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Identification and Analysis of Flood Problems

CHAPTER 6

IDENTIFICATION AND ANALYSIS OF FLOOD PROBLEMS

In identifying and analyzing the flood problems in the study area, the study team utilized the following survey results:

- Location maps discussed in Chapter 3 for locations of manholes and drainage channels and flow directions.
- LATERAL database discussed in Chapter 3 for existing conditions and data processing.
- Drainage channel and water surface profiles (Tables 4.1 and 4.2 and Figures 4.10 to 4.26), which are discussed in Chapter 4 for longitudinal profiles and for checking the adequacy of flow capacity of drainage channels.
- Runoff and flow capacity tables (Tables 4.3 and 4.4 for drainage laterals, Table 4.5 for drainage mains, and Table 4.6 for open channels) discussed in Chapter 4—for checking the adequacy of drainage channels.
- Flood condition database and inundation maps discussed in Chapters 3 and 5 -for flood data and identification of flood-prone areas and flood depths.

From the inundation map of the September 1999 flood, forty-five (45) critical flood-prone areas (i.e., with flood depths exceeding 0.50 m) were selected for analysis and evaluation of flood problems. Table 6.1 lists the findings and presents possible countermeasures for each flood-prone area identified as critical.

6.1 Analysis of Flood Problems

6.1.1 Regional Flooding

Two seriously affected flood-prone areas were identified as regional in scope and which involved several drainage blocks, namely the eastern part of north Manila (España-Sampaloc area), and the areas of San Andres Bukid, San Antonio, Metropolitan Subdivision, Palanan and San Isidro in South Manila. The flood problems are discussed below.

Northeastern Manila Flood Problem

Because undersized drainage laterals (NL041, NL039, NL043) cannot accommodate the runoff cascading from the relatively steep slopes of Sta. Mesa Heights, the unaccommodated or excess runoff spills over the carriageway of existing roads towards the Blumentritt Interceptor (DM01). Since the interceptor is also undersized, the spilling runoff is further directed to the neighboring Vitas drainage block where it develops as flood. As the floodwaters rise and spread, they again cross over to the lower Sampaloc area. The rising floodwaters then result to widespread flooding of the España area, the lowest point of the larger low-lying area of Sampaloc.

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Disposal of the floodwaters is made by way of the N. Reyes-Severino Main (DM06) to the Quiapo pumping station where it is ultimately pumped out to the Pasig River.

Adding to the floodwaters from the Sta. Mesa Heights is the runoff coming from the gentle slopes of Balic-Balic in Quezon City. The floodwaters enter the Sampaloe area through drainage laterals into the Josefina-Lepanto Main (DM07) thus aggravating further the inundation of the España area.

The floodwaters are disposed of by way of the Lepanto-Gov. Forbes Main (DM30) down to Estero de Sampaloc where they are ultimately pumped out into the Pasig River.

At high flood stage, floodwaters from the respective drainage blocks of Quiapo and Aviles-Sampaloc merge, making the flood problem more complex. Under such condition, more than one pumping station operate, each serving an indistinct drainage system or drainage block.

CHANNEL CODE	NAME	CAUSES OF FLOODING
DM01	Blumentritt Inter	ceptor
NL041	Amoranto- Mayon-Calamba (Right Side)	 Inadequate flow capacity of Calamba Creek. Presence of sediment deposits and other obstructions. Sills come from construction sites and since the drainage area has steep slope, sand/silts are easily transported to the creek.
NL039	Andres Bonifacio	 Inadequate flow capacity of NL039 and receiving drainage main (DM01). Presence of sediment deposits and other obstructions. 50% deposit at low point (manhole ii 15C2019).
NL043	Piy Margal (Mayon-M Cuenco)	 Inadequate flow capacity of NL043 and receiving drainage main (DM01). Presence of sediment deposits and other obstructions.
DM06	N. Reyes - Severi	10
NL031	Laong-Laan- Gov. Forbes- España	 Inadequate flow capacity of NL031 and receiving drainage main (DM06). NL031 has small outlet, hence a choking condition occurs; floodwater coming from northern Sampaloc spills over to España.
NL032	Dimasalang- Gov. Forbes- España	 Inadequate flow capacity of NL032 and receiving drainage main (DM06). Layout of drainage lateral facilitates deposition and clogging of manhole, especially at places with abrupt change of slope direction.
DM07	Josefina - Lepanto	
NL036	España (Right Side)	 Inadequate flow capacity of NL036 and receiving drainage main (DM07). Layout of drainage lateral facilitates deposition and clogging of manholes, especially at places with abrupt change of slope direction.

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DM08	Economia	
NL033	M. Earnshaw- España	 Inadequate flow capacity of NL033. NL033 drains to NL032.
	тээрана	Presence of sediment deposits and other obstructions.
		Clogged outlet (ii15C4064) and manhole ii15C4152.
		Choked at ii 15C4075.
		Floodwater spills over the Estero de Calubcub.
NI.034	España (Right	 Inadequate flow capacity of drainage laterals, NL034 and
	Side)	NL035.
NL035	España (Left	
	Side)	
EST15	Estero de San M	
NL029	M.V. delos	 Inadequate flow capacity of NL029.
	Santos (Right Side)	 Presence of sediment deposits and other obstructions.
NI.030	M.V. de los	Inadequate flow capacity of NL030.
111,050	Santos (Left	Presence of sediment deposits and other obstructions.
	Side)	Drainage lateral has 50 to 100% sand/silt deposition,
	1,	manhole ii 15C4086 and ii 15C4051 clogged.
DM28	South Antipolo l	
NL055	F. Huertas	 Inadequate flow capacity of NL055 and receiving drainage
		main (DM28).
		Area served by the lateral is low-lying.
DM02	Solis-Tecson	
NL016	J. Abad Santos	 Inadequate flow capacity of NL016 and receiving drainage
	(Right Side)	main (DM02).
		Presence of sediment deposits and other obstructions.
		Both ends of NL016 have 50% sediment deposition.
		The lateral lies in a low-lying area where flood can persist for a long time. The lateral is located at the upstream end of
		DM02 where flood takes longer to subside.
NL017	J. Abad Santos	Inadequate flow capacity of NL017 and receiving drainage
	(Left Side)	main (DM02).
		 Presence of sediment deposits and other obstructions.
		NL017 has 70% uniform deposition; manhole ii15B2209 is
		clogged.
		The lateral lies in a low-lying area where flood can persist for
		a long time. The lateral is located at the upstream end of
DM29	Tourman	DM02 where flood takes longer to subside.
NL025	Tayuman Oroquieta	Inadequate flow capacity of NL025 and receiving drainage
1112023	Oroquicta	main (DM29).
		Saw-tooth profile of drainage lateral.
		Presence of sediment deposits and other obstructions
		Manhole ii15B3180 is clogged. Sediment deposits at sag
		point,
		Area serviced by lateral is low-lying.
EST06	Estero de Magd:	alena
NL018	S. Herrerra	 Inadequate flow capacity of NL018 and the receiving Estero
		de Magdalena (upper reach).
NL019	Toyohaa	The area is low-lying and floodwaters can stand still easily.
1417013	Tayabas	 Inadequate flow capacity of NL019 and the receiving Estero do Mandalana (upper reach)
		de Magdalena (upper reach). The area is low-lying and floodwaters can stand still easily.
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Southern Manila Flood Problem (San Antonio-Palanan-Pio del Pilar-San Isidro)

Runoff from the San Antonio Village enters the laterals to full capacity. Since the drains are undersized, the unaccommodated excess runoff appears as flood. The floodwater is collected along roadways and led towards the Zobel-Roxas Main (DM23). But because the capacity of this main at its upper reaches is limited, floodwaters cannot be conveyed further. This results to the rising of flood level upstream. Worsening this adverse condition, and because the overflowing Estero de Tripa de Gallina submerges the main's outfall, a further reduction of capacity of the Zobel-Roxas Main occurs at its middle and lower reaches.

The area south of Zobel-Roxas Street is drained by Calatagan Creek. The creek, however, has a very limited flow capacity, and thus facilitates the swelling of floodwaters in the area and its immediate vicinity. The floodwater is conveyed along Calatagan Creek to Estero de Tripa de Gallina, which is also overflowing, hence compounding the flood problem.

The PNR open canal drains the floodwaters east of the existing railroad tracks, but overflows due to its limited capacity. Nevertheless, the floodwaters are discharged either via the Faraday main or toward the Calatagan Creek, which becomes further overloaded. Large scale flooding of the area therefore ensues.

The complexity of this drainage system problem can be brought into clearer view if it is considered that a number of pumping stations, namely, Paco-Pandacan-San Andres-Libertad and Tripa de Gallina pumping stations serve the same Estero de Tripa de Gallina

CHANNEL CODE	NAME	CAUSES OF FLOODING
Estero de Tri	pa de Gallina	
DM 23	Zobel Roxas	
SL001	Primo de Rivera	 Layout of drainage lateral facilitates deposition and clogging of manholes, especially at places with abrupt change of slope
SL002	Vito Cruz Ext.	direction.
SL022	Mayapis	Adverse slope from 0 to 450 and from 580 to 700 of SL001. Surface runoff from headwaters to Tejeron spills over towards areas served by SL001 and SL002 (Primo de Rivera and Pasong Tamo, respectively).
		The general area of San Antonio Village is flat and low-lying and bounded by main streets and the existing railroad track, which is relatively higher than the natural ground. This results in ponding during heavy rains.
SL032	Sen. Gil Puyat-	 Inadequate flow capacity of SL032.
	Dian-DM22	Drainage profile has saddle.
		Chances of sediment filling the saddle are high and fast. Estero de Tripa de Gallina overflowed.
SL033	Finlandia- Edison-Morse- EST25	shares the same causes with SL032

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SL037	Hen. A. Ricarte	 Inadequate flow capacity of SL037. Layout of drainage lateral facilitates deposition and clogging
		of manholes, especially at places with abrupt change of slope
]		direction.
		Presence of sediment deposits and other obstructions.
SL039	Cabrera Protação	 Inadequate flow capacity of SL039.
	Ext.	 Layout of drainage lateral facilitates deposition and clogging of manholes, especially at places with abrupt change of slope direction. Clogged manhole at upstream end (iii21A1042).
		Overtopping of Estero Tripa de Gallina,
SL031	Dayap-Dian	Inadequate flow capacity of \$1.031 and receiving creek.
02031	Calatagan Creek	Swelling of flood over Pio del Pilar.
	Canada Greek	Overtopping of Estero de Tripa de Gallina.
SL030	Dian (Outfall)	Shares the same causes with SL031,
DM33	Pasong Tamo	- Shares the same causes wan SLOSI,
SL055	Lumbayao and	Inadequate flow capacity of SL055.
01.000	St. Paul	Irregular profile of SL055.
	50. 1 au	
		Presence of sediment deposits and other obstructions. What are with almost a few for the contractions.
SL022	Mayapis	Flat area with slow movement of surface runoff.
51.022	iviayapis	Inadequate flow capacity of SL022.
		Presence of sediment deposits and other obstructions. Desirant letteral in the sed 6 - 250.
		Drainage lateral is clogged for 350 meters
	PNR Open Canal	Drainage area for lateral is flat.
SL020	Dagonoy	
51,020	Dagonoy	 Inadequate flow capacity of SL020 and receiving PNR open canal
		 Layout of drainage lateral facilitates deposition and clogging of manholes, especially at places with abrupt change of slope direction.
		 Presence of sediment deposits and other obstructions.
		Outlet of the lateral is constricted.
		Drainage profile is irregular. Sand and silt deposits at the saddle section reduce the flow.
		Clogged manhole (iii 16A3158).
		Area north of Zobel-Roxas main has scattered flood-prone
01.00.1		portions.
SL021	Estrada A	 Inadequate flow capacity of SL021 and SL054.
SL054	Estrada B	Presence of sediment deposits and other obstructions.
		SL021 is clogged at manhole iii16A3171 and rest of lateral
	<u> </u>	length has 50 to 75% sand/silt deposition.
		SL054 has a 50% sand deposition over its length.

6.1.2 Local Flooding

Amply supported and properly managed, certain remedial measures for localized floods can yield immediate benefits. It must be stressed, however, that only by adopting a regional context can more permanent solutions to localized floods be found. Lined up below are drainage channels that are causing localized flood problems, in which urgent works to mitigate flood damage may be implemented.

North Manila (Local Flooding)

CHANNEL, CODE	NAME	CAUSES OF FLOODING
NL049	Luzon/Negros	 NL049 has steep slope. Presence of sediment deposits and other obstructions. Steep slope followed by adverse slope forms a saddle part (potential siltation site). 70% clogged at saddle (manhole iiiA4197). Incoming lateral from Luzon may have inlet problem, such that flooding occurs.
NL010	Claro M.Recto (Left Side)	Inadequate flow capacity of NL010. Upstream end of lateral may be small.
NI.026	P. Guevarra	 Inadequate flow capacity of NL026. Irregular drainage profile (facilitating deposition and clogging of manholes, especially at places with abrupt slope changes). Presence of sediment deposits and other obstructions. Irregular drainage profile. Clogged manhole at sag (ii5C3326) and at upstream manhole (ii5C3322).
NL.004	Moriones/ Nolasco/Morga	 Inadequate flow capacity of NL004. Layout of drainage lateral facilitates deposition and clogging of manholes, especially at places with abrupt slope changes. Presence of sediment deposits and other obstructions. Drainage profile has a saw-tooth shape; clogged manhole ii 15A 4037 (sag point). Drainage lateral has 80% deposit over its length.
NL020	North Antipolo Creek	 Inadequate flow capacity of North Antipolo Creek. Presence of sediment deposits and other obstructions. Outlet manhole (ii5B3194) is clogged. Whole length of NL020 has 50% sand/silt deposit. Drainage profile is conducive for silt deposition. Possible spilling of runoff from upstream of Solis-Tecson Main.
NL044	Cordillera- Quezon AveD. Tuazon-Data- Matimyas	 Inadequate flow capacity of NL044. Irregular profile of NL044. Presence of sediment deposits and other obstructions. Profile undulating; size changes from 76 cm to 46 cm back to 76 cm; constricted drainage pipe at manhole iii/A3186; choked condition.
NL028	Carlos Palanca- Padilla- Nepomuceno	 Inadequate flow capacity of NL028. Irregular profile of NL028. Presence of sediment deposits and other obstructions. Adverse bed slope near outlet/hydraulic behavior changes. Deposition at saddle portion. Clogging of manhole #20C1025.
NL054	Old Sta. Mesa- Albina-Altura-R. Magsaysay- Hipodromo- Anonas	 Inadequate flow capacity of NL054. Irregular profile of NL054. Presence of sediment deposits and other obstructions. Presence of two choking points. Hydraulic behavior changes rapidly due to abrupt change in section area and due to incomplete siphon. Clogged manhole due to choking.

NL045	Matimyas (right	Inadequate flow capacity of lateral.
	side)	 Presence of sediment deposits and other obstructions.
NL046	Matimyas (left	shares the same causes with NL045.
	side)	has 50% deposition at iii1A3209.

South Manila (Local Flooding)

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CHANNEL CODE	NAME	CAUSES OF FLOODING
SL010	Paz Mendoza/ Guanzon	 Inadequate flow capacity of SL010. Irregular profile of SL010. Presence of sediment deposits and other obstructions. Drainage line has excessive sag at 0+380 m. The erratic slope greatly reduces flow capacity. Drain size is not consistent (larger at the upper end and smaller at the lower end).
SL035	Rockefeller/ Ford/ Tripa de Gallina	 Inadequate flow capacity of SL035. Road inlets are not provided. Presence of sediment deposits and other obstructions. Because the area served by the lateral lies on a flat area, this poor drain capacity results to localized flooding.
SL047	Victoria	 Irregular profile of SL047, particularly at segment 0 to 491 m. Outfall is submerged by Maricaban Creek during floods.
SL041	Donada/DM14	 Inadequate flow capacity of SL041. Segment 176 to 289 m does not conform with minimum requirement of DPWH.
SL045	Rodriquez/Apelo Cruz/ C. Jose	 Inadequate flow capacity of SL045. Irregular profile of SL045. A saddle point is present at upper reach of lateral, where hydraulic behavior abruptly changes; upstream of the lateral is on high ground and inlets to manhole are not adequate. Presence of sediment deposits and other obstructions. The drainage lateral is 25% filled with sediments.
SL008	T.M. Kalaw/faft	 Inadequate flow capacity of SL008. Size of drain from 317 to 500 m is below DPWH standard. Adverse slope from 0 to 103. Presence of sediment deposits and other obstructions. Curb inlets are clogged with garbage.
SL009	San Marcelino	High water level at Estero de Balete outfall. The lateral is affected by high water level of Pasig River.
SL032	Sen. Gil Puyat/ Dian/DM22	 Irregular longitudinal profile of SL032 (saw-tooth) Presence of sediment deposits and other obstructions. Manholes are filled with sediment deposits.
SI.033	Finlandia/Edison /Morse/ Tripa de Gallina	 shares the same causes with SL032.
SL029	Herrera	 Inadequate flow capacity of SL029. Clogged at outlet.
SL019	E. Pascua	 Inadequate flow capacity of SL019 and clogged at outlet. Affected by tide which causes backwater and reduces flow capacity.

SL014	Road 9	The outfall is affected by high water level at Tripa de Gallina.
SL015	Road 16/Pedro	 Irregular profile of SL015.
ŀ	Gil	Drain size at segment 0 to 50 is a bottleneck.
		Outfall invert is too low.
		An assortment of conduit sizes has been installed
L		inconsistently.

To summarize, the primary cause of flooding is inadequate flow capacity caused by one or several combinations of the following:

- undersized drainage channels
- unevenly laid longitudinal slope of the channel or conduit
- irregularly shaped channel
- inconsistent drain size, i.e., the line should progressively increase in size as it goes down slope
- clogged manholes
- sediment deposits of varying depth along drainage channel or conduit
- overflowing of esteros
- floodwater spilling to neighboring drainage areas
- submerged crown elevation at the outlet

6.2 Other Related Flood Problems

Flood problems other than those largely resulting from inadequate flow capacity are summarized below.

Encroachment on Esteros and Waterways

Throughout the Metro Manila area, colonies of informal settlers are common sights along esteros/waterways. Shanties are built along waterway easements, over open channels, and under bridges. Most are built of wood and other makeshift materials, but a considerable number are made of GI sheets claddings and other semi-permanent construction materials. Some are even multi-level. The presence of these settlers makes regular maintenance impossible and eliminates the possibility of retrieving the original flood plain width to increase the flow capacity.

One major effect of this illegal occupation may be given. With shanties built inside the esteros banks, plastic materials carried by the flowing water become easily entangled and entrapped on columns or posts, the consequence of which is the retardation of flow and, in some cases, total blockage of the drainage channels. (see Photo 7)

The informal settlers are of major concern, not only in regard to the encroachment on waterways but also in compounding the lack of public services such as garbage collection. Where informal settlements are present, it is the prevailing practice to dispose of garbage indiscriminately and directly to waterways, adding to pollution and public health hazards, and making regular maintenance of drainage channels more troublesome.

Uncoordinated Developments

To improve and sustain their services, public utility agencies often have on-going construction and development activities. In so doing, however, and perhaps unwittingly, the practice of giving little weight to the hydraulic requirements of waterways, or even totally disregarding them, becomes ingrained, resulting to numerous obstructions and constrictions that significantly reduce the flow capacity of waterways.

Road crossings, bridges and access roads, whether vehicular or pedestrian, retard the flow of water and, in extreme cases, caused complete blockage of waterways. Typical examples are as follows:

- constricted road crossing (PNR open canal and Vito Cruz) (Photo 8)
- road crossing along Estero de San Lazaro at Laguna (Photo 9)
- railroad crossing at Estero de Maypajo (Photo 10)
- parallel access pedestrian bridge along Estero de Magdalena (Photo 11)
- construction and installation of water supply pipes, telephone conduits, telephone poles, and other utilities within drainage channels (Photo 12 Sewer line across Estero de Calubcub)

Garbage, Trash, Construction Materials and Siltation

A substantial portion of the garbage currently generated in the study area is disposed of indiscriminately to streets, vacant lots or other open spaces, street gutters or canals, and waterways. The presence of undulating mounds of garbage and even construction wastes along banks of esteros confirms the above practice (Photo 13). Uncontrolled construction sites, especially those on higher grounds, also give rise to erosion and entry of silt and sediment into the drainage system.

In some cases, trash racks (e.g. Vito Cruz, Estrada, Dian, and Tayuman; Photo 14) are provided in open channels to prevent garbage being carried further downstream. However, irregular maintenance or non-removal of garbage contributes to blockage problem and backwater effects.

Percentage distribution of sediment deposition in the surveyed manholes is shown in Figure 6.1. The data used came from the LATERAL database. The percent deposition is taken as the ratio of depth of deposit to either depth or diameter of channel. It can be seen in the figure that the pattern of sediment deposition in North Manila drainage lines shows almost no variance from those in South Manila drainage lines. Approximately, twenty per cent (20%) of the total number of surveyed manholes have a 20% sediment deposit, another 20% have 40% sediment deposits, and another 15% have 60% sediment deposit. It is clear therefore that a sizable number of manholes have considerable amount of sediment deposits or have reduced cross-sectional areas, hence further decreasing the carrying capacity of drainage channels.

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Increased Runoff in Developed Areas

Many of the drainage mains follow the old natural channels that existed before extensive land development took place. These channels are now inadequate for the following reasons.

- rapid urbanization has reduced the runoff travel time and thereby increased peak discharge.
- the runoff coefficient, C, used in earlier studies and design has become inappropriate.

