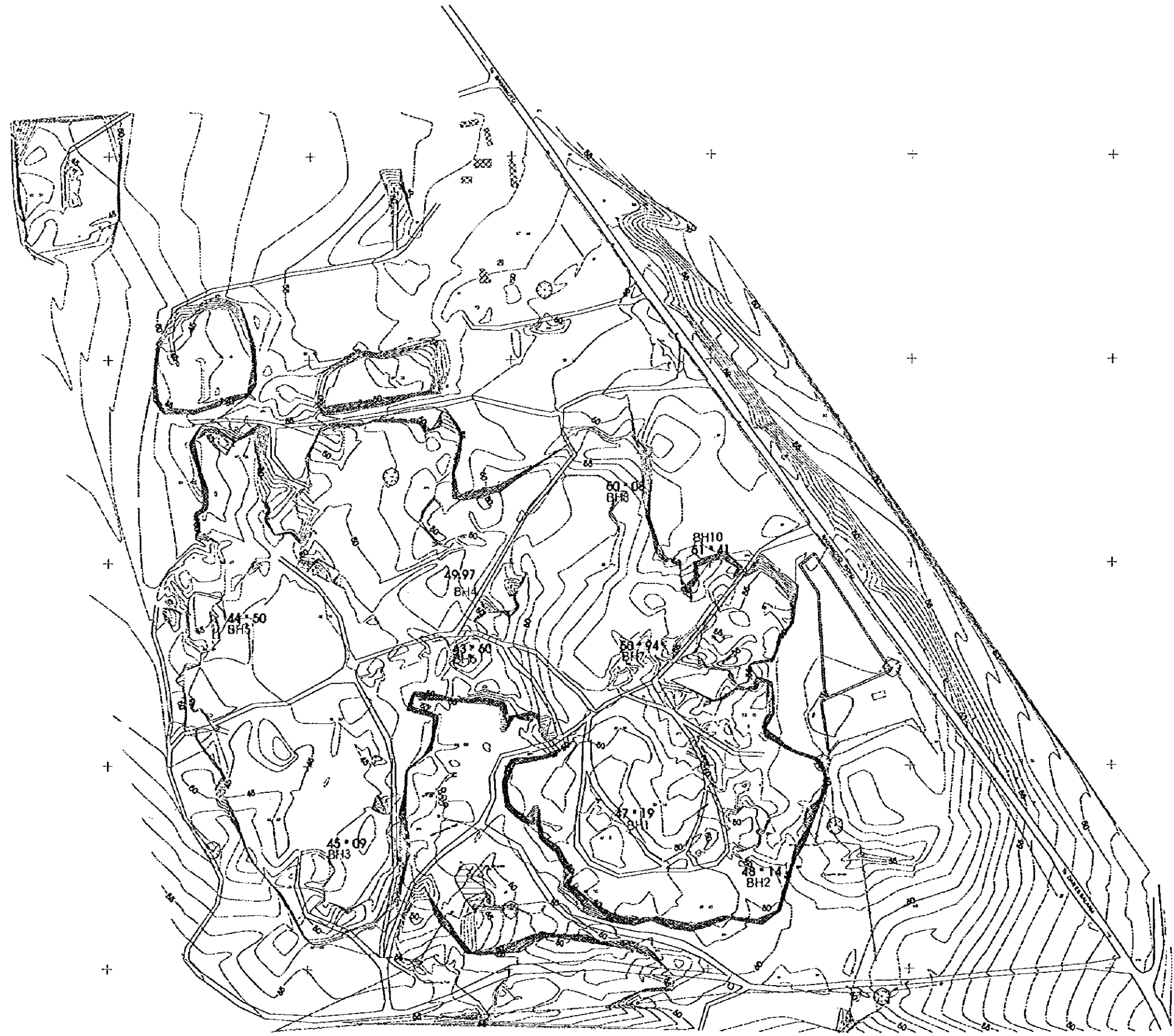
Drawings



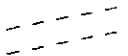







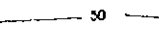
List of Drawings

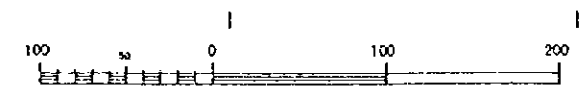
Drawing No.	Title
T1	Present Topographical Conditions
L1	Site Location Map
L2	Proposed Future Landscape on Completion of Landfilling
L3	Layout of the Sanitary Landfill
L4	Layout Plan of the Reception Area
L5	Office Building Plan
L6	Plan of Landfill Section 1A and 1B
L7	Final Soil Coverage and Precautions Against Gas

