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Our Ref: OM-LA/024

18 September 2006

MEMORANDUM

To: Engineering Staff

From: Tan L S

ADDENDUM TO THE CODE OF PRACTICE FOR INFOCOMMUNICATIONS FACILITIES IN BUILDINGS ISSUED IN SEPTEMBER 2000 ("COPIF: 2000")

IDA Singapore issued a Circular on 15 September 2006 concerning changes made to Code of Practice for Infocommunications Facilities in Buildings (COPIF:2000). A copy of the Circular together with scanned copies of the addenda to COPIF:2000 are attached herewith for your information.

Tan L S

cc RT/LCT
cc Memo File

enc

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BCA
ISO 9000
CERT. NO.: 236
SS ISO 9001 : 2000

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IDA Reference: IDA.INTC.03.0601

15 September 2006

To: Distribution List

Dear Sirs / Madams

ADDENDUM TO THE CODE OF PRACTICE FOR INFOCOMMUNICATIONS FACILITIES IN BUILDINGS ("COPIF:2000")

1. IDA has conducted a public consultation in March 2005 to solicit feedback from the industry, building developers and telecommunication system licensees on the proposed revisions to COPIF:2000. Amongst the changes, IDA has proposed to:

   (a) merge the space and facilities used for the deployment of telecommunication systems and broadband coaxial cable system. This has been well received by the industry and IDA has received numerous queries on how soon this change could be implemented by the industry; and

   (b) remove MDA's related requirement on new buildings of 6-storey and above to provide tap-off points.

2. Arising from the Next Generation National Broadband Network project ("Next Gen NBN") which was recently announced PM Lee Hsien Loong and MICA Minister Dr Lee Boon Yang, IDA intends to further review the current COPIF:2000 to take into consideration the space and facilities requirements related to the Next Gen NBN. In order not to unduly hold up the advancements while IDA reviews the current COPIF:2000, IDA has incorporated consequential changes, highlighted in paragraph 1(a) and 1(b), as an addendum to the existing COPIF:2000 ("the Amended COPIF"). The addendum can be downloaded from IDA website at:

   http://www.ida.gov.sg >> Policy & Regulation >> Codes of Practice & Guidelines >> Code of Practice for Infocomm Facilities in Buildings (COPIF)

3. All developers or owners whose permission for building development was granted by the Urban Redevelopment Authority on or after 15 September 2006 shall comply with the requirements in the Amended COPIF. For developers or owners whose permission for building development was granted before 15 September 2006, and who wish to adopt the requirements of the Amended COPIF, such developers or owners shall submit their building plans or resubmit their revised building plans to Telecommunication Facilities Co-ordination Committee ("TFCC") via the CoreNet e-submission system for TFCC's comment and approval.

4. We would greatly appreciate it if you can disseminate this information to the members in your association.

Yours faithfully

Leong Keng Thai
Director-General (Telecoms)
Info-communications Development Authority of Singapore

ADDENDUM TO THE CODE OF PRACTICE FOR INFO-COMMUNICATIONS FACILITIES IN BUILDINGS ISSUED IN SEPTEMBER 2000 (COPIF)

This Addendum consists of:

1. deletions;
2. amended sections;
3. new section; and
4. replacements of Part 4, 5 and 6.

The Addendum is to be incorporated to the September 2000 issue of the COPIF and shall take effect from 15 September 2006. The Addendum shall supersede the respective Sections or Parts of the specifications that were stated in the September 2000 issue of the COPIF. Save as revised by the Addendum, all other provisions of the COPIF remained unchanged.

A. ***THE FOLLOWING SUB-SECTIONS IN COPIF:2000 SHALL BE DELETED:***

(i) Section 1.2.4.4

(ii) Section 2.2.2

(iii) Section 6.1.4

(iv) Section 12.8.1

(v) Section 12.8.2

(vi) Sections 12.8.3.2 to 12.8.3.6

(vii) Section 12.8.4

(viii) Section 12.8.5

B. THESE SUB-SECTIONS SHALL SUPERSEDE THE CORRESPONDING SUB-SECTIONS OF COPIF:2000.

(i) Section 1.2.2 in COPIF:2000 shall be superseded by:

1.2.2 The Telecommunication Facility Co-ordination Committee (TFCC) means the committee constituting of representatives from licensees that is appointed by IDA to –

(a) serve as a contact point for owners of buildings to submit their building plans;

(b) provide guidance to owners of buildings regarding the placement and orientation of the space and facilities which they are required to be provide;

(c) conduct inspections of the space and facilities upon completion of their construction by owners of buildings; and

(d) perform such other functions as IDA may from time to time assign,

but which does not act as IDA's representative or agent and is not competent to grant any exemptions from the requirements of this Code.

(ii) Section 1.2.4.3 in COPIF:2000 shall be superseded by:

1.2.4.3 The plans are to be submitted via CORENET e-Submission system, (http://www.corenet-ess.gov.sg).

(iii) Section 2.2.1 in COPIF:2000 shall be superseded by:

2.2.1 Developers are advised to approach the cable system operator early during the planning stage of the building to ensure that the proposed facilities for cable services are suitable for cable system installation, and adequate to meet immediate and future need.

Apartments/ condominiums/ non-residential buildings	Conventional/ strata landed housing	Single unit landed housing
1. Site plans which indicate: – lead-in pipes to each building; – lead-in pipes interconnecting buildings within a development project.	1. Site plans which indicate: – lead-in pipes to gate pillar & to building; – lead-in pipes to manholes; – pipes between manholes.	1. Site plan which indicate the lead-in pipe to gate pillar & from gate pillar to building.
2. Basement plans which indicate the location of MDF room.	2. Floor plans which indicate the location of MDF room.	2. Dwelling unit plans which indicate: – all BCS TV outlets or commercial unit plans; – desired distribution point for units types with 4 or more BCS TV points.
3. Dwelling unit plans which indicate: – all BCS TV outlets or commercial unit plans; – desired distribution point for units types with 4 or more BCS TV points.	3. Dwelling unit plans which indicate: – all BCS TV outlets or commercial unit plans; – desired distribution point for units types with 4 or more BCS TV points.	

(iv) Section 12.8.3.1 in COPIF:2000 shall be superseded by:

12.8.3.1 For landed and strata landed properties, it is necessary to make certain provisions on the premised to facilitate convenient connection to utility services. Similarly, the provisions specified below are required for convenient connection to the cable network. The requirements for different types of landed housing projects are summarised in Table 12-5:

Table 12-5

Landed/ strata landed housing	Single units landed housing
1. Feeder cables between TV outlets and a n-way splitter which is installed in an utility room.	1. Feeder cables between TV outlets and a n-way splitter which is installed in an utility room.

C. THE SUB-SECTION IS A NEW ADDITION TO SECTION 1 OF COPIF:2000.

1.12.1 Where good cause is shown, IDA may grant exemptions from specific provisions of this Code. A person who seeks to be exempted shall write to IDA with supporting reasons for his request. An exemption may be on a one-time basis, temporary, permanent, for a fixed period, effective until the occurrence of a specific event or subject to compliance with specified conditions.

D. THIS PART SHALL SUPERSEDE THE EXISTING PART 4 OF COPIF:2000.

4. LEAD-IN PIPES AND UNDERGROUND PIPELINE SYSTEM

4.1 Overview

4.1.1 This section specifies the requirements for the provision of –

(a) lead-in pipes;

(b) underground pipeline system (including associated manholes); and

(c) cable trays where such trays are provided in lieu of underground pipes.

4.1.2 The quantities of lead-in pipes and underground pipes specified in this section are the minimum required to be provided. IDA reserves the right to require any owner of a building to provide additional lead-in pipes and underground pipes to meet the demand for telecommunication services where necessary.

4.2 Qualified builders

Every owner of a building who is required to provide lead-in pipes or an underground pipeline system or both shall ensure that they are constructed by builders who are registered with the Building and Control Authority under the ME14 (Mechanical and Electrical Heads) category specialising in "Underground Pipeline for Telecommunication". The list of registered contractors may be obtained from the Building and Control Authority website (http://www.bca.gov.sg).

4.3 General requirements for all pipes

Every owner of building who is required to provide lead-in pipes or an underground pipeline system or both shall for such purpose –

(a) use only pipes and associated couplings that are made from unplasticised polyvinyl chloride (uPVC) material which are compliant with the Singapore Standard SS:272 or its equivalent;

(b) use only pipes that have a nominal diameter of 110mm and which conform to the dimensions specified in the Singapore Standard SS:272 in relation to pipes of that size;

(b) use only pipes and associated couplings that are no darker than the grey colour;

(d) ensure that all pipes and associated couplings used are compliant with the tests specified in the Singapore Standard SS:272 or its equivalent;

(a) provide all pipes in straight length of 6.0m within the tolerance of +50mm and -0mm as specified the Singapore Standard SS:272 or its equivalent;

(f) provide all pipes complete with one coupling per pipe;

(g) ensure that all pipes are clearly, indelibly and continuously marked at intervals of not more than 1.0m along the length of the pipe using a distinctive colour with the following description –

Manufacturer's identification/110mm uPVC pipe/Day/Month/Year/SS272

(a) ensure that all associated couplings are manufactured by injection moulding method which conform to the details for couplings specified in the Singapore Standard SS:272;

(b) ensure that all associated couplings are of the dimensions and tolerances specified in Table 4.3(i) below;

Table 4.3(i)) Dimension and tolerance of couplings

Coupling Length	180.0mm ± 2.0mm
Internal Diameter	At the edges: 110.5mm + 0.2mm – 0.0mm At the centre: 110.0mm + 0.0mm – 0.2mm
Wall Thickness	Average Value: 3.2mm + 0.4mm – 0.0mm Individual Value: 3.0mm (min)
Wall thickness for a length of 15mm from both ends of the coupling shall increase to:	Average Value: 4.7mm + 0.3mm Individual Value: 4.2mm (min)

(c) lay all pipes throughout in a straight run as far as practicable;

(d) join all pipes together using a coating of solvent cement to both coupler and pipes;

(e) where a bend is required to any pipe, use a factory-made bend of nominal diameter of 110mm and 50mm as illustrated in **Figure 4.1** for 90° upturns (i.e. changing from the horizontal to vertical plane) and, unless otherwise advised by the Telecommunication Facility Co-ordination Committee, ensure that the pipe is clipped and flushed against the wall and rises up to a height of 1m above ground;

(f) where a straight pipe reducer is required to reduce the nominal diameter of the pipe from 110mm to 50mm, use a pipe reducer in accordance with the specifications shown in **Figure 4.2**;

(g) construct all pipes located below carriageways to a minimum depth of 1m;

(h) construct all pipes located below side-tables or footpaths to a minimum depth of 1.2m;

(i) ensure that all pipes that are buried in the ground are encased in 50mm concrete surround except that pipes with nominal diameter of less than

110mm and which are not buried under vehicular access need not be encased with 50mm concrete surround if such pipes are of grade 20;

(j) provide a nylon/polyethylene rope of 4-core or multi-strand type with overall diameter of 6mm in every pipe to facilitate cable pulling;

(k) cap the unconnected ends of all pipes with rubber caps to prevent entry of earth, debris or cement except those ends terminating in manholes;

(l) separate all pipes from power cables by no less than –

(i) 50mm of concrete surround of grade 20; or

(ii) 300mm in well tamped earth;

(t) where the underground pipes enter a building in a horizontal position, install a cable duct sealing module system such as MCT, SVT or ROX types as described in **Appendix A.4** to prevent the ingress of water and construct a drain below the module system to allow for the drainage of water;

(u) where the main distribution frame room is located in the basement of the building, ensure that the underground pipes do not lead directly into the room but connects to cable trays installed outside the main distribution frame room for entry via such cable trays into the room; and

(v) ensure that all pipes terminating inside the telecommunication risers are flushed against the wall and rise up to a minimum height of 1m.

4.4 Specific requirements for lead-in pipes

4.4.1 Every owner of a building who is required to provide lead-in pipes shall –

(a) construct the lead-in pipes such that they extend from the boundary line of the building or building development (at the point along the boundary line where they connect to the underground pipeline system of the building or building development) to a point 1m beyond the existing or proposed roadside drain located immediately outside the boundary line;

(b) construct all lead-in pipes below the existing or proposed roadside drain in accordance with the requirements of the Drainage Department of the Public Utilities Board except that where it is not possible for the lead-in pipes to under-cross below the roadside drain, the owner may install pipes to over-cross the drain subject to the approval of the Public Utilities Board;

(c) orientate all lead-in pipes to face public roads and ensure that they are not constructed into State Land or oriented to face the direction of trees, lamp posts, traffic lights, road signs, over-ground boxes (OG boxes) or other permanent obstacles;

(c) ensure that the number of lead-pipes provided is equivalent to and no less than the number of pipes in the underground pipeline system entering the main distribution frame room;

(d) where a common services tunnel (CST) or an equivalent type of tunnel system is constructed for the laying of telecommunication cables to building developments (for example, the CST constructed in the Marina South new downtown area) –

(i) construct and connect the lead-in pipes to the pipe-sleeves of the designated CST junction box adjacent to the building or building development and obtain all necessary approvals from the relevant authorities for such connection works; and

(ii) ensure that the number of lead-in pipes provided is equivalent to and corresponds with the number of pipe-sleeves of the designated CST junction box. In this regard, the quantities specified in sections 4.6 to 4.9 shall not apply; and

(e) cap all lead-in pipes intended for connection to any licensee's network and indicate their position by a marker on the final ground level.

4.4.2 Owners of buildings are advised to consult the Telecommunication Facility Co-ordination Committee for guidance on the most suitable location and orientation for their lead-in pipes.

4.5 Specific requirements for underground pipeline system

4.5.1 Every owner of building who is required to provide an underground pipeline system shall –

(a) where multi-way pipes are used, ensure that spacers are installed;

(b) lay the underground pipes in straight runs and in lengths of 6 metres as far as practicable;

(c) join the underground pipes together using a coating of solvent cement to both coupler and pipes;

(d) where there is a 90° bend in the underground pipes whether such bend is right angle or gradual, construct a manhole at the location of the bend;

(e) ensure that the pipeline distance between manholes is not more than 150 metres;

(f) where the laying of the pipes is obstructed by other services or deep culverts which require the under-crossing or over-crossing of such obstacles, lay the pipes in a gradual gradient of not less than 1:6 for pipes

of nominal diameter of 110mm and not less than 1:3 for pipes of nominal diameter of 50mm;

(g) ensure that the number of pipes in the pipeline system connecting from the lead-in pipes to the main distribution room are equivalent to and correspond with the number of pipes entering the room;

(h) provide a minimum of 8 pipes at the portion of the underground pipeline system located furthest away from the main distribution frame room; and

(i) ensure that the underground pipeline system is constructed with good workmanship and is free of obstructing materials and substances to facilitate the deployment of plant by licensees.

4.5.2 Owners of buildings are advised to implement the testing procedures specified in **Appendix A.5** for the testing of the underground pipeline system.

4.5.3 An owner of a building who is required to provide an underground pipeline system may use cable trays or metal trunking in place of underground pipes at those locations where it is practicable to do so subject to the owner's compliance with section 4.10.

4.6 Additional requirements for single-unit landed house and cluster or strata landed house or housing development

4.6.1 Every owner of a single-unit landed house or a cluster or strata landed house or housing development shall –

(a) ensure that all lead-in pipes and underground pipes are made of uPVC material with a nominal diameter of 50mm (Class C complying with the Singapore Standard SS:141) and 110mm (complying with Singapore Standard SS:272) respectively;

(b) provide 3 lead-in pipes from the gate pillar of each house to the roadside drain;

(c) ensure that the lead-in pipes rise up to a minimum height of 250mm from the compartment level inside the gate pillar as shown in **Figure 4.3**;

(d) provide 3 underground pipes from the gate pillar into the house, with 2 pipes allocated for telecommunication (non-broadband coaxial cable) system and 1 pipe allocated for broadband coaxial cable system;

(e) provide a polyethylene cable in the underground pipe designated for telecommunication (non-broadband coaxial cable) system;

(f) provide a RG-11 (flooded) cable in the underground pipe designated for broadband coaxial cable system;

(f) in relation to cluster or strata landed housing developments, ensure that the section of lead-in pipes from the gate pillar to the roadside drain is connected to the pipes of the underground pipeline system provided for the development;

(g) ensure that the number of underground pipes provided is in accordance with the quantities specified in Table 4.7(a) below; and

(h) set aside a minimum space of –

(i) 1500mm x 650mm in dimension; or

(ii) 500mm x 500mm in dimension

beside every manhole serving a house in a cluster or strata landed housing development (which shall be used by licensees for the construction of a pedestal to provide services via the broadband coaxial cable system) and provide 2 additional pipes of nominal diameter of 110mm which are to extend from the manhole to the space set aside and protrude upwards to at least 300mm from ground level at the location of such space. Owners shall consult the licensee on the appropriate space to be set aside.