Chapter
Conclusions and
Recommendations

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CHAPTER 7

CONCLUSIONS AND RECOMMENDATIONS

As discussed in previous chapters, almost all drainage laterals and a number of drainage mains and esteros have limited flow capacity. Due to this deficiency, the unaccommodated excess storm water swells and inundates large portions of Manila and Suburbs, especially the low-lying areas of España (north of the Pasig River) and the San Antonio-Palanan-Pio Del Pilar area (south of the Pasig River).

The major drainage channels were intended to have the safety level for floods of a 10-year return period. Their actual capacity, however, proved less than the targeted safety level mainly because of the limited rainfall data used in the 1952 drainage plan, and partly because of the increase in runoff brought about by rapid urbanization.

Sediment deposits that have accumulated through the years due to deferred maintenance have also impaired the effectiveness of drainage laterals and mains. The combination of using varying sizes of laterals and presence of adverse slopes has facilitated, too, the settling of sediments, thus resulting to the reduction of the effective flow area of these drainage facilities and further diminishing their flow capacity.

Uncollected solid wastes that find their way into the drainage channels, construction waste materials included, further decrease the channels' flow carrying capacity and eventually block them. Solid wastes appearing in large quantities at the pumping stations also greatly hamper pump operations and reduce as well the detention pond capacity.

The esteros are intended to function both as primary drainage channels and detention ponds for the pumping stations. But accessing these waterways to do channel improvement and maintenance work has become virtually impossible today, given the colonies of informal settlers that have encroached on long stretches of these esteros.

With these conditions obtaining in the drainage system of Manila and Suburbs, what comes to fore is a pressing need for concerned agencies to come up with a new and comprehensive drainage master plan, one that can provide a lasting solution to Metro Manila's recurring floods.

7.1 Master Plan and Feasibility Study

As shown by this study, the present flow capacities of drainage channels are inadequate for draining floodwaters brought by a 10-year return period flood. Unaccommodated floodwaters in particular drainage blocks spill over to neighboring drainage blocks and result to wide-scale flooding of low-lying areas. As the flooding is regional in scope, involving several closely connected drainage blocks, drainage mains, esteros, and pumping stations, comprehensive drainage planning should be undertaken through a master plan study.

Areas identified for the master plan study are the Sampaloc area of North Manila and the San Antonio-Palanan-Pio del Pilar-San Isidro area of South Manila, which are described as follows.

For North Manila. Flooding of the large low-lying Sampaloc area comes from the runoff contributions of part of Sunog Apog drainage block, Vitas drainage block, Aviles-Samplace drainage block and Quiapo drainage block. In the event of flood, the Vitas drainage area and the Binondo-Escolta drainage block share the same estero, and this is the Estero dela Reina. In like manner, the Quiapo drainage block and Aviles-Sampaloc drainage block may share the same estero, the Estero de San Miguel. This arrangement places stress or puts pressure on some of the pumping stations.

For South Manila. The habitual flooding areas are along Calatagan Creek and PNR open canal. Both canals flow to the overflowing Estero de Tripa de Gallina. But also connected to this estero are other drainage blocks such as Pandacan, Paco, San Andres and Libertad. The estero system (network) for south Manila is more complex because several pumping stations operate on the same estero, the Estero de Tripa de Gallina. This arrangement, as previously said, stresses pumping stations.

In proposing flood abatement or mitigation measures, the master plan should consider not only structural measures but also nonstructural ones. The structural measures could include:

- construction of additional drainage channels;
- improvement of esteros;
- rehabilitation and improvement of existing drainage mains;
- rerouting of flows to less stressed lines;
- compartmentalization of drainage blocks to reduce problem areas into manageable levels; or possibly,
- redesign or reconstruction of the whole drainage system altogether.

Nonstructural measures should include IEC and advocacy programs so that effective garbage collection and disposal, and effective removal and relocation of informal settlers may be achieved.

Given that a number of esteros are provided with pumping stations and are interconnected, note be taken that the simple assumption on free surface condition is unattainable in the field. Other flow combinations such as pressure flow at the lower reaches and open channel at upper reaches may occur. An operation model for effective pump operation, particularly during stormy conditions, is an option that should be considered in the master plan study.

For determining the technical, institutional, financial, social and environmental aspects of drainage system improvements, feasibility studies should be conducted for projects identified as priorities in the master plan.

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7.2 Implementation of Urgent Works

In addition to the above, the Study Team has identified some urgent works for immediate implementation, as follows:

North Manila Watershed: Regional

CHANNEL	NAME	MEASURES
CODE		
DM01	Blumentritt Interceptor	
NL041	Amoranto/Mayon/ Calamba (Right Side)	 Increase lateral/main capacity, reduce run-off peak or provide additional line if space allows Desilting/Declogging of drainage channel Develop/implement solid waste management plan to include non-structural measures like IEC and advocacy programs Inclusion in the overall master planning
NL039	Andres Bonifacio	 Increase lateral/main capacity, or provide additional line if space allows Declog/dredge drainage main (DM01) and declog manholes Inclusion in the overall master planning, being contributor to large scale flooding of Sampaloe area (diversion channel can be considered in the master planning).
NL043	Piy Margal (Mayon/M. Cuenco)	 Increase lateral/main capacity, or provide additional line if space allows (flooding problem covers a large area and several drainage areas interact) Develop/implement solid waste management plan to include non-structural measures like IEC and advocacy programs Inclusion in the overall master planning
DM06	N. Reyes - Severino	
NL031	Laong-Laan/ Gov. Forbes/España	 Increase lateral/main capacity, or provide additional line if space allows Develop guidelines to improve drainage planning, design, construction, operation and maintenance. Undertake overall master planning and include this lateral (the drainage basin lies in low-lying area and also involves other interdependent drainage basins)
NL032	Dimasalang/Gov. Forbes/España	 Increase lateral/main capacity, or provide additional line if space allows Clean/declog NL032. Develop proper drainage planning, design, construction, and operation guidelines so as to put more emphasis on the hydraulic aspect of the problem Develop/implement solid waste management plan to include non-structural measures like IEC and advocacy programs Undertake comprehensive drainage master planning and include this lateral for it is part of the large scale flooding of the Sampaloe area.
DM07	Josefina - Lepanto	
NL036	España Right Side)	 Increase lateral/main capacity, or provide additional line if space allows Develop guidelines on proper drainage planning, design, construction, and operation, with emphasis on the hydraulic aspect of the flooding problem.

		 Develop/implement solid waste management plan to include non-structural measures like IEC and advocacy programs Undertake comprehensive drainage master planning (This lateral involves a number of interdependent drainage basins including those in low-lying areas.)
DM08	Economia	
NL034 NL035	España (Right Side) España (Left Side)	 Increase capacity of NL034, or provide additional line if space allows Undertake comprehensive drainage master planning (The laterals' drainage basin lies in a low-lying area and involves also a number of interdependent drainage basins. Due consideration should be given to the fact that the drainage main (DM08), NL034 and NL035 are in the interior of a large basin.)
NL033	M. Earnshaw/ España	 Increase lateral/main capacity, or provide additional line if space allows Clean clogged manholes from ii15C4064 to ii15C4071. Enlarge drain size at manhole ii5C4075 Develop guidelines on proper drainage planning, design, construction and operation, with emphasis on the hydraulic aspect of the flooding problem. Develop/implement solid waste management plan to include non-structural measures like IEC and advocacy programs As this is part of the large scale flooding of the Sampaloc area, it should be included in the overall master planning study.
NL029	M.V. delos Santos	Increase lateral capacity, or provide additional line if space
NL030	(Right Side) M.V. de los Santos (Left Side)	 allows Develop guidelines on proper drainage planning, design, construction, and operation, with emphasis on the hydraulic aspect of the flooding problem. Undertake comprehensive drainage master planning as this involves a number of interdependent drainage basins and also because these laterals' drainage basin lies in a low-lying area.
DM 28	South Antipolo Main	
NL055	F. Huertas	 Increase lateral/main capacity, or provide additional line if space allows Dredge South Antipolo Main. Include in a small basin-wide drainage improvement study (say north Sta. Cruz area).
DM02	Solis-Tecson	
NL016 NL017	J. Abad Santos (Right Side) J. Abad Santos (Left Side)	 Increase lateral/main capacity, or provide additional line if space allows Declog/desilt NL016 & NL017. Develop guidelines on proper drainage planning, design, construction, and operation, with emphasis on the hydraulic aspect of the flooding problem Improve carrying capacity of DM02, preferably through a study on improvement of drainage laterals for small drainage area.
DM29	Tayuman	
NL025	Oroquieta	 Increase lateral/main capacity, or provide additional line if space allows Develop guidelines on proper drainage planning, design, construction, and operation, with emphasis on the hydraulic aspect of the flooding problem Declog manholes and dredge Tayuman Main.

		 Include in a small basin-wide drainage improvement study (say north Sta. Cruz area).
NL018	S. Herrerra	 Increase lateral/main capacity, or provide additional line if
NL019	Tayabas	space allows
	İ	 Declog/dredge Estero de Magdalena for immediate impact,
		 For long range planning, conduct a drainage improvement
		study of Estero de Magdalena from South Antipolo to
		Tayuman. It may include the improvement of the drainage
		laterals under a small basin wide study.

North Manila Watershed: Local

CHANNEL CODE	NAME	MEASURES
NL049	Luzon/Negros	 Desilt/declog lateral and manhole iii11A4197. Improve slope of lateral and check inlet to NL049 from Luzon. Develop proper drainage planning design, construction, and operation guidelines so as to put more emphasis on the hydraulic aspect of the problem
NL010	Claro M.Recto (Left Side)	 Increase lateral capacity, or provide additional drain line, if space allows Develop proper drainage planning, design, construction, and operation guidelines so as to put more emphasis on the hydraulic aspect of the problem
NL026	P. Guevarra	 Increase lateral capacity, or provide additional drain line, if space allows Declog drainage lateral (NL026). Develop proper drainage planning, design, construction, and operation guidelines so as to put more emphasis on the hydraulic aspect of the problem.
NL.004	Moriones/Nolasco/ Morga	 Increase lateral capacity, or provide additional drain line, if space allows Declog drainage lateral NL004. Develop proper drainage planning, design, construction, and operation guidelines so as to put more emphasis on the hydraulic aspect of the problem
NL020	North Antipolo Creek (T. Bugallon Antipolo)	 Declog/clean NL020. Improve downstream of drainage laterals. Improve flow capacity of North Antipolo Creek. Include in a small basin-wide drainage improvement study (say north Sta. Cruz area).
NL044	Cordillera/Quezon Ave./D.Tuazon /Data/Matimyas	 Study the possibility of replacing drainage lateral from iii11A3186 to iii11A3121 to get rid of the choke. Develop proper drainage planning, design, construction, and operation guidelines with more emphasis on the hydraulic aspect of the problem Design channel with appropriate gradient and flow capacity.
NL028	C. Palanca/ Padilla/ Nepomuceno	 Declog manhole ii20C1025. Improve drainage profile through proper planning.
NL054	Old Sta. Mesa/ Albina/Altura/ R. Magsaysay/ Hipodromo/Anonas	 Declog manhole. Revise drainage profile through proper drainage planning. Develop proper drainage planning design, construction, and operation guidelines with more emphasis on the hydraulic aspect of the problem.

NL045	Matimyas (Right	Declog NL045 and desilt NL046
	Side)	 Improve drainage lateral through proper planning.
NL046	Matimyas (Left	
1	Side)	

South Manila Watershed: Regional

CHANNEL CODE	NAME	MEASURES
	Estero de Tripa de Gallina	 Improve channel capacity of Calatagan Creek and Tripa de Gallina.
DM 23	Zobel Roxas	
SL001	Primo de Rivera	 Re-design SL001 and rectify longitudinal slope. Constant slope must be maintained throughout the whole length. Verify availability of head from upper end of line to junction with SL044 (Vito Cruz), to DM23 (Zobel Roxas) and ultimately at Tripa de Gallina.
SL002	Vito Cruz Extension	Do the same for SL002 (north segment of Mayapis).
		 Provide auxillary pump at the Tripa de Gallina inlet of Vito Cruz outlfall (DM14). Forced pumping is necessary. Another alternative is to completely redesign/ reconstruct the drainage system of San Antonio Village. Compartmentalize the area by providing floodgates on Tripa de Gallina area for the Libertad to prevent external flows. This will ensure a definite influence area for the Libertad Pumping Station plus a new auxiliary force pump which should be provided at inlet of Vito Cruz outfall.
SL032	Sen. Gil Puyat Dian-DM22	 Increase lateral capacity, or provide additional line if space allows
SL033	Finlandia-Edison- Morse-EST25	 Increase lateral capacity, or provide additional line if space allows
SL037	Hen. A. Ricarte	 Increase lateral capacity, or provide additional line if space allows Declog/desilt drainage lateral.
SL039	Cabrera Protacio Extension	 Increase lateral capacity, or provide additional line if space allows Reconstruct pipe sections to gradual slope. Declog/clean manhole iii21A1042 and downstream sections.
SL031	Dayap-Dian- Calatagan Creek	Improve capacity of lateral and Calatagan Creek, or provide additional line if space allows
SL030	Dian (Outfall)	 Improve capacity of lateral and Calatagan Creek, or provide additional line if space allows
DM33	Pasong Tamo	
SL055	Lumbayao and St. Paul	 Increase lateral capacity, or provide additional line if space allows
SL022	Mayapis PNR Open	 Increase lateral capacity, or provide additional line if space allows Declog whole length of drainage lateral Dredge PNR open canal.
	Channel	
SL020	Dagonoy	 Improve capacity of lateral including the receiving PNR open canal or provide additional line if space allows. Clean manhole iii16A3158 of sediment deposit.

SL021	Estrada A	 Declog/clean the PNR open canal and the drainage lateral as
		well.
		Undertake improvement of the drainage laterals for San
Ì		Andres Bukid; this can be studied in detail using a small
		basin-wide approach.
SL054	Estrada B	Do the same for SL054.

South Manila Watershed: Local

CHANNEL CODE	NAME	MEASURES			
SL010	Paz Mendoza Guanzon	 Reconstruct \$1.010 and rectify slope. Verify size of drain line. Flatness of the existing terrain may require closer spacing of street/curb inlets. Drain size must be smaller at the upper end, becoming progressively larger at the lower end. 			
SL035	Rockefeller/Ford/ Tripa de Gallina	 Declog manhole inlets. Provide additional curb inlets. Clean SL035. 			
SL047	Victoria	Redesign and reconstruct segment 0 to 893 for a steeper slope.			
SL041	Donada/DM14	 Redesign whole segment and replace with larger RCPs. Clean SL041. Develop proper drainage planning, design, construction, and operation guidelines with more emphasis on the hydraulic aspect of the problem 			
\$I.045	Rodriquez/Apelo Cruz/ C. Jose	 Reconstruct SL045 and rectify slope Desilt/declog the whole pipe system. Clean inlets. If necessary, provide additional inlets. Develop proper drainage planning, design, construction, and operation guidelines so as to put more emphasis on the hydraulic aspect of the problem 			
SL008	T.M. Kalaw/Taft	 Replace SL008 with one that has a bigger capacity or provide additional parallel line if space is available Recalculate to determine proper drain size. Rectify longitudinal slope from 0 to 103. Clean inlets. Develop proper drainage planning, design, construction, and operation guidelines with more emphasis on the hydraulic aspect of the problem 			
SL009	San Marcelino	Provide flap gate or check gate at outfall.			
SL032	Sen. Gil Puyat/Dian/ DM22	Reconstruct \$L032 and \$L033 and rectify slope Desilt/declog manholes			
SL033	Finlandia/Edison/ Morse/Tripa de Gallina	Develop guidelines for proper drainage planning, design, construction, and operation, with emphasis on the hydraulic aspect of the problem			
SL029	Herrera	 Clean/clear of sediment deposits the whole length of drainage lateral 			
SL019	E. Pascua	 Redesign and reconstruct SL019 from 0 to 167 Raise outfall invert to El. 11.50 Desilt/declog SL019 			
SL014	Road 9	 Reconstruct segment from 0 to 50 and raise outfall invert to El. 12. Increase channel capacity of Tripa de Gallina. 			

SL015 Road 16/Pedro Gil	 Redesign and reconstruct segment from 0 to 328. Rectify longitudinal slope. Drain size must progressively become larger as the lower end is approached. Increase channel capacity of Tripa de Gallina.
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The study team also recommends the following areas for pilot projects as requested for joint implementation by DPWH, MMDA and LGUs:

- Sta. Mesa Heights in Quezon City, involving NL039 (A. Bonifacio), NL041 (Amoranto-Mayon-Calamba), NL043 (Piy Margal, Mayon-M. Cuenco) and DM01 (Blumentritt Interceptor)
- Sta. Cruz, Manila, involving Tayuman Main (DM29), NL018 (S. Hererra),
 NL019 (Tayabas), NL025 (Oroquieta)
- Metropolitan Subdivision in Makati City, involving SL001 (Primo de Vera),
 SL002 (Vito Cruz Extension) and DM23 (Zobel-Roxas)
- Manila City Hall, involving SL056 (Aroceros) and SL057 (Concepcion)

7.3 Strengthening of Inter-agency Coordination

A requisite for the effective operation, maintenance, rehabilitation and improvement of drainage facilities is the close coordination between and among the DPWH, the MMDA and the concerned LGUs within Metro Manila. It is suggested that a Technical Working Committee (TWC) composed of representatives of DPWH, MMDA and the different LGUs be created. With a view towards ensuring the effective utilization of the outputs of the present study and improving the management of drainage laterals, the TWC will be responsible for the following:

- Firming up of post-project (study) implementation arrangements particularly in regard to the operation and maintenance of the database system for drainage laterals;
- Coordinating the implementation of pilot projects recommended under this study. These projects are aimed at providing immediate structural and nonstructural solutions to the recurrent flood problems;
- Design and implementation of a capacity-building program for concerned staff of member-agencies on drainage system planning, design, construction, operation and maintenance;
- Evaluation of the current practice of planning drainage systems, to include updating of drainage design criteria in coordination with the Bureau of Design of the DPWH; and
- Exploring the possibility of replicating the study, particularly the development
 of database system for drainage laterals in other critical areas of Metro Manila
 and in other key urban centers of the country such as Metro Cebu, Metro
 Davao, Metro Surigao, Butuan City, Naga City, and other urban centers.

7.4 Management of Database System

The potential benefits from the database system for drainage laterals that was developed as part of the study can only be realized through proper system management. To answer this need, an appropriate agency within the TWC should be designated to operate and maintain the database system. This agency should be able to provide a full-time staff and allocate an adequate budget for database system operation and maintenance. Specifically, the designated agency will be involved in:

- Coordination with the other agencies within the TWC regarding the use and updating of database information;
- Conduct of capacity-building and skills transfer activities for concerned personnel of member-agencies of the TWC for them to be able to establish and manage on their own a database system for drainage laterals;
- Preparation of post-project monitoring reports on the utilization status of the database system, to include the status of equipment and materials acquired through the study for submission to JICA.

7.5 Follow-up Study on the Flooding Problem in Metro Manila

The present study was able to identify and analyze specific causes of flood problems in Metro Manila based on the results of the survey of existing conditions of drainage facilities and the inundation survey, and aided by the drainage database system that was developed through the study. It is necessary, however, to do a follow-up study that is focused on existing government policies on flood control and anchored on addressing policy and institutional aspects of the problem of flooding in the metropolis. This proposed follow-up study should, among others, examine existing policies including the allocation of financial resources, review the present roles and functions of various government organizations involved in flood control, and recommend appropriate policy measures and institutional arrangements to mitigate the problem of flooding. The results of the said study would then serve as basis for initiating future executive and legislative actions for providing long-term solution to the recurring and worsening floods in Metro Manila.

Tables

TABLE 2.1 BENCHMARK ELEVATION

No.	вм	MSL (m)	DPWH DATUM (m)
1	BM66	1.832	12.310
2	GM1A	3.799	14.277
3	BM4B	3,015	13.493
4	CGS54	1.916	12.394
5	GMP2a	2.899	13.377
6	,CIMA18a	1.980	12.458
7	DLM 17	2.623	13.101
8	DLM 21	2.397	12.875
9	GM6A	2.954	13.432
10	GM8A	2.837	13.315
11	GM9Ab	3.552	14.030
12	GM53a	2,519	12.997
13	¹GM7H	2.789	13.267
14	DLM 20	4.809	15.287
15	BMQU2	1.802	12.280
16	BMST3	1.968	12.466
17	BMSC2	2.389	12.867
18	BMR 1-3	16.995	27.473
19	GM12F	2.748	13.226
20	DLM 22	8.805	19.283
21	DLM 23	6.514	16.990
22	DLM 19	5.304	15.782
23	DLM 18	8.791	19.269
24	BM6Ba	2.381	12.859
25	GM6E	2.562	13.040
26	DLM 24	3.264	13.742
27	DLM 10	3.466	13.944
28	DLM 9	2.876	13.354
29	DLM 8	5.132	15.610
30	DLM 7	15.337	25.815
31	DLM 6	12,217	22.695
32	DLM 5	3.053	13.531
33	DLM 4	2.931	13.409
34	DLM 3	2.771	13.249
35	DLM 2	3.498	13.976
36	DLM 1	2.745	13.223
37	GM9M	3.532	14.010
38	DLM 16	2.407	12.885
39	DLM 15	3.878	14.356
40	DLM 14	4.347	14.825
41	DLM 13	6.831	17.309
42	DLM 12	17.874	28.352
43	DLM 11	14.993	25.471

NOTE: DLMs are new benchmark established by the Study Team; while others are those under NAMRIA.