22' 30" N
22' 30" N
22' 30" N
22' 30" N
22' 30" N

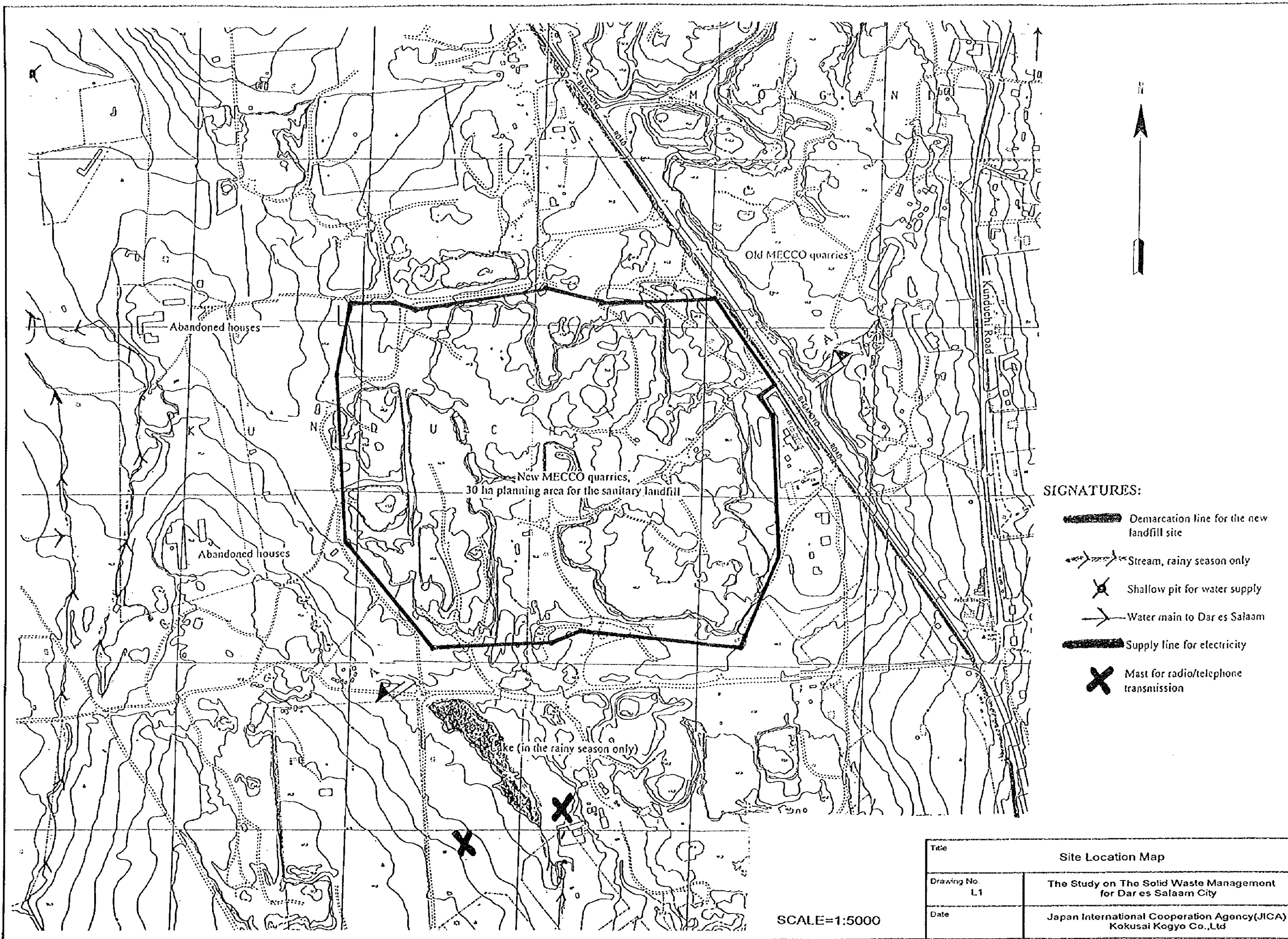


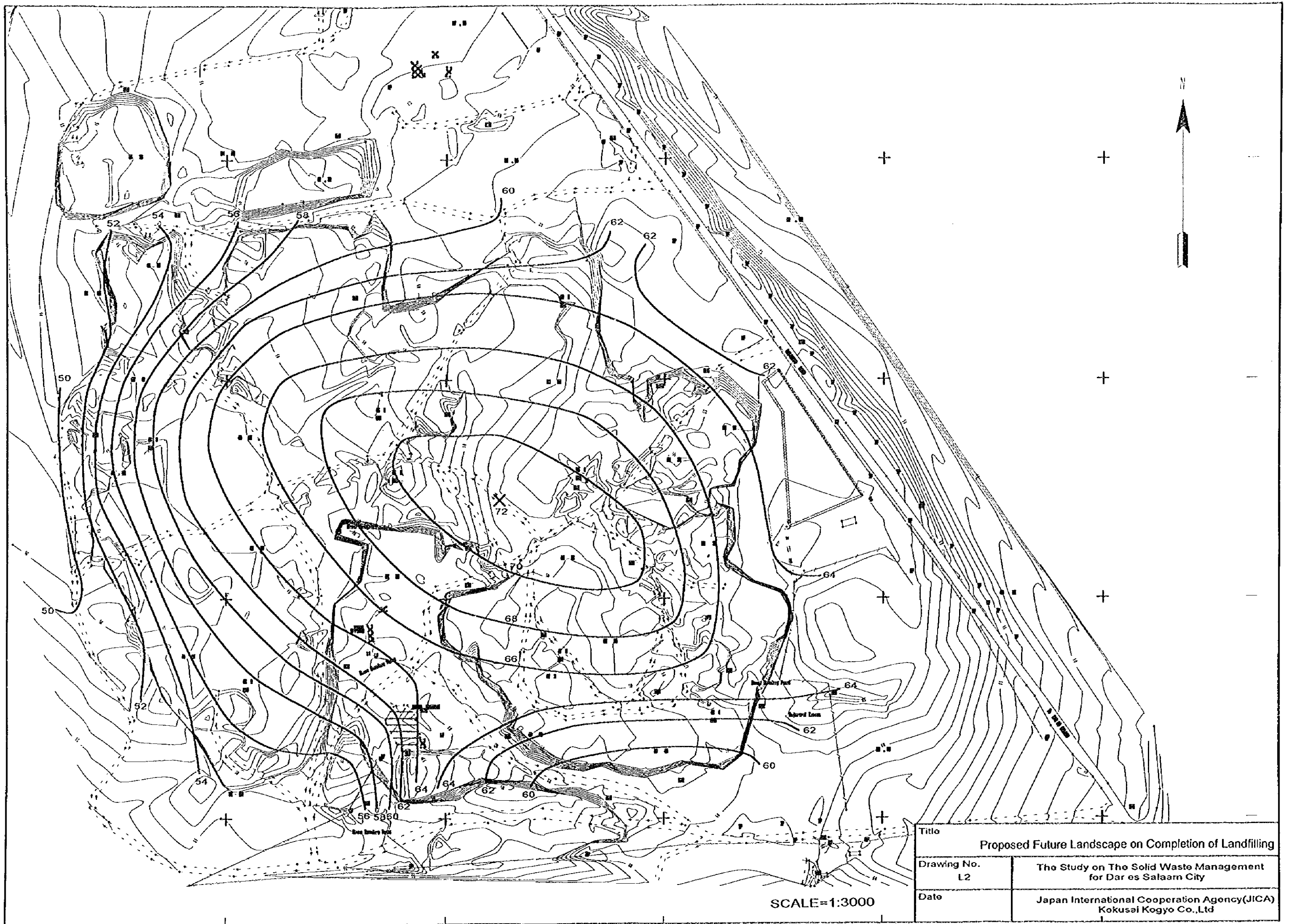
LEGEND

-  Supply Roads (Temporary)
-  Spot Height (with elevation)
-  Lamp Post
-  Buildings
-  Tree
-  Bore Hole (with elevation value)
-  Telephone Post
-  Electricity Supply Post
-  Contour Line (V1 = 1 m)



Title		PRESENT TOPOGRAPHICAL CONDITIONS	
Drawing No.		The Study on The Solid Waste Management for Dar es Salaam City	
Date		July 1997	
		Japan International Cooperation Agency (JICA) Kokusai Kogyo Co., Ltd.	