4.6.2 Where addition and alteration works are carried out to any existing house in a cluster or strata landed housing development or single-unit landed house that does not have a gatepost, the owner of such house shall provide an exposed lead-in pipe clipped along the roadside drain leading from the house and connecting to the existing exposed pipe used for broadband coaxial cable system located at the existing headwall of the roadside drain. The owner shall be responsible for obtaining all necessary approvals from the relevant authorities for the running of any exposed pipes along the drain headwall.

4.7 Additional requirements for residential multi-storey building or building development

Every owner of a residential multi-storey building or building development shall –

(a) in relation to the pipes entering into the main distribution frame, provide such pipes in accordance with the quantities and formation specified in Table 4.7(a) below based on the number of residential units in the building or building development, out of which 2 pipes shall be allocated for broadband coaxial cable system; and

Table 4.7(a) Quantities and formation of pipes for main distribution room serving residential multi-storey building or building development

Total number of residential units in building or building development	Total number of pipes to be provided	Pipe formation when entering main distribution frame room
< 200	8	2 x 4
201 – 400	10	2 x 5
401 – 600	12	2 x 6
601 – 800	14	2 x 7
801 – 1000	16	2 x 8
1001 – 1500	18	2 x 9

(b) where underground pipes are provided in place of cable trays between the main distribution frame room and the telecommunication risers of a building, provide such pipes in accordance with the quantities and formation specified in Table 4.7(b) below based on the number of residential units in the building or development, out of which 2 pipes shall be allocated for broadband coaxial cable system.

Table 4.7(b) Quantities and formation of pipes for main distribution frame room serving residential multi-storey building or building development where underground pipes replace cable trays

Total number of residential units in building or building development	Total number of pipes to be provided	Pipe formation when entering main distribution frame room
≤ 60	12	2 x 6
61 – 200	14	2 x 7
201 – 400	16	2 x 8
401 – 600	18	2 x 9
601 – 800	20	2 x 10
801 – 1000	22	2 x 11
1001 – 1500	24	2 x 12

4.8 Additional requirements for multi-tenant non-residential building or building development

Every owner of a multi-tenant non-residential building or building development shall –

(a) in relation to the pipes entering into the main distribution frame room, provide such pipes in accordance with the quantities and formation specified in Table 4.8(a) below based on the usable floor area in the building or development, out of which 2 pipes shall be allocated for broadband coaxial cable system; and

Table 4.8(a) Quantities and formation of pipes for main distribution frame room serving multi-tenant non-residential building or building development

Total usable floor area in building or building development (per '000 m^2)	Total number of pipes to be provided	Pipe formation when entering main distribution frame room
Up to 20	8	2 x 4
20 to 40	12	2 x 6
40 to 60	20	2 x 10
60 to 80	24	2 sets of 2 x 6
80 to 120	32	2 sets of 2 x 8
120 to 160	40	2 sets of 2 x 10
160 to 200	48	2 sets of 2 x 12

(b) in relation to buildings with more than $60m^2$ of usable floor area, ensure that each set of pipes enters the main distribution frame room from a different direction (for example, one set of pipes enters the main distribution frame room from the east and the other set of pipes enters the room from the west).

4.9 Additional requirements for single-tenant non-residential building or building development

Every owner of a single-tenant non-residential building or building development shall –

(a) in relation to buildings with $2,000m^2$ or less of usable floor area for telecommunication services and whose demand for telephone lines does not exceed fifty (50), provide a minimum of 6 pipes entering into the main distribution frame room, of which 2 pipes shall be allocated for broadband coaxial cable system; and

(b) in relation to buildings with more than $2,000m^2$ of usable floor area for telecommunication services or whose demand for telephone lines exceeds fifty (50), provide for the pipes entering into the main distribution frame room in accordance with the quantities and formation specified in Table 4.9(b) below, out of which 2 pipes shall be allocated for broadband coaxial cable system.

Table 4.9(b) Quantities and formation of pipes for main distribution frame room serving single-tenant non-residential building or building development exceeding 2,000 m^2 usable floor area

Total usable floor area in building or building development (per '000 m^2)	Total number of pipes to be provided	Pipe formation when entering main distribution frame room
20 to 40	12	2 x 6
40 to 60	20	2 x 10
60 to 80	24	2 sets of 2 x 6
80 to 120	32	2 sets of 2 x 8
120 to 160	40	2 sets of 2 x 10
160 to 200	48	2 sets of 2 x 12

(c) in relation to buildings with more than $60m^2$ of usable floor area, ensure that each set of pipes enters the main distribution frame room from a different direction (for example, one set of pipes enters the main distribution frame room from the east and the other set of pipes enters the room from the west).

4.10 Cable trays and metal trunking

4.10.1 Where an owner of a building who is required to provide underground pipes chooses to provide cable trays in place of such pipes, that owner shall –

(a) in relation to a cluster or strata landed house or housing development, provide 2 cable trays of which –

(i) 1 cable tray of 200mm width shall be used for the telecommunication (non-broadband coaxial cable) system; and

(ii) 1 cable tray of 100mm width shall be used for the broadband coaxial cable system.

(b) in relation to a residential multi-storey building, provide 2 cable trays between the telecommunication risers and the main distribution frame room and telecommunication equipment room (if any) of which –

(i) 1 cable tray of 300mm width shall be used for the telecommunication (non-broadband coaxial cable) system; and

(ii) 1 cable tray of 100mm width shall be used for the broadband coaxial cable system.

(c) in relation to a multi-tenant non-residential building of up to 25 storeys, provide 2 cable trays between the telecommunication risers and the main distribution frame room of which –

(i) 1 cable tray of 450mm width shall be used for the telecommunication (non-broadband coaxial cable) system; and

(ii) 1 cable tray of 100mm width shall be used for the broadband coaxial cable system.

(d) in relation to a multi-tenant non-residential building of more than 25 five storeys, provide 2 cable trays between the telecommunication risers and the main distribution frame room of which –

(i) 1 cable tray of 600mm width shall be used for the telecommunication (non-broadband coaxial cable) system; and

(ii) 1 cable tray of 200mm width shall be used for the broadband coaxial cable system.

(e) in relation to a single-tenant non-residential building, provide 2 cable trays between the telecommunication risers and the main distribution frame room or telecommunication equipment room (if any) of which –

(i) 1 cable tray of 200mm width shall be used for the telecommunication (non-broadband coaxial cable) system; and

(ii) 1 cable tray of 100mm width shall be used for the broadband coaxial cable system.

4.10.2 As an alternative to providing the cable trays specified in section 4.10.1(b), the owner of a residential multi-storey building may provide 2 metal trunking between the telecommunication risers and the main distribution frame room or telecommunication equipment room (if any) of which –

(a) 1 metal trunking of 400mm by 100mm in dimension shall be used for the telecommunication (non-broadband coaxial cable) system; and

(b) 1 metal trunking of 200mm by 100mm in dimension shall be used for the broadband coaxial cable system.

4.10.3 Where an owner of a building who is required to provide underground pipes chooses to provide cable trays in place of such pipes in relation to a building in which both a master antenna television system (MATV) and a broadband coaxial cable system is installed, the owner shall increase the width of the cable tray to be used for broadband coaxial cable system by an additional 50mm.

4.11 Manholes

4.11.1 Every owner of a building who is required to provide underground pipes shall construct a manhole at every location where there is effectively a 90° bend in the direction of the pipes regardless of whether such bend is constructed at a right angle or in a gradual curve.

4.11.2 The type of manhole to be provided by the owner shall be in accordance with Table 4.11.2 below based on the maximum number of pipes entering any one side of the manhole.

Table 4.11.2 Type of manhole to be provided by owner of building

Maximum number of pipes entering any one side of the manhole	Type of manhole to be provided
2	JX2
6	MX1
9	MX2
12	MX3
16	MX4

4.11.3 In providing the requisite manholes, the owner shall –

(a) where standard sized manholes of type JX2, MX1, MX2, MX3 and MX4 are constructed, comply with the specifications set out in **Figure 4.4 to 4.29** in relation to such manholes;

(b) where it is necessary for larger sized manholes (type MX5 and above) or non-standard manholes or irregular manholes to be constructed, obtain the specifications for such manholes from the Telecommunication Facility Co-ordination Committee;

(c) before any concrete is laid for the construction of the manhole, ensure that –

(i) the bottom of the excavation is properly levelled and consolidated; and

(ii) the bottom of the excavation is kept dry by providing a sump-hole to accommodate water pump, and where necessary provide a layer of 150mm thick hard-core materials;

(d) ensure that pipes are cast on site and that manhole fittings are placed as the construction proceeds;

(e) ensure that uPVC pipes with a flared mouth at one end and which comply with the Singapore Standard SS:272 are used for entry into the wall of the manhole;

(f) ensure that the underground pipes enter each manhole in the manner shown in **Figure 4.4 to 4.13, 4.18 to 4.21 & 4.26 to 4.29**, and at such depths as to ensure a minimum clearance of 450mm above the floor level and 350mm below the roof unless otherwise specified;

(g) ensure that the manhole is constructed at a depth which allows for a concrete (1:2:4) shaft wall of varying height to be constructed for the various manhole sizes shown in **Figure 4.14 to 4.17 & 4.22 to 4.25;**

(h) ensure that the concrete used for filling the recess of the manhole frame and cover is of 1:2:4 mix and that such filling is flushed with the top of the cover, and where heavy duty frame and cover is used, ensure that the concrete is filled up to the ribs without covering the ribs;

(i) ensure that manhole walls are fair faced and not rendered, and that all projections or cavities in the manhole walls are removed or filled with cement mortar respectively;

(j) ensure that the manhole walls are not coated with cement or cement sand wash;

(k) ensure that the floor of the manhole is given a 20mm rendering of cement mortar with fall towards the sump-hole from all directions;

(l) ensure that one uPVC pipe of nominal diameter of 50mm with a 1-way trap is constructed at the neck of the manhole and connected to the nearest drain that is situated at a lower level than the manhole;

(m) ensure that only approved formwork is used in the construction of manholes;

(n) where the manhole is constructed under carriageways or vehicular access areas, ensure that a heavy duty manhole cover which complies with the Singapore Standard SS 30 Grade A1 is used for such manhole; and

(o) where the manhole is constructed under turfed areas or pedestrian footways, ensure that a medium duty manhole cover which complies with the Singapore Standard SS 30 Grade B is used for such manhole.

4.11.3 The owner may choose to install pre-cast manholes as an alternative to constructing the manholes.

4.11.4 Owners may purchase manhole frames, covers and channel brackets directly from suppliers or from licensees. Every owner shall ensure that the manhole covers which he provides does not bear the name of any licensee.