BMs elevation is measured from BM66 (1979 NAMRIA data)

Table 3.1 Data File Structure of Manhole Table

Database Table Name : MH DATA

Field Name	Description	Туре	Size	Remarks
Mh_code	Manhole code no.	Text	12	Map prefix with + (3) digit number.
w				Code shall not be duplicated
HouseLot	Nearest house lot no.	Text	50	Alpha-numeric
Street	Street	Text		Alpha-numeric
Barangay	Barangay code	<u>Text</u>		Alpha-numeric
City	City	Text	50	Alpha-numeric
ManDia	Manhole diameter	Single Precision	4	Numeric entry. Units in mm
ManLen	Manhole length	Single Precision	4	Numeric entry. Units in mm
ManWid	Manhole width	Single Precision	4	Numeric entry. Units in mm
ManThick	Manhole thickness	Single Precision	4	Numeric entry. Units in mm
ManDep	Manhole depth	Single Precision	4	Numeric entry. Units in mm
ManCovPcs	Number of manhole cover	Integer	2	Numeric entry. Unitless
ManCovDia	Diameter of manhole cover	Single	4	Numeric entry. Units in mm
ManCovLen	Length of manhole cover	Precision Single	4	Numeric entry. Units in mm
ManCovWid	Width of manhole cover	Precision Single	4	Numeric entry. Units in mm
ManCovThick	Thickness of manhole cover	Precision Single	4	Numeric entry. Units in mm
ManGarati	With much to seed 9	Precision		V for Von M for No
ManCrack	With manhole crack?	Text	<u>l</u>	Y for Yes, N for No
WaSurface	Distance of water surface from top of manhole cover	Single Precision	4	Numeric entry. Units in mm
WaCon	Water condition	Text	1	N for Normal, S for Stagnant water
DepSurf	Distance of deposition surface from	Single	4	Numeric entry. Units in mm
	top of manhole cover	Precision		· · · · · · · · · · · · · · · · · · ·
DepMat	Deposited materials	Text		Alpha-numeric
Obs	With obstacles?	Text	20	Alpha-numeric
Curbini	With curb inlet?	Text	<u>i</u>	Y for Yes, N for No
CurbInlWid	Curb inlet width	Single Precision	4	Numeric entry. Units in mm
CurbInlHei	Curb inlet height	Single Precision	4	Numeric entry. Units in mm
DBCode	Drainage block code	Text	10	Alpha-numeric
DOCOGO	Diamage block code	Double		Aipha-humore
ManTopElev	Manhole top elevation	Precision	8	Numeric entry. Units in m
BMCode	Bench mark code used	Text	20	Alpha-numeric
DrEngr	Drainage engineer	Text	50	Name of Engineer
Checker	Checker of datasheet	Text	50	Name of Engineer/Checker
DateTimeInves	Date and time of investigation	Date/Time	8_	Date (e.g. 20-Aug-2000)
DateInput	Date of input	Date/Fime	8	Date. Defult can be set to current date of computer
Operator	Computer encoder/operator	Text	50	Name of encoder/operator
Remarks	Remarks	Text	50	Alpha-numeric
MapPrefix	Prefix of map code	Text	12	Last 6 characters of Map Code (e.g. Map prefix of 3130-II-15-C4 is "II15C4")
X	x coordinate (casting)	Double Precision	8	Not necessary. Coordinates can be obtained from AutoCAD
	y coordinate (northing)	Double	8	Not necessary. Coordinates can be

Table 3.2 Data File Structure of Inlet Drainage Channel Table

Database Table Name: INLET

Field Name	Description	Туре	Size	Remarks
Mh_code	Manhole code number	Text	12	Automatically encoded when Data Entry Form was used
In_ch	Inlet channel code	Text	10	Automatically encoded when Menu (4) was processed
In_mh	Upstream manhole code	Text	12	Map prefix with + (3) digit number
In_status	Condition of channel	Text	1	N if normal, C if Clogged
In_mat	Composition/made of channel	Text	10	C for concrete, S for steel, P for Pvc, M for masonry, R for riprap
In_shp	Shape of channel	Text	5	R for rectangle, C for circular, T for trapezoidal
In_dia_wid	Diameter if Circular or top width if Rectangular or Trapezoidal	Single Precision	4	Numeric entry. Units in mm
In_dep	Channel depth for Rectangular and Trapezoidal only	Single Precision	4	Numeric entry. Units in mm
In_bot_wid	Bottom width. Applicable only in Trapezoidal	Single Precision	4	Numeric entry. Units in mm
In_cell	Number of cells	Integer	2	Numeric entry. Unitless
In_bot	Distance of invert from top of manhole cover	Single Precision	4	Numeric entry. Units in mm
In_ovb	Distance of top of channel from top of manhole cover	Single Precision	4	Numeric entry. Units in mm
In_ch_len	Distance from upstream manhole specified in 'In mh' field	Single Precision	4	Numeric entry. Units in m

Table 3.3 Data File Structure of Outlet Drainage Channel Table

Database Table Name: OUTLET

Field Name	Description	Туре	Size	Remarks
Mh_code	Manhole code number	Text	12	Automatically encoded when Data Entry Form was used
Out_ch	Outlet channel code	Text	10	Automatically encoded when Menu (4) was processed
Out_mh	Downstream manhole code	Text	12	Map prefix with + (3) digit number
Out_status	Condition of channel	Text	1	N if normal, C if Clogged
Out_mat	Composition/made of channel	Text	10	C for concrete, S for steel, P for Pvc, M for masonry, R for riprap
Out_shp	Shape of channel	Text	5	R for rectangle, C for circular, T for trapezoidal
Out_dia_wid	Diameter if Circular or top width if Rectangular or Trapezoidal	Single Precision	4	Numeric entry. Units in mm
Out_dep	Channel depth for Rectangular and Trapezoidal only	Single Precision	4	Numeric entry. Units in mm
Out_bot_wid	Bottom width. Applicable only in Trapezoidal	Single Precision	4	Numeric entry. Units in mm
Out_cell	Number of cells	Integer	2	Numeric entry. Unitless
Out_bot	Distance of invert from top of manhole cover	Single Precision	4	Numeric entry. Units in mm
Out_ovb	Distance of top of channel from top of manhole cover	Single Precision	4	Numeric entry. Units in mm
Out_ch_len	Distance from downstream manhole specified in 'Out mh' field	Single Precision	4	Numeric entry. Units in m

Table 3.4 Data File Structure of Manhole Sequence Table

Database Table Name : CHANNEL

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Field Name	Description	Туре	Size	Remarks
ID	Autonumber	Long Integer	4	Automatically encoded when Menu (4) was processed
Mh_code	Manhole code number	Text	10	Automatically encoded when Menu (4) was processed
Ch_code	Channel code	Text	10	Automatically encoded when Menu (4) was processed
Inlet_MH_code	Upstream manhole code	Text	10	Automatically encoded when Menu (4) was processed
Outlet_MH_code	Downstream manhole code	Text	10	Automatically encoded when Menu (4) was processed

Table 3.5 Data File Structure of Drainage Channel Names Table

Database Table Name : NAMES

Field Name	Description	Туре	Size	Remarks
Drain_code	Channel Code	Text	10	Automatically encoded when Menu (4) was processed
Drain_name	Channel Name	Text	100	Automatically encoded when Menu (4) was processed

Table 3.6 Contents of Drainage Channel Names Table

Database Table Name: NAMES

DRAIN_CODE	DRAIN_NAME			
DM 29	TAYUMAN			
DM28	SOUTH ANTIPOLO			
DM15-A	BUENDIA OUTFALL, PASAY CITY			
DM08	ECONOMIA MAIN			
DM17-A	EDSA OUTFALL, PASAY CITY			
DM24	EDSA -LUMBANG			
DM20	ESTRADA			
DM22-A	FARADAY (RIGHT SIDE)			
DM05	FUGOSO			
DM07	JOSEPHINA - LEPANTO			
DM32	G. PERFECTO			
DM04	LAKANDULA			
DM31	KABULUSAN OUTFALL			
DM16	LIBERTAD OUTFALL			
DM18	MAKATI HEAD RACE - I			
DM19	MAKATI HEAD RACE - II			
DM06	NICANOR SEVERINO REYES			

Table 3.7 Contents of Manhole Sequence Table

Database Table Name: CHANNEL

ID	MH_CODE	CH_CODE	INLET_MH_CODE	OUTLET_MH_CODE
1	II15B4258	DM05	II15B4099 _,	END
2	II15B4099	DM05	II15B4100	JI1584258
3	111584100	DM05	II15B4172	111584099
4	II15B4172	DM05	II15B4175	II1584100
5	111584175	DM05	II15B4178	II15B4172
6	111584178	DM05	II15B4179	111584175
7	II15B4179	DM05	START	II1584178
8	II15C4157	DM06	II15C4029	END
9	II15C4029	DM06	II15C4030	1115C4157
10	II15C4030	DM06	II15C4026	II15C4029
11	II15C4026	DM06	II15C4027	II15C4030
12	1115C4027	DM06	II15C4021	II15C4026
13	1115C4021	DM06	II15C4019	1115C4027
14	II15C4019	DM06	II15C4018	II15C4021
15	II15C4018	DM06	START	II15C4019
16	1115B3204	DM29	1115B3090	END

Table 3.8 SAMPLE OF ERROR MANHOLE SEQUENCE TABLE

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		MEAS	REAL CHAINE	CIMENSTONS	ε					ELEVATION, m	F		
u China	k	3			- T		TATE ATTAC		30 acr	dal v/v	T ITS / CNAS	TWVFRT	DEPOSITIO
CODE NO.	< ⊢ → O Z	NO. OF CELLS	тор МІВТН	BOTTOM HTCIW	DEPTH / DIA.	MANHOLES (m)	DISTANCE (m)	MANHOLE LEVEL	CHANNEL	SURFACE	DEPOSITION	ELEVATION OUTLET/INLET	рертн
II582016	Z	72	2.20	2.20	1.50	101.39		11.55	10.54	10.54	8.85	9.04	(61.0)
II1582015	5	14		2.00	1.46		101.39	11.63	10.24	10.24	85'6	8.78	0.80
	Z	2	2.00]	2.00	1.46	46.06	101.39	11.63	10.24	10.24	85.6	8.78	8.0
II1582014	TJ0												
	N												•
II1582013	5	77	2.00	2.00	1.45			11.86	10.81	10.71	58.6	9.36	0.49
	Z	77	2.00	2.00	1.45	213.4		11.36	10.81	10.71	9.85	926	0.49
111582012	50	12	2,00	2.00	1.48		213.40		11.07	10.92	9:95	9.59	0.3
	Z	2	2.001	2.00	1.48	21.23	213.401		11.07	10.92	56'6	65'6	0.3
11582011	50	7.7		1.961	1.53	-	234.63		11.17	11.10	10.38	9.64	0.7
	ž	2		1.86	1.53	187.58	234,63		12.17	11.10	10.38	9.64	0.74
II1582010	5	72		2.001	1.43		422.21		11.31	10.99	10.13	6.83	0.3
	ፈ	12		2.00	1.49	78.64	422.21		11.32	10.99	10.13	9.83	6.0
I15B2009	50	2		1.50!	1.27		500.85		11.24	10.71	10.29	6.6	0.3
	K	77		1.50	1.27	110.72	500.35;		11.24	10.71	10.29	9.97	0.32
I15B2008	120	121		1.50	1.47		611.57		11.57	10.86	:0.63	10,10	0.5
	š	21		1.50	1.46	85.89	611.57	12.16	11.56	10.86	10.63	10.10	0.5
II15B2007	50												
	ž		o .or un								-		
I15B2006	50	1	2,00	2.00	ដ្ឋា	-		12.19	11.59	10.97	10.93	10.36	0.5
	ĸ	1	2.00]	2.00	1.3	52.64	 	12.19	11.59	10.97	10.93	10.36	0.57
II15B2005	5	Ħ	2.00	2.00	1.25		52.64	12.21	11.61	11.10	11.03	10.36	9.0
	ደ	7	2,00	2.00	1.22	44.37	52.64	12.21	11.58	11.10	11.03	10.36	9.0
II1582004	5	ਜ	2.00	2.00	1,39		97.01	12.14	11.58	10.99	11.03	61.01	0.84
	A	=	2,00	2,00	84:	59.77	10.76	12.14	11.67	10.99	11.03	10.19	0.84
II15B2003	Ş	77	2,00	2.00	1.8		156.78		11.47	11.09	11.11	10.47	0.6
	ĸ	77	2:00	2.00	1.15	164.86	156.781		11.62	11.09	11.11	10.47	9.0
II15B2002	5	-1			1.02	<u> </u>	321.64		11.85	11.29	11.23		0.40
	ĸ	17	-		1.02!	66.01	321.64	12.85	11.85	11.29	11.23		0.4
						-							

Table 3.9 Data File Structure of Flood Condition Table

Field Name	Description	Туре	Size	Remarks
Drainage Block	Drainage Block	Text	50	Alpha-numeric
CodeNo	Location of interview	Text	10	Alpha-numeric
Street	Location of interview	Text	50	Alpha-numeric
Area	Location of interview	Text	50	Alpha-numeric
City	Location of interview	Text	50	Alpha-numeric
Duration	Duration of flooding	Double	.1	Numeric entry. Units in hours
Duration	Duration of flooding	Precision	4	Tumene entry. Onto in nouis
ManDanth	Manine	Double		Name is ant - Unite in mater
MaxDepth	Maximum depth	Precision	4	Numeric entry. Units in meter
Overbanking	Name of river	Text	50	Alpha-numeric
PoorDrainageSystem	Problems in drainage system	Text	50	Alpha-numeric
OtherCause		Text	50	
FloodFrequency	Frequency (Time/Year)	Long	4	Numeric entry. Units in number of times
rioduriequency	rrequency (Time real)	Integer	4	per year
AusDanth	Augraga dauth	Double		Numaria antre Unita in mater
AveDepth	Average depth	Precision	-4 	Numeric entry. Units in meter
OtherInformation		Text	50	Alpha-numeric
DateEncoded		Tme/Date	8	Date (e.g. 10-Aug-2000)

LIST OF DRAINAGE CHANNEL PROFILE DRAINAGE MAINS

NO.		DRAINAGE MAINS
"	Code	Name
1	DM01-A	BLUMENTRITT INTERCEPTOR-LEFT
2	DM01-B	BLUMENTRITT INTERCEPTOR-RIGHT
3	DM02	SOLIS - TECSON
4	DM04	LAKANDULA
5	DM05	FUGOSO
6	DM06	N, REYES - SEVERINO
7	DM07	JOSEFINA - LEPANTO
8	DM08	ECONOMIA
9	DM09	MARGAL
10	DM10	VISAYAS
11	DM11	PADRE FAURA
12	DM12	REMEDIOS
13	DM13	ONYX
14	DM14	VITO CRUZ
15	DM15-A	BUENDIA OUTFALL-RIGHT
16	DM15-B	BUENDIA OUTFALL-LEFT
17	DM16	LIBERTAD OUTFALL
18	DM17-A	EDSA OUTFALL-LEFT
19	DM17-B	EDSA OUTFALL-RIGHT
20	DM18	MAKATI HEAD RACE-I
21	DM19	MAKATI HEAD RACE-II
22	DM20	ESTRADA
23	DM21	ZOBEL ORBIT
24	DM22-A	FARADAY - RIGHT
25	DM22-B	FARADAY - LEFT
26	DM23	ZOBEL ROXAS
27	DM24	EDSA LUMBANG
28	DM25	ZARAGOSA SUBMAIN
29	DM26	PAMPANGA-EARNSHAW
30	DM27	BUENDIA
31	DM28	SOUTH ANTIPOLO
32	DM29	TAYUMAN
33	DM30	LEPANTO - GOV. FORBES
34	DM32	G. PERFECTO
35	DM33	PASONG TAMO

Table 4.1 DRAINAGE CHANNEL PROFILE (1 OF 35)
DRAINAGE MAINS

MO1-A BL	1					1 ·····	r: 1			CIEVATION :			
MANHOLE CODE NO.		MEAS.	RED CHANNE	L DIMENSI BOTTON	ONS, m DEPTH/	DISTANCE BETWEEN	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE	TOP OF	ELEVATION, WATER	SAND/ SILT	INVERT	DEPOSITI
	:	ceus	HIGEW GOT	WIGH	DIA	(m)	DISTANCE (III)	LEVEL	CHANNEL LEVEL	SURFACE LEVEL	DEPOSITION LEYEL	ELEVATION OUTLET	DEPTH
111582235	ΪN	1	2.62	2.62	2.58	111.51		12.59	10.52	10.52	8.35	7.94	· · · · · · o
111582300	OUT		2.10	2.10	2.58		111.51	12.63	10.56	10.56	8.30	7.98	0
111582299	IN OUT		2.10 1.80	2.10 1.80	2.58	213.62	111.51 325.13	12.88	10.56	10.56	8.30	7.98	
********	IN	1	1.80	1.80	2.28		325.13	13.35 13.35	10.33	10.33		8.05 8.05	0
111582215	OUT	1	1.35	1.35	2.00		502.80	13.38	10.83	10.88	10.88	8.89	0. 2.
	IN	1	1.35	1.35	2.00	204.06	502.80	13.38	10.68	10.88	10.88	8.88	
111582299	OUT	1	1.70	1.70	2.63		706.86	13.40	10.68	10.88	8.53	8.25	0
II1582297	IN		1.70	1.70	2.63	157.26	706.86	13.40	10.88	10.89	8.53	8.25	0
111304497	in i		1.72	1.72	2.12	107.47	864.12 861.12	13.14	10.89	10.89	9.14	8.77	0
111582216	οντ	i	1.20	1.20	2.40		971.59	12.83	10.89	10.69 10.48	9.14	8.77 8.08	O.
	ÎN	1	1.20	1.20	2.40	155.24	971.59	12.83	10.43	10.48	10.43	8.08	
111502002	ουт	i	2.03	2.03	5.00		1126.83	12.70	10.19	10.19	9.43	8.19	î
	IN	1	2.03	2.03	2.00	159.61	1126.83	12,70	10.19	10.19	9.43	8.19	1.
H15C2007	ou	1	2.00	2.00	2.50		1286.44	12.93	11.06	11.06	10.08	8.56	1.
II15C2009	IN OUT		2.00 1.65	2.00	2.50	107.85	1286.44 1394.29	12.93	11.06	11.06	10.08	8.56	1.
	in	··-i	1.65	1.85	2.54	715.55	1391.29	13.16	11.11	11.11	9.04	8.61 8.61	0.
H15C3371	OUT	i	2.15	2.15	2.03		2109.84	13.21	11.45	11.45	10.23	9.42	0.0
	IN	i	2.15	2.15	2.08	171.45	2109.84	13.21	11.50	11.50	10.23	9.42	0.
U15C3372	OUT	1	2.15	2.15	1.71	111111111111111111111111111111111111111	2281.29	13.42	11.73	11.73	11.73	10.02	1.
II15C3373	IN	!	2.15	2.15	1.77	65.39	2281.29	13,42	11.79	11.79	11.73	10.02	1.
111503373	IN		1.70	1.70	2.40	~~ >>	2346.68	13.27	12.17	12.17	11.85	9.77	2.0
II15C3374	out		1.80	1.80	2.16	96.33	2345.68 2443.01	13.27	12.17	12.17	11.85 12.04	9.77	2.0
	IN		1.80	1.80	2.16	164.76	2413.01	13.66	12.20	12.20	12.01	10.04	<u>2.0</u>
1115C3375	ουτ	1	1.40	1.40	2.25		2607.77	14.86	12.39	12.10	11.71	10.14	
	IN.	1	1.40	1.40	2.25	65.16	2607.77	14.65	12.39	12.10	11.71	10.14	1.5
115C3376	ou]	1	1.75	1.75	1.57		2672.93	15.11	11.93	11.93	11.93	10.36	1.5
15.0 14.0 14.0 13.0 12.0 11.0 10.0 9.0		X				× × × × × × × × × × × × × × × × × × ×						Top of Marko Water Surface Invest	
7.0	1	- ·	50		omekon u ek	1000	150	00	2000	- • •	2500	— Deposition Top of channe	3000