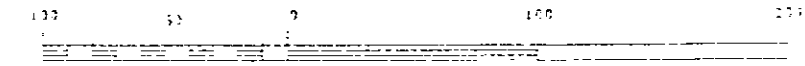





Title		Proposed Future Landscape on Completion of Landfilling
Drawing No.	L2	The Study on The Solid Waste Management for Dar es Salaam City
Date		Japan International Cooperation Agency(JICA) Kokusai Kogyo Co.,Ltd

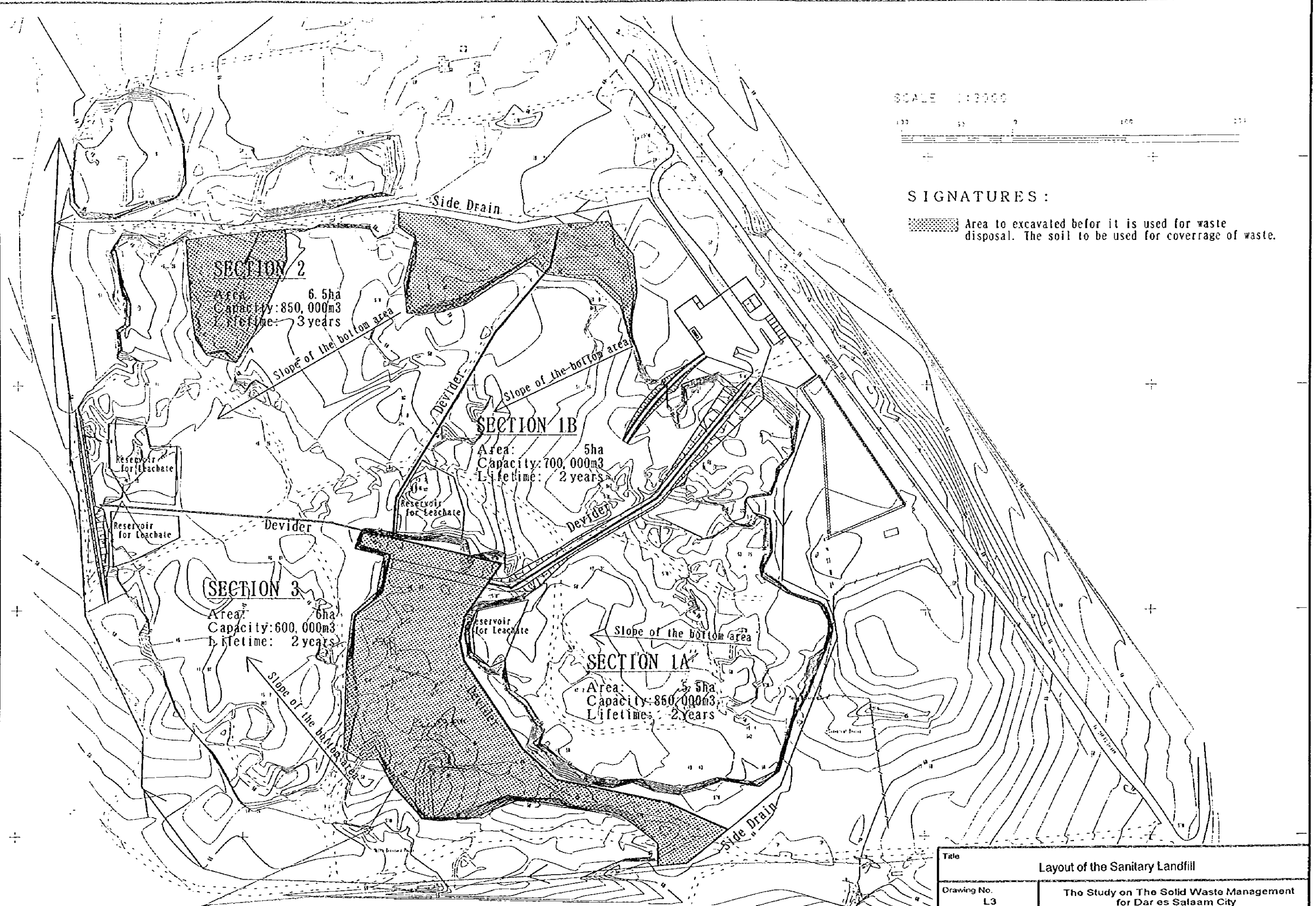
SCALE=1:3000

SCALE 1:3000

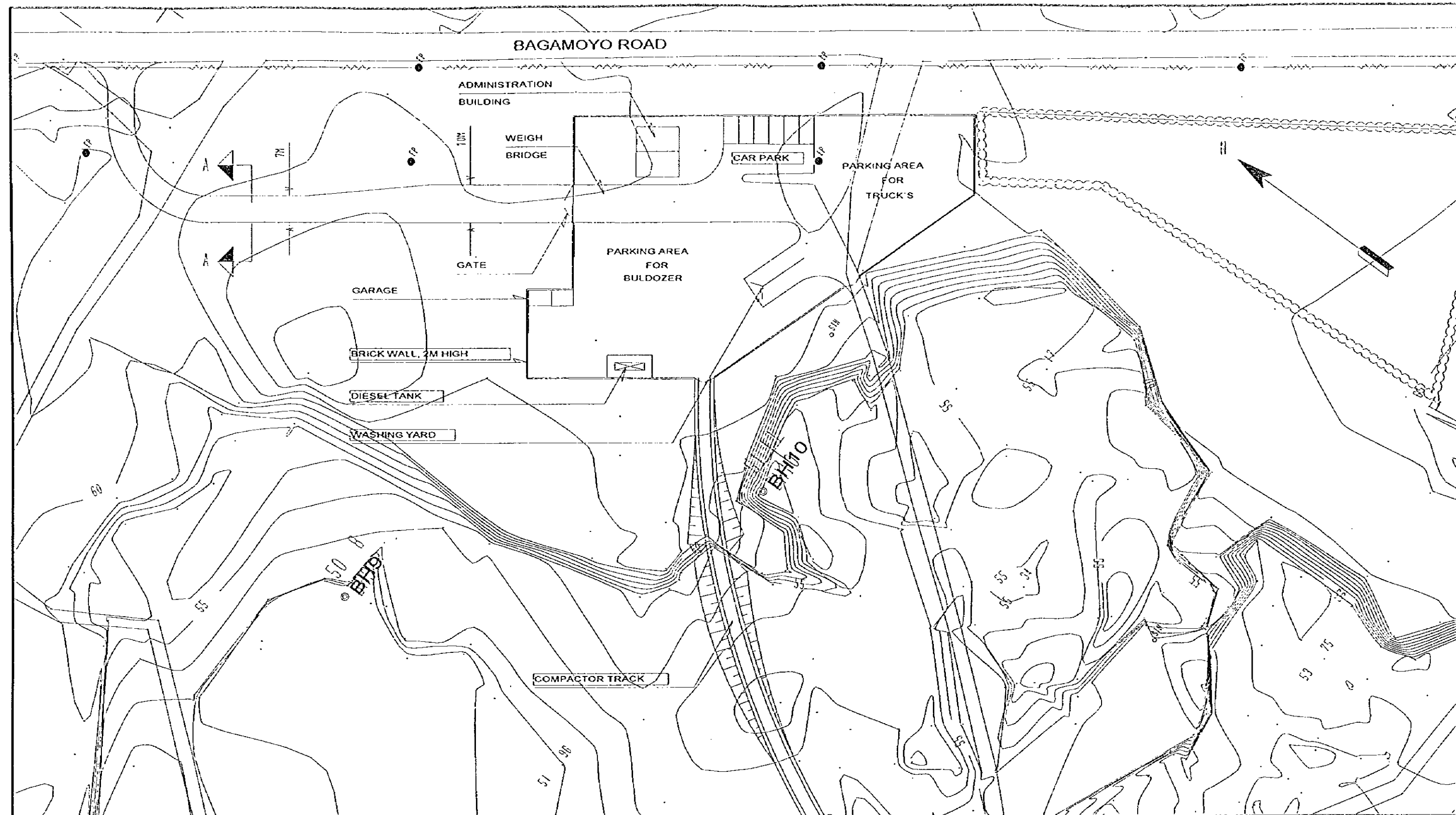


SIGNATURES :