Figure 4.1

ILLUSTRATIONS OF LEAD-IN PIPES AND MANHOLES

DETAILS OF LEAD-IN PIPES WITH BEND PIPES

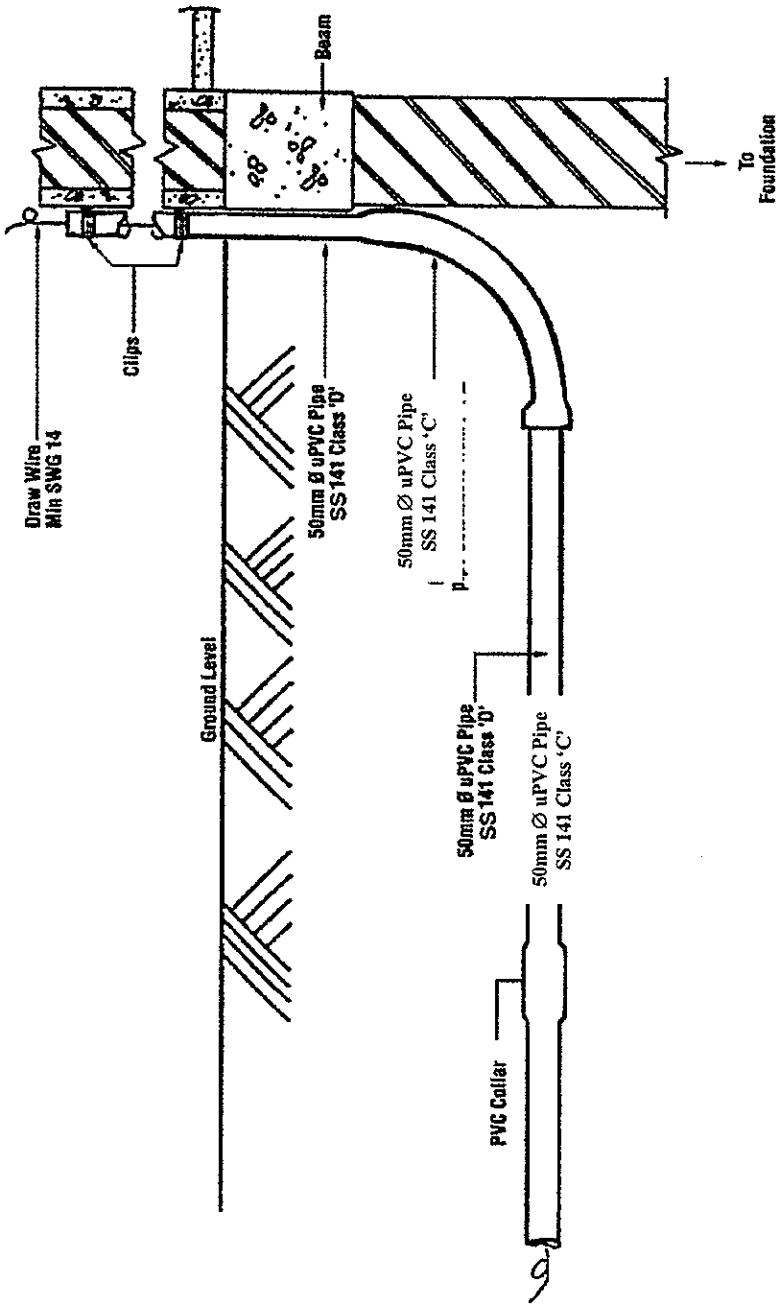


Figure 4.1: Ddtails of Lead-in Pipes with Bend Pipes

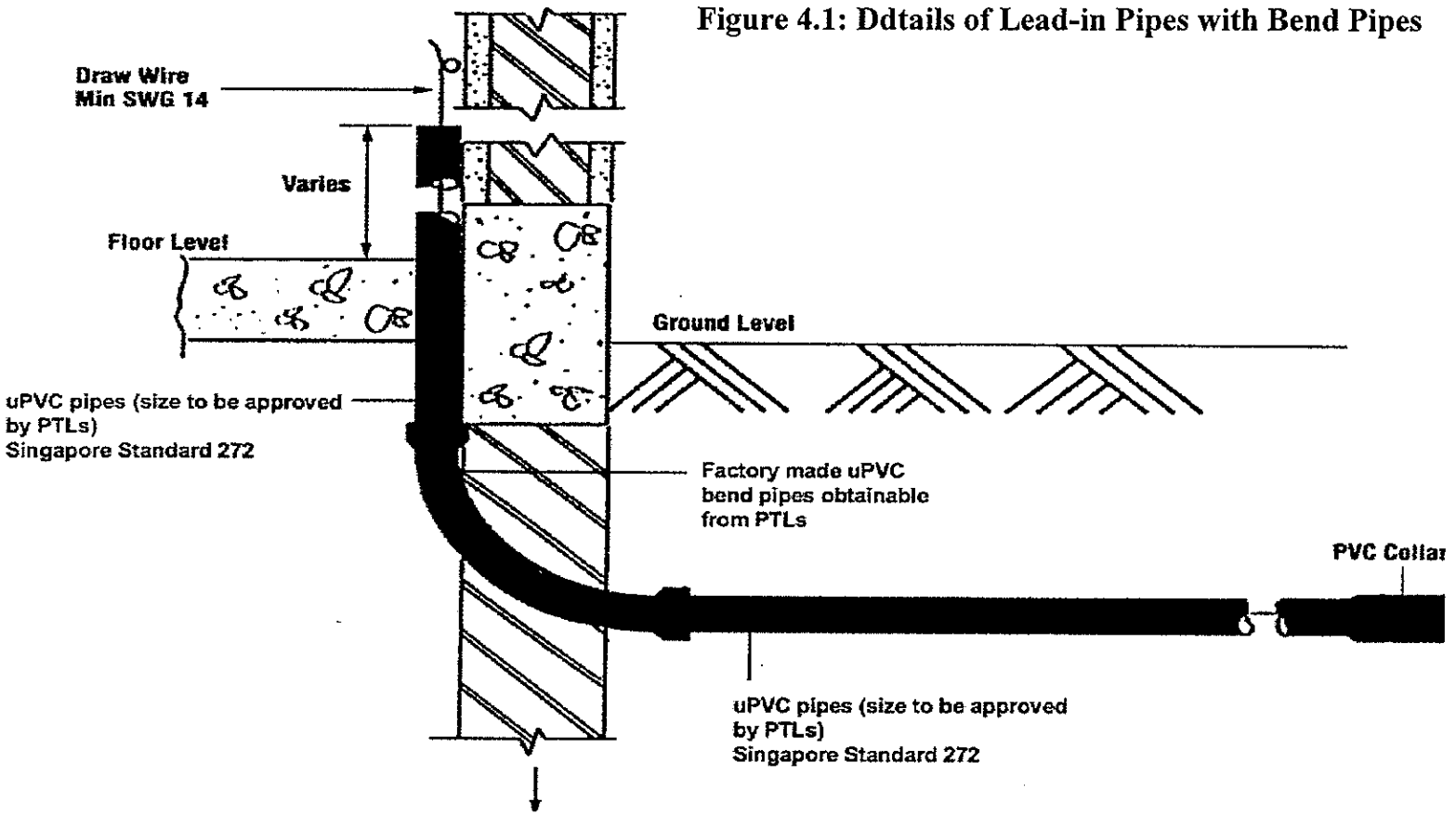


Figure 4.2: 50mm Diameter UPVC Bend Pipe

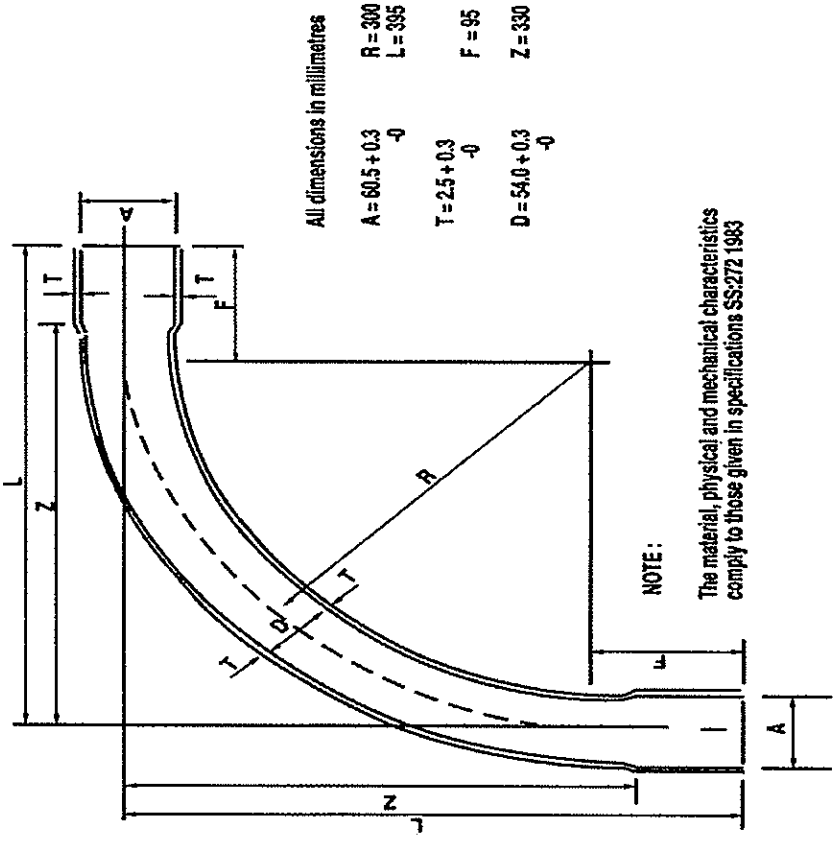


Figure 4.3: Location of Lead-in Pipes in Gate Pillar

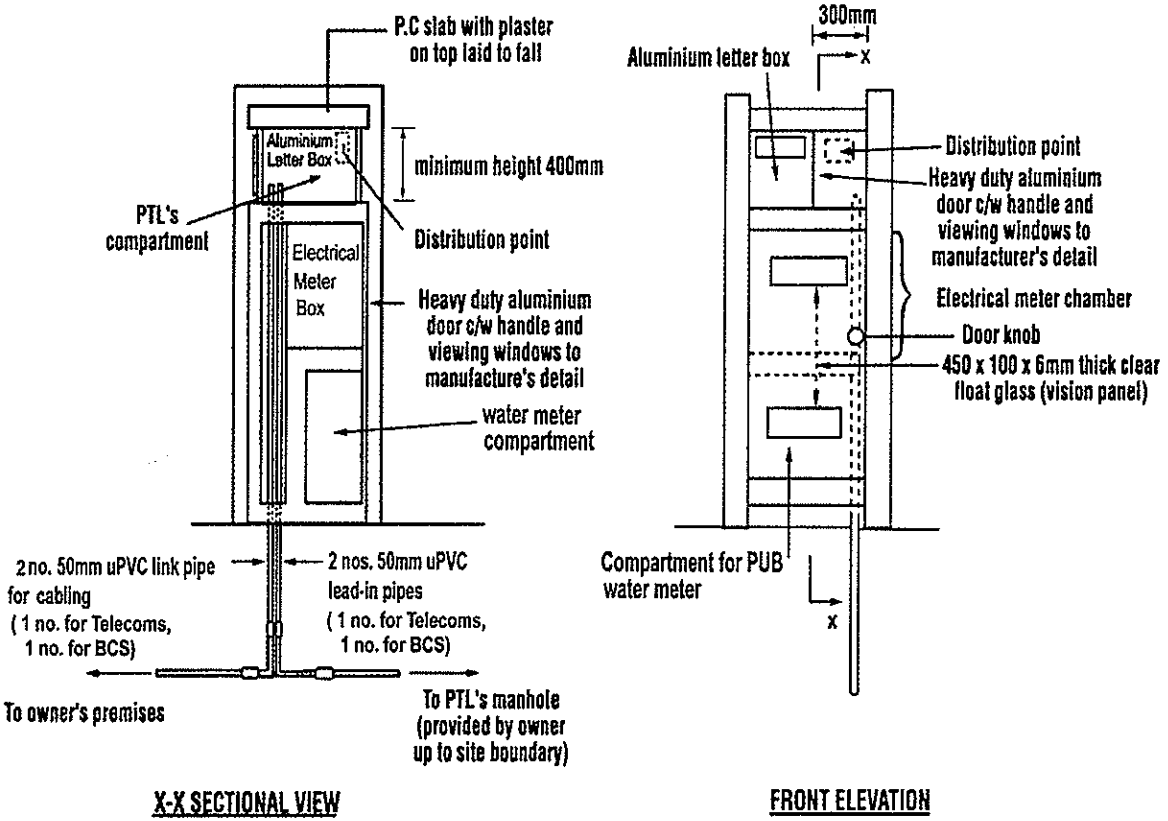
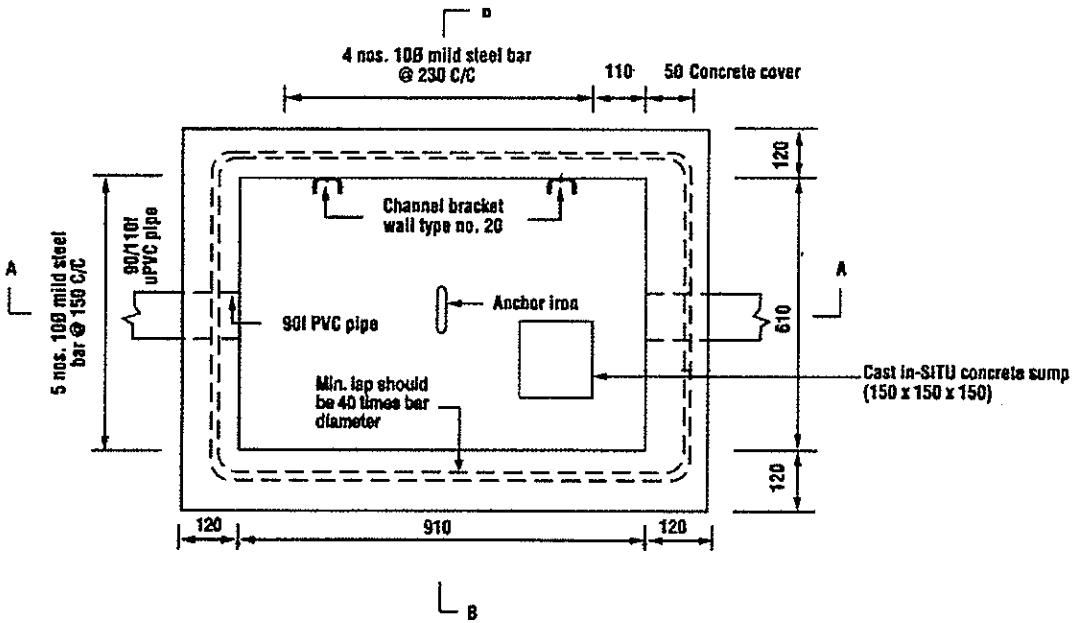