Table 4.1 DRAINAGE CHANNEL PROFILE (2 OF 35)
DRAINAGE MAINS

		MEASI	URED CHANNE	L DIMENSE	ONS m	OFTENER	· · · · · · · · · · · · · · · · · · ·			ELEVATION,	m		I
MANHOLE CODE NO.		NO, OF CELLS	TOP WIDTH	воттом WIÐTH	DEFIH!	DISTANCE BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEYEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITIO DEPTH
111582315	IN	i	2.62	2.62	2.58	111.51		17.59	19.52	10.52	8.35	7.91	0.4
111582316	ОЛ	1	2.10	2.10	₹.58		111.51	12.89	10.56	10.56	8.30	7.93	0.3
	ŧΝ	1	2.10	2.10	2.58	213.62	111.51	17.88	10.56	10.56	8.30	7.98	0.3
111582317	CUT		1.80	1.60	2.28		325.13	13.35	10.33	10.33	8 23	8,05	0.1
111582318	IN ON		1.80	1.B0 2.80	2.28	177.67	325.13	13.35	10.33	10.33	8.23	8.05	0.1
	iŇ		2.80	2.80	2.00	201.06	502.80 502.80	13.38 13.38	10.88 10.88	10,83	10.88	8.89 8.88	5.0
111582319	ćά	ī	1.70	1.70	2.63		705,85	13.40	19.88	10.88	8.53	8.25	0.2
	IN		1.70	1.70	2.63	157.26	706.86	13.40	10.83	10.88	B.53	8.25	0.7
IIISB2320	CUT	1	2.50	2.50	2.12		854.12	13.14	10.89	10.89	9.14	8.77	0.3
U1582321	IN		2.50	2.50	2.12	107.47	864.12	13.14	10.89	10.89	9.14	8.77	0.3
111302321	ĮN		3.00	3.00	2.40 2.40	155.24	971.59 971.59	12.83	10.48	10.48	10.43	8.08	2.3
1115C2223	OUT	<u>î</u>	2.03	2.03	2.60	155.29	1126.83	12.83	10.48	10.48	10,43 9,43	8.08 8.19	2.3
	IN	1	2.03	2.03	2.60	159.61	1126.83	12.70	10.19	10.19	9.43	8.19	1.2
111502224	our	1	2.00	2.00	2.50		1286.41	12.93	11.06	11.06	10.08	8.56	1.5
	IN	1	2.00	2.00	2.50	167.85	1286.41	12.93	11.06	11.06	10,08	8.56	1.5
111502225	out	1	1.85	1.85	2.50		1391.29	13.16	31.11	11.11	9.04	8,61	0,4
II15C3496	CUT		1.85 2.15	1.85	2.54	715.55	1394.29	13.16	11.15	11.15	9.01	8,61	0.4
111.5.3139	IN		2.15	2.15	2.03 2.08	171.45	2109.81 2109.81	13.21	11.45	11.45	10.23	9.42	0.8
T15C3487	OUT	1	2.15	2.15	1.71	171.35	2281.29	13.21	11.50	11.50	10.23 11.73	9,42	0.8
	IN	1	2.15	2.15	1.77	65.39	2281.29	13.42	11.79	11.79	11.73	10.02	1.7
115C3488	ουτ	1	1.70	1.70	2.40		2316.68	13.27	12.17	12.17	11.85	9.77	2.0
·	IN	1	1.70	1.70	2.40	95.33	2315.68	13.27	12.17	12.17	11.85	9.77	2.0
H15C3489	OUT	1	1.80	1.80	2.16		2443.61	13.66	12.20	12.20	12.04	10.04	2,0
II15C3490	IN OUT		1.80	1.80	2.16	154.76	2413.01	13,66	12.20	12.20	12.04	10.04	2.0
	IN		1.40	1.40	2.25 2.25	65.16	2607.77 2607.77	14.86 14.86	12.39	12.10	11.71	10.14	1.5
115€ 3491	ουτ	1	1.75	1.75	1.57		2672.93	15.11	11.93	11.93	11.71	10.14 10.36	1.5
16 15 14									AN AMAG SALAH SALAH		and the second		
%40) E 12	-	and the second			,	The state of the state of the	and the second					>	
ELEVATION,	+						× ×					_	
9	.0			~\	×	×′	×					Top of Manhole Water Surface	1
8.	۰ 🕇	· X ·	<u></u>	×		\		_				Invert Deposition Top of channel	
7.	o			,		1000		•	2000	· · · · · · · · · · · · · · · · · · ·	2500	TOP CT CHAIRD	3000

Table 4.1 DRAINAGE CHANNEL PROFILE (3 OF 35)
DRAINAGE MAINS

	1:	MEAS	URED CHANNE	DIMENS	TONS		*	· · · · · · · · ·		ELEVATION,	m		···
MANHOLE CODE NO.		NO. OF	тор улотн	BOTTON	DEFIH!	DISTANCE BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVIL	TOP OF CHANNEL LEYEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEP)
II1582016	ĪN		2 20	₹ 20	1.50	101.39		11.55	10.54				ļ
111582015	our	2	2.60	2.00	1.46		101.39	11.63	10.54 10.24	10.51	9.01	9.04	
	IN	2	2.00	2.00	1.46	45.06	the second of the second	11.63	10 24	10.24	9.58 9.58	8.78 8.78	
111582014	CUT	2	5.00	2.00	1.14		147.45	11.83	10.27	10.27	9.77	9.13	
	IN		\$.00	2.00	1.09	92.29	147.45	11.83	10.22	10.72	9.77	9.13	
111582013	OUT		2.00	2.00	1,45		239.74	11.86	10.81	10.71	9.85	9.36	
111582012	NO.	ļ	2.60	2.00	1.45	213,40	dane and area	11.85	10.81	10.71	9.85	9.35	
	ÎN	;	2.00	2.00	1.48	21.23	453.14 453.14	12.10	11.07	10.92	9.95	9.59	
111582011	OUT	2	1.96	1.96	1.53	21.23	474.37	12.10 12.28	11.07	10.92	9.95	9.59	
	IN	2	1.96	1.96	1.53	187.59	474.37	12.28	1L17	11.10	10.38	9.61	
111582010	our	2	2.00	2.00	1.49		661.95	11.93	11.31	10.99	10.38	9.64 9.83	
	IN	2	2.00	2.00	1.49	78.64	661.95	11.93	11.32	10.99	10.13	9.83	
111552009	OVT.	?	1.50	1.50	1 27		749.59	12.14	11.24	10.71	10.29	9.97	
H1582008	134	} ²	1.50	1.50	1.27	110,72	740.59	12.14	11 24	10.71	10.29	9.97	
111202000	OUT IN		1.50	1.50 1.50	1.47		651.31	12.15	11.57	10.86	10.63	10.10	
111582007	ουт	5	1.50	1.50	1.45	85,89	851.31	12.16	11.55	10.86	10.63	10.10	
	IN		1.97	1.97	1.28	30.38	937.20 937.20	12.17	11.52	10.93	10.72	10.15	
111582006	our	1	2.00	2.00	1.23		967.58	12.17	11.57	10.93	10.72	10.29	
· • • • • • • • • • • • • • • • • • • •	ΙN	i	2.00	2.00	1.23	52.64	967.58	12.19	11.59	10.97	10.93	10.36	
111582005	ου	i	2.00	2,00	1.25		1020.22	12.21	11.61	11.10	11.03	10.36	
	IN		2.00	₹.00	1.22	44.37	1020.22	12.21	11.58	11.10	11.03	10.36	
H1582004	out		2.00	2.00	1.39		1064.59	12.14	11.58	10.99	11.03	10.19	
111582003	IN OUT		2.00	2.00	1.43	59.77	1064.59	12.14	11.67	10.59	11.03	10.19	
111.02(00)	İN		2.00	2.00	1.00	***	1174.36	12.22	11.47	11.09	11.11	10.47	
ff1582002	άντ			2.00	1.15	164.86	1124.36 1289.22	12.22	11.62	11.09	11.51	10,47	
	ĪN	1			1.02	65.01	1289.22	12.85	11.85	11.29	11.23	10.83	
111582001	out	i			1.02		1355.23	12.65	12.02	11.43	11.23	10.83	
14.0				·····	• • • • • • • • • • • • • • • • • • • •			. •			· · · · · · · · · · · · · · · · · · ·		
(HMM40))	الميتنيين والمعارض والمدارة	January Commen	ه مه ومده میدید در برخمی از	and the second second second second	Section Control of the Control of th	Sanda of Polices of	agenter y excession or consequence.					
10'0 E.EVATION, 11'0	+	<u></u>	×1	<u> </u>		1	-x-	X	XX	;A=X-X			-
9.0 8.0		Š										Top of Manhole Water Surface Invert Deposition Top of Channel	
5.0	0		500		400		600	800	**	1000	1200	······································	 1400

Table 4.1 DRAINAGE CHANNEL PROFILE (4 OF 35) DRAINAGE MAINS

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DM04 LAKANDULA	ANDU	5								1					
	,	MPAS	MEAST CHANNEL	1	DIMENSIONS m	Į.	·	1 			ELEVATION, m	ε			
μ (120) Σ	0 U	}				BETWEEN TO		UMULATIVE	10 aOF	u d d C L	WATER	SAND/S		INVERT	DEPOSITION
CODE NO.	<+ 0 Z	8.8 2.8 2.3	HTOIW YOT	MOTTOM MIDTH	DEPTH / DIA.	MANHOLES (m)		DISTANCE (m)	MANHOLE LEVEL	CHANNEL	SURFACE LEVEL	DEPOSITION LEVEL		ELEVATION OUTLET/INLET	DEPTH
II15A4099	Z		3.84	3.84	341 2.62		214.40		12.52	11.50	10.77		10.52	3.88	1.64
II15A4028	5	1						214,40	13.19	11.24	11,24		11.09	9.23	1.86
	Z	•-		4.20			462.92	214.40	13.19	11.29	11.29		11.09	9.28	1.81
II15A4045	5				1.07	1.		677.32		10.95	10.95		10.52	9.88	0.64
	Z				1.07		131.30	677.32	12.72	11.41	11.41		10.52	10.34	0.18
II15A4044	5	1			1.07	12		808,621	12.61	11.40	11.30		10.51	10.33	0.18
ЕГЕЛАТІОИ, т. (DPWH)	0.0111100 0.001000000000000000000000000				A Transaction of the Control of the	(Prophysical Control of Control o				Contract of Contra		The state of the s	Top of Man Invert X—Deposition Top of Cha	Top of Manhole ———— Water Surface ———————————————————————————————————	
		0 80	100	150	200 25	250	300	350 400 DIST	450 ANCE, m	500 550	909	650 700	220	800	850

Table 4.1 DRAINAGE CHANNEL PROFILE (5 OF 35)
DRAINAGE MAINS

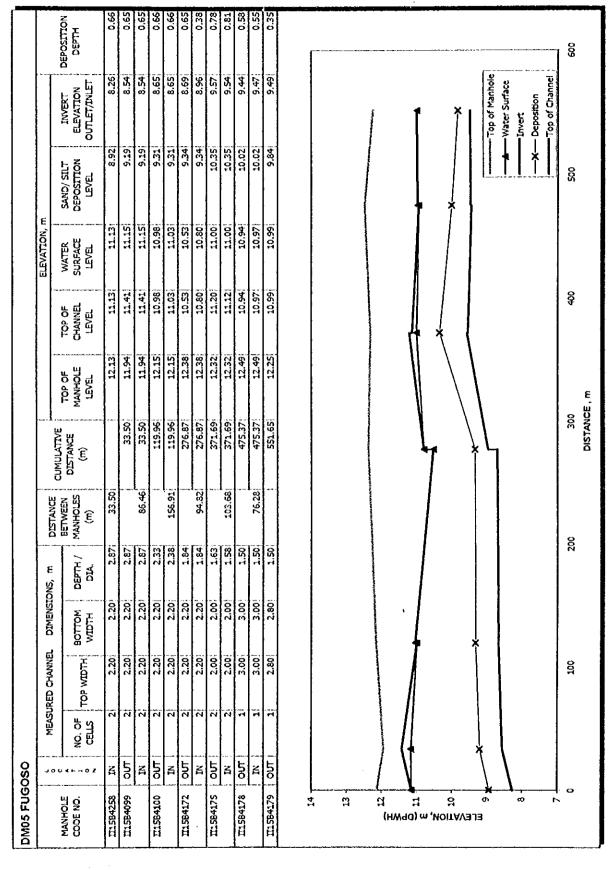


Table 4.1 DRAINAGE CHANNEL PROFILE (6 OF 35)
DRAINAGE MAINS

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December December											ELEVATION, m	E		
1	MANHOLE		MEA	SURED CHANNEL	DIMEN	NS, 3	DISTANCE	CUMULATIVE	10 P.OF	TOP OF	WATER	SAND/ SILT	INVERT	DEPOSITION
1	CODE NO.	r - c ₹	No. of CELLS		MOTTOM MTGIW	DEPTH / DIA.	MANHOLES (m)	DISTANCE (m)	MANHOLE LEVEL	CHANNEL	SURFACE LEVEL	DEPOSITION LEVEL	ELEVATION OUTLET/INLET	EPTH THE
OUT 1 320 150 320 120 320 928 OUT 1 320 320 150 3300 3300 3220 120 928 OUT 1 320 320 150 130 1226 10.88 10.88 10.89 9.28 9.28 OUT 1 320 120 150 149.75 20.54 12.28 10.88 10.55 9.28 9.28 9.28 OUT 1 320 320 1.60 1.60 20.54 12.48 10.65 9.28 9.28 OUT 1 320 3.60 1.60 32.23 1.2.46 10.64 9.28 9.28 DV 1 3.20 3.60 3.60 3.20 1.2.44 10.73 10.64 9.71 DV 1 3.20 3.60 3.60 3.60 1.2.44 10.73 10.64 9.71 DVT 1 3.20	115C4157	Z			3.10	8.7	23.27		12.05	10,45	10.45	9.17		0,32
1	II15C4029	50			3.20	1,60		23.27	12.18	10,88	10.88	9.30		0,02
Olymatic 1 3.20 3.20 1.60 49.25 1.228 10.089 9.28 9.28 9.28 Olymatic 1 3.20 1.60 1.49,25 56.29 1.228 10.08 9.08 9.28 Olymatic 1 3.20 1.60 1.60 265.29 1.245 10.64 10.64 9.04 9.04 Olymatic 1 3.20 1.60 3.07 1.60 3.05 1.228 10.072 9.04 9.04 Olymatic 1 3.20 1.60 3.07 1.06 9.04 9.04 Olymatic 1 3.20 1.60 3.05 1.223 1.234 1.064 9.04 9.04 Olymatic 1 3.20 1.60 3.00 1.223 1.234 1.04 9.04 9.04 Olymatic 1 3.20 1.60 3.03 3.20 1.10 9.04 9.04 9.04 N 1 3.20 <t< td=""><td></td><td>Z</td><td></td><td></td><td>3.20</td><td>1.60</td><td>33.02:</td><td></td><td>12.18</td><td>10.88</td><td>10.88:</td><td>9.30</td><td></td><td>0.02</td></t<>		Z			3.20	1.60	33.02:		12.18	10.88	10.88:	9.30		0.02
Nat	II15C4030	50			3.20	1.60			12.28	10.83	10.85	9.28		
Our 11 3.201 3.201 1.601 116.77 205.541 12.461 10.651 10.721 9-481 9.125 Our 11 3.201 1.601 116.77 205.541 12.041 10.641 9.041 9.041 9.041 Our 11 3.201 1.601 327.511 12.041 10.641 9.041 9.041 Our 11 3.201 1.601 3.201 1.2001 12.211 11.211 10.641 9.041 9.041 Our 11 3.201 1.601 3.201 12.001 12.211 11.214 10.731 10.041 9.041 Our 11 3.201 1.601 3.201 12.0561 11.244 10.771 10.046 10.141 Our 11 3.201 3.201 12.0561 11.274 10.751 10.046 10.141 Our 11 3.201 3.201 12.0561 11.777 10.251 10.041 9.041		Z			3.20	1.68			12.28	10.88	10.85	9.28		
Nat	II15C4026	50			3.20	1.60		2	12.45	10.85	10.72	9,48		
Our 11 3.201 3.601 3.2031 12.044 10.644 9.044 9.044 IN 31 3.201 3.601 3.6031 3.2031 12.044 10.644 3.044 9.044 OUT 11 3.201 3.601 3.6031 12.221 13.31 10.641 3.044 9.73 OUT 11 3.201 3.601 3.500 1.601 9.451 2.221 13.744 3.0731 10.641 9.731 OUT 11 3.201 3.601 4.50 6.23.081 2.2006 13.774 3.0731 10.641 9.731 OUT 1 2.661 1.777 6.23.081 12.066 13.778 3.031 10.501 10.141 0 1 2.661 1.777 2.665 1.778 3.051 10.051 10.051 10.051 0 2 2 2 3 3 4 4 4 4 4 4 4 <th< td=""><td></td><td>Z</td><td></td><td></td><td>3.20</td><td>1.60</td><td></td><td></td><td>12.45</td><td>10.85</td><td>10.72</td><td>9.48</td><td></td><td>0,23</td></th<>		Z			3.20	1.60			12.45	10.85	10.72	9.48		0,23
Nat	X15C4027	50			3.20	1.60			12.04	10.64	10.64	9.04		
OUT 1 3.20 3.20 1.66 890,001 12.21 11.31 10.64 9.71 DN 1 3.20 3.50 1.60 9.43 52.308 12.06 11.74 10.72 10.64 9.71 DN 1 3.20 3.20 1.60 9.43 623.08 12.06 11.74 10.72 10.66 10.14 DN 1 3.20 3.20 1.60 9.43 623.08 12.06 11.78 10.61 10.65 10.14 OUT 1 2.65 2.65 1.77 632.51 12.06 11.78 10.81 10.65 10.04 OUT 1 3.20 3.20 3.20 3.20 4.60 4.60 4.60 4.60 4.60 OUT 1 3.20 3.20 3.20 3.20 4.00 4.60 5.0 6.00 OUT 1 3.20 3.20 3.20 3.20 4.00 4.60 5.0 6.00 OUT 1 3.20 3.20 3.20 3.20 4.00 4.50 5.00 6.00 OUT 1 3.20 3.20 3.20 3.20 4.00 4.50 5.50 6.00 6.00 OUT 1 3.20 3.20 3.20 3.20 4.00 4.50 5.50 6.00 6.00 OUT 1 3.20 3.20 3.20 3.20 4.00 4.50 5.50 6.00 6.00 OUT 1 3.20 3.20 3.20 3.20 4.00 4.50 5.50 6.00 6.00 OUT 1 3.20 3.20 3.20 3.20 4.00 4.50 5.50 6.00 6.00 OUT 1 3.20 3.20 3.20 3.20 4.00 4.50 5.50 6.00 6.00 OUT 1 3.20 3.20 3.20 3.20 4.50 5.50 6.00 6.00 OUT 1 3.20 3.20 3.20 3.20 6.00 6.00 OUT 1 3.20 3.20 3.20 3.20 4.00 4.50 5.50 6.00 6.00 OUT 1 3.20 3.20 3.20 3.20 4.00 4.50 5.50 6.00 6.00 OUT 1 3.20 3.20 3.20 3.20 4.00 4.50 5.50 6.00 6.00 OUT 1 3.20 3.20 3.20 3.20 6.00 6.00 OUT 1 3.20		z			3.20	1.66			12.04	10.64	10.64	9.04		
National Property 1, 2, 201 1, 2, 10	T15C4021	50			3.20	1.60			12.21	11.31	10.81	10.04		
OUT 1 3.20 3.20 1.66 1.206 11.74 10.73 10.46 10.14 10.17 10.14		Z			3.20:	1.60			12.21	11.31	10.81;	10.04		
1 3,20 3,20 1,60 9,43 623,58 12,06 11,78 10,73 10,46 10,24	T15C4019	50			3,20	1.68			12.06	11.74	10.73	10.46		
OUT 1, 2.65 1,77 632.51 12.06; 11,78 10.61 10.50; 10.01		ጸ			3,201	1.60			12.06	11.74	10.73	10.46		
Color Colo	T15C4018	i		2	2.65	1.77		632.51	12.06	11,78	10.81	10.50		0,49
Top of Channel 0 50 100 150 200 250 300 350 400 450 500 550 600 DISTANCE, m												And and a second	Top of Manhole - Water Surface - Invert - Deposition	11 13/
DISTANCE, m	7.(S		155	200			350	904		<u>!]</u>		
		•							NCE, m					