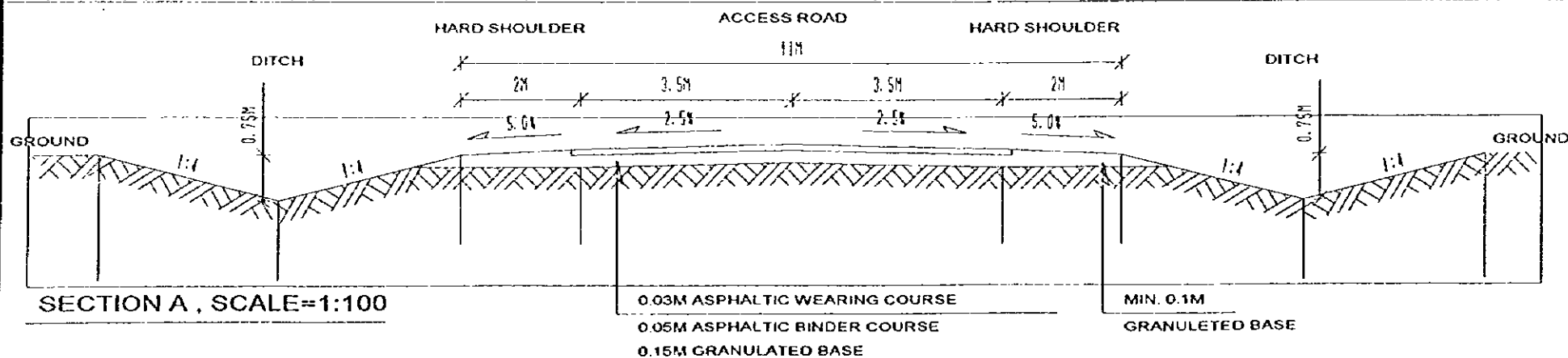
 Area to excavated before it is used for waste disposal. The soil to be used for coverage of waste.



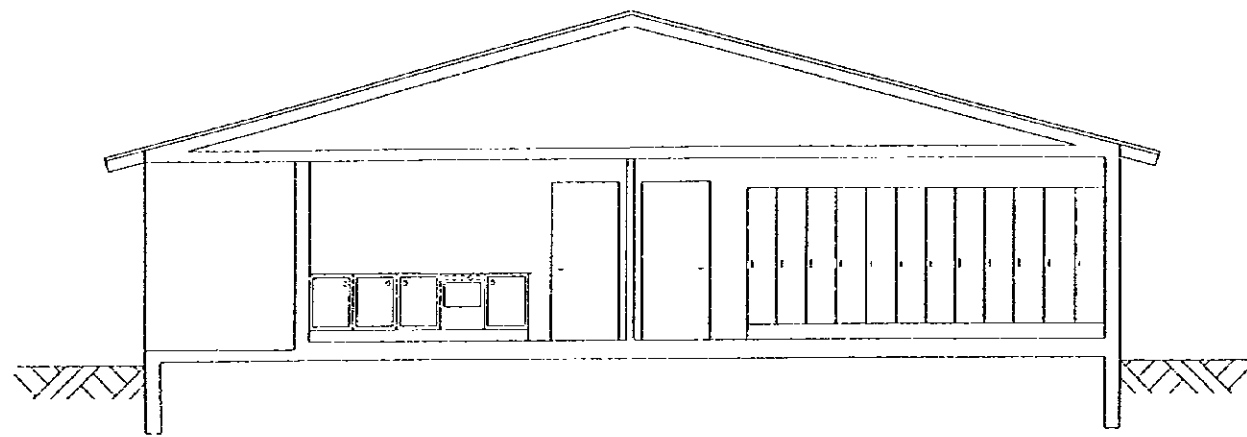
Title	Layout of the Sanitary Landfill	
Drawing No.	L3	The Study on The Solid Waste Management for Dar es Salaam City
Date		Japan International Cooperation Agency(JICA) Kokusai Kogyo Co.,Ltd