Figure 4.4: Manhole Drawings – Type JX2



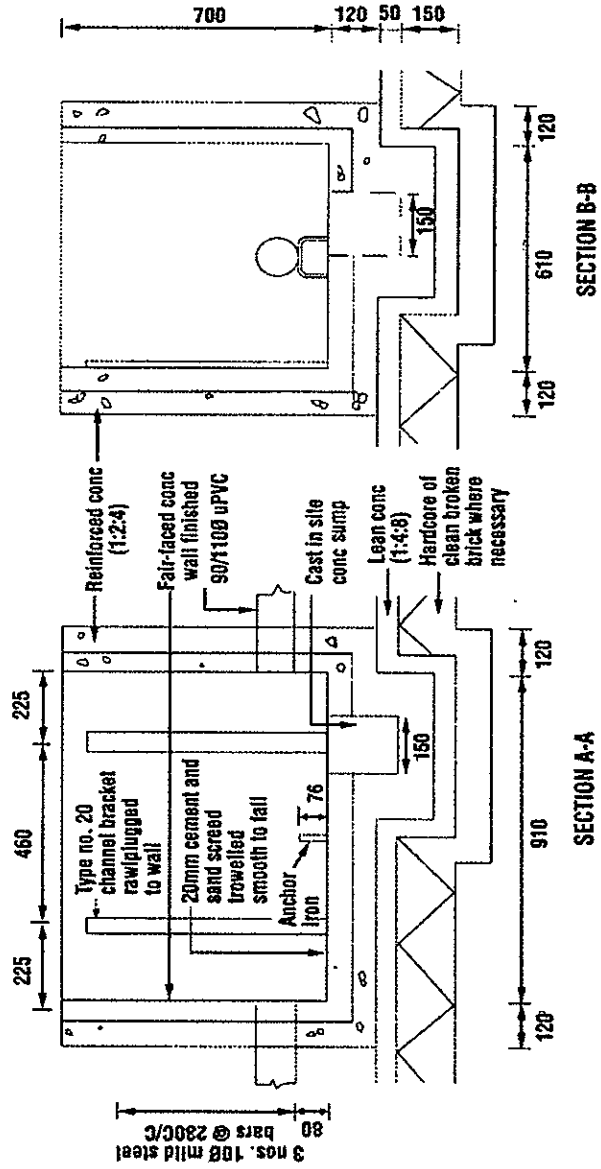


Figure 4.5: Manhole Drawings – Type JX2

Figure 4.6: Manhole Drawings – Type MX1

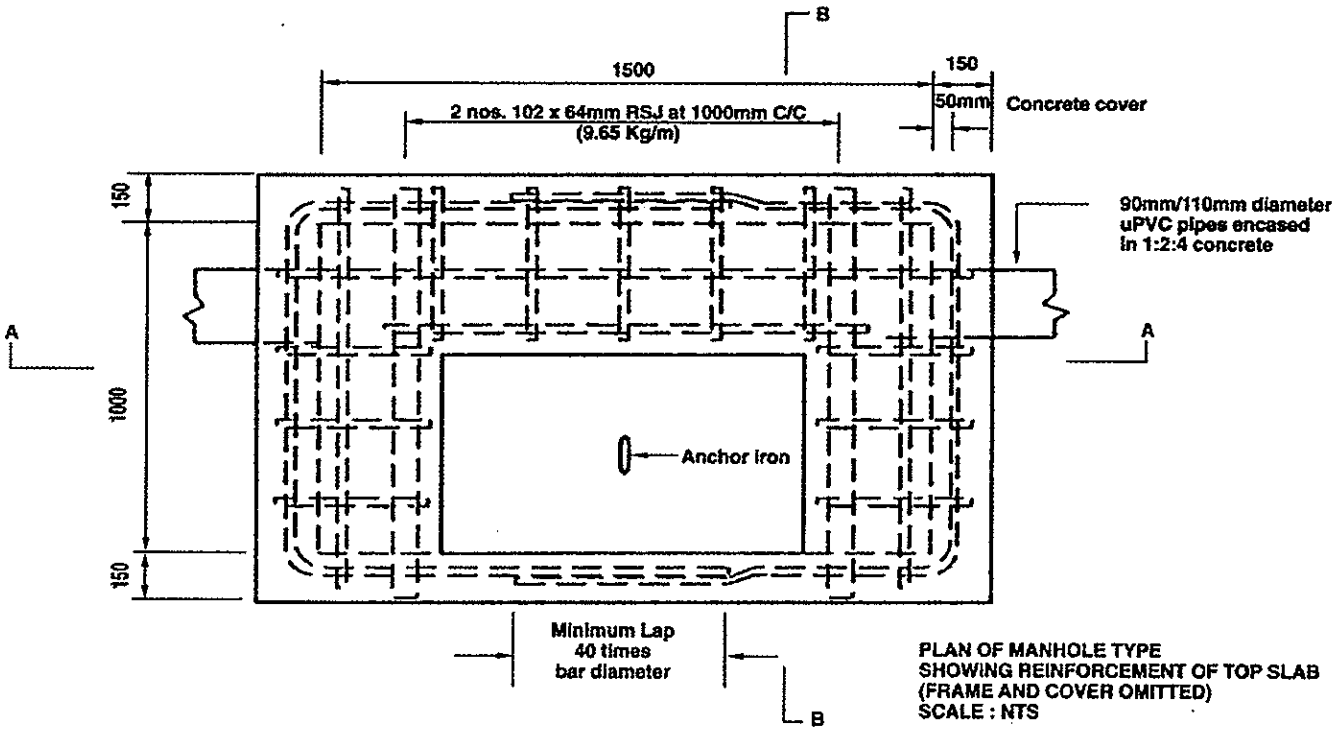


Figure 4.7: Manhole Drawings – Type MX1

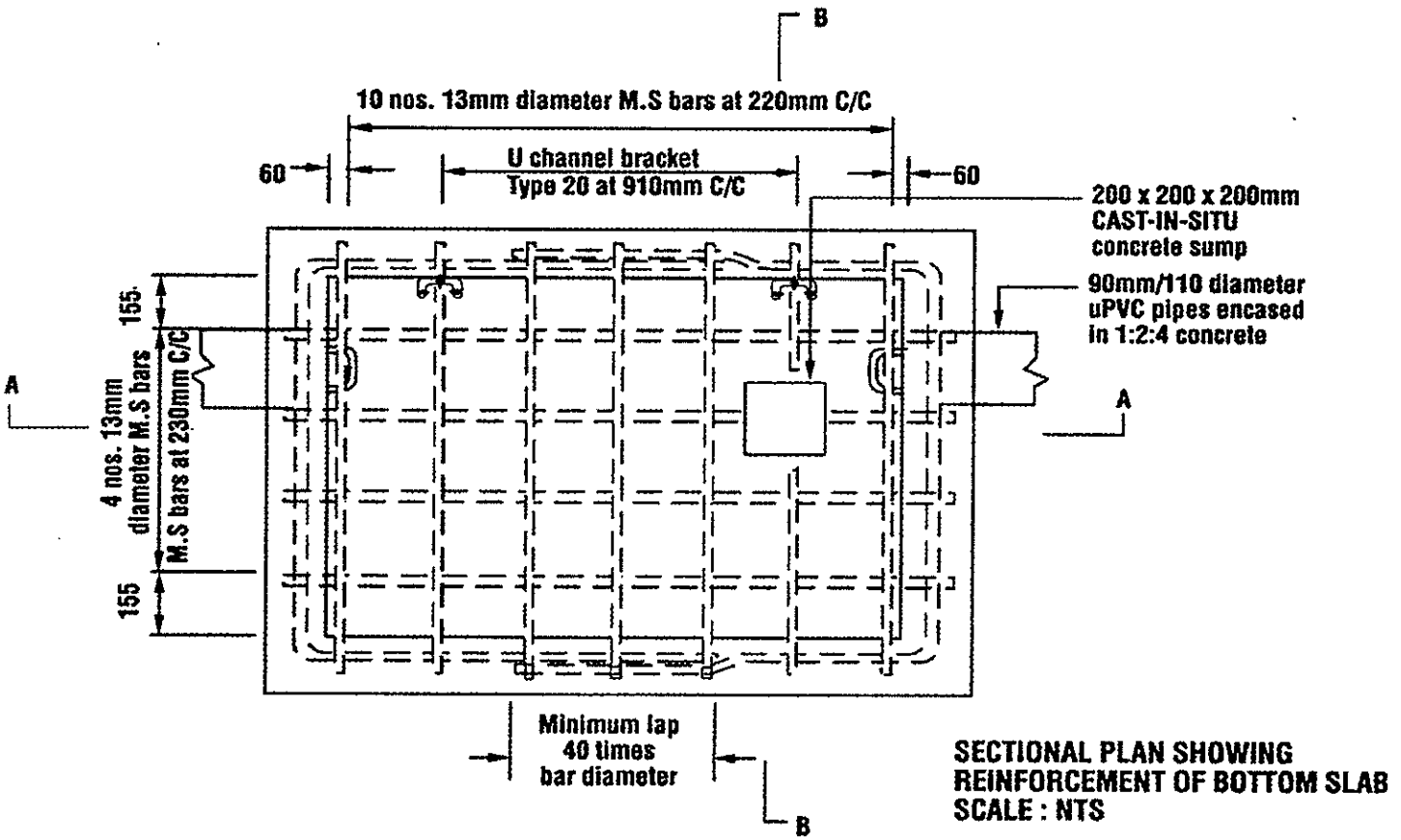


Figure 4.8: Manhole Drawings – Type MX1

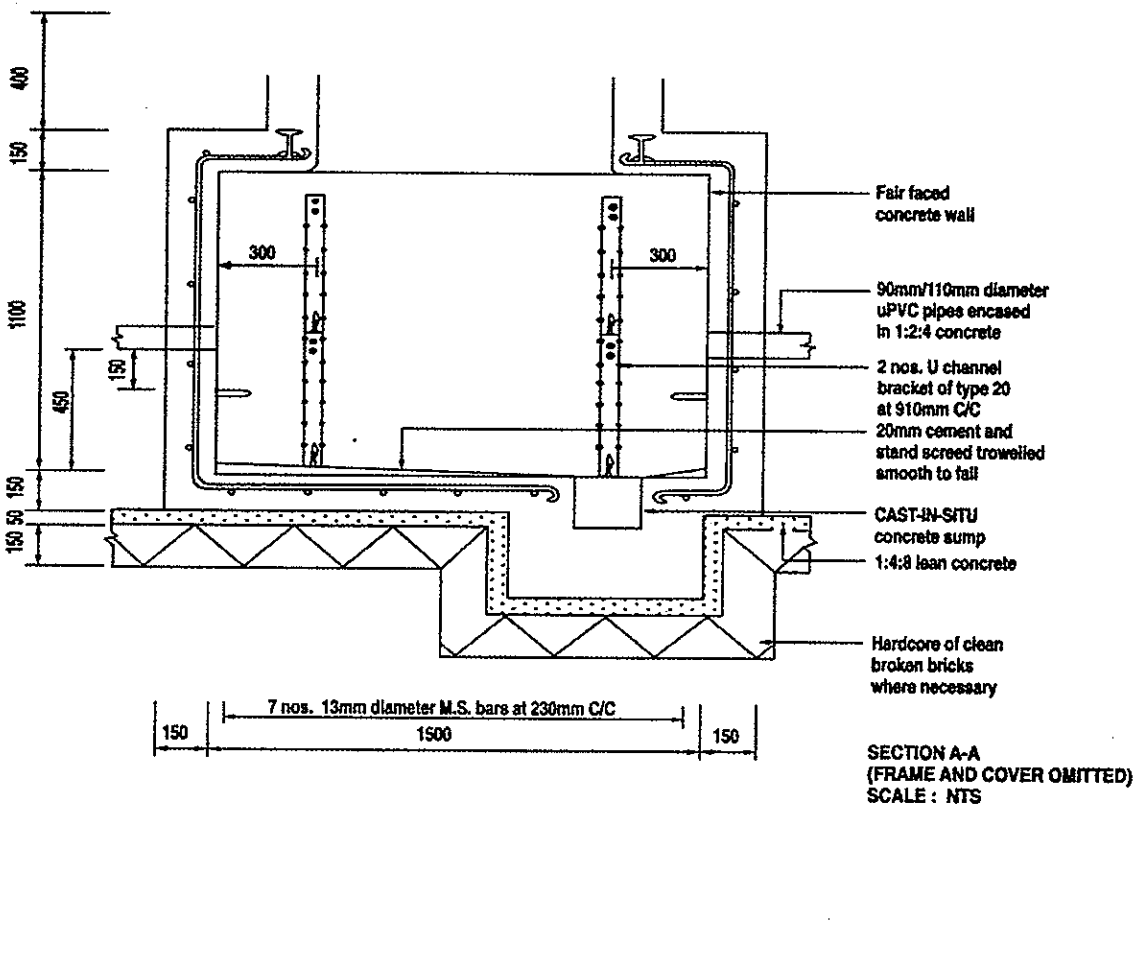


Figure 4.9: Manhole Drawings – Type MX1

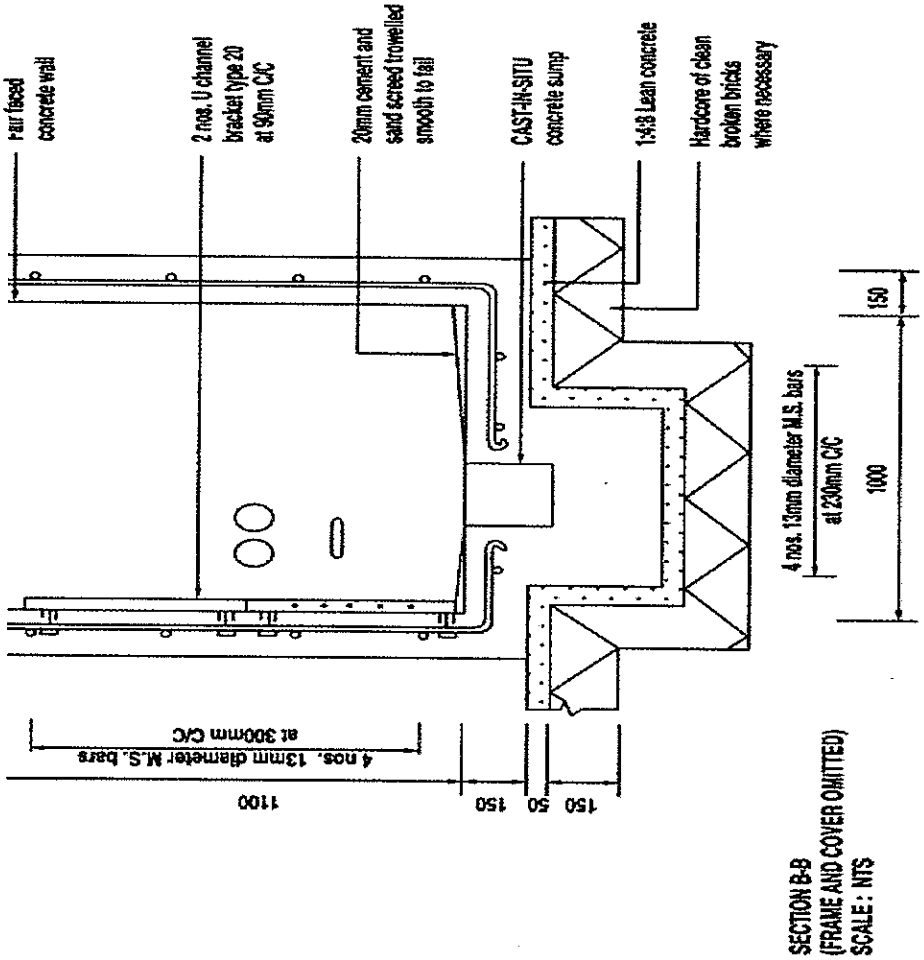
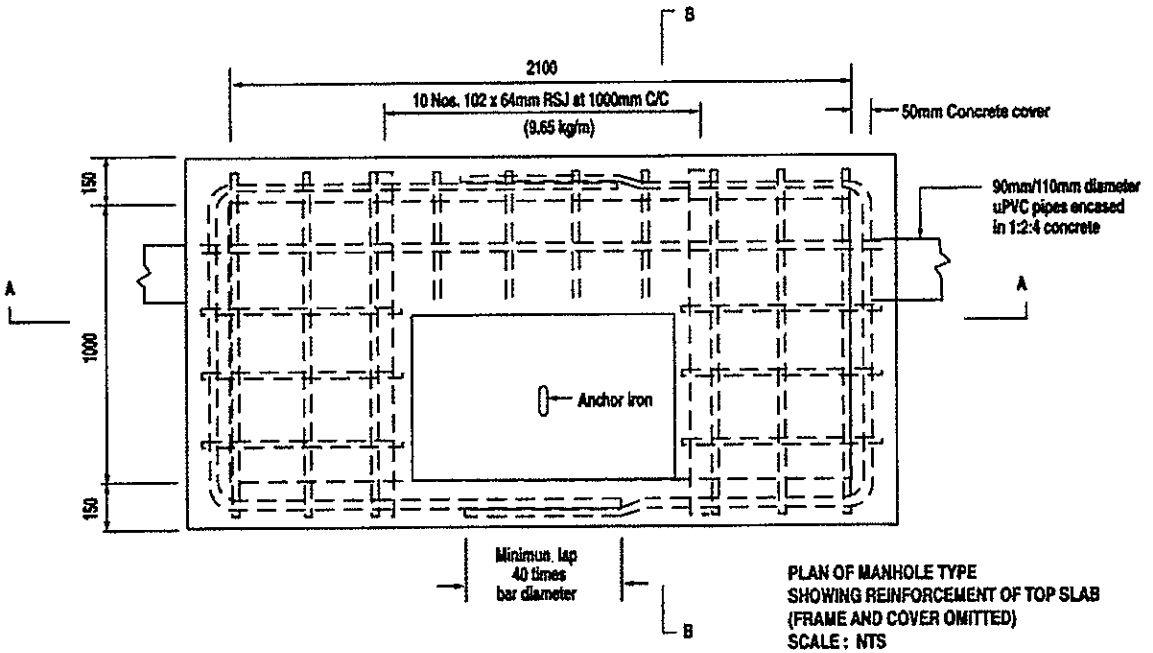