Table 4.1 DRAINAGE CHANNEL PROFILE (7 OF 35)
DRAINAGE MAINS

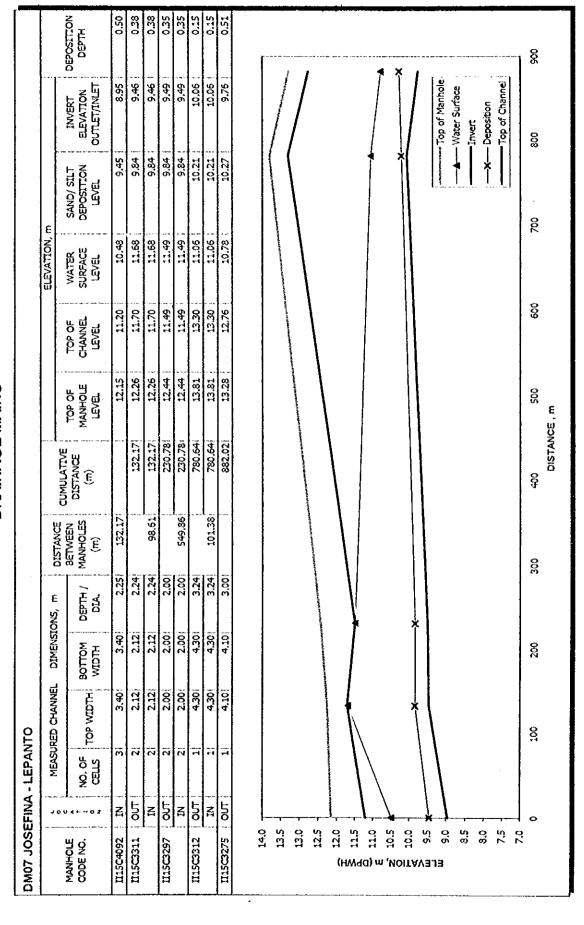


Table 4.1 DRAINAGE CHANNEL PROFILE (8 OF 35)
DRAINAGE MAINS

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Machael Channel Diffusions, m. Machael Channel Diffusions Machael Ch				-					ELEVATION, m				
N	MANHOLE CODE NO.	J0045-02	8 ≥	e Èa	មួន៥	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL		DEPOSITION DEPTH	SLOPE (%)
Our 31 2.46 2.46 2.75 1.59.68 11.72 9.82 9.33 0.49 IN 31 2.46 2.75 66.70 1.59.68 11.28 11.72 9.82 9.33 0.49 IN 31 2.30 2.20 2.70 372.44 2.86.38 12.87 12.25 11.65 10.25 9.55 0.70 Our 11 1.40 1.40 2.70 372.44 2.86.38 12.87 12.25 11.65 10.25 9.55 0.70 Our 11 1.40 2.70 2.70 372.44 2.86.38 12.87 12.25 11.65 10.25 9.55 0.70 Our 11 1.33 1.33 2.20 14.14 9.48.52 12.87 12.31 11.39 10.61 9.61 1.00 Our 11 1.33 1.33 2.20 14.14 9.48.52 12.87 12.34 11.39 10.61 9.61 1.00 Our 11 1.33 1.33 2.20 14.14 9.48.52 12.87 12.34 11.39 10.61 9.61 1.00 Our 11 1.33 1.33 2.20 4.45 2.25 12.27 12.31 11.39 10.61 9.61 1.00 Our 11 1.33 1.33 2.20 4.45 2.25 12.27 12.34 11.29 10.61 9.61 1.00 Our 11 1.33 1.33 2.20 2.00 2.00 6.50 700 Our 11 1.33 1.33 2.30 2.00 2.00 6.50 700 Our 12 13 13 13 13 13 13 13		Z		2.25	159.68	00.0	12.15	11.20	10.48	9,45		02.0	-0.238%
National Property 12,246 2,446 2,751 66.70 155,681 12,251 12,681 11,751 9,822 9,535 0,701 National Property 1,401 1,40	1	50			J	159.681	12.38	12.08	11.72	9.82		0.49	; ;
10 21 230 230 230 230 235 236 236 236 235 1255 1165 1025 955 0.70 10 11 1.40 2.70 322.4 226.38 12.55 12.23 11.65 10.64 961 1.00 10 1.40 2.70 2.70 24.2 26.38 12.57 12.31 11.39 10.64 961 1.00 10 1.40 2.70 2.70 2.70 24.2 25.2 12.57 12.31 11.39 10.65 961 1.00 10 1.53 1.53 2.20 2.70 2.25 2.25 12.56 12.34 11.25 10.62 9.61 1.00 10 1.53 2.20	J,	Z			66.70	159.68	12.38;	12.08	11.72	9.82			-0.330%
N	1	150			L	226.381	12.55	12.25	11.65	10.25			
Out 11 1.40 1.50 2.70 5-86.22 12.57 12.31 11.39 10.61 9.61 1.00 TN 11 1.40 2.70 2.70 141.4 5-86.52 12.57 12.31 11.39 10.62 9.61 1.00 Out 11 1.40 2.70 141.4 5-86.52 12.57 11.31 11.30 10.62 10.64 0.48 August		z			322.14	226.38	12.55	12.25	11.65	10.25			-0.019%
1N 1; 1.40 1.40; 2.70; 141.4; 548.52; 12.57; 12.31; 11.39; 10.61; 9.61; 1.00;		750			ł	548.52	12.57	12.31	11.39	10.61			
3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	I	Z		2.70		548.52	12.57	12.31	11.39	10.61		1.00	-0.376%
13.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	-	5		2.20	۱	689.66	12.56	12,34	11.29	10.62		0.48	
0 50 100 150 200 250 300 350 400 450 500 550 600 650 DISTANCE. m				A property of the control of the con	A Disconnection of the second	The state of the s	A Annual control of the control of t				Manh Invert Mater Surfac Invert Mater Surfac Invert Mater Surfac		
			150	200	250				200			200	

Table 4.1 DRAINAGE CHANNEL PROFILE (9 OF 35)
DRAINAGE MAINS

SAND/ SILT INVERT DEPOSITION DEPOSITION OUTLET/INLET 9.52 8.95 9.60 8.98 9.60 8.98 10.61 9.00 10.61 9.00 10.68 9.02 10.68 9.02	DM09 MARGAL	GAL											
10		,	MEASURED CHANNE			אַנוּעאַיניע	[ELEVATION, m	Ę		
N	MANHOLE CODE NO.	00<++01	NO. OF TOP WIDTH	8≥	DEPTH / DIA.	BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION DEPTH
OUT 11 2.801 2.481 31.731 12.10 11.46 11.20 9.60 8.58 DV 11 2.801 2.481 79.57 11.31.31 12.29 11.44 11.20 9.60 8.58 OUT 11 2.801 2.801 2.401 38.44 111.301 12.28 11.42 10.74 10.61 9.00 OUT 11 2.801 2.401 38.44 111.301 12.28 11.42 10.74 10.61 9.02 OUT 11 2.801 2.401 38.44 111.30 12.28 11.42 10.74 10.61 9.02 OUT 11 2.801 2.401 38.44 12.28 11.42 10.74 10.68 9.02 A 11 2.801 2.401 38.44 12.28 11.42 10.74 10.68 9.02 A 12 40 40 40 80 100 40 40 40 40	II15C3098	z		2.80			00:00	11.97	11.32	11.22	9.52	8.95	0.57
National Court 11	II15C3099	50					31.73	12.10	11.46	11.20	09'6	8.98	0.62
OUT 1; 2.80; 2.80; 2.40; 111.30; 12.29 11.40; 10.74 10.65; 9.00 OUT 1; 2.80; 2.80; 2.40; 11.30; 12.29 11.40; 10.74 10.65; 9.00 OUT 1; 2.80; 2.80; 2.40; 10.28 11.40; 10.74 10.68 9.02 OUT 1; 2.80; 2.80; 2.40; 10.28 11.40; 10.74 10.68 9.02 OUT 1; 2.80; 2.80; 2.40; 10.28 11.40; 10.74 10.68 9.02 OUT 1; 2.80; 2.80; 2.40; 10.74 10.74 10.74 10.78 OUT 1; 2.80; 2.80; 2.40; 10.74 10.74 10.74 10.78 OUT 1; 2.80; 2.80; 2.40; 10.74 10.74 10.74 10.78 OUT 1; 2.80; 2.80; 2.40; 10.74 10.74 10.74 10.78 OUT 1; 2.80; 2.80; 2.40; 10.74 10.74 10.74 10.78 OUT 1; 2.80; 2.80; 2.40; 10.74 10.74 10.74 10.74 OUT 1; 2.80; 2.40; 2.40; 10.74 10.74 10.74 10.74 OUT 1; 2.80; 2.40; 2.40; 2.40; 2.40; 2.40 OUT 1; 2.80; 2.40; 2.40; 2.40; 2.40 OUT 1: 2.80; 2.40; 2.40; 2.40; 2.40; 2.40 OUT 1: 2.80; 2.40;		Z					31.73	12.10	11.46	11.20	09'6	8.98	0.62
N	II15C3100	5					111.30		11.40	10.74	10.01	00.6	1,61
OUT 11 2.80 2.40 149.74 12.28 11.42 10.74 10.68 9.02		몶					111.30		11.40	10.74	19.01	9.00	1.61
20 40 60 120 DISTANCE.IN	H15C3101	5	1	2.80			149.74		11.42	10.74	10.68	9.02	1.66
0 20 40 60 80 100 120 DISTANCE.m	ਜ ਜ ਜ		et us representation de la constitución de la const	A Company of the Comp		Lo-cyclobaccomercu (constitution and constitution and con	(E) The Action of the Property	R-Other-Andrews (Approximated Name Co.			The state of the s	Top of Manho Invert Deposition Top of Manho The African	De la constitución de la constit
	`		. 20		5	δ		SO	001		120	91	أذ

Table 4.1 DRAINAGE CHANNEL PROFILE (10 OF 35)
DRAINAGE MAINS

DISTANCE CUMULATIVE TOP OF TOP OF											ELEVATION, B				
1		ں ہ د	MEASUR	RED CHANNEL	DIMENSIC	ε		CUMULATIVE	00 00	90 901	MATEO	CAND/ CH #	1	DEPOSITION	
18 2 2.00	MANHOLE CODE NO.				воттом млетн	~		DISTANCE (m)	MANHOLE	CHANNEL	SURFACE			ОЕРТН	SLOPE (%)
OUT 21 2000 2001 2400 12.82 11.58 11.58 11.58 10.03 9.58 0.65 NN 2. 2.000 2.000 2.000 2.000 2.000 2.000 3.001 9.81 9.81 0.67 NN 2. 2.000 2.000 2.000 2.000 2.000 2.000 3.001 9.81 9.81 0.27 NN 2. 2.000 <t< td=""><td>III11A4193</td><td>- }</td><td>7</td><td>2.00</td><td>2.00</td><td>2.001</td><td>84.00</td><td></td><td>12,80!</td><td>11,60</td><td>11.60:</td><td>10,40</td><td></td><td>08.0</td><td>0.024%</td></t<>	III11A4193	- }	7	2.00	2.00	2.001	84.00		12,80!	11,60	11.60:	10,40		08.0	0.024%
Nat	TT11A4044	1-	2	2.8	2.8	2.00		84.00	12.82	11.58	11.58	10.03		0,45	
Outril 2 2,00 2,00 2,00 1,00		.J	2	2.80	2.00	2.00	81.16	84.00	12.82	11.58	11.58	10.03		0.45	-0.283%
No. 2 2.001 2.001 2.001 2.003 2.003 2.004 2.005 2.004 2.005 2.	TT11A4051	1	2	2.00	2,8	2.00;	- ^	165.16	12.61:	11.81	11,61	186'6		0.17	- 1
Outr 2 2.001 2.001 2.001 2.001 2.001 2.001 2.002 2.003 2.003 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.003 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 2.004 2.003 0.0		L.,,	2	2.00	2.00	2,00	76.30	165,16	12,61	11.81	11.61	86'6		0.17	
Nat	TT11A40S6	1	24	2.00!	2.00	2.00		241.46	12.72:	11.72	11.57	10.42		0.70	ļ
Cut 2 2.00		· t · ~	7	2,00	2.00	2,00	73.33	241,46	12.72	11.72	11.57	10.42		0.70	
Nat 2 2,00 2,00 32,40 12,55 12,57 12,57 12,57 12,57 11,29 12,655 0,54 Out 2 1,70 1,70 1,70 1,56 297,59 13,57 12,47 11,19 1,105 0,54 Out 2 1,70 1,70 1,70 2,56 473,38 13,77 12,47 11,12 10,77 0,35 Out 2 1,70 1,70 1,70 2,56 473,38 13,77 12,47 11,10 1,10 0,43 Out 2 1,70 1,70 2,70 1,70 2,66 2,66 2,70 1,70 1,70 2,66 2,70 1,70	III11A4063	ğ	2	2:00	2.00	2:00		314,791	12.95	12.05	11.50	10.40		0.35	
National Procession National Procession		z	7	2.001	2.00	2.00	82.90	314,79	12.95	12.05	11.50	10.40		0.35	-0.724%
Dr 2 170 170 176 75.69 357.60 13.55 11.75 11.10 10.65 0.54 OuT 2 1.70 1.70 1.70 1.70 35.61 13.27 12.47 11.47 11.12 10.77 0.35 DuT 2 1.70 1.70 1.70 2.83 1.35 1.239 1.245 11.49 11.10 10.65 0.40 OuT 2 1.70 1.70 1.70 2.83 2.83 1.35 1.245 11.49 11.10 10.65 0.40 OuT 2 1.70 1.70 1.70 2.83 2.83 1.35 1.245 11.65 11.65 10.65 0.40 OuT 1 2.90 2.90 1.60 661.80 1.34 12.45 11.65 11.65 11.20 10.65 0.40 Out 2 1.70 1.70 1.70 1.70 1.20 1.245 11.65 11.65 10.65 0.40 Out 2 1.70 1.70 1.70 1.70 1.70 1.70 1.70 1.70 Out 2 1.70 1.70 1.70 1.70 1.70 1.70 Out 2 1.70 1.70 1.70 1.70 1.70 Out 2 1.70 1.70 1.70 1.70 1.70 Out 2 1.70 1.70 1.70 1.70 Out 2 1.70 1.70 1.70 1.70 Out 1.70 1.70 Out 1.70 1.70 1.70 Out 1.70 1.70 O	II11A4068	†	2	1.70!	1.70	1.70		397.69:	13.15	12.35	11.75	11.19		0.54	1
Duty 2 1.70 1.70 1.70 55.61 473.36 13.37 12.47 11.47 11.12 10.77 0.35 Duty 2 1.70 1.7			2	1.70	1.70	1.70	75,69	397.691	13.15	12.35	11.75	11.19		0.54	
No. 1, 1, 1, 1, 2, 30 1, 1, 1, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3,	III11A4074	+	2	1.70	1.70	1.70		473,38	13.37	12,47	11.47	11.12		0.35	
00T 2: 1.70; 1.70; 2.88;99; 13.39; 12.39; 11.49; 11.09; 1.069; 0.40; 0.4		J	22	1.70	1,70	1.70	95.61	473.38	13.37	12,47	11.47	11.12		0.35	
0ut 1; 2,90; 2,50; 1,60; 56,130; 12,39; 12,39; 11,49; 11,09; 1,069; 0,40 Out 1; 2,90; 2,50; 1,60; 66,130; 12,45; 12,45; 11,65; 11,138; 1,085; 0,43 Out 1; 2,90; 2,50; 1,60; 66,130; 12,45; 12,45; 11,65; 11,138; 1,085; 0,43 Out 1; 2,90; 2,50; 1,6	III11A4081	1	2	1,701	1.70	1,70		568,99	13.39	12,391	11.49	11.09		0.40	
00TT 11 2.301 2.451 11.251 11.281 10.855 .0 .0 .0 .0 .0 .0 .0 .0 .0			2	1.70	1.70	1.70	92.81	568.99	13,391	12,391	11,49	11.09			
.0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .	TIT11A4094	1		2.90	2.90	1.60		661.80	13,45	12.45	11.65	11,28			
13.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12		1												["	
13.0 12.0 13.0 13.0 14.0 15.0 15.0 15.0 15.0 16.0 10.0	14	- •												.,,	
13.0 12.0 13.0										egyet işini bir tel eğil Farfestind yazıttığı bir bet i birletikle	PARTIMENTAL CONTRACTOR OF THE PARTY.	・ 日本の日本の日本の日本の日本の日本の日本の日本の日本の日本日本日本日本日本日本	- Property like the special defends by the special spe		
11.0		- 0			THE PARTY AND PROPERTY OF THE PROPERTY AND THE PROPERTY OF THE	Lagar Profession art Declaration to Secure 1888	أالماملين وليفضعها كالبائعام عدوجة لمواو	Profit to Demonstrate regularity of the major of the profit of the profi							
11.0 X X X X X X X X X 10.0 10.0 X Water Surface Invert ———————————————————————————————————							,								
10.0 X									+				•		
10.0								ı	*	\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \		*	X		
10.0 9.0 100 200 300 400 500 600 DISTANCE, m)					>		//			- (ACHER)		o e	
0 100 200 300 400 500 600 Thannel DISTANCE, m		(o		*	*	$\setminus \mid$	{ }		\			<u> </u>	Water Surface Invert	 8	
0 100 200 300 400 500 600 DISTANCE, m		L,								į			X—Deposition		
DISTANCE, m	ň			100		200		300	400		200	9	1	1	
								DISTA	E. BO						

Table 4.1 DRAINAGE CHANNEL PROFILE (11 OF 35)
DRAINAGE MAINS

MANAGE	DM11 PA	DM11 PADRE FAURA	4											
1		ەد	MEAS	URED CHANNEL		Š	DISTANCE	L			ELEVATION,	E		
Direction 1 3477 3477 2770 150.001 12.644 12.244 13.144 10.059 9.944 Direction 1 3.407 3.407 2.30 2.405 12.040 11.254 11.254 11.254 13.274 9.744 Direction 1 3.407 3.300 2.405 12.000 12.000 12.024 11.221 12.045 9.744 Direction 1 3.207 2.207 2.205 2.205 2.205 12.027 12.027 11.277 10.235 9.955 Direction 1 2.207 2.207 2.207 2.207 12.047 12.047 11.207 12.047 12	MANHOLE CODE NO.		NO. OF CELLS	HTOIW GOT	0 -	<u> </u>		CUMULATIVE DISTANCE (m)			WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATIC OUTLET/IN	DEPOSITION DEPTH
Deciding 1	112082156	z							13.49	12.64	11.14	10.09		0.15
National Color 1 3440 3440 250 2500 15000 12501 1122 1122 9/74 9/74 National Color 1 3340 2545 2500 25000 12501 11291 11461 10-55 9.55 National Color 1 2201 2201 2201 2200 1201 1202 11291 11461 10-55 9.55 National Color 1 2201 2201 2201 2201 1201 1201 1201 1201 1202 10-55 National Color 1 2201 2201 2201 1201 1201 1201 1201 1201 10-55 National Color 1 2201 2201 2201 1201 1201 1201 1201 1201 10-55 National Color 1 2201 2201 1201 1201 1201 1201 1201 10-55 National Color 1 2201 2201 1201 1201 1201 1201 1201 1201 10-55 National Color 1 2201 2201 1201 1201 1201 1201 1201 1201 1201 National Color 1 2201 2201 1201 1201 1201 1201 1201 1201 1201 National Color 1 2201 2201 1201 1201 1201 1201 1201 1201 1201 National Color 1 2201 2201 1201 1201 1201 1201 1201 1201 1201 National Color 1 2201 2201 1201 1201 1201 1201 1201 1201 1201 National Color 1 2201 2201 1201 1201 1201 1201 1201 1201 1201 National Color 1 2201 2201 2201 1201 1201 1201 1201 1201 1201 1201 National Color 1 2201 2201 2201 1201 1201 1201 1201 1201 1201 1201 1201 1201 National Color 1 2201 2201 2201 120	112082201	1500								12.04	11.22	9.74		
Ord 11 3301 3201 245; 380,001 1292; 1228; 1148; 10421 9531 12041 9531 9531 12041 9531 9531 12041 9531 9531 12041 9531 9531 12041 9531 9531 9531 12041 9531 9531 9531 12041 9531		Z								12.04	11.22!	9.74		
DN 1 330 330 253 28000 1222 11.79 11.79 10.38 9.95 DNT 1 2.20 2.20 2.00 13.11 11.20 11.79 10.38 9.95 DNT 1 2.20 2.20 2.20 13.06 13.06 12.24 11.79 10.28 9.95 DNT 1 2.20 2.20 2.20 13.06 13.06 13.06 12.24 11.79 10.28 9.95 DNT 1 2.20 2.20 2.20 1.38 9.90 13.06 13.06 13.06 13.06 DNT 1 2.20 2.20 2.20 1.38 9.90 13.06 13.06 13.06 13.06 DNT 1 2.20 2.20 2.20 1.38 9.90 13.06 13.06 13.06 13.06 DNT 1 2.20 2.20 2.20 1.38 9.90 13.06 13.06 13.06 13.06 DNT 1 2.20 2.20 2.20 1.38 9.90 13.06 13.06 13.06 13.06 DNT 1 2.20 2.20 2.20 1.38 9.90 13.06 13.06 13.06 13.06 DNT 1 2.20 2.20 2.20 1.38 9.90 13.06 13.06 13.06 13.06 13.06 13.06 13.06 DNT 1 2.20 2.20 2.20 1.38 9.90 10.06 10.06 DNT 1 2.20 2.20 2.20 1.38 9.90 10.06 10.06 DNT 1 2.20 2.20 2.20 1.30 11.37 10.99 10.99 DNT 1 2.20 2.20 2.20 1.30 11.37 10.99 10.99 DNT 1 2.20 2.20 2.20 1.30 11.37 10.99 10.99 DNT 1 2.20 2.20 2.20 2.20 1.20 1.20 1.20 1.20 1.20 DNT 1 2.20 2.20 2.20 1.20 1.20 1.20 1.20 DNT 1 2.20 2.20 1.20 1.20 1.20 1.20 DNT 1 2.20 2.20 1.20 1.20 1.20 DNT 1 2.20 2.20 1.20 DNT 1 2.20 2.20 2.20 1.20 DNT 1 2.20 2.20 1.20 DNT 1 2.20 2.20 2.20 1.20 DNT 1 2.20 2.20 1.20 DNT 1 2.20 2.20 2.20 DNT 1 2.20 2.20 DNT 1 2.20 2.20 DNT 1 2.20 2.20 2.20 DNT	II2082205									12.28	11.48	10.43		0.60
Our 11 270 270 120 120 120 110		ጸ	_							12.34	11.48	10.43		0.60
National Part 12 2701 2701 2702 2203 22200 13214 11294 11179 10281 10021 National Part 11 2201 2201 2201 2201 1381 1304 1239 11181 10291 10291 National Part 11 2201 2201 2201 1381 108500 12301 12301 11291 10291 10571 National Part 11 2201 2201 2201 1381 108500 12301 12301 11291 10391 10571 National Part 11 2201 2201 2201 1381 108500 12301 12301 11291 10391 10571 National Part 11 2201 2201 2201 1381 108500 12301 11291 10391 10571 National Part 12 2201 2201 2201 1381 108500 12301 11291 10391 10571 National Part 12 2201 2201 2201 2301 12301 11291 10391 10571 National Part 12 2201 2201 2201 2201 2301 2301 2301 2301 National Part 12 2201 2201 2301 2301 2301 2301 2301 National Part 12 2201 2201 2301 2301 2301 2301 National Part 12 2201 2201 2301 2301 2301 2301 2301 National Part 12 2301 2301 2301 2301 2301 2301 2301 2301 2301 2301 2301 National Part 12 2301	112082204	_	-			=				11.92	11.79	10.38		0.4
OUT 11 2.201 2.201 2.201 355.01 662.001 13.661 12.241 12.291 10.281 9.961		l								12.04	11.79	10.38		
National Part 1 2.20 2.20 2.37 335.00 652.00 13.06 11.29 11.59 10.23 9.96	112082203	-	_							12.24	11.69	10.28		
OUT 11 2.20 2.20 1.58 86.00 13.04 12.29 11.58 10.55 10.55 N										12.33	11.69	10.28		
National Parameters 13.201	112082202									12.39	11.58	10.99		
100T 1; 220 220 1230 1230 1230 1305 1005 150	· ·]								12.39	11.58!	10.99		9.0
15	112002230									12.00	11.37	10.95		0.2
0 200 400 600 800 DISTANCE, m		3.5 2.5 2.5 3.0 3.5 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0				* X		Table of the state	The state of the s				X Top of Manhoic Tinvert Deposition Top of Channel	1 1 1 × 1 =============================
DISTANCE, m	_			200		. . 8	8	ŢĢ.	000		800		0001]
								DISTANCE, B						