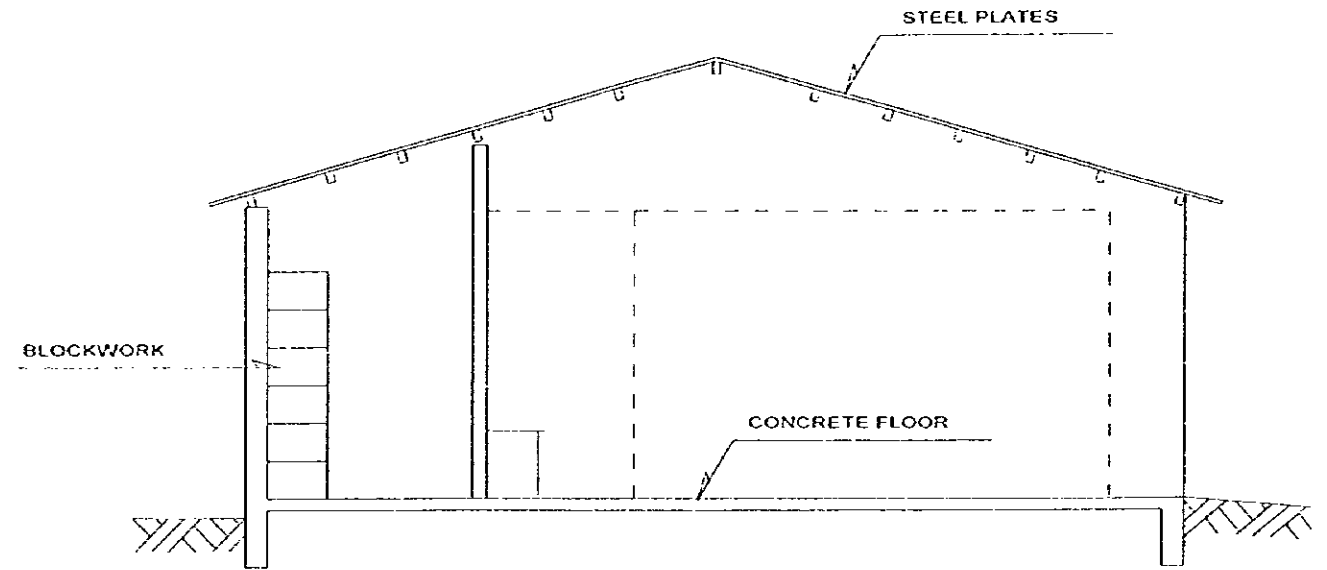
SCALE=1:1000



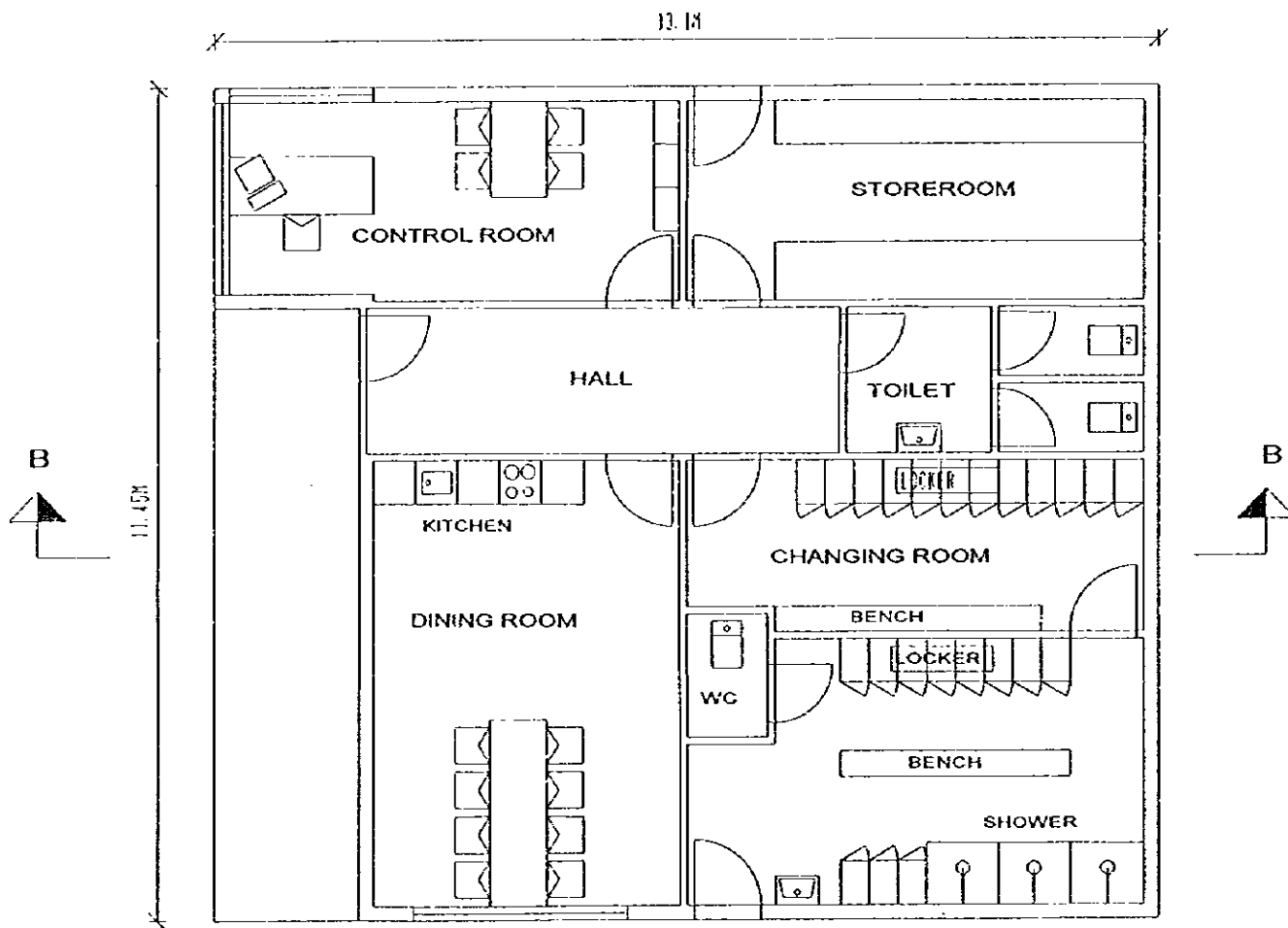
Title		Layout Plan of the Reception Area	
Drawing No.		The Study on The Solid Waste Management for Dar es Salaam City	
L4			
Date		Japan International Cooperation Agency(JICA) Kokusai Kogyo Co.,Ltd	