Figure 4.10: Manhole Drawings – Type MX2



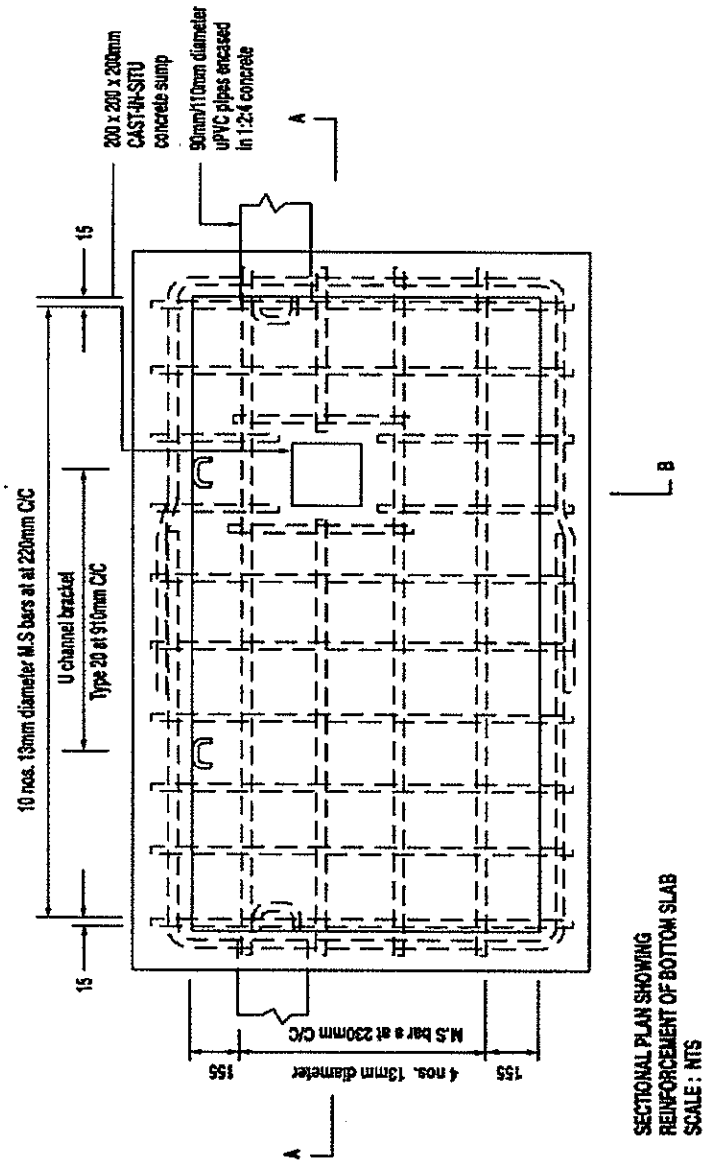


Figure 4.11: Manhole Drawings – Type MX2

Figure 4.12: Manhole Drawings – Type MX2

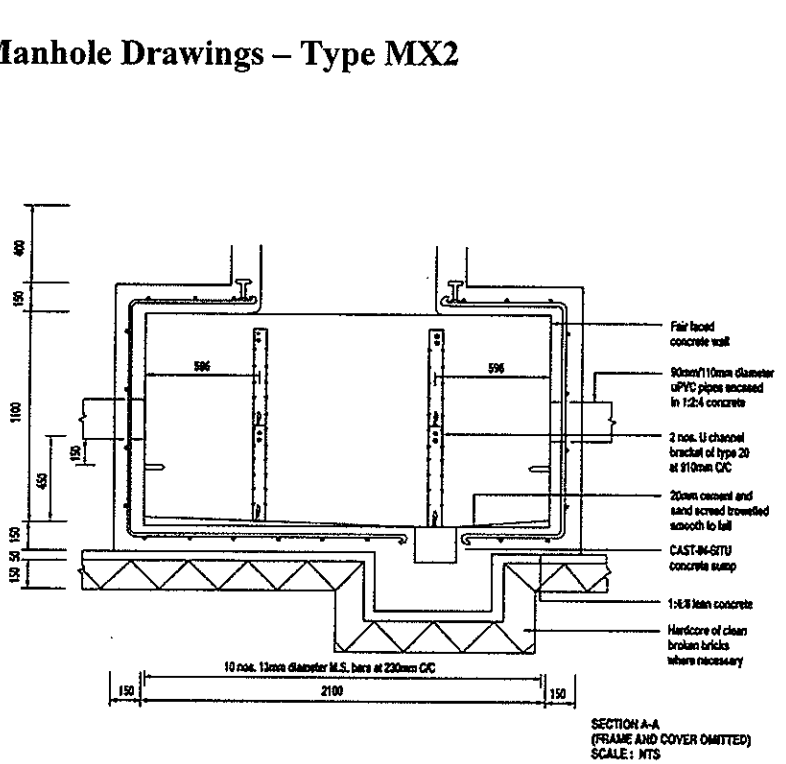


Figure 4.13: Manhole Drawings – Type MX2

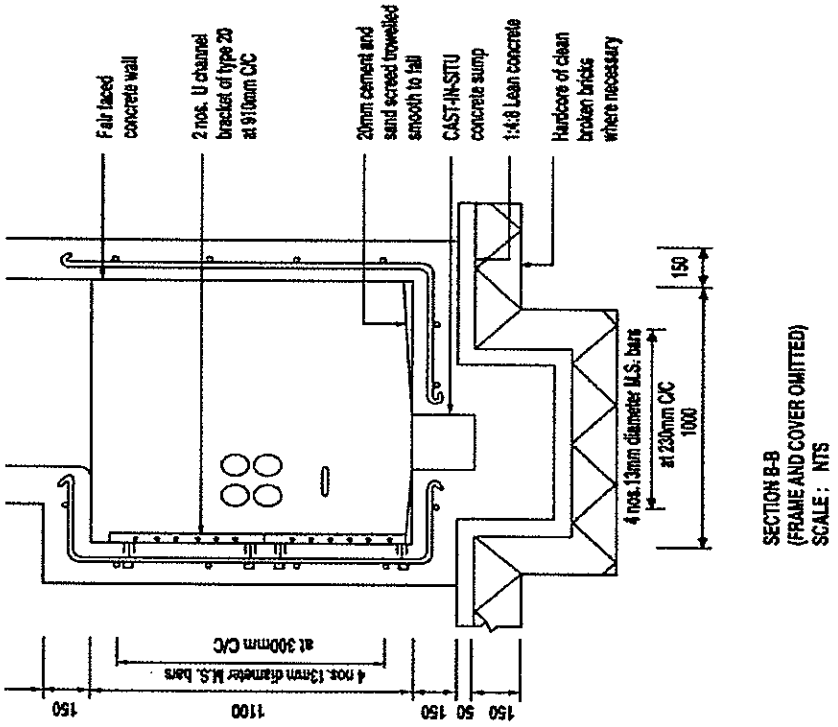


Figure 4.14: Manhole Drawings – Type MX1 & MX2

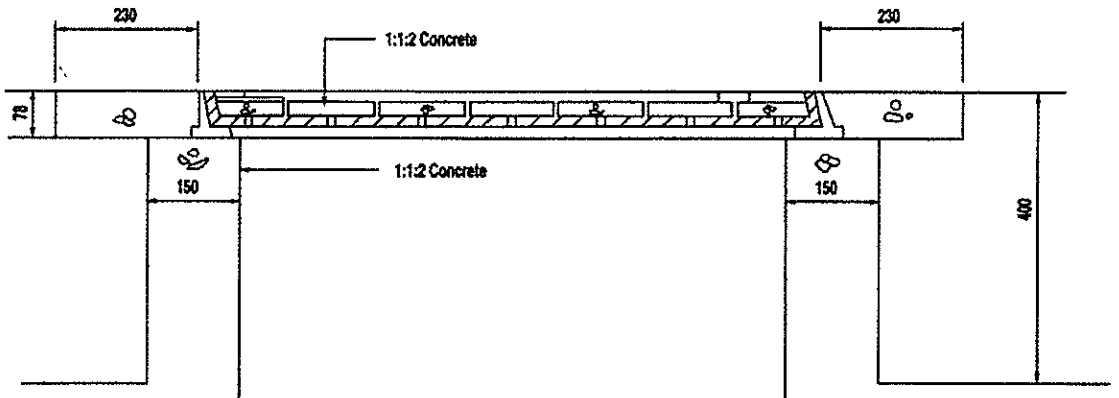


Figure 4.15: Manhole Drawings – Type MX1 & MX2

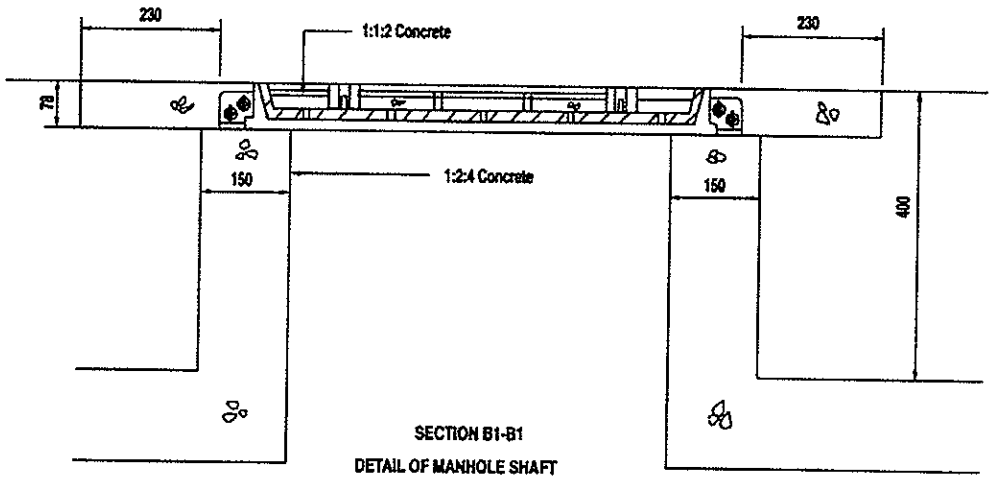
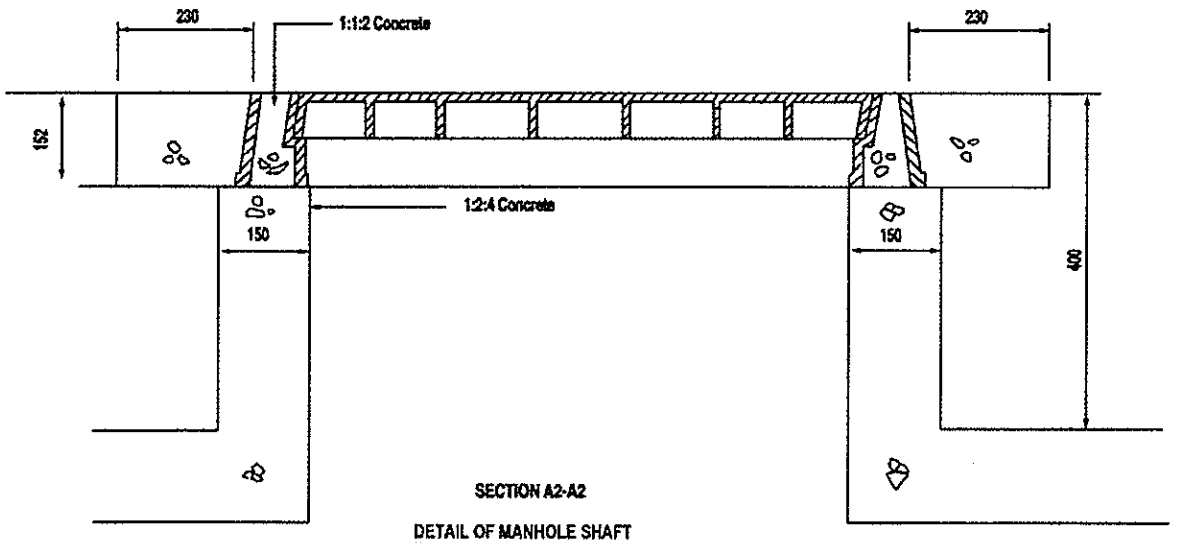


Figure 4.16: Manhole Drawings – Type MX1 & MX2



SECTION A2-A2

DETAIL OF MANHOLE SHAFT
FOR TYPE MX 1 AND MX 2
WITH HEAVY DUTY FRAME
AND COVER COMPLIED WITH SS:30
SCALE: NTS

Figure 4.17: Manhole Drawings – Type MX1 & MX2

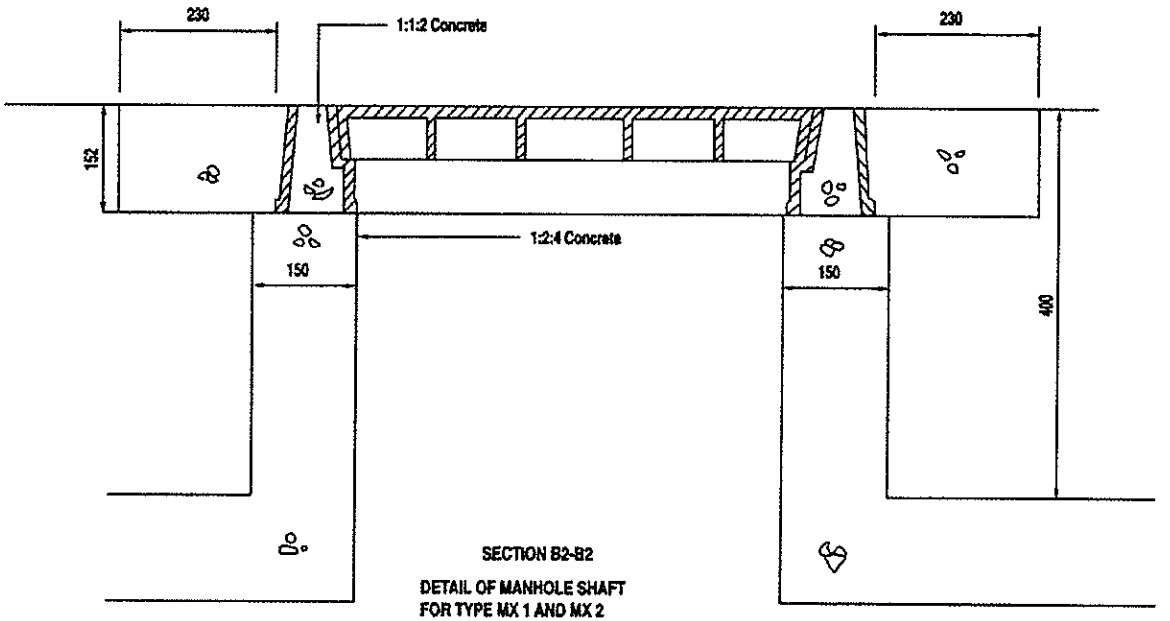
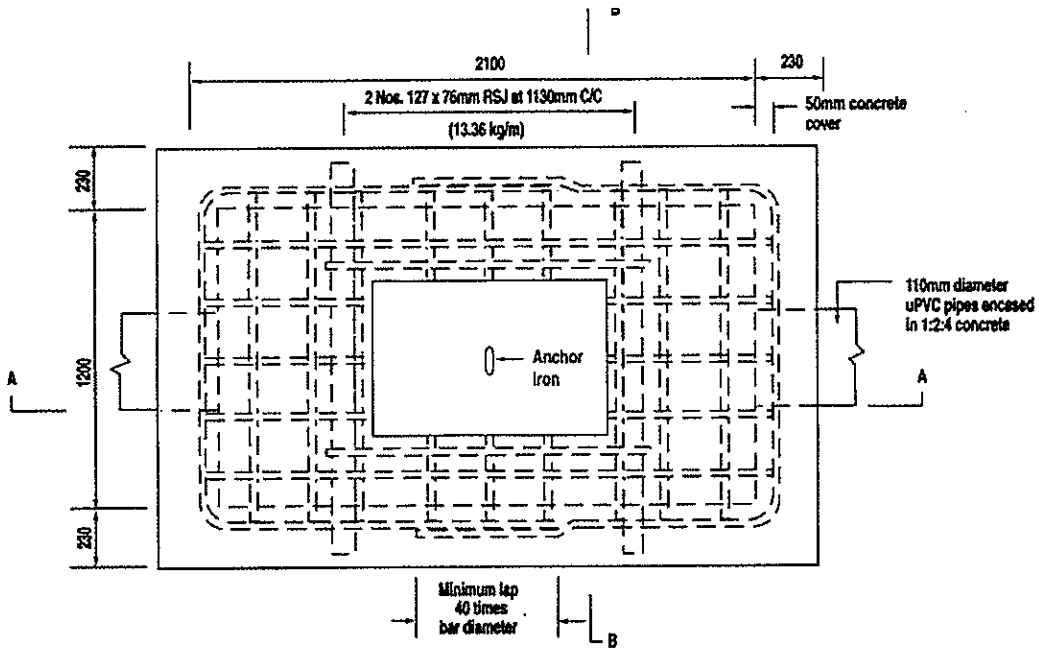