Table 4.1 DRAINAGE CHANNEL PROFILE (12 OF 35)
DRAINAGE MAINS

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DESTMEND COLUMN DESTMEND DESTMEND COLUMN		-								ELEVATION, m	F		
National Property Nati	MANHOLE CODE NO.	>0∪<⊬→0	ار	8 ≥	ONS, M DEPTH/ DIA	DISTANCE BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION DEPTH
National Property 1, 440 440 220 155.00 151.50	1120/03362	z Z		04.4	3.20			13.37	12.87	12.37	10.87	9.67	1.20
NA	1120C3363	5		4.40	3.20		215.00!		12.75	11.80	96.6	9.55	0.43
Out 11 440 440 2.50 370.00 13.47 12.91 12.42 11.27 10.41		Z		9.4	3.20				12.75	11.80	86.6	9.55	0.43
N	1120C3277	9		04.4	2.50			ļ	12.91	12.42	11.27	10,41	0.36
Duty 1, 4,40 4,40 2.20 450.00 13.44 12.74 11.24 10.54 1.055 1.055		2		4.40	2.50		370,00		12.91	12.42	11.27	10.41	98'0
TN 11 440 446 2256 675.00 13.44 112.80 112.80 112.80 112.80 112.80 10.58	II20C3364	5		4.40	2.20		420.001		12.74	12.74	11.24	10.54	0.70
OUT 11 2.60 2.60 1.33 1095.00 12.53 11.71 11.71 11.93 10.33 OUT 11 2.60 2.60 1.22 12.50 11.66 11.66 10.53 10.33 OUT 11 2.60 1.22 1.355.00 12.50 11.30 11.14 10.53 10.33 A 11 1.12 1.122 1.1255.00 12.50 11.19 11.14 10.53 10.53 A 11 1.12 1.12 1.12 1.13 11.14 10.53 10.53 A 11 1.12 1.12 1.13 1.13 11.14 10.53 10.53 A 12 1.13 <td></td> <td>Z</td> <td> </td> <td>4.4</td> <td>2,26</td> <td></td> <td>420.00</td> <td></td> <td>12.30</td> <td>12.30</td> <td>11.24</td> <td>10.54</td> <td>0.70</td>		Z	 	4.4	2,26		420.00		12.30	12.30	11.24	10.54	0.70
13 15 15 15 15 15 15 15	1120C3365	50		2.60	1.33	- ~	1095.001		11.71	11.71	10.93	10.38	0.55
OUT 11 1.150 11.14 10.58 10.58 11.14 10.58 10.58 10.59 11.14 10.58 10.58 10.58 10.59 11.14 10.58 10.59 11.14 10.58 10.59 10.59 11.14 10.59 10.59 11.14 10.59 10.59 14.00 1500 1500 1500 1500 14.00 1500		Z		2.60	1.28		1095.00		11.66	11.66	10.93	10.38	0.55
	1120C2289	5			1.22		1355.00		11,30	11.50	11.14	10.58	0.56
0 200 400 600 800 1000 1200 DISTANCE, m		Account of the contract of the	American desired the street many the street of the street		the contraction of the contracti	Will be constructed to proper to the construction of the construct	enter control of the			*** Only the Article of Security (Inc., No. 1) professional of Security (Inc., No. 1) professional of Security (Inc., No. 1) professional of Security (Inc., No. 1) professional of Security (Inc., No. 1) professional of Security (Inc., No. 1) professional of Securi		Top of Manhole Water Surface 'Invert Deposition Top of Channel	
		O	200		8					1000	1200		1400

Table 4.1 DRAINAGE CHANNEL PROFILE (13 OF 35)
DRAINAGE MAINS

DM13 ONYX	۲											
	ه د	MEASURED CHANNEL		DIMENSIONS, m	DISTANCE				ELEVATION, m	3		
MANHOLE CODE NO.	U < H H O Z	NO. OF TOP WIDTH	BOTTOM HTGIW	M DEPTH /	BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION DEPTH
III16A2178	2	1 2.60		2.60 2.00	33.99	56	13.43	12.93	11.23	11.03	10.93	0.10
III16A2175	5	Ŧ				33.99		12.54	11.24	40.11	10,54	0.50
	Z	1 2.50		2.50 2.15	221.41	33.99		12.69	11.24	11.04	10,54	0.50
III6A2176	5	T .		2.50 2.15		255.40		12.51	11.24	10.67	10.36	0.31
- 1	Ľ				156.71	1 255.40	13.01	12.51	11.24	10.67	10.36	0.31
II16A2177	2	1 2.50		2.50 1.30		412.11		12.30	11.95	11.80	11.00	0.80
ELEVATION, m (DPWH) 14. 15. 13. 13. 15. 15. 15. 15. 15. 15. 15. 15. 15. 15	N	** The state of th	or comments and the same of th	West accounts in the distribution of the control of	A PRODUCTOR INCLUDIO AND AND AND AND AND AND AND AND AND AND	**************************************	Charmer Laboration and Constitution (Constitution Constitution Constit	And a difference constitution of the same cons	Ti veri et control de la contr	Plana manatari	Top of Channel Top of Channel	fu
	O	25 50	75	100 125	150	175 200		250 275	300 32	325 350	375 400	425
						DISTA	DISTANCE, m					

Table 4.1 DRAINAGE CHANNEL PROFILE (14 OF 35)
DRAINAGE MAINS

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1.52	-			PTMENCY	WIG S					ELEVATION, m	E		
N		5 8	TOP WIDTH	d	DEPTH / DIA.		CUMULATIVE DISTANCE (m)	1	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITIO DEPTH
OUT 11 2.00 2.00 1.52 135.00 12.94 11.46 11.04 10.25 9.94 NT 11 2.00 2.001 1.87 135.00		_		1.52	1.50			13.07;	11.57	10.96			0.
N				2.00	1.52		135.00	12.24	11.46	11.04			ď
1	. I			2.00	1.57	175.00		12.94	11,51	11.04			0
Th	1			2.00	1.58				11.58	11.33			0
Out 1 2.00 2.00 1.42 505.00 12.97 11.37 11.32 10.60 9.95	l			2.00	1.63				11.63	11.33			ö
N	1			2.00	1.42		505.00		11.37	11.32			0.0
100T 1.54 1.54 1.139 11	1			2.00	1.30				11.25	11.32			0.0
.0	1			1.54	1.40			13.19	12.47	11.79			0.0
0 100 200 300 400 500 600 700		* NAC CONTRACTOR CONTR				* A Language of the Control of the C	The difference of the differen	A TOWN LOT PROVIDE THE PROVIDE	A STATE OF THE STA	Cural popularity control contr		Top of Manhole Water Surface Invert Deposition Top of Channel	
			100	20	Q	300	40 DISTAN	о П	200	9		007	000

Table 4.1 DRAINAGE CHANNEL PROFILE (15 OF 35)
DRAINAGE MAINS

DM15-A B	UENDI	A OUTFA MEASU	DM15-A BUENDIA OUTFALL - RIGHT	r L DIMENSIONS, m	E 'SNC	DISTANCE				ELEVATION, m	ε		
MANHOLE CODE NO.	U < F - O &	NO. OF CELLS	тор мотн	ВОТТОМ МІТОТН	DEPTH / OIA.		CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION DEPTH
T25C1113	Zi	ir	3,60	3.60	2.50	770.00		13.22	10.93	9.74	8.78	8.43	0.35
H20C4211	5	r	3.60	3.60	3.05		770.00	12.65	10.95	9.77	8.21	7.90	0.31
	ደ	7	3.60	3.60	3.05	70.00	770.00	12.65	10.95	77.6	8.21	7.90	0.31
1120C4210	5	=	3.50	3.50	2.99		840.001	13.73	11.43	9.93	8.49	4.2	0.05
	Z	ਜ		3.50	2.99	260,00		13.73	11.43	9.93	8.49	8,44	0.05
112004177	5	==		3.80	3.10	~-	1100.001	14.64	11.74	10.14	10.18	8.64	1.54
	Z	7	3,80	3.80	3.00	975.00		14.64	11.64	10.14	10.18	8,64	1.54
II20C4209	5	17	3.60	3.60	3.90		2075.00	14.07	13.57	10.47	79.6	2.67	1
(IIWYO) m (DPWII)	9 9 9 9 9 9 9 9 9 9	Vical Vicania August			Performance and the second sec	The second secon				*Addition control of constraints and control of constraints and control of constraints and control of constraints and control of constraints and control of constraints and control of constraints and control of constraints and control of constraints and control of constraints and control of constraints and control of control of constraints and control of constraints and control of co	Acception in the control of the cont	**************************************	. The state of the
	0	200	8	0	9009	800	1000 12 DISTANCE, m	1200 ICE , m	1400	1600	1800	2000	2200 -

Table 4.1 DRAINAGE CHANNEL PROFILE (16 OF 35)
DRAINAGE MAINS

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		UMIS-B BUENDIA COLFALL - LEFT	j										
	٠.	MEASURED CHANNEL	CHANNEL	DIMENSIONS. T	E SNS	RATANCE	J.			ELEVATION, m	Ę		
MANHOLE CODE NO.	004FH0\$	NO. OF TOP		MOTTOM HTGIW	DEPTH / DIA.		CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION
IIZSC1111	z	17	3.60	3.60	2.50	265.00		13.22	10.93	9.74	8.78	8.43	0.35
1	5	-1	3.60	3.60	3,80		265.00		11.10	69'6	8.69	8.10	65.0
ـــ د	Z	17	3.60	3.60	3.00	25.00		12.80	11.10	69'6	8.69	8.10	0.5
II25C1135	5	ਜ ਜ	3.60	3.60	3.00		290,00		11.28	9.77 (8.39	8.23	0.11
.	Z	÷	3.60	3.60	3,00	528.00			11.28	9.77 :	8.39	8.28	0.11
II20C4180	3	ä	18.8 18.8	3.8	3.26				11.39	10.50	9.04	8.13	0.9
.1	z	Ā	3.70	3.70	3.26	265,00			11.39	10.50	9.04	8.13	0.91
II20C4179	5		3.80	3.80	3.25				11.67	10.08	8.96	8.42	6.5
	Z		3.80	3.80	3.25	383.00	1083.00		11.67	10.08	96'8	8.42	45.0
II20C4178	50	Fi	3.60	3.60	3,90		1971.00		13.57	10.47	9.67	29.6	
ELEVATION, m (DPWH) ないない ロット・	····		A particular section of the section			A Market Annual	An extraction manager free literature and according to the literature and the literature	X .	The control of the co	Afficiant of the Assistance of	And in the control of	Water Surface Invert Top of Manhole Invert Top of Channel	1 1 1 X (v = 1
l o		500	:	400	909	008	1000 DISTANCE, m		1200	1400	1600	1800	2000

Table 4.1 DRAINAGE CHANNEL PROFILE (17 OF 35)
DRAINAGE MAINS

NO. OF TOP WIDTH BOTTOM DISTANCE CUMULATIVE MANHOLES (m) DISTANCE DISTANCE DISTANCE (m) DISTANCE DIST			ONOTOMORE				-		ELEVATION, m	E		
IN 1 4.80 4.80 3.13 120.00 120.00	S S S S S S S S S S S S S S S S S S S	S TOP WIDTH	BOTTOM	DEPTH /	DISTANCE BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION
OUT 1 4.70 4.70 3.29 1030.00 120.00	Z.		4.80	3.13			13.22	12.35	57.6	9.22	9.22	•
IN 1 4.70 4.70 3.27! 1020.00 120.00	1750		4.70	3.29		120.00	13.25	12.60	10.20	79.67	18.6	0.36
OUT 1 3.00i 3.00i 2.35i 610.00 1150.00i OUT 1 4.00i 4.00i 2.60i 1760.00i OUT 1 4.00i 4.00i 2.60i 1760.00i OUT 1 4.00i 4.00i 2.60i 1760.00i OUT 1 4.00i 4.00i 2.60i OUT 1 4.00i 3.00i OUT 1 1150.00i OUT 1 115	Z.		4.70	3.27		120.00		12.58	10.20	9.67	9.31	0.36
IN 1; 3.00 3.00 2.35 610.00 1760.00	TUO		3.00	2.35		1150.00		12.52	11.44	10.82		0.65
6	R		3.00	2.35		1150,00	13.17	12.52	11.44	10.82	10.17	0,65
15 - 14 - 14 - 15 - 15 - 15 - 15 - 15 -	750		4.00	2.60		1760.00		12.81	10.96	10.46	10.21	0.25
0 200 400 600 800	Wave Constitution of the Laboratory	NA PARA PARA PARA PARA PARA PARA PARA PA	** Transcription of the Transc	e) na prima min min min min min min min min min min	reproductive and describe and describe and describes and d	CITY COLOR TO THE		Accordance of the first of the			Top of Channel	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
DISTANCE, B	. 0	200	\$		009		1000	1200		1400	1500	1800
,		į				DISTAI	NCE, B					

Table 4.1 DRAINAGE CHANNEL PROFILE (18 OF 35)
DRAINAGE MAINS

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NAME CODE NO. Column C	DM17-A EI	DSA C	DM17-A EDSA OUTFALL-LEFT	FT										
10 10 10 10 10 10 10 10		-	MEASIBED	FLANNE	OTMENSTO	£ 42					ELEVATION, n	u		
N	MANHOLE CODE NO.	0U < > - 0 Z	No. of Top			DEPTH / DIA.	DISTANCE BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION DEPTH
Our 1 4.25 4.25 2.43 510.00 275.00 11.65 11.15 10.65 10.35 8.72	II25C:119	Z		4.20	4.20	2.50	375.001		12.34	10.51	9.79	8.79	8.01	0.78
12.07 11 4.25; 4.56; 3.09 375.00; 13.65; 11.62; 10.55; 9.42 8.53 13.15 11.62 10.55 9.42 8.53 14.5 11.62 10.55 9.42 8.53 14.5 11.62 10.55 9.42 8.53 15.5 11.62 10.55 9.42 15.5 11.62 10.55 9.42 15.5 11.62 10.55 9.42 15.5 11.62 10.55 9.42 15.5 11.62 10.55 9.42 15.5 11.62 10.55 9.42 15.5 11.62 10.55 9.42 15.5 11.62 10.55 9.42 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 10.55 15.5 11.62 10.55 15.5 11.62 10.55 15.5 11.62 10.55 15.5 11.62 10	II25C:117	5	न	4.25	4.25	2.43		375.00	13.65	11.15	10.65	10.35	8.72	1.63
CUT 1; 4,55; 4,55; 3,59; 8,55; 11,62; 11,62; 10,55; 9,42; 8,53;	•	3	H	4.25	4.25	2.43				11.15	10.65	10.35	8.72	1.63
14.5 13.5 13.5 13.5 13.5 13.5 13.5 13.5 13	1125C1114	5		4.95	4.95	3,09		885.00		11.62	10.55	9.45	8,53	0,89
0 100 200 300 400 500 600 700 800 DISTANCE, m									A Video Contract Cont			Trans and analysis in the state of the state	Top of Manhol Water Surface Invert Deposition	
DISTANCE, m	9	1	OT .	<u>8</u>	200		300	609	200	9		730	008	
								DISTA	NCE, m					

Table 4.1 DRAINAGE CHANNEL PROFILE (19 OF 35)
DRAINAGE MAINS

MANHOLE CODE NO. TO NO.	MEASURED CHANNEL										
1 5 S S S S S S S S S S S S S S S S S S		EL DIMENSIONS, m	m, SMC			-		ELEVATION, m	£		
11-	NO. OF TOP WIDTH	MOTTOM HTGIW	DEPTH / DIA.	BETWEEN MANHOLES (m)	OISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION DEPTH
-	1 4,30	4.30	2.50	375.001		12.30	10.60	96'6	8.60	8.10	0.50
	1 4.25	4.25	2.45]	375.00	13.59	11.09	10.49	9.04	8.64	64.0
NI	1 4.25		2.45	295,00	375.00	13.59	11.14	10.49	9.04	69'8	0.35
IIZSC1115 OUT	1 4.26	4.26	2.99		670.00	14.11	1141	10.45	9,42	8.42	1.00
(HWYH) m (DPWH)			III) Appropriate in contract of the Principle of the Prin		A production to the state of th	Use now to make the property and interferen		A company of the comp	To a control of the c	X—————————————————————————————————————	
0	100		200		300	400		500	009	_	700
·					A. SIO	DISTANCE, M					

Table 4.1 DRAINAGE CHANNEL PROFILE (20 OF 35)
DRAINAGE MAINS

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MANOLE 1	DM18 MA	Σ	DM18 MAKATI HEAD RACE4											
NO OF TOP WIDTH WOTTON DEFTH CHANNEL		-		LI WAY VI'S	Carried Annual Control						ELEVATION,	ε		
1 1 1 1 1 1 1 1 1 1	(()		MEASURED	ישאואני	רוואפואפזר		DISTANCE	CUMULATIVE	000	uC aCE	AHLEN VAV	T ITS / CINES	INVERT	DEPOSITION
TN 1	CODE NO.				MOTTOM MIDTH	DEPTH / DIA.	MANHOLES (m)	DISTANCE (m)	MANHOLE	CHANNEL	SURFACE	DEPOSITION LEVEL	ELEVATION OUTLET/INLET	ОЕРТН
OUT 11 \$6.021 \$5.021 \$2.501 \$233.24 \$14.08 \$12.10 \$11.69 \$13 IN 11 \$6.031 \$2.49 \$212.43 \$233.24 \$14.06 \$13.29 \$11.59 \$11.59 \$11.59 \$11.39 \$11.39 \$11.39 \$11.39 \$11.39 \$11.39 \$11.39 \$11.39 \$11.39 \$11.39 \$11.50 \$11.62 \$11.	III1683508		17	5.20	5.20	2.50	233.24	, April	14,39	12.00	11.69	9.80	9.50	0.30
1N 1; 5.02 5.03 2.49 212.43 14.08 12.09 11.69	TI1683319		H	5.03	5.03	2.50		233.24	14.08	12.10	11.69	10,48	9.60	0.88
0UT 11 4.06 4.06 2.32 1.75.20 445.67 12.69 12.06 11.39 11. OUT 1 1 4.06 4.06 2.32 1.75.20 445.67 12.64 12.30 11.62 11. OUT 1 1 4.06 4.06 2.30 2.00 350 400 450 500 500 500 500 5			F	5.03	5.03	2.49	212.43	233.24		12.09	11.69		9.60	0.88
IN 1; 4,06 2,32 1,75,20 445,67 12,69 12,30 11,62 11,152 11,162	II1682016	1-	17	4.06	4.06	2.32		445,67		12.06	11.39	10.64	9.74	0.90
0UT 1; 4.06 4.06 2.30 11.62 11.		J	(T	4.06	4.06	2.32	175.20	445.67		12.08	11.39	10.64	9.76	0.38
X Column 150 200 250 350 400 450 500 500 500 600	II1682015			4.06	4.06	2.30		620.87		12.30	11.62	11.13	10.00	1.13
0 50 100 150 200 250 300 350 400 450 500 550 DISTANCE, m		Registration			e particular que contrata de la contrata del contrata del contrata de la contrata del contrata de la contrata del contrata de la contrata del contrata de la contrata de la contrata de la contrata de la contrata de la contrata de la contrata del contrata de la contrata del contrata del contrata de la contrata del contrata de la contrata de la contrata de la contrata del contrata del contrata de	A Projection of the part of th	** Yellindon assiling the managing planes	** Order by Normal Broad Strategy of Control	trades of the Advances are a second to the advances of the Adv	Constitution to the constitution of the consti	es (con planetimento consultante productivo	PALIFICATION CONTRACTOR CONTRACTO	Mathole Invert Deposition Top of Channel	
DISTANCE , m	\		50	100	150	500	250	300	350	400			009	650
								DISTAN	ICE, m					

Table 4.1 DRAINAGE CHANNEL PROFILE (21 OF 35) DRAINAGE MAINS

MANHOLE CODE NO.		_										
			1						ELEVATION, m	و	- 1	
	NO. OF TOP WIDTH	TOP WIDTH	BOTTOM DEF	Ēś	DISTANCE BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTET/INLET	DEPOSITION DEPTH
TAT CD240C TA		200	3.75	2.03	00:06		14.14	10.67	10.67	10.67	8.64	2.03
		8	9 4	3.00		90.00	14.29	13.42	11.71	10.75	10.42	0.33
		4.90	96	3,00	30.00 1	90.06	14.29	13.62	11.71	10.75	10.62	0,13
TIT1683373 OUT		4.00	9	1.95		390.00		12.76	11.61	10,88	10.81	0.07
, J		3.54	3,54	1.95	236.00	390.00		:2.76	11.61	10.88		0.07
TIT1683364 OUT	_	2.97	2.97	2.63		626.00	14.80	13.45	11.61	11.65	10.82	0.83
ELEVATION, m (DPWH) ないない はいまままままままままままままままままままままままままままままままま	The second secon		A PARTICIPATION OF THE PARTICI	And Annual Control of the Annual Control of	And department of the control of the	The managed real section (1994) and the secti			Table 1	* X	Top of Manhole Thorat Toposition Top of Channel	[<u>9</u> ₀ , 7]
ν -		100		200		300 DISTA	400 DISTANCE, m		900	009	Q	700