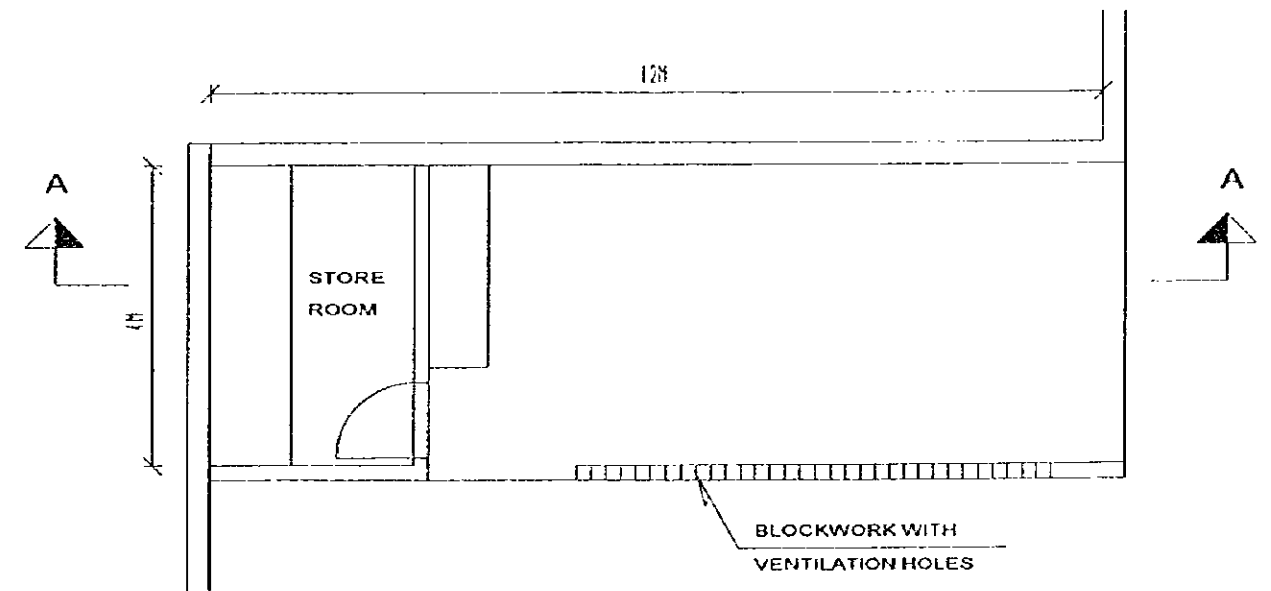
SECTION B



SECTION A



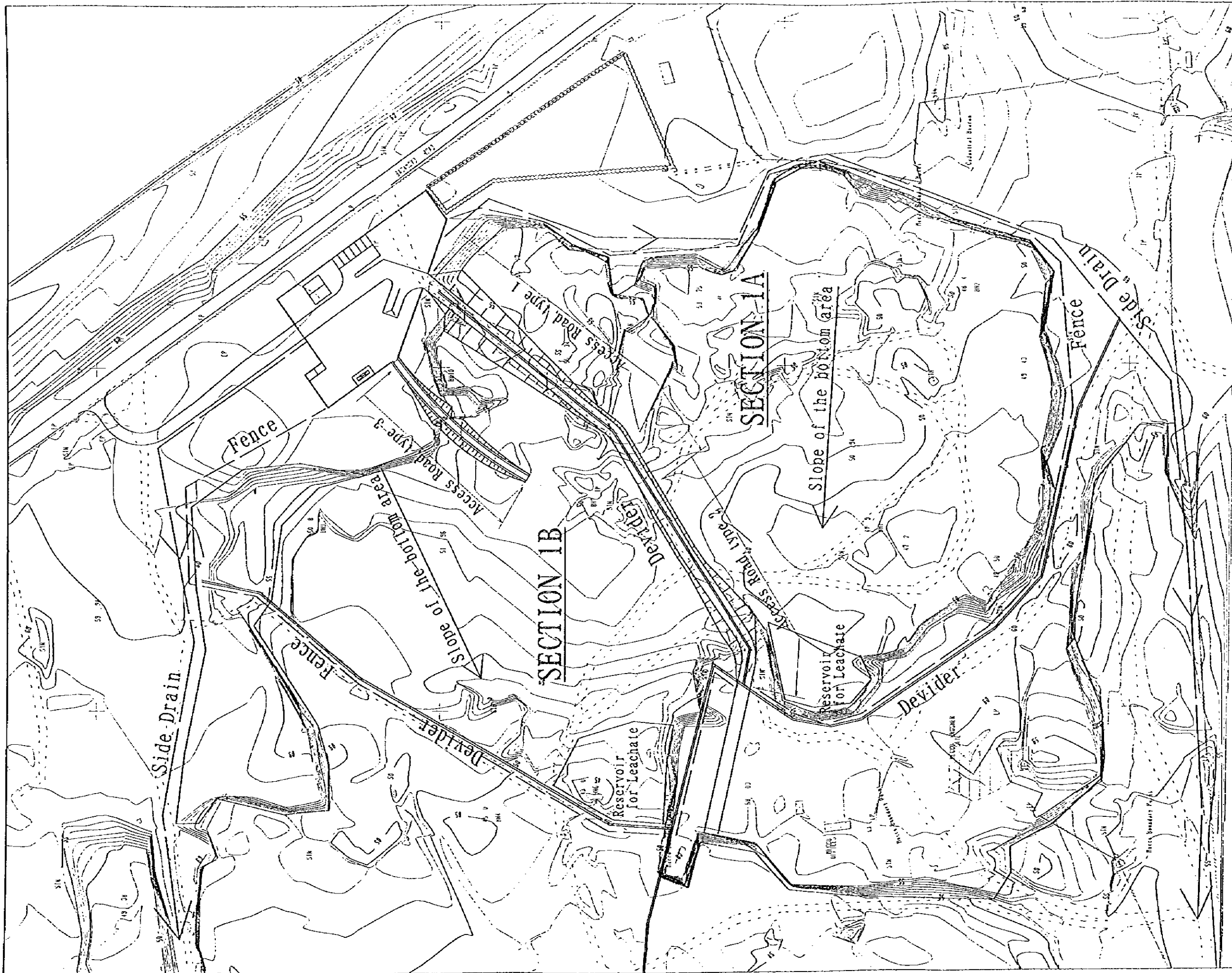
ADMINISTRATION BUILDING 150M



GARAGE

SCALE=1:100

Title	Office Building Plan
Drawing No. L5	The Study on The Solid Waste Management for Dar es Salaam City
Date	Japan International Cooperation Agency(JICA) Kokusai Kogyo Co.,Ltd