Figure 4.18: Manhole Drawings – Type MX3



PLAN OF MANHOLE TYPE
SHOWING REINFORCEMENT OF TOP SLAB
(FRAME AND COVER OMITTED)
SCALE : NTS

Figure 4.19: Manhole Drawings – Type MX3

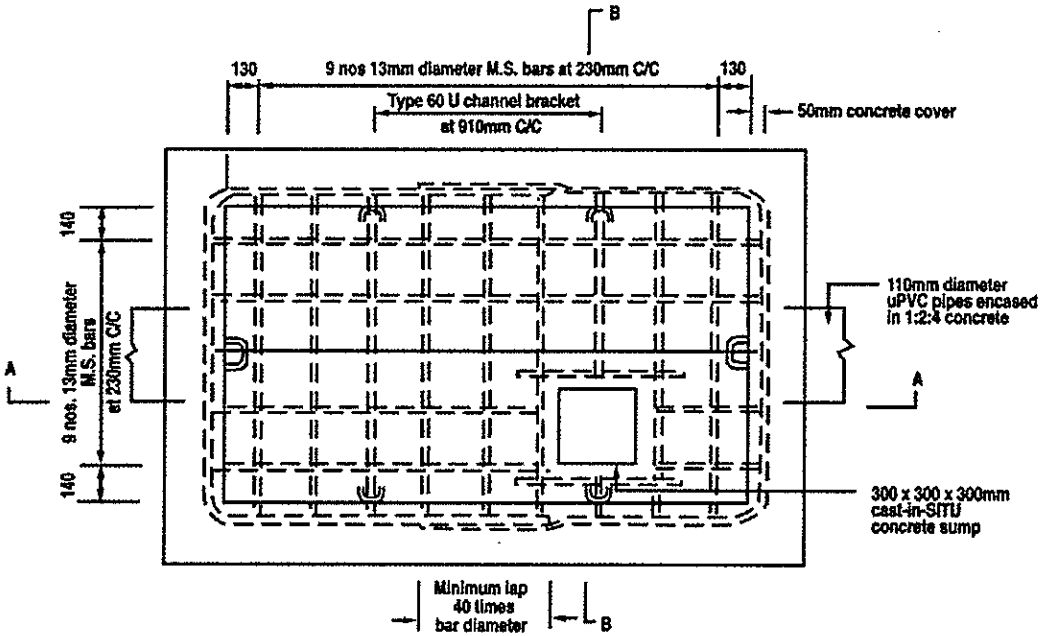


Figure 4.20: Manhole Drawings – Type MX3

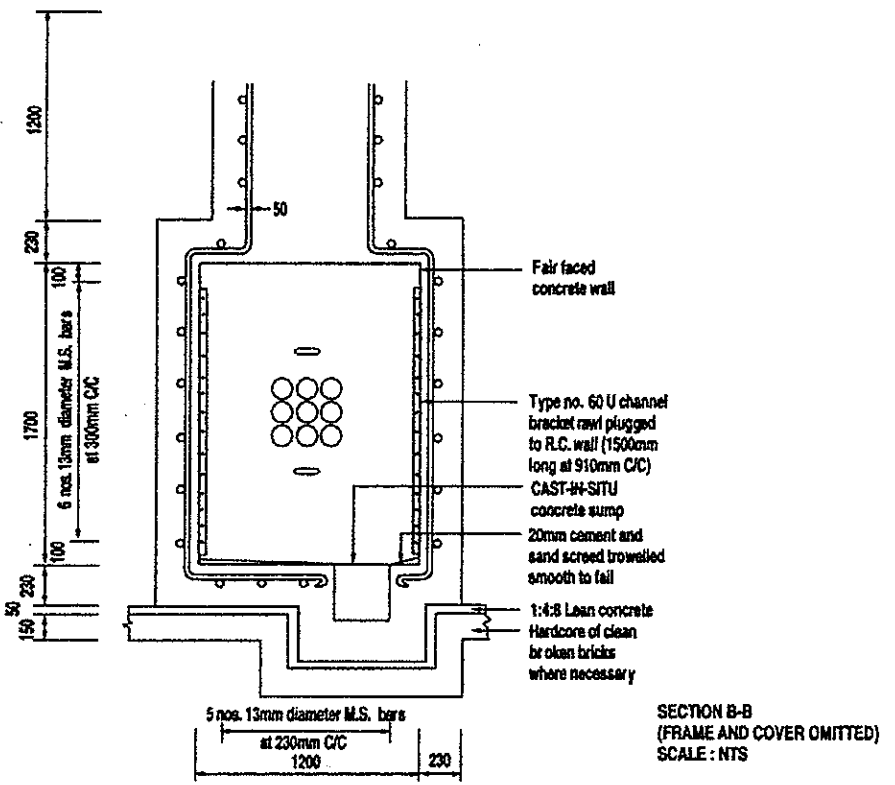
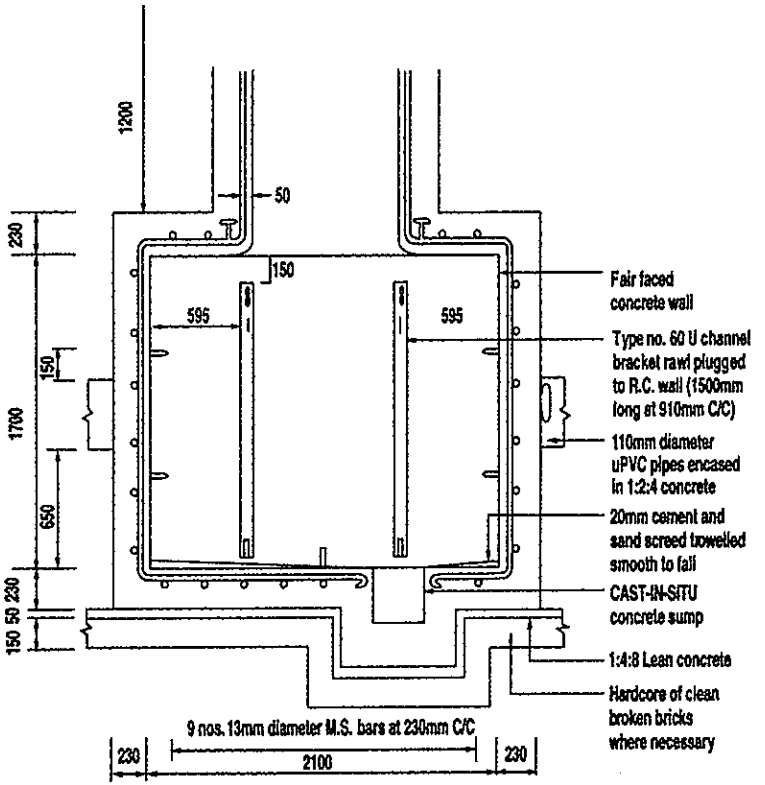
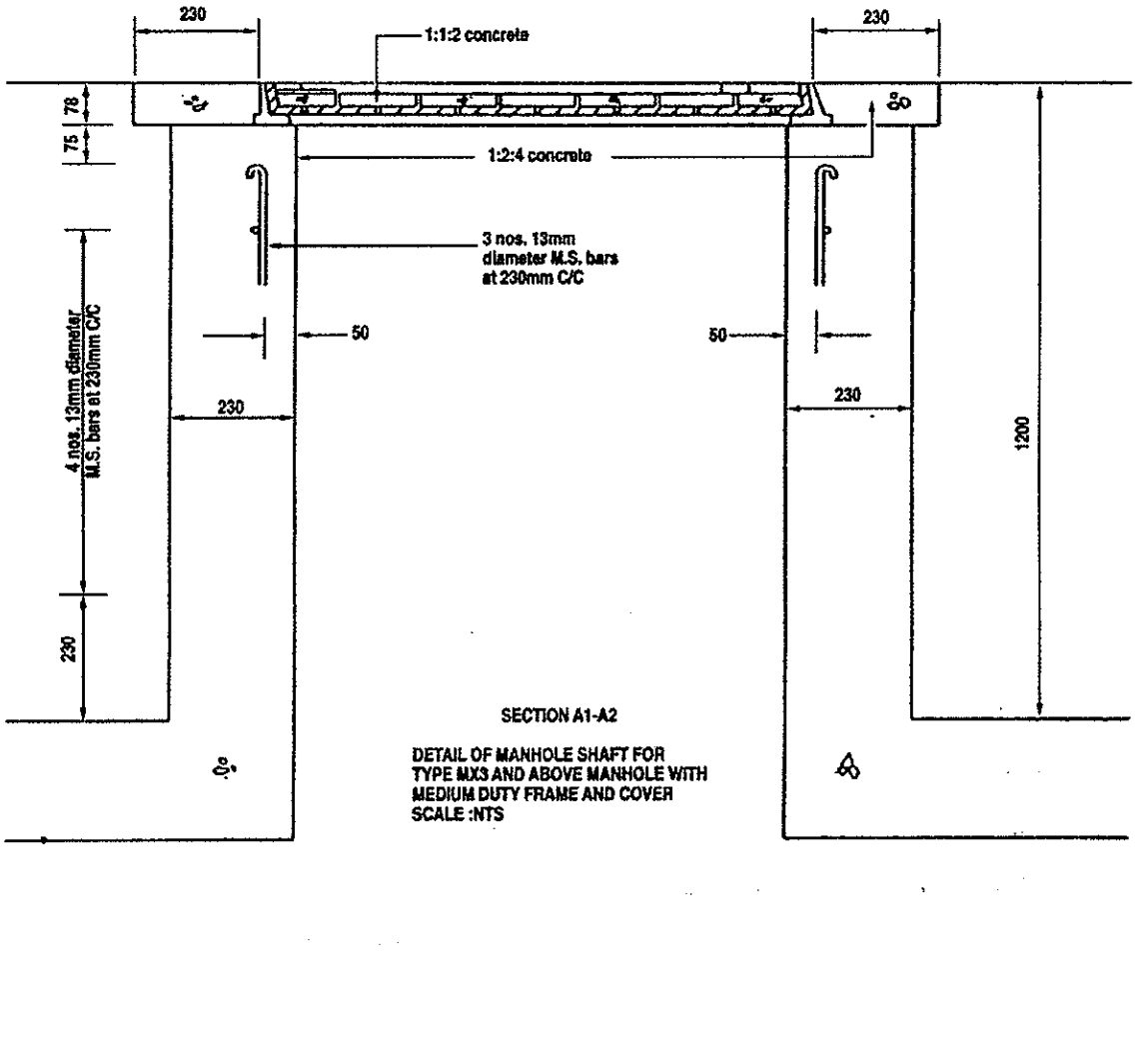


Figure 4.21: Manhole Drawings – Type MX3



SECTION A-A
(FRAME AND COVER OMITTED)
SCALE : NTS

Figure 4.22: Manhole Drawings – Type MX3



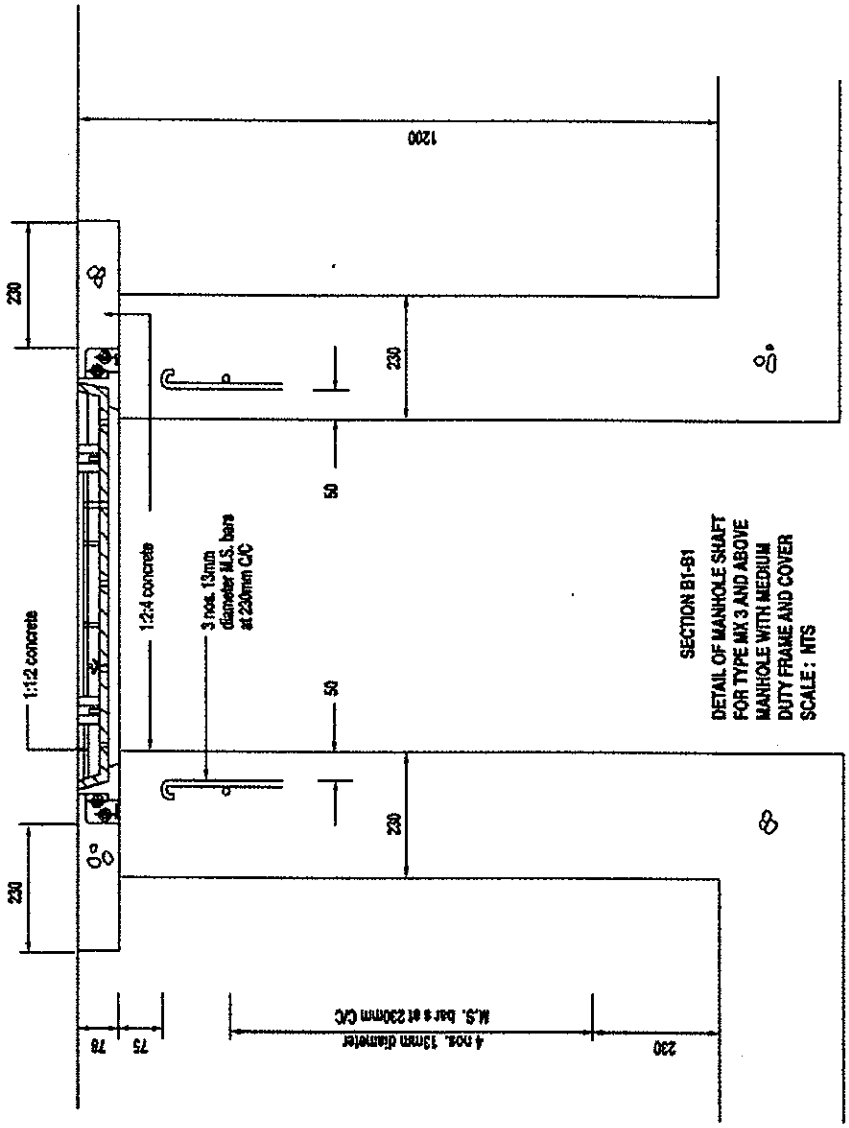
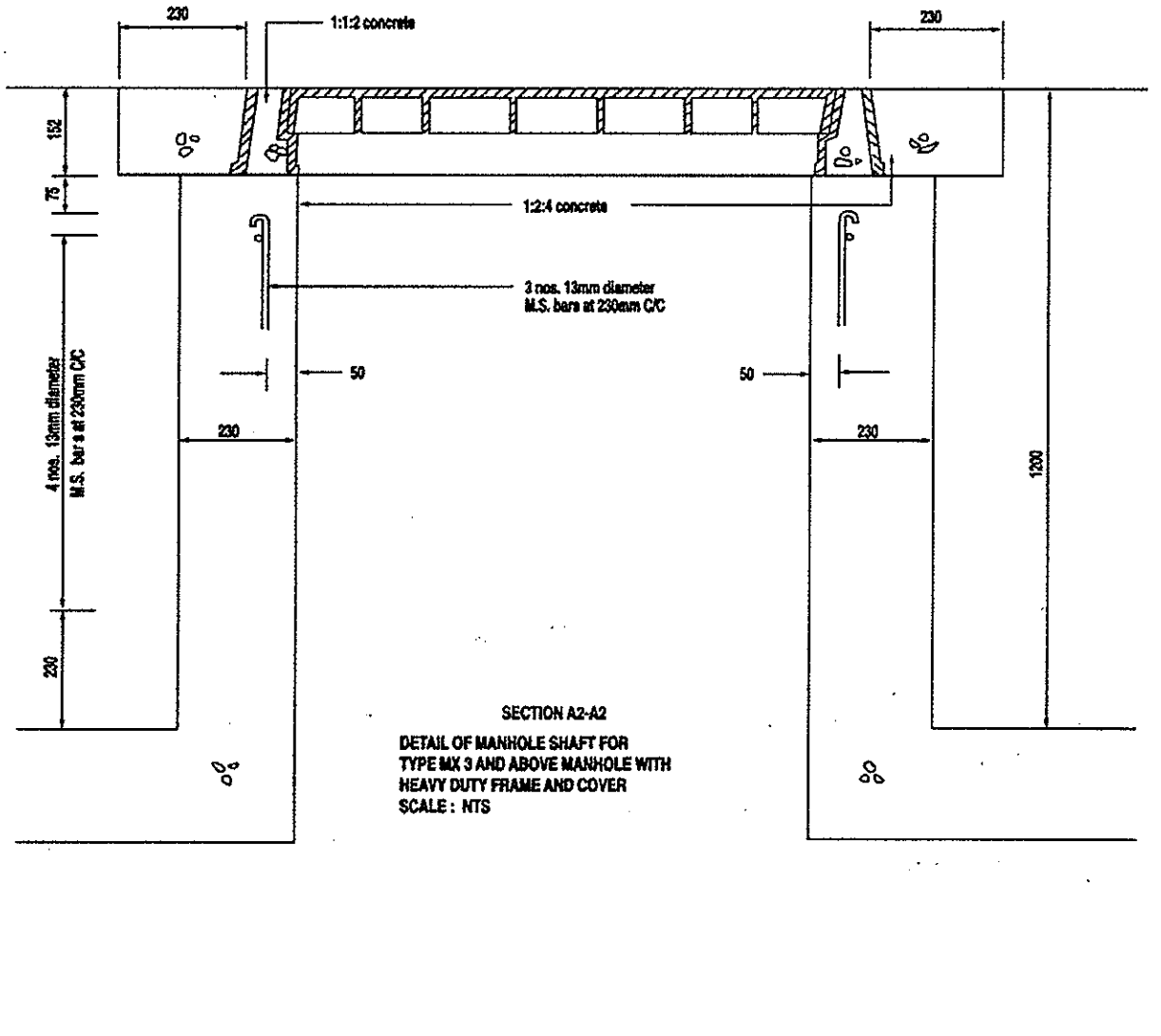


Figure 4.23: Manhole Drawings – Type MX3

Figure 4.24: Manhole Drawings – Type MX3



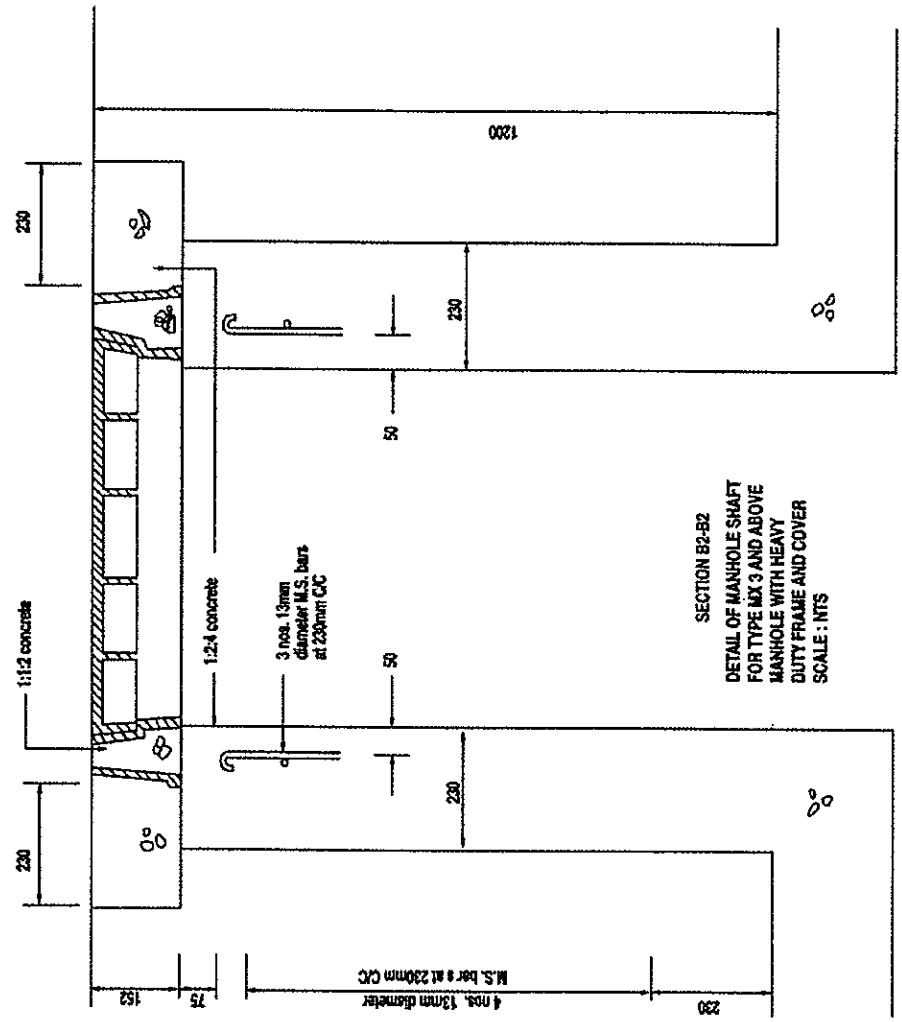
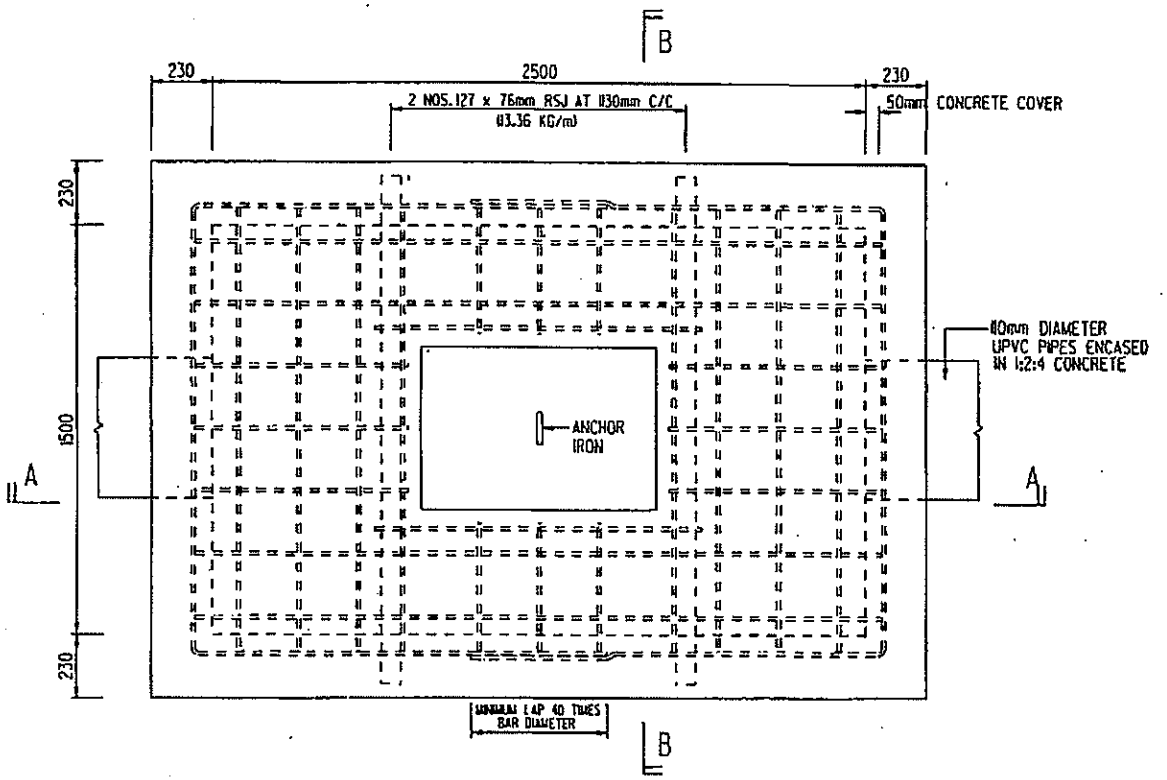