Table 4.1 DRAINAGE CHANNEL PROFILE (22 OF 35)
DRAINAGE MAINS

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Ω	DM20 ESTRADA	RADA												
L		,	MEASUR	MEASURED CHANNEL	DIMENSTONS.	ONS. B	O TOTA BILLO				ELEVATION, m	E		
 .	MANHOLE CODE NO.	0046~02	NO. OF CELLS	тор міртн	8 ≥	1 0 12	BETWEEN BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTET/INLET	DEPOSITION DEPTH
1	112003360	<u> </u>		2.50)	2.50	1.67	72.04		12.42	11.74	11.74	11.57	10.01	1.50
	1120C3366	5	=	2.50	2.50!	1.20		72.04	12.43	11.43	11.43	10.66	10.23	0.43
		_ 名		2.50	2.50	1.20	194.45	72.04	12.43	11.43	11.43	10.66	10.23	0.43
L_	1120C3357	50	ä	2.85	2.85			266.49	12.59	11.36	11.36	10.40	9.84	0.56
		Z		2,85	2.95	1.62	72.25		12.59	11.48	11.48	10.40	98.6	25.0
l_	1120C3356	50	77	2,831	2.83!	1,64		338.74	12.67	11.63	11.63	10.97	66.6	96'0
		곱	17	2.83	2.83	1.66	79,46	338.74	12.67	11.63	11.53	10.97	5.97	3.00
L	112003355	50	+4			1.25		418.20	12.71	11.93	11.61	11.41	10.68	6.73
	ELEVATION, m (DPWH)										*		Top of Manhole Water Surface Invert Deposition Top of Channel	
	?	. 0		20	001		150	200 DISTANCE, m	250 CE.m	8		350	8	450

Table 4.1 DRAINAGE CHANNEL PROFILE (23 OF 35)
DRAINAGE MAINS

DM21 ZOBEL ORBIT	EL OR	'BIT											
	٥٠	MEASI	MEASURED CHANNEL	EL DIMENSIONS, m		i	I			ELEVATION, m	£		
MANHOLE CODE NO.	U 4 F H O Z	No. OF GELLS	тор мотн	моттом нтотм	DEPTH / DIA.	BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION DEPTH
1111683509	몹	1	5.18	5.18	3.10:	43.00		14.78	12.38	11.88	9.38	9.28	0.10
1111683406	50				2.99;		43.00;	13.89	13.41	11.57	10.69	10.42	0.27
	Z	1			2,97	150.00	43.00	13.89	13.39	11.57	10.69	10.42	0.27
III16B3388	5	1			2.97;		193.00		13.67	12.72	10.85	10.70	0.15
ELEVATION, m (DPWH)		**************************************	Company of the control of the contro	A constitution of the section of the	to A principle of the P	userabacı eleğiye erre dikkerin aşıklığısı ini		A Name of Address of Address of Constitution o	New riginal principle Andrew Principles (1917)				
			50	4	93	80		001	120	140	160	130	500
							OISTA	OISTANCE, M					

Table 4.1 DRAINAGE CHANNEL PROFILE (24 OF 35) DRAINAGE MAINS

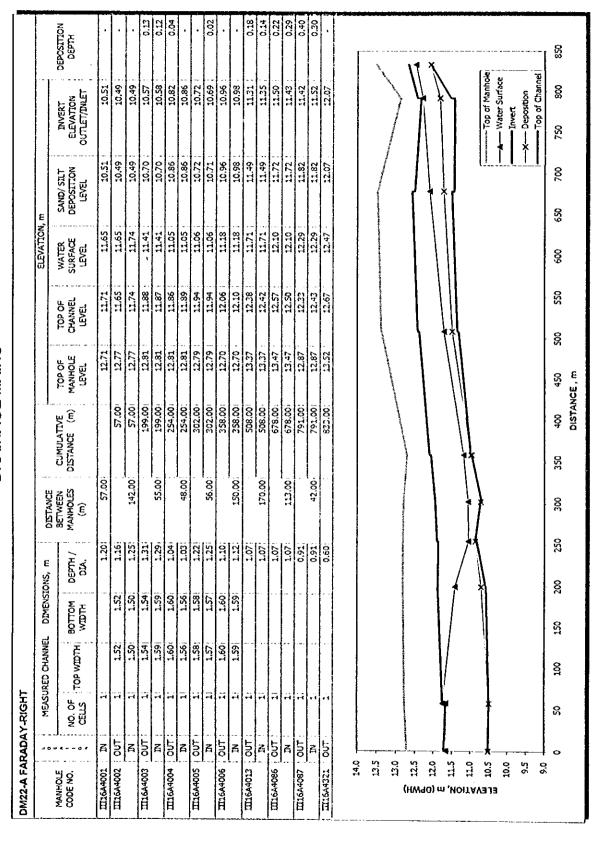


Table 4.1 DRAINAGE CHANNEL PROFILE (25 OF 35)
DRAINAGE MAINS

	٠,	MEASURED CHANNEL	-ANNE	DIMENSIONS. m	W.S.	1001447-047				ELEVATION, m			
MANHOLE CODE NO.	av < o e	NO. OF TOP WIDTH		BOTTOM	DEPTH /	DISTANCE BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION DEPTH
III16A4007	Z	-			1.20	56.00 :		12.68	11.64	11.69	10.51	10.44	0.07
II16A4008	Ş	17	1.49!	1.49	1.27		56.00	12.78	11.72	11.73	10.56	10.45	0.11
	Z.	ī	1.52	1.52	1.33	145.00		12.78	11.71	11.73	10.56		0,3
II16A4009	5	ī	1.55!	1.55	1.36		2	12.79	11.92	11.35	10.62	10.56	90.0
	Z	ei	1.61	1,61	1.31	113.00		12.79	11.88	11.35	10.62		0.05
II16A4010	DO	H	1.60	1.60	1.16			12.77	11.91	11.03	10.75		
	Z	ਜੱ	1.55	1,55	1.19	00'09		12.77	11.91	11.03	10.73		0.01
III6A4011	750	H	1.60	1,60	1.07			12.69	12.08	11.25	11.01	11.01	٠
	Z	: H	1.60	1.60	1.01	20,00		12,69	12.07	11.25	11.06	11.06	
III6A4012	TUO	} +	1,961	1.96	0.91		424.00	12.87	12.17	11.36	11.27	11.26	0.0
	Z	ਜੰ	1.99;	1.98	0.88	116.00		12.87	12.12	11.36	11.27	11.24	0.03
III6A4056		ļį.	2.15	2.15	0.82		540.00	13,44	12.48	11.67	11.66	11.66	
	Z,	e-t	1.30	130	0.92	150.00:	\$40.00	13,44	12.62	11.67	11.70	11.70	
III6A4188	100	j r	0.941	8,0	0.85		100'069	13.40	12.85	12.02	12.00	12.00	
	A	11		l	0.90	100.001	100.069	13.40	12.83	12.02	11.95		0.02
III16A4187	<u> </u>	- 1			06.0		790,00	12.93	12.40	12.06	11,77	22.50	0.27
	ß	F		-	8.6	42,00	790,00	12.93	12.43	12.06	11.77	: 23.23	0.24
TT:644406	DO:	1	,		0.60		832,001	13.52	:2.67	12.47	12.07	12.07	٠
Ä	14.0												~
H	13.0						999	وهنواء إيدابها بارخوهها والكماها وعاوما وهاور	e in de state for the state of a state of the state of th	ad (decrease and a second to the latest second to t	Personal Land of the Control of the)	\
(HW4Q) m ,NOIT,	110 22				The state of the s	4 X	To the state of th						11.1
	9.00										X	Mathole Mathole Invert Ton of Change	
-) # 	81	500	0	300	400 ATSIC	400 2 HONATAIN	200	009	700	008]

Table 4.1 DRAINAGE CHANNEL PROFILE (26 OF 35)
DRAINAGE MAINS

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DESTANCE CLAMULATYNE TOP OF WATER SAND/SILT INVEST DEPOSITION DEPOS					1						ELEVATION,	E		
1	Ç	100	MEASO	KED CHANNEL		E ,SNO	DISTANCE) (100	30 901	GOL V/V	T. I.S / CIVYS	TANACOT	DEPOSITION
Nat 11 440 440 2502 1000 1229 1159 1112 11049 1049 1040	MANHOLE CODE NO.	< 0 ₹	·	HTOIW 90T	MOTTOM HTGIW	DEPTH / DIA.	MANHOLES (m)	DISTANCE (m)	MANHOLE	CHANNEL	SURFACE LEVEL	DEPOSITION LEVEL	ELEVATION OUTLET/INLET	HLABO
Out 11 4-40 4-40 2-50 100.001 13.23 11.55 11.57 10.53 10	II20C3361	Z	F	4.40	4.4	202			13.00	12.50	11.47	11.12	10.48	0.64
Thi	1120C3359	50		4.40	4.4	2.60			13.23	12.58	73.15	10.83	86'6	0.85
Our 11 4.35 4.35 2.55 45.00 2375.00 23.19 12.64 11.44 11.38 10.13 10.1		Z	7	4.40	4,40	2.52				12.65	11.57	10.83	10.13	0.70
NN 11 4-30 5-46 4-500 275-500 12.24 11.44 11.24 10.77 10.22 10.77 10.23 10.77 10.24 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25 10.77 10.25	II20C3358	500	_	4.33	4,331	2.51				12.64	11.41	11.38	10.13	
National Property 1 2.84 2.84 2.85 2.15.0 4.00.0 13.22 11.45 11.45 10.77 10.32 11.45 11.45 10.77 10.32 11.47 10.32 11.47 10.32 10.27 10.32 11.47 10.32 10.27 10.32 10.27 10.32 10.37 10.32 10.37 10.32 10.37 10.32 10.37 10.32 10.37 10.32 10.37 10.32 10.37 10.32 10.37 10.32 10.37 10.32 10.37 10.32 10.37		Z		4,30	4.30	2.48			13.19	12.61	11.41	11.38	10.13	
No. 1 2.54 2.24 2.23 2.550 13.27 12.55 11.47 10.65 10.27 10.22 10.27 10.22 10.27 10.25 10.27 10.25 10.27 10.25 10.27 10.25 10.27 10.25 10.27 10.25 10.27 10.25 10.27 10.25	III16A3258	50		2.84	2.84	2.52				12.84	11.45	10.77	10.32	
12 230 2391 234 10.27 11.47 10.39 10.27 10.2		Z		2.34	2.84	2.33				12.65	11.45	10.77	10.32	
National Park 12.20 2.20 2.20 2.20 13.15 11.45 10.20 10.45 10.45 10.4	III16A3339	50	H	2.90	2.90	2.34				12.61	11.47	10.89	10.27	
Cut 1 2.80 2.85 2.25 37.00 13.43 12.63 11.48 10.58 10.43 11.20 2.80 2.80 2.85 2.50 13.43 12.63 11.29 11.20 2.80 2.80 7.82.00 13.13 12.29 11.29 11.13 11.13 11.13		Z	7	2.90	2.90	2.26				12.53	11.47	10.39	10.27	0.62
National Plane 12.50 12.	III16A3338	700		2,30	2,80;	2.25				12.63	11.48	10.58	10.43	0.15
122 123 1242 1129 1120 11		Z		2,80	2.80	2.25				12.68	11.48	10.58	10.43	0.15
0UT (1, 1, 1, 1, 2) 395.00 13.19 12.37 11.54 11.15 11	H16A3337	5				1.22!				12.42	11.54	11.20	11.20	•
0.0Tr 1:29 1:145 1		K				1.21				12.37	11.54	57.15	11.15	•
Solution 1000 100	II.16A3336	5	-4			1.22		1157.00	: 61.51	12.67	12.19	11.94	11.45	65 .0
200 400 600 500 . 1000 DISTANCE, m								**************************************	and a process of the second se		is the way to be a very large of the control of the		Top of Manho Top of Manho Invert C—Deposition Top of Chann	ال الله الله الله الله الله الله الله ا
		o		Ř	0		9	600 DISTANC	Έ. Ή	800		1000		1200

Table 4.1 DRAINAGE CHANNEL PROFILE (27 OF 35)
DRAINAGE MAINS

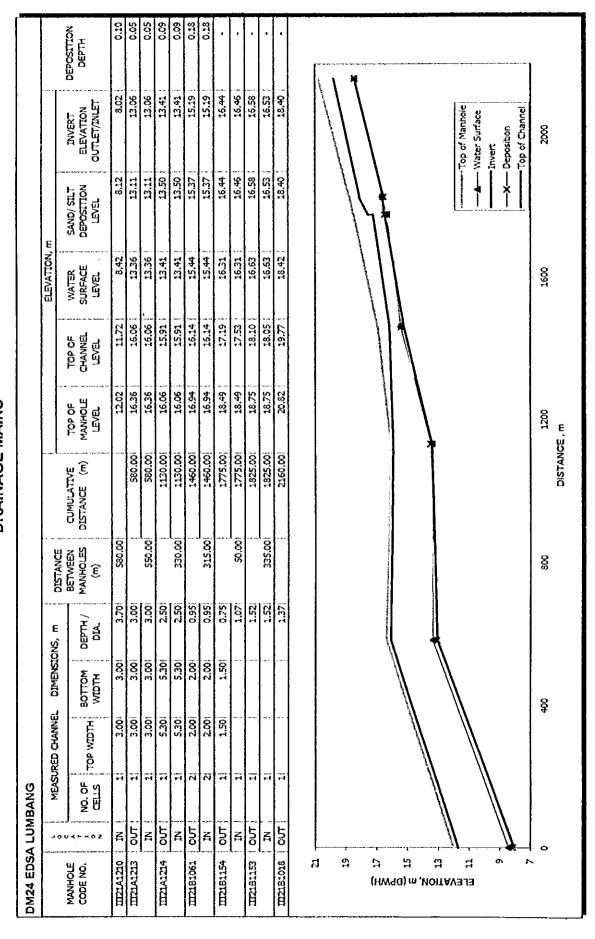


Table 4.1 DRAINAGE CHANNEL PROFILE (28 OF 35) DRAINAGE MAINS

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0	MEASURED CHANNEL S 1 1 1 1 1 1 1 1 1 1 1 1	BOTTOM DEPTH / WIDTH	/ DIA. M	MANHOLES (m) 440.00	(m) (m) LA40.00 A40.00 A40.00	2P OF OF NHOLE EVEL 13.32	TOP OF CHANNEL LEVEL 10.81	WATER SURFACE LEVEL 10.81 11.80	TOP OF WATER SAND/SILT INVERT CHANNEL SURFACE DEPOSITION ELEVATION LEVEL OUTLET/INLET 10.81 10.89 10.89 11.80 11.80 10.89	ELEVATTON OUNLET/INLET 9.90 10.89	DEPOSITION DEPTH 0.91
IN I LIN I II			0.91	(m) 1440.00	440,000	13.32 i	10.81 ; 11.80	10.81 11.80	10.81	9.90 10.89 10.89	
1 NI OUT			# 10 mm	O.O.	440.00	13.32	11.80 ::	11.80	11.30	ACTO	
2 - 2	in the state of th	ecuje eponiministraje va garbaje pravaje, o stalidati da	7711E		440.00	13.32	11.80	11.80	11.30	10.88	
	esent apomene esent que frequent personal	ecife politicate de la principa de la constitución	Lasting Proposed and Control of the		Algorithm of the state of the s	giornal companies (2-11) or call the	Language resistance or control problem ends	ou (protypement And Stronbelly) Stronbelly S	malay spaceties (gar i majar v mount économ	nacodoperación de crescá de presenta de diferente de dife	Parks and the distribution of the State St
ELEVATION, m									1	Top of Manhole ———————————————————————————————————	
05	10	100	150	902		250	300	350	_	604	450
					DISTANCE, m						

Table 4.1 DRAINAGE CHANNEL PROFILE (29 OF 35)
DRAINAGE MAINS

MANHOLE CODE NO IIISAZIOI IN IIISAZIOZ OUT IIISBZOZO OUT IIISBZO40 OUT IIISBZO40 OUT IIISBZO40 OUT IIISBZO41 OUT IIISBZO41 OUT IIISBZO42 OUT IIISBZO42 OUT IIISBZO44 OUT IIIISBZO44 OUT IIIISBZO44 OUT IIIISBZO44 OUT IIIISBZO44 OUT IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	76. Of 16.	BOTTOM D 2.80 2.80 2.70:	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	i i	! !!							
	N N N N N N N N N N N N N N N N N N N	2.80 2.80 2.70 2.70 2.60 3.20 3.20 3.20 2.30;	2.80	, 5 5 7 7 7 7	MANHOLES (m)	DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION DEPTH
	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	2.80 2.70 2.70 2.60 3.20 3.20 3.20 2.30:	2.80	3.36	120.001		12.38	10.58	86.6	8.00	7.22	0.78
	8888	2.70 2.601 2.601 2.601 3.20 3.201 3.201 2.301	2.70;	2.50		120.00	11.59	10.79	10.53	8.49	8.19	0.30
	8 8 8 8 8 8 8 8	2.70 2.60 2.60 3.20 3.20 2.30	i	2.50	366,00		11.59	10.79	10.53	8.49	8.29	0.20
		2.60 2.60 3.20 3.20 3.20 2.30	2,70	2.50			11.93	11.18	10.93	8.68	8,68	٠
	8 	2.60 3.20 3.20 3.20 2.30	2.60)	2.40	150,00		11.93	11.18	10.93	8.78	8.78	
	ਜ ਜ ਜ ਜ ਜ ਜ	3.20! 3.20! 3.20! 2.30!	2,60	2,40		636.00	11.55	10.60	10,58	8,85	8.20	0.65
	ਜ ਜ ਜ ਜ ਜ ਜ	3.20:	3,20	2.40	10.00		:1.55	10.75	10.58	8.85	8.35	
	ਜ ਜ ਜ ਜ	3.20	3,20	2.49			11.58	10.82	10.64	9.15	8,42	0.73
	ਜ ਜ ਜ	3,201	3.20	2.40	118.00	646.00	11.58	10.81	10.64	9.15	8.41	0.74
	-	2,30	3.20	2.40		764,00	11.54	10.67	10.69	99.6	8.27	1.39
	.	-	2,301	2.20	115.00	764,00	11.54	10.78	10.69	99.6	8.58	1.08
-1		2.201	2,201	2.20		100:628	11.61	10.95	10.82	9,71	8.75	96.0
		2.20;	2,20!	2.20	52,00:	879.00	11.61	10.97	10.82	9.71	8.77	\$ \$
	-1	2.20	2,20	2.20		-00756	12.67	11.04	10.96	9.84	8,84	1.00
	Ŧŧ	2.20:	2.20	2.20	93,00	931.00	11.67	11.04	10,96	9,84	3.84	1.8
II1582049 OUT		2.20	2,20	2.20:		1024.00	11.82	11,04	10.97	10.27	8,84	1,43
		500		300	900	005	1 No. 10	700	S SO		Top of Manhole — Invert — Top of Channel 1000	T 170

Table 4.1 DRAINAGE CHANNEL PROFILE (30 OF 35)
DRAINAGE MAINS

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		DEPTH DEPTH	0.09	90.0	•	0.95	1.10	0.63	0.63	1,00	0.83	0,43	0.20	0.55		009
-		INVERT ELEVATION OUTLET/INLET	8.11	8.24	8.35	8,42	8.27	8.65	8.65	8.57	8.74	8.60	8.83	8.23	Water Surface	
		SAND/ SILT DEPOSITION LEVEL	8.20	8.30	3.35	9.37	9.37	9.23	9.28	9.57	25'6	9.03	: 50'6	3.83		200
8 NOT 4/0 (2	ELEVALION, A	WATER SURFACE LEVEL	9.79	69.6	69.6	9.74	9.74	9.52	9.52	9.55	9.55	9.46	9.46	9.53	Activities and the second seco	
		CHANNEL LEVEL	10.51	10.50	10.55	10.35	10.37	10.32	10.32	10.27	10.34	10.30	10.33	10.38	The word of the second of the	400
		TOP OF MANHOLE LEVEL	11.86	11.62	11.62	11.57	11.57	11.52	11.52	12.11	12.11	12.06	12.06	11.78	A contract of the contract of	
	OUMULATIVE	DISTANCE (m)	- 14	30,001	30.003	174.00	174.001	319,091	319.09	390.93	390.93	401.43	401,43	552,62		300
	DISTANCE		30.00		144.00		145.09		71.84		10.50		151.19			200
	NS, m	DEPTH / DIA.	2.40	2.26	2.20	1.93	2.10	1.67	1.67	1.70	1.60	1.70	1.50	2.10	X X	
	DIMENSIONS	воттом нтатум	3.00;	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.50	2.40	And the second s	
	MEASURED CHANNEL	тор млотн	3.00	2.50!	2.501	2,501	2.50	2.50	2.50	2,50	2.50	2,501	2.50	2.40		100
-	MEASU	NO. OF	7	a	î.	-	F4	+i	-7		7	Ä	ñ	-		
מסממסמ		· < 0 <i>2</i>	A	<u>5</u>	Z	5	F	5	Z	50	Z	5	2	TJ0		0
DINIZI BOL		MANHOLE CODE NO.	Z15B2245	II1582243		II15A2063		II15A2053		T15A2036		II15A2033		II15A2051	ELEVATION, m (DPWH) ま は は は む w ぃ	•