SCALE 1:2000



Title

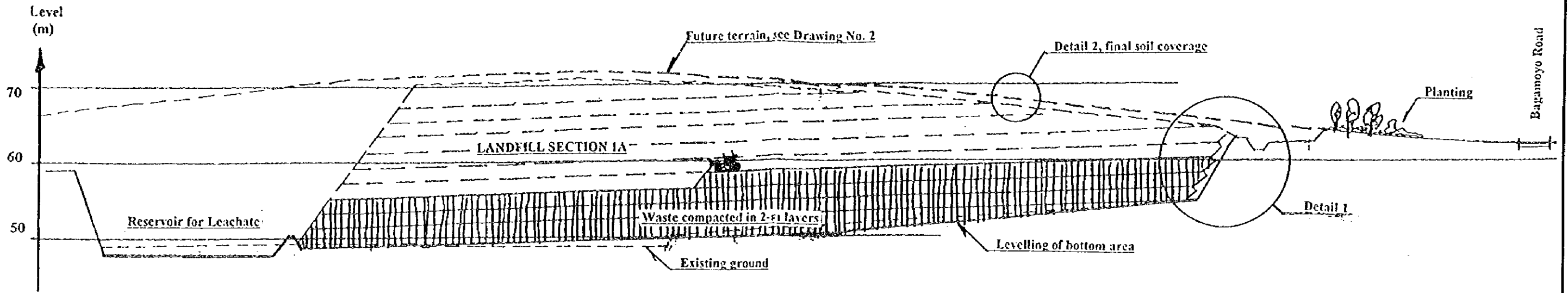
Plan of Landfill Section 1A and 1B

Drawing No.
L6

The Study on The Solid Waste Management
for Dar es Salaam City

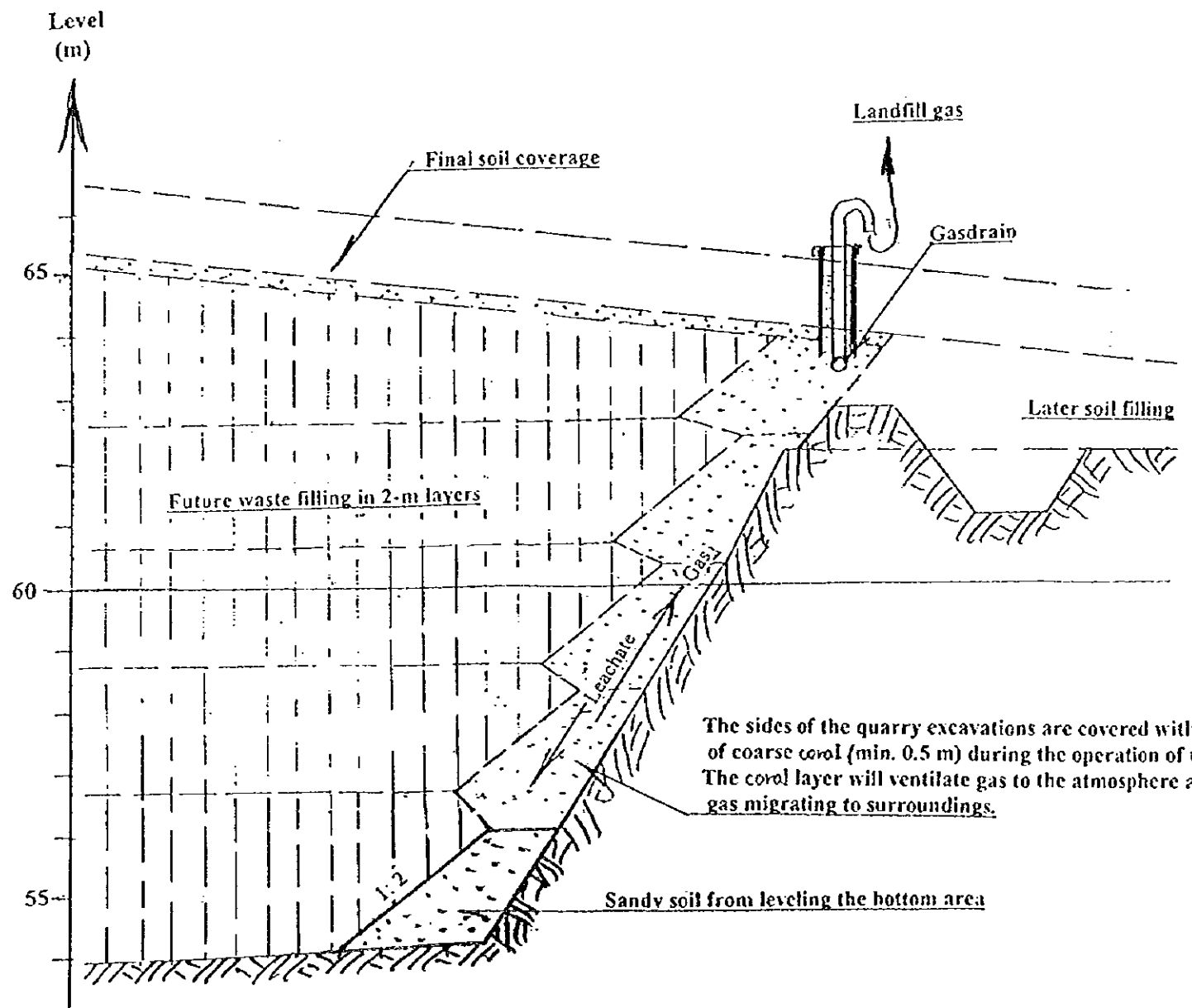
Date

Japan International Cooperation Agency (JICA)
Kokusai Kogyo Co., Ltd

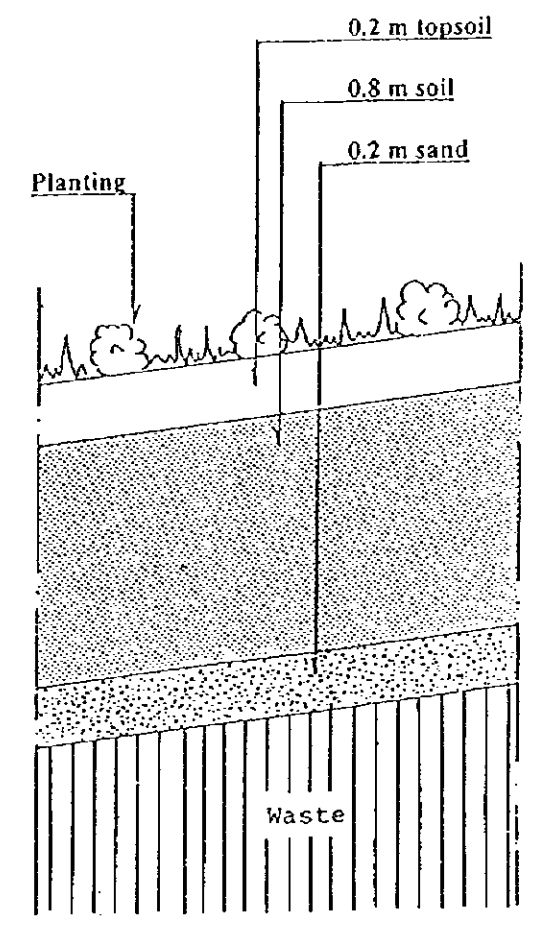


SECTION A

Refer to the drawings no. 1, 2, 3, and 6.