Figure 4.25: Manhole Drawings – Type MX3

Figure 4.26: Manhole Drawings – Type MX4



PLAN OF MANHOLE
SHOWING REINFORCEMENT OF TOP SLAB
(FRAME AND COVER OMITTED)
SCALE : NTS

Figure 4.27: Manhole Drawings – Type MX4

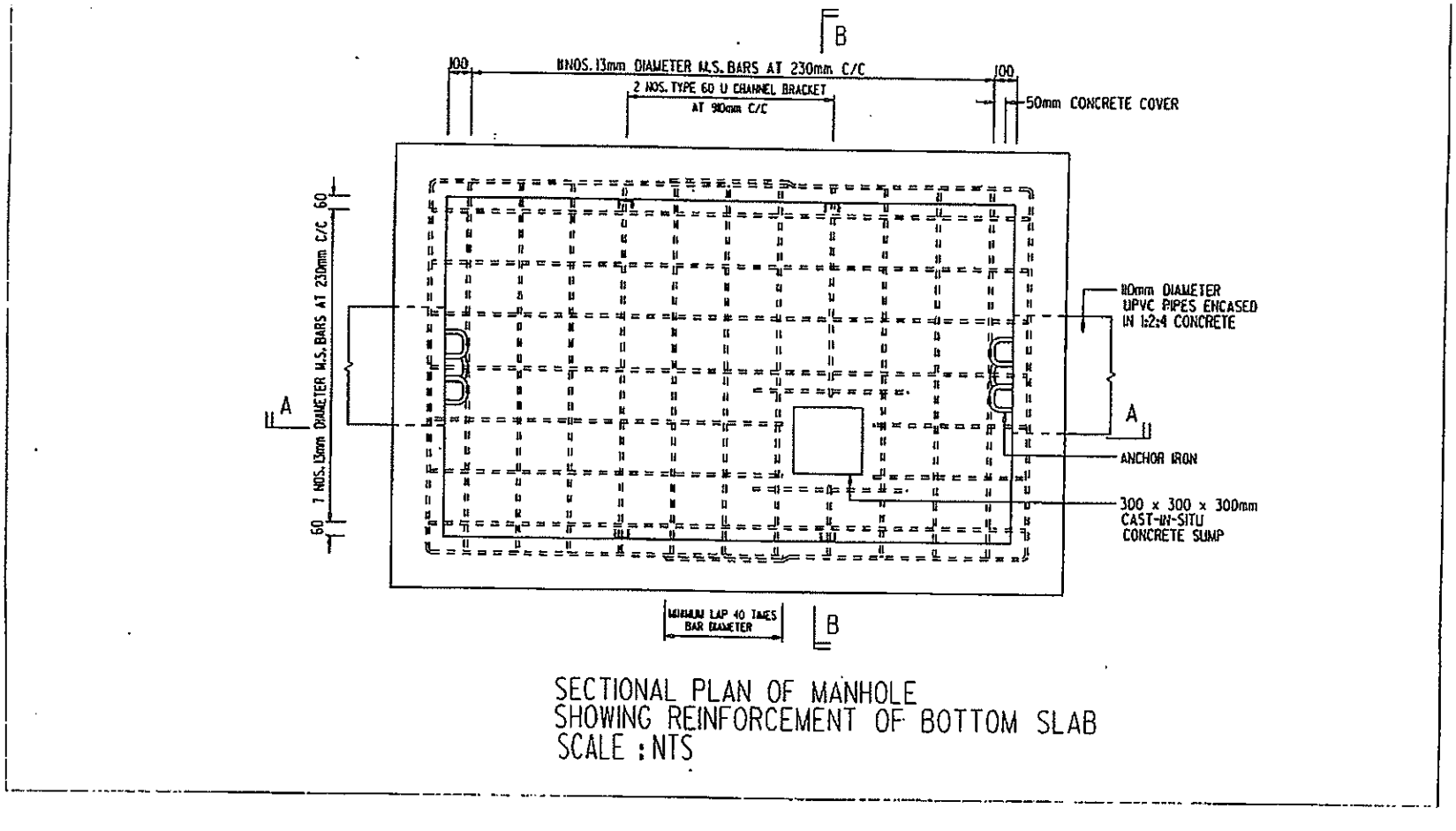


Figure 4.28: Manhole Drawings – Type MX4

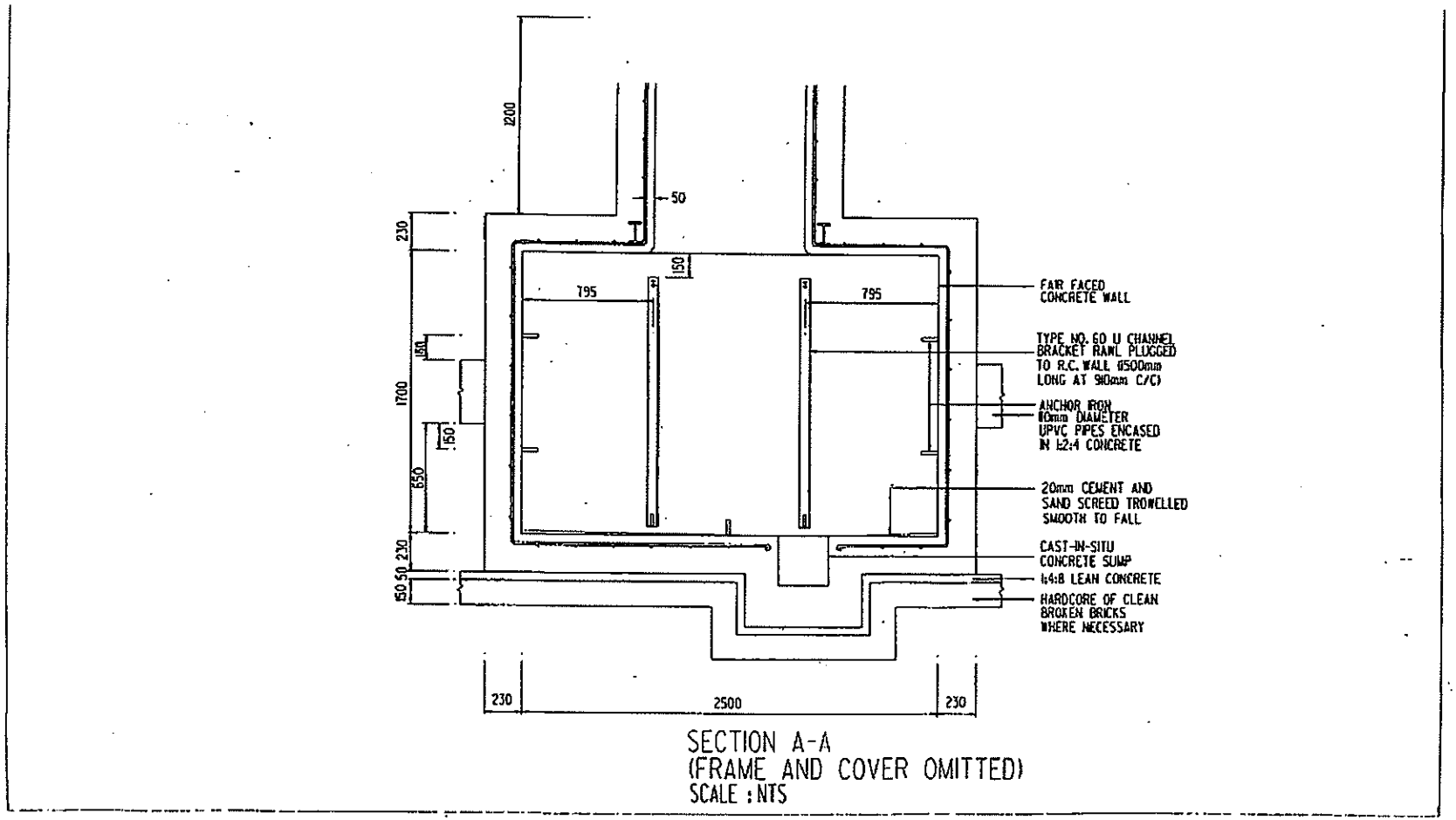
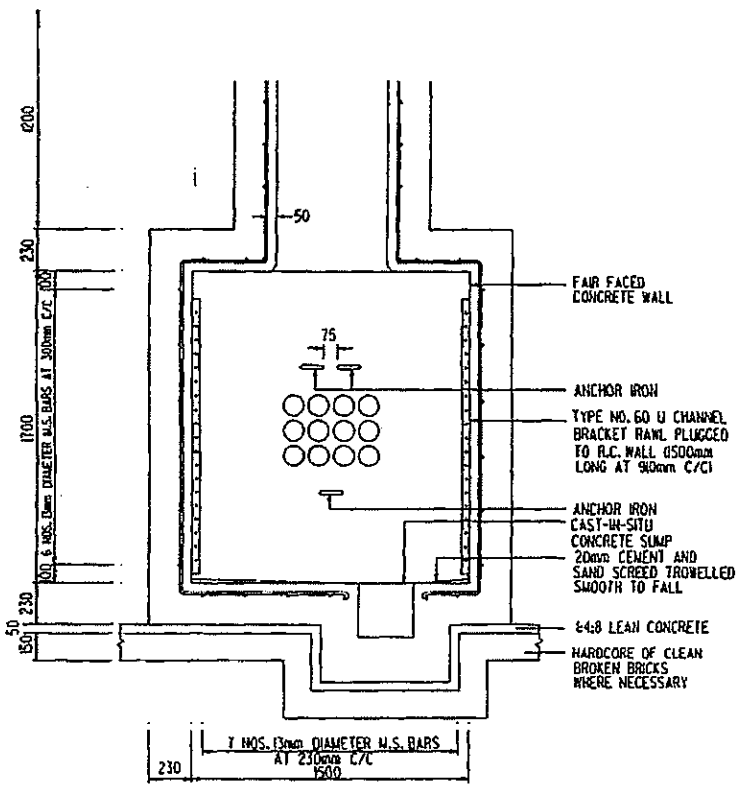


Figure 4.29: Manhole Drawings – Type MX4



SECTION B-B
(FRAME AND COVER OMITTED)
SCALE : NTS

E. ***THIS PART SHALL SUPERSEDE THE EXISTING PART 5 OF COPIF:2000.***

5. MAIN DISTRIBUTION FRAME ROOM

5.1 Overview

5.1.1 This section specifies the requirements for the provision of main distribution frame rooms.

5.1.2 The size and quantity of the main distribution frame room specified in this section are the minimum required to be provided. IDA reserves the right to require any owner of a building to provide larger sized or additional main distribution frame rooms to meet the demand for telecommunication services where necessary.

5.2 No provision required for single-unit landed house

For the avoidance of doubt, an owner of a project consisting solely of a single-unit landed house is not required to provide a main distribution frame room.

5.3 Requirements for residential multi-storey building or building development and cluster or strata landed housing development

5.3.1 Every owner of –

(a) a residential multi-storey building of 40 storeys or less;

(b) a residential multi-storey building development with 1500 units or less and with buildings that are no higher than 40 storeys; or

(c) a cluster or strata landed housing development with 1500 units or less,

shall provide a main distribution frame room in accordance with the size specified in Table 5.3.1 below based on the number of units in the building or development.

Table 5.3.1 Size of main distribution frame room for residential multi-storey building or development and cluster or strata landed housing development

Number of residential units in the building or building development	Size of main distribution frame room (m^2)
2 – 10	4
11 – 20	5
21 – 30	6
31 – 60	8
61 – 120	12
121 – 200	16
201 – 400	20
401 – 600	30
601 – 800	42
801 – 1000	49
1001 – 1500	56

5.3.2 Every owner of –

(a) a residential multi-storey building with more than 1500 units;

(b) a residential multi-storey building of more than 40 storeys in height;

(c) a residential multi-storey building development with more than 1500 units;

(d) a residential multi-storey building development with buildings of more than 40 storeys in height; or

(e) a cluster or strata landed housing development with more than 1500 units,

shall consult IDA on the quantity, size and location of the additional main distribution frame rooms to be provided and comply with such requirements as IDA may impose.

5.4 Requirements for single tenant non-residential building or building development

Every owner of –

(a) a single tenant non-residential building which consists of less than 2,000 m^2 of usable floor area and whose demand for telephone lines does not exceed 50; or

(b) a single tenant non-residential building development which consists of less than 2,000 m^2 of usable floor area and whose demand for telephone lines does not exceed 50,

shall provide a main distribution frame room of 2m by 3m in size.

5.5 Requirements for multi tenant non-residential building or building development

5.5.1 Every owner of –

(a) a multi tenant non-residential building; or

(b) a multi tenant non-residential building development,

shall provide a main distribution frame room in accordance with the size specified in Table 5.5.1 below based on the usable floor area of that building or development. .

Table 5.5.1 Size of main distribution frame room for multi-tenant non-residential building or development

Usable floor area (' 000 m^2)	Size of main distribution frame room (m^2)
Under 2	12
2 – 12	20
12 – 25	30
25 – 50	40
50 – 75	60
75 – 100	80

5.5.2 Every owner of –

(a) a multi tenant non-residential building exceeding 30 storeys in height; or

(b) a multi tenant non-residential development with usable floor area exceeding 60,000 m^2

shall consult IDA on the quantity, size and location of the additional main distribution frame rooms to be provided and comply with such requirements as IDA may direct.

5.6 Shape and dimension

5.6.1 Every owner of a building who is required to provide a main distribution frame room shall –

(a) ensure that the shape of the main distribution frame room is either square or rectangular with a maximum length to width ratio of 2:1; and

(b) where required to provide a main distribution frame room of 4 m^2, 5 m^2 or 6 m^2, ensure that the minimum length or width of such room is at least 2m.

5.7 Location

Every owner of a building who is required to provide a main distribution frame room shall –

(a) site the main distribution frame room at street level or first floor level except that in buildings with more than 1 basement, the main distribution frame room may be located at the topmost basement floor;

(b) site the main distribution frame room as close as possible to the telecommunication risers;

(c) not site the main distribution frame room –

(i) in an area through which any system or network of water pipes, gas pipes or electrical trunking is running;

(ii) under any area that is susceptible to dampness or moisture such as a vehicle washing bay, swimming pool, washroom or toilet;

(iii) in any area which will subject the plant deployed therein to vibration of more than 0.05G, where G is the acceleration due to gravity (G=9.81 m/s^2); or

(iv) in any area where it will be directly subjected to the discharge of steam, fumes, gases or dust; and

(d) where there is no practicable alternative but to site the main distribution frame room in an area that places any opening of the room in close proximity to the discharge of steam, fumes, gases or dust, ensure that –

(i) such opening is sealed to protect the plant deployed in the room; and

(ii) provide appropriate ventilation to the room.