Table 4.1 DRAINAGE CHANNEL PROFILE (31 OF 35)
DRAINAGE MAIN

ļ	:	MEASL	RED CHANNE	L DIMENS	ONS, m	DISTANCE	ļ	–		ELEVATION,	m		1
VNHOLE DDE NO.		NO. OF	нтөгж чот	BOTTON	DEFTH/	BETWEEN	CUMULATIVE DISTANCE (m)	TOF OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITI DEPTH
583164	IN	ì	4.50	4.50	2.41	83.00		12.89	12.19	11.78	11.99	9.78	2
1583168	OUT	1	4.50	4.50	2.28		83.00	13.26	12.36	17.01	15.21	10.08	3
SC3001	OUT		4.50 4.50	4.50 4.50	2.17	92.00	83.00 175.00	13.26 13.17	12.36	12.01 12.32	12.21 11.59	10.08	5
	IN	i	4.50	4.50	2.17	68.58	175.00	13.17	12.37	12.37	11.99	10.20	
5C3002	out	1	4.48	4.43	2.00	**********	263.58	12.96	12.26	11.96	11.95	10.26	
	IN	i	4.49	4.49	2.00	176.10	263.59	12.96	12.26	11.96	11.96	10.26	1 1
.5C3003	out	!	4.45	4,45	2.60		439.68	12.59	11.69	11.69	10.99	9.09	
SC3004	IN	·· <u>-</u> 1	4.45 3.10	4.45 3.10	2.60 1.85	11.72	439.68 451.40	12.59	11.69 11.54	11.59 11.54	10.99 10.75	9.09 9.69	1
	IN	1	4.45	4.45	3.00	36.96	451.40	12.54	11.54	11.54	10.75	8.51	·
5C3005	OUT	1	4,40	4.40	2.25		488.35	12.58	11.81	11.81	10.59	9.56	
	N	1	4,44	4.41	2.33	7.85	488.36	12.58	11.69	11.69	10.59	9,56	
5C 3006	out	!	4.15	4.15	2.29		495.21	12.36	11.53	11.53	10.63	9.24	
SC3007	IN	1	4.15 4.20	4.15	2.25	39.27	496.21 535.48	12.36	11.43	11.49 11.54	10.68	9.24 9.16	
	IN.	i	4.20	4.20	2.38	45.31	535.48	12.46	11.54	11.51	10.17	9.16	
5C3008	OUT	1	4.41	4.41	2.32	التبذب سسسا	580.79	12.51	11.54	11.54	10.79	9.22	
	IN.	1	4.41	4.41	2.32	43.21	580.79	12.54	11.54	11.54	10.79	9.22	
SC3009	CUT		4,45	4.45	2.05		624.00	12.55	11.60	11.60	10.68	9.55	
503010	OUT		4.45 4.20	4.45	2.15	41.53	624.00 665.53	12.55	11.70	11.79	10.68	9.55 9.33	
	IN	i i	4.20	4.20	2.67	47,84	665.53	12.61	12.06	11.98	10.35	9.39	-
5C3352	OUT .	ì	4.30	4.30	2.38		713.37	12.72	11.57	11.57	10.87	9.19	
	IN	1	4.30	4.30	2.38	145.46	713.37	12.72	11.57	11.57	10.87	9.19	
SC3281	CUT	1	4.00	4.00	2.10	24.24	659.83	12.82	11.72	11.72	10.07	9.62	
5C3353	IN		4.00	4.00	2.15	36.34	658.83 895.17	12.82	11.77 11.85	11.77	10.07	9.62 9.05	
}	IN	1	4.30	4.30	2.85	43.23	895.17	12.75	11.90	11.90	10.55	9.05	
5C3351	OUT	1	4.20	4.20	2.40		938.40	12,56	11.96	11.96	10.55	9.56	
	IN	1	4.20	4.20	2.40	61.37	938.40	17.56	11.95	11.96	10.55	9.56	
503282	OUT		4.30	4.30 4.30	2.28	450.70	999.77	12.65	11.56	11.56	10.06	9.28	
563289	ōuī		4.30	3.00	2.28	159.78	939,77 1169,55	12.66	11.56 11.95	11.56	10.06	9.28 9.61	
1	ĬŇ	i	3.00	3.00	2.34	157.28	1169.55	12.58	11.95	11.95	10.29	9.61	}
5C3355_J	où [1	2.00	2.00]	2.14		1326.83]	12.20	11.51	11.54	19.66	9.40	I
15								THE RESERVE OF A SECOND					7
											4	~Top of Manhole -Water Surface	
14												-Invert	
		والمراجعة فالمحالين	Date -								x-	Deposition	1
_ 13			and the second of the	The Park of The Park of the Park				44.000.000.000.00	eren e ger			Top of Channel	
(DPW)				_	and the second	Company British	production of the beautiful		and the same of	رمايهي ويحام والمحادة حوالي	and the second of the second o	The same of the same	
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9					7	/-	~		~	-			
8	·		200		400		600	800		1000	1200		1400

Table 4.1 DRAINAGE CHANNEL PROFILE (32 OF 35) DRAINAGE MAINS

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MANHOLE CODE NO.		91,949,04		OINCTONOUS.C			_			ELEVATION, m	E		
	004			. 8	Ē	유명성	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE	TOP OF CHANNEL	WATER SURFACE	SAND/ SILT DEPOSITION	INVERT	DEPOSITION DEPTH
		STIB STIB	E	W.DTH	 4	<u>E</u>		ij j	편 역	를 일		OUTLET/INLET	
11583204	Z		2.31	2.81	2.40	23.00		12.82	10.29	:0.29	9.50	7.89	1.61
111583090	1.		3,10;	9.10	1.68	~	23,00	12.64	:0.28	10.28	67.6	8.60	0.89
	J	:-	3.10	3.10	89	150.00	23.00		10.28	10.28	9.49	8,60	0.89
111583023	5		2.98	2.98	1.36		:73.00		10.27	10.27	10.27	8,91	1.36
	·		7.98	2.98	1,36	110.00			10.27	10.27	10.27	8,91	1.36
111583024	5		2,46	2.46;	2,1				10.41	10.41	10.37	8.77	397
			2.46	2,46	29.	105.00	283.00	:2.46	10,41	10.41	10.37	8.77	99:1
111583034	- -		2.12	2.:2;	1.73				10.48	10.48	10.43	8.75	1.68
			2.12	2.22	1.73	00'86			10.48	10.48	10.43	8,75	1,68
1115R3036	-	-	2,26	2,261	1.72				:0.68	10.68	:0.68	8,96	1.72
			2.26	2.26	1,77,1	125.00			10.68	10.68	: 89.0:	8.96	1,72
111583054	, '		2,34	2.341	1.70	'			10,66	30.66	9.86	8,96	8
	Z.		2.34	2.34	1.70	286.00			10.66	- 99'0"	98.6	8.96	8.0
111583061	l –		2,34	2,34	1.671		897.00		10.52	10.52	10.52	8.85	1.67
			:6:	1.911	1.67	114,00		12.09	10.74	10.74	10.74	9.07	1.65
111 SB3097	1:-	17	1,85	1.85	1.581				10.91	10.91	10.14	9.33	0.81
			1.85	1.851	1.58	96,00			10.91	10.91	4:0:	6.33	0.83
111583112	<u>-</u> -		:95:	1.95	1,48		1107.00		10.84	10.94	10.84	9:36	1.48
	٠		:95	1:95	1,48	00'86			10,84	10.84	10.94	9:36	1.4
111582122	ľ		1.93:	1.93	1.50				10.74	10.74	5.6 6.	9,24	0.70
			1.93	1.93	1.50	118,00			:0.74	10.74	45.6°	9.24	9.70
111582136	-		8:	1.90	-68.1			12.99 i	:2.69	11,46	11,35	: 08'01	0,55
	ŧ ef												<u> </u>
-												200	
	<u></u>		\ <i>\</i>	Helius is to company of the state of the leaders of	Aprilement of the Second Control of the Seco	-			end the second and and the second in the second	laboration personal characteristics of the Leville	The section of the se	- The second sec	
	0.21					Although the shift of the shift.	etifijakini milabagajaja izračostepesi militektot	The section of the se				1	
	11.0					ş		:	<u>k</u>	-			
IOITA ∺					1	/			/ [\	>	<i>_</i>		
	-×-						4		1		and design to the second	Top of Machole	 E.]
	96								}		<u> </u>		<u> </u>
-											†	—Inverti I—Deposition	
, ,	 22 23												
	0		200		8		8	80		1000	1280	0	1400
								The state of the s					

Table 4.1 DRAINAGE CHANNEL PROFILE (33 OF 35)
DRAINAGE MAINS

DM30 LEPANTO	ANTO	- GOV. FORBES	BES										
	- 0	MEASURED CHANNEL	CHANNEL	DIMENSIONS,	E	DISTANCE				ELEVATION, m			
MANHOLE CODE NO.	U < ► ↔ O Z	NO. OF TOP	чор мертн	воттом мартн	DEPTH / DIA.	BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	OEPOSITION OEPTH
II15C4178	Z	m	3.68	3.68	3.15	148.36		12.51	11.66	10.91	9.11	8.51	0.60
II15C4108	50	m	3,64	3.64	2.91		148.36	12.56	11.81	10.46	9.76	8.90	0.36
	Z	m	3,64	3.64	2.91	534.71	148.36	12.56	11.81	10.46	9.76	8.90	0.36
E15C4101	5	m	4,00	4.00	1.75!		683.07	12.23	11.13	10.43	10.00	9.38	0.62
	Z.	3	4.00	4.00	1.75	82.63	683.07	12.23	11.13	10.43	10.00	9.38	0.62
II15C4068	- FJO	n	3.80	3.80	2.12	7-	765.70	12.42	11.07	10.45	9.21	36'8	0.26
	Z	8	3.80	3.80	2.14	67.70	765.70	12.42	11.09	10.45	9.21	8.95	0.26
II15C4067	5		3,54	3.54	2.101		833.40	12.42	11.07	10.45	9.27	8.97	0.30
	Z	m	3.54	3.54	2.10	259.80	833.40	12.42	11.07	10.45	9.27	8.97	0.30
II15C4093	50	3	3.40	3.40	2.25		1093.20	12.15	11.20	10.48	9.48	8.95	0.53
	Z	8	9. 9.	3.45	2.25	51.03	1093.20	12.15	11.20	10.48	9.48	8.95	0.53
1115C4092	50	3	9.46	3.40	2.25		11,44,23	12.15	11.20	10.48	9.45	8.95	0.50
ELEVATION, m (0PWH)			STANDARD USA (SING)	VICTOR of the control		Table of great particular management and an article of great particular management and great p				(4) The season of the season o	A Control of the Cont	**************************************	,
	٥		200			00	600 DISTANCE, m	о сп. э	008		7000		1200

Table 4.1 DRAINAGE CHANNEL PROFILE (34 OF 35)
DRAINAGE MAINS

ğ

Machine Directors, m							DISTANCE				ELEVATION, m	ε		
N	MANHOLE CODE NO.		NO. OF	JRED CHANNEL TOP WIDTH	않	DEPTH /	BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ SILT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION DEPTH
Out 1 5.80 5.80 5.80 12.0 110.00 12.11 11.75 10.58 9.52 9.66	11583206				5.80	231	110,00		12.49	11.44	10.50	9.30	9.13	0.17
N	II15B3013		H		5.80	2.70		110.00	12.11	11.76	10.58		90.6	0.46
Outrol 11, 20, 12, 24, 20, 25, 25, 25, 25, 25, 25, 25, 25, 25, 25		.J	1		5.80	2.70		110.00(12.11	11.76	10.58		90'6	0.46
1	II1583014	1			4.50	1.83		240.003	11.80	11.21	10.76		85.6	0.93
0uT 11 450 450 200 11.39 11.30 11.30 9.30 11.30 11.30 9.30 11.30 9.30 11.30 9.30 11.30 9.30 11.30 9.30 11.30 9.30 11.30 9.30 11.30 9.30 11.30 9.30 11.30 9.30 11.30 9.30 11.30 9.30 11.30 9.30 9.30 11.30 9.30 11.30 9.30 9.30 9.30 9.30 9.30 9.30 9.30 9		· I	F		4.50;	1.83	15.00	240.00	11.80	11.21	10.76		9.38	6.0
N	H1583216	ł	Ī		4.50	2.00		255.00	11.93	11.30	10.80		9.30	2.0
00 40 80 120 120 120 120 120 1100 1100 1100		'I	ī		4.50	2.00		255.00	11.93	11.30	10.80		08'6	
15.0 10.0 9.0 40 80 120 40 80 120 130 130 130 130 140 150 150 150 150 150 150 15	11583217				3.35	2.44		355.00	12,83	11.63	10.87		9.19	
0 40 80 120 160 200 240 280 320 DISTANCE, m		9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9, 9	To descript the control of the contr	THE PARTY OF THE P	To the control of the	The state of the s		the company of the control of the co		X X of the state and a constant		And the state of t	Top of Manhole Water Surface -Invert - Deposition - Top of Channel	* X
DISTANCE, m	`			4	8	1	22	160	200	240	•	280	320	360
								DISTANCE,	Ę					

Table 4.1 DRAINAGE CHANNEL PROFILE (35 OF 35)
DRAINAGE MAINS

MANHOLE CODE NO. 0F TO CODE NO. 0F TO CODE NO. 0F332 IN 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		PINCHONOMIC	\$ UN					ELEVATION, B	E		
KI DO I TO I TO I	в нтогм чот	BOTTOM		DISTANCE BETWEEN MANHOLES (m)	CUMULATIVE DISTANCE (m)	TOP OF MANHOLE LEVEL	TOP OF CHANNEL LEVEL	WATER SURFACE LEVEL	SAND/ STLT DEPOSITION LEVEL	INVERT ELEVATION OUTLET/INLET	DEPOSITION DEPTH
71 N 1 N 1 N 1 N 1 N 1 N 1 N 1 N 1 N 1 N	3.50	3.50	1.55	200.00		13.64	13.01	13.01	11.66	11.46	0.20
NI POO	3.44	е. 4	1.83		200.00	13.58	12.86	12.59	12.12	11.03	1.09
NI DO	۶. 4	3,44	1.86	65.00	200.00	13.58	12.89	12.59	12.12	11.03	1.09
NI COUT	3,45	3,45	1.80		265.00	13.60	12.96	12.56	12,46	11.16	1.30
OUT O	3,45	3,45	1.78	40.00	265.00	13.60	12.96	12.66	12.46	11.18	1,28
15.0	4,05	4.05	1.90		305.00	13.60	12.92	12.70	12.40	11.02	1.38
14.0 H. 12.5 H. 12.5 H. 10.5 H	August Apparatus (August (August Apparatus (August (Augu			CONTROL AND THE CONTROL OF THE CONTR			X X		Manuschierischen von Vorgenschen der German der Gebenschen Germannen Top of Manhx ———————————————————————————————————	Manhole Surface Invert Deposition Top of Manhole Invert Top of Channel	
0	9	80	0	120	, X	160	200	240		280	320
					DISTAN	DISTANCE, m					

LIST OF DRAINAGE CHANNEL PROFILE DRAINAGE LATERALS NORTH MANILA

NO.		NORTH MANILA
	Code	Name
1	NL001	IMELDA/HERBOSA (C-2 RD-HERBOSA-OSMENA)
2	Nr.005	LACSON/HERBOSA/OSMENA (PANDAY PIRA-HERBOSA-OSMENA-PACHECO-DMO3)
3	NL003	VÁRONA (HERBOSA-PACHECO-DM03)
4	NL004	MORIONES/NOLASCO/MORGA (MASINOP-NOLASCO-MORGA-ASUNCION-DM04)
5	NL005	HONORIO LOPEZ BLVD -RIGHT SIDE (JUAN LUNA-DEL ROSARIO-DM26)
6	NL006	FRANCO (HERBOSA-PACHECO-DM03)
7	NL007	JUAN LUNA-LEFT SIDE (H LOPEZ BLVD-DEL FIERRO-DM02)
8	NL008	JUAN LUNA-RIGHT SIDE (MA GUIZON-SOLIS-DM02)
9	NL009	JUAN LUNA-LEFT SIDE (BENITA-ESTO3)
10	NL010	C M RECTO -LEFT SIDE (STO CRISTO-ESTOS)
11	NL011	DAGUPAN (CORAL-TAYUMAN-DM29)
12	NL012	ANTONIO RIVERAJMAYHALIGUEJJ ABAD SANTOS
		(C M RECTO-MAYHALIGUE-) ABAD SANTOS- C M RECTO)
13	NL013	JOSE ABAD SANTOS-LEFT SIDE (MAYHALIGUE-TAYUMAN-DM29)
14 15	NL014	JOSE ABAD SANTOS-RIGHT SIDE (BATANGAS-TAYUMAN-DM29)
16	NL015 NL016	JOSE ABAD SANTOS-LEFT SIDE (ANTIPOLO-TAYUMAN-DM29)
17	NL010	JOSE ABAD SANTOS-RIGHT SIDE (ANTIPOLO-SOLIS-DMO2)
18	NL017	JOSE ABAD SANTOS-LEFT SIDE (RIZAL AVE EXT-SOLIS-DM02) S HERRERA (SEVERINO REYES-EST06)
19	NL019	TAYABAS (T MAPUA-EST06)
20	NL020	IPIL (T BUGALLON-ANTIPOLO-ESTO9)
21	NL023	MAYHALIGUE/F HUERTAS (RIZAL AVE-F HUERTAS-FUGOSO-DM05)
22	NL024	OROQUIETA (MALABON-FUGOSO-DM05)
23	NL025	OROQUIETA (ANTIPOLO-TAYUMAN-DM29)
24	NL026	P GUEVARRA (TAYUMAN-FUGOSO-DM05)
25	NL027	F HUERTAS (BATANGAS-TAYUMAN-DM29)
26	NL028	CARLOS PALANCA/PADILLA/NEPOMUCENO (ELIZONDO-P CASAL EXT-) NEPOMUCENO EST15)
27	NL029	M V DELOS SANTOS-RIGHT SIDE (C TORTUOSA-LEGARDA)
28	NL030	M V DELOS SANTOS-LEFT SIDE (C TORTUOSA-LEGARDA)
29	NL031	LAONGLAAN/GOV FORBES/ESPAÑA (ANDALUCIA-GOV FORBES-ESPAÑA-P CAMPA)
30	NL032	DIMASALANG/GOV FORBES/ESPAÑA (CONSTANCIA-LAONGLAAN-ESPAÑA-N REYES)
31 32	NL033	M EARNSHAW/ESPAÑA (SULUCAN-GOV FORBES-ESPAÑA)
33	NL034 NL035	ESPAÑA-RIGHT SIDE (KUNDIMAN-VICENTE CRUZ-DM08) ESPAÑA-LEFT SIDE (CRAIG-VICENTE CRUZ-DM08)
34	NL035	ESPANA-RIGHT SIDE (QUEZON CITY CIRCLE-CRAIG-DM07)
35	NL037	DAPITAN/ANTIPOLO (JOSEFINA-ANTIPOLO-EST12)
36	NLO38	LAONGLAAN/ANTIPOLO (MUSA-ANTIPOLO-MARÍA CLARA)
37	NL039	ANDRES BONIFACIO (WACAT-BLUMENTRITT-DM01)
38	NL040	LAONGLAAN (CONSTANCIA-GOV FORBES)
39	NL041	AMORANTO/MAYON/CALAMBA-RIGHT SIDE (KANLAON-MAYON-CALAMBA-BLUMENTRITT-DMOI)
40	NL042	APO/CALAMBA-LEFT SIDE (AMORANTO-CALAMBA-BLUMENTRITT-DM01)
41	NL043	MAYON/M CUENCO (DAPITAN-M CUENCO-BLUMENTRITT-DM01)
42	NL044	CORDILLERA/QUEZÓN AVE/D TUAZON/DATA/MATIMYAS
43	NL045	MATIMYAS-RIGHT SIDE (T ALFONSO-)OSEFINA III-DM07)
44	NL046	MATIMYAS-LEFT SIDE (ALEX-JOSEFINA 111-DMO7) ALGECIRAS/SOBRIEDAD/VICENTE CRUZ/HONRADEZ
45	NL047	(FAJARDO-SOBRIEDAD-HONRADEZ-GOV FORBES-DM30)
46	NL048	ANZURES/E QUINTOS/ANTIPOLO/G TUAZON/PRUDENCÍO
l		(SOBRIEDAD-E QUINTOS-ANTIPOLO-G TUAZON-EST16)
47	NL049	LUZON/NEGROS (BOHOL-NEGROS-VISAYAN AVE-DM10)
48 49	NL050	SANTOL/MINDANAO/CEBU -RIGHT SIDE (G TUAZON-MINDANAO-CEBU-VISAYAN-DM10)
50	NL051 NL053	PIÑA AVE (SANTOL-MINDANAO AVE.) PUREZA (R MAGSAYSAY AVE-ANONAS)
51	NL054	OLD STA MESA/ALBINA/ALTURA EXT/R MAGSAYSAY/HIPODROMO/ANONAS
52	NL055	F HUERTAS (BATANGAS-ANTIPOLO-EST10)
53	NL056	TAYUMAN-(KATAMANAN-JUAN LUNA-ESTO5)
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