DETAIL 1, 1:100



DETAIL 2, Final Soil Coverage

Title Final Soil Coverage and Precutions Against Gas	
Drawing No. L7	The Study on The Solid Waste Management for Dar es Salaam City
Date	Japan International Cooperation Agency(JICA) Kokusai Kogyo Co.,Ltd

Appendix E

References

References

1. Environmental Profile of the Metropolitan Area, SDP, August 1992
2. UNDP Development Co-operation 1992 Report TANZANIA, August 1994
3. Statistical Abstract: 1993, Bureau of Statistics, President's Office, Planning Commission, Dar-es-Salaam, Feb. 1995
4. Health Statistics Abstract, Ministry of Health, DSM, Tanzania, 1995
5. Proposals for Health Sector Reform DRAFT, Ministry of Health, DSM, Tanzania, Aug. 1994
6. "Poor in Health"; Save the Children Fund, UK, April 1996
7. "Environmental Engineering and Sanitation"; J.A. Salvato; 4th edition; John Wiley & Sons, New York, 1992
8. Health Department Report, City Medical Officer, City Director's Office, DCC, 1993
9. "Environmental Health Engineering in The Tropics"; S. Cairncross & R. Feachem; 2nd edition; John Wiley & Sons, New York, 1993
10. Tanzania Comoros Country Report, 2nd Quarter 1995; The Economist Intelligence Unit, UK, 1995
11. DSM Urban Health Project, Project Document Final Version; DCC City Health Department, Feb 1993
12. "Cultural Revolution in Tanzania", Ministry of National Culture and Youth, Dar-es-Salaam
13. "Spectrum Guide to Tanzania", Camerapix Publishers International, 1992
14. Dar es Salaam Road Development Plan, JICA, March 1995
15. Dar-es-Salaam Master Plan, Chp 5 on Solid Waste Management, Marshall, Macklin and Monaghan Limited, October 1979
16. Masterplan on Solid Waste Management for Dar es Salaam, Haskoning and M-Konsult, 1989
17. Sustainable Cities Programme, Report on Solid Waste Management, Manus Coffey for SDP, 1992
18. Environmental Survey Proposed Sanitary Landfill Kinzudi "B", SDP, Mgana, 1992
19. Takagas Biogas for Tanzania, Preinvestment Study, University of DSM, Carl Bro, et. al., 1993
20. Vingunguti Landfill Study, Dar es Salaam, Tanzania, COWIconsult for Habitat, 1994
21. Urban and Housing indicator Study for DSM City, Centre for Human Settlement Studies, Ardhi Institute, DSM, Tanzania, September 1995
22. The Labour Force Survey 1990/91, Tanzania (Mainland); Bureau of Statistics, President's Office, Planning Commission & labour Department, Ministry of Labour and Youth Department, DSM, June 1993
23. The Urban Housing Sector, An Analysis of the Urban Housing Survey, DSM, 1990
24. Beede, D. N. and Bloom D. E. (1995); "The Economics of Municipal Solid Waste" in *The World Bank Research Observer*, Vol. 10, No. 2, Washington. pp. 113-150.
25. Bank of Tanzania (1994); *Economic Bulletin for the Quarter Ended 31 st December, 1993* Vol. XXIV No. 4.
26. Bank of Tanzania (1995); *Economic Bulletin for the Quarter Ended 31st December, 1994.* Vol. XXIV No. 4.
27. Bank of Tanzania (1996); *Economic Bulletin for the Quarter Ended 31st December, 1995,* Vol. XXIV No. 4.
28. Bank of Tanzania (1996); *Dar es Salaam Regional Statistical Abstract 1993.*

29. Bureau of Statistics (1995a); *National Accounts of Tanzania 1976-1994*.
30. Bureau of Statistics (1995b); *Statistical Abstract: 1993*.
31. Bureau of Statistics (1994); *Industrial Commodities, Quarterly Report 1994:2*.
32. DCC (1996a); *The Estimate of Income and Expenditure for the financial Year 1996*, DCC.
33. DCC (1996b); *Abstract of Accounts and Statements for the Year Ended 31st December 1995*, DCC.
34. DCC (1995); *Abstract of Accounts and Statements for the year Ended 31st December 1994*, DCC.
35. DCC (1994); *Abstract of Accounts and Statements for the Year Ended 31st December 1994*, DCC.
36. Doriye, J. (1995); "Structural Adjustment in Tanzania: Progress and Prospects" in Msambichaka, L.A. et. al. (eds.). *Beyond Structural Adjustment programmes in Tanzania*, Economic Research Bureau, University of Dar es Salaam, Dar es Salaam University Press. pp. 7-26.
37. Economic Intelligence Unit (1995); *Country Profile, Tanzania and Comoros 1994-95*.
38. Limbumba, T. M. et. al. (1995); *Urban and Housing Indicators Study for Dar es Salaam City, Volume I*, Center for Human Settlement Studies (CHS) and Ardhi Institute.
39. Osoro, N.E. (1994); "Taxation in Tanzania: Motivations, Directions and Future Prospects" in Msambichaka, L. A. et. al. (eds.). *Development Challenges and Strategies for Tanzania - An Agenda for the 21st Century*, Economic Research bureau, University of Dar es Salaam, Dar es Salaam University Press. pp 245-266
40. Kironde, J. M. L. (1995); *The Governance of Waste Management in Africa Cities: the case of Dar es Salaam, Tanzania*, Ardhi Institute.
41. Manus Coffey (1992); *Managing the Sustainable Development of Dar es Salaam, Volume one: Solid Waste Collection*. UNCHS / SDP, Consultant's Report.
42. Ministry of Finance (1996); *The Estimates of Public Revenue and Expenditure for the Financial Year 1996/97*.
43. National Urban Water Authority (1995); *Annual Report of National Urban Water Authority for the Fiscal Year of 1995*.
44. President's Office / Planning Commission (1996); *Dar es Salaam Regional Statistical Abstract 1993*.
45. President's Office / Planning Commission (1994); *The Rolling Plan and Forward Budget for the Period 1994/95 - 1996/97, Volume I*.
46. Presidents Office / Planning Commission (1989); *Economic Recovery Programme II (Economic and Social Action Programme)*.
47. President's Office / Planning Commission (1988); *Population Census, Regional Profile, Dar es Salaam*.
48. President's Office / Planning Commission (1986); *Economic Recovery Programme*.
49. United Nations Development Programmed (1995); *Development Co-operation Report Tanzania, 1994 Report*.





JICA