5.8 Construction

5.8.1 Every owner of a building who is required to provide a main distribution frame room shall –

(a) construct the main distribution room of reinforced concrete or brick wall;

(b) finish the surface of the main distribution frame room with cement plaster and ensure that it is free of cracks, blister or other defects;

(c) paint the wall of the main distribution frame room with a light colour durable paint;

(d) ensure that the room is of a minimum height of 3.5m (measured from the floor to ceiling) throughout the entire room to accommodate both the equipment racks and overhead cable ladders in the main distribution frame room;

(e) where it is not practicable to provide a minimum height of 3.5m, provide a cable ladder from the lead-in pipes which is to –

(i) rise up vertically to a height of at least 2.5m and from there run horizontally to at least 3 sides of the walls of the main distribution frame room with a height clearance of at least 300mm from any obstruction above it; and

(ii) have a width which is similar to the collective width of all the pipes entering the main distribution frame room;

(f) finish the floor of the main distribution frame room with vinyl tile or screed;

(g) ensure that the floor of the main distribution room is able to withstand a loading of 480 kg/m^2;

(h) ensure that all doors to the main distribution frame room open outwards fully; and

(i) ensure that the door frames for the doors of the main distribution frame room have a 100mm high concrete skirting/kerb to prevent the ingress of water.

5.8.2 Where an owner of a building provides a main distribution frame room in the form of a standalone structure, such owner shall in addition to the requirements specified in section 5.8.2 ensure that –

(a) the floor of the main distribution frame room is at least 150mm above the immediate external final road or driveway level;

(b) the floor of the main distribution frame room is waterproofed;

(c) the walls of the main distribution frame room are waterproofed;

(d) the emulsion painting system used for the outside wall of the main distribution is suitable for external application;

(e) the ceiling of the main distribution frame room is smoothly finished and emulsion painted;

(f) the roof of the main distribution room is constructed of flat reinforced concrete, suitably waterproofed and constructed to a fall of approximately 1:80 away from the door direction;

(g) proper drainage is provided around the main distribution frame room such as hinged hot-dipped galvanized m.s. gratings;

(h) where applicable, the gate and perimeter fencing is of a minimum height of 1.8m;

(i) the driveway to the main distribution frame room is of a minimum width of 4m and designed to withstand a minimum vehicular load of a 3-tonne vehicle that is typically used; and

(j) all vacant space from the main distribution frame room to the perimeter fencing is paved using tarmac or weld-mesh reinforced concrete with fall designed for quick dispersion of water to surrounding drains.

5.9 Ventilation and air-conditioning

5.9.1 Every owner of a non-residential building who is required to provide a main distribution frame room shall –

(a) provide air-conditioning to the main distribution room from a central system;

(b) ensure that temperature in the main distribution room is 22°C ± 2°C; and

(c) ensure that the relative humidity in the main distribution room is < 70%.

5.9.2 Where the owner of a non-residential building is unable to provide air-conditioning from a central system, such owner shall –

(a) provide louvers on the wall above the door of the main distribution frame room; and

(b) where it is necessary to further ventilate the room, install mechanical exhaust fans at the top corners of the main distribution frame room.

5.9.3 Every owner of a residential building who is required to provide a main distribution frame room shall –

(a) provide louvers on the wall above the door of the main distribution frame room; and

(b) where it is necessary to further ventilate the room, install mechanical exhaust fans at the top corners of the main distribution frame room.

5.10 Electrical

5.10.1 Every owner of a building who is required to provide a main distribution frame room shall –

(a) provide electrical mains to the main distribution frame room from the main distribution board which shall be successfully tested by the competent authority;

(b) provide 2 sets of electrical distribution panels operating on 230V, single phase, 50Hz supply connecting to 13A switch socket outlets and 30A isolators in the main distribution frame room;

(c) in relation to the electrical distribution panels, ensure that –

(i) each panel contains a 40A, 30mA earth leakage circuit breaker and miniature circuit breakers for final circuit connections and to facilitate the installation of electrical meters;

(ii) each panel contains two spare 20A miniature circuit breakers; and

(iii) a single-line diagram is placed in each panel.

(d) ensure that the power supply to the main distribution frame room is connected to the standby generator in the building;

(e) where there is no standby generator in the building, ensure that the 30A isolators are connected to power sockets for connection to portable generators and equipped with a manually activated switch to effect the changeover; and

(f) ensure that the mean lighting illuminance in the main distribution frame room is at least 450 lux at floor level.

5.10.2 In addition to section 5.10.1, owners of a residential building or building development shall provide switch socket outlets and isolators in the main distribution frame room in accordance with the quantities specified in Table 5.10.2 below which are to be distributed evenly between the 2 sets of electrical distribution panels.

Table 5.10.2 Power points and isolators required for main distribution frame room of residential building or development

Total number of residential units in building or development	Minimum number of switch socket outlets to be provided in main distribution frame room	Number of isolators to be provided in main distribution frame room
20 or below	2 x single-15A 2 x twin-13A	Not applicable
21 – 200	4 x twin-13A	2 x 30A
201 and above	4 x twin-13A	2 x 30A

5.10.3 In addition to section 5.10.1, owners of a non-residential building or building development shall provide a minimum of 4 twin-13A switch socket outlets and 2 30A isolators in the main distribution frame room to be distributed evenly between the 2 sets of electrical distribution panels.

5.10.4 In addition to section 5.10.1, owners of a single tenant non-residential building or building development –

(a) which consists of less than 2,000 m^2 of usable floor area; and

(b) whose demand for telephone lines does not exceed 50,

shall provide 2 twin-13A and 2 single-15A switch socket outlets in the main distribution frame room to be distributed evenly between the 2 sets of electrical distribution panels.

5.11 Earthing

5.11.1 Every owner of a building who is required to provide a main distribution frame room shall –

(a) provide a building ground grid (clean earth) of 1Ω or less without the use of salts for earthing of the main distribution frame room;

(b) in relation to the clean earth, ensure that it –

(i) is separated from the electrical supply earthing and lightning earthing systems; and

(ii) is used only for telecommunication plant;

(c) ensure that the earthing point is connected to the earth electrode system via earth cable with a cross section area of not less than $50mm^2$;

(d) ensure that the copper earth bar is at least 600mm long with screw holes that are –

(i) 6mm in diameter; and

(ii) spaced 50mm apart measured from centre to centre; and

(e) place the certified test result of the earth system together with actual layout diagrams showing the earth system arrangement in the main distribution frame room.

F. THIS PART SHALL SUPERSEDE THE EXISTING PART 6 OF COPIF:2000.

6. TELECOMMUNICATION RISERS & TELECOMMUNICATION EQUIPMENT ROOM

6.1 Overview

This section sets out the requirements for the provision of telecommunication risers.

6.2 General requirements

6.2.1 Every owner of a multi-storey building or building development is required to provide telecommunication risers in the buildings.

6.2.2 In providing the telecommunication risers, the owner shall –

(a) ensure that the telecommunication risers are vertically aligned beginning from the first storey or basement of the building, as the case may be, and extending vertically through to the topmost level of the building;

(b) ensure that the serving radius of the telecommunication riser on every storey does not exceed 40m where such serving radius refers to the length of the cable running from an intermediate distribution frame or distribution point located in the telecommunication riser to the telephone outlet served by such riser;

(c) in relation to a non-residential building, provide –

(i) an intermediate distribution frame; and

(ii) a tap box for broadband coaxial cable system,

inside the telecommunication riser on every storey for termination of cables or internal wiring;

(d) in relation to a residential building, provide –

(i) a distribution point, and

(ii) a tap box for broadband coaxial cable system,

inside the telecommunication riser on every storey for termination of cables or internal wiring;

(e) provide a single-leave door on the width side of each telecommunication riser on every storey that can be opened fully outwards and is approximately 2.1m in height except that where the width of the riser exceeds 1.8m, provide double-leave doors;

(f) ensure that the fire-rating of the doors and compartment walls of the telecommunication risers comply with the Fire Code;

(g) provide a 100mm high concrete skirting or kerb around the doors of the telecommunication risers;

(h) ensure that a label with the words "Telecoms Riser" is affixed to the door of the telecommunication risers on every storey and properly numbered;

(i) provide locks for all doors to the telecommunication risers and ensure that the doors are locked at all times except that an owner of a residential building shall not be required to provide locks for the telecommunication risers where he provides 1 vertical metal trunking for telecommunication (non-broadband coaxial cable) system and 1 vertical metal trunking for broadband coaxial cable system in place of cable trays in the telecommunication risers in accordance with the dimensions specified in Table 7.2.2(i) below;

Table 7.2.2(i) Dimension of metal trunking in telecommunication risers of residential building

Type of system	Dimensions of metal trunking
Telecommunications (non-broadband coaxial cable) system	300mm x 100mm
Broadband coaxial cable system	200mm x 100mm

(j) provide adequate lighting to enable licensees to carry out their installation and maintenance work in the telecommunication risers;

(k) ensure that the width and depth of the inter-floor openings for the telecommunication risers are 1.25 times the width and depth of the cable trays or metal trunking;

(l) ensure that the inter-floor openings for the telecommunication risers are sealed with fire resistant material in compliance with the Fire Code after the installation of cables;

(m) where additional cables are required to be installed by licensees, provide reasonable assistance to create openings through the fire resistant material used to seal inter-floor openings and to reseal the inter-floor openings after installation of the cables;

(n) ensure that the walls of the telecommunication risers are smoothly plastered and painted with a light colour;

(o) where telecommunication (non-broadband coaxial cable) system cables are laid from the residential or tenant units in the building to the telecommunication risers, ensure that such cables are terminated into the intermediate distribution frames or distribution points located in the telecommunication risers;

(p) where broadband coaxial cable system cables are laid from the residential or tenant units in the building to the telecommunication risers, ensure that such cables are terminated onto an amplifier (where applicable) or the taps/splitters located in the telecommunication risers; and

(q) ensure that the internal wiring to all units by licensed telecommunication wiring contractors is performed strictly in accordance with the internal wiring schedule.

6.3 Additional requirements for residential building

6.3.1 In addition to section 6.2, every owner of a residential building who is required to provide telecommunication risers shall –

(a) in relation to a residential building with 21 units or more, ensure that all telecommunication risers are at least 800mm in width x 600mm in depth, regardless of the number of risers provided in that building;

(b) in relation to a residential building with 20 units or less, ensure that all telecommunication risers are at least 600mm in width x 450mm in depth, regardless of the number of risers provided in that building;

(c) provide 2 cable trays or 2 metal trunking in the telecommunication risers to facilitate the installation of cables in accordance with the dimensions specified in Table 7.3.1(c) below.

Table 6.3.1(c) Minimum dimensions of cable trays or metal trunking in telecommunication risers of residential building

Type of telecommunication system	Up to 25 Storeys	Up to 50 Storeys
Cable trays		
For telecommunication (non-broadband coaxial cable) system	200mm (width)	300mm (width)
For broadband coaxial cable system	100mm (width)	150mm (width)
Metal trunking		
For telecommunication (non-broadband coaxial cable) system	300mm by 100mm	
For broadband coaxial cable system	200mm by 100mm	

(d) where both a master antenna television system (MATV) and a broadband coaxial cable system are installed in the building, increase the width of the cable tray or metal trunking to be used for broadband coaxial cable system by an additional 50mm.

6.4 Additional requirements for non-residential building

In addition to section 6.2, every owner of a non-residential building who is required to provide telecommunication risers shall –

(a) in relation to a non-residential building or building development with more than 60,000 m^2 of usable floor area, ensure that the telecommunication risers are at least 1600mm in width x 800mm in depth, regardless of the number of risers provided in that building or development;

(b) in relation to a non-residential building or building development with 60,000 m^2 or less of usable floor area, ensure that the telecommunication risers are at least 1100mm in width x 800mm in depth, regardless of the number of risers provided in that building or development;

(c) in relation to a single-tenant non-residential building –

(i) of less than 2,000 m^2 usable floor area for telecommunication services; and

(ii) whose demand for telephone lines does not exceed 50,

provide telecommunication risers of minimum size of 600mm in width and 450mm in depth;

(d) provide 2 cable trays or cable ladders in the telecommunication risers to facilitate the installation of cables in accordance with the dimensions specified in Table 6.4(d) below; and

Table 6.4(d) Dimensions of cable trays/cable ladders in telecommunication risers of non-residential building

Type of telecommunication system	Up to 25 storeys	Above 25 storeys
Cable trays/cable ladders		
For telecommunications (non-broadband coaxial cable) system	450mm (width)	600mm (width)
For broadband coaxial cable system	100mm (width)	150 mm (width)

(e) where the owner installs both a master antenna television system (MATV) and a broadband coaxial cable system in the building, increase the width of the cable tray or metal trunking to be used for broadband coaxial cable system by an additional 50mm.

6.5 Internal wiring schedule

Every owner of a building who is required to provide internal wiring for the building shall –

(a) prominently display an internal wiring schedule in all main distribution frame rooms and telecommunication equipment rooms indicating the unit number of the tenants to be served by the telecommunication risers branching from such main distribution frame rooms or telecommunication equipment rooms as the case may be;

(b) ensure that the internal wiring schedule is in the format shown in Table 6.5(b) below; and

Table 6.5(b) Internal wiring schedule

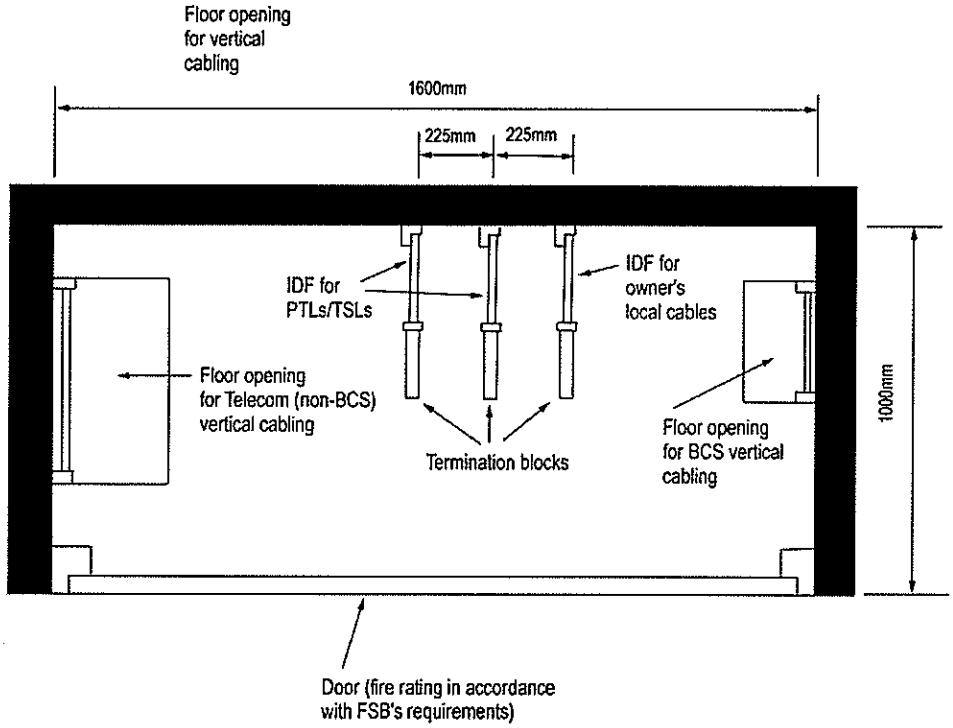
Telecom riser number	Address of unit served

(c) extend a copy of the internal wiring schedule to licensees upon their request.

6.6 Placement of cables in telecommunication risers

Every owner of a building who is required to provide telecommunication risers shall ensure that the cables and associated cabling facilities for telecommunications (non-broadband coaxial cable) system and broadband coaxial cable system are placed as far apart as possible in the configuration shown in Figure 6.6 below.

Figure 6.6: Typical Layout in Riser Duct



SCALE: NTS

6.7 TELECOMMUNICATION EQUIPMENT ROOM FOR FLATS AND CONDOMINIUMS

6.7.1 To cater for the provision of telephone and broadband services via fibre-based transmission equipment, a telecommunication equipment room (TER) of the following size is to be provided in each block of apartments or condominiums.

No. of units	Size of TER
2 to 10	2m x 2m
11 to 20	2m x 3m
21 to 60	3m x 3m
61 to 120	3m x 4m
121 to 200	4m x 4m

6.7.2 The specifications for building, electrical and earthing requirements for the TER are as follows:

a) High level vents for natural ventilation;

b) It should not be located under or near wet area. Floor to be raised 100mm to prevent ingress of water and screeded. Alternatively, a kerb of 100mm high, shall be provided.

c) Internal walls to be plastered and painted a light colour.

d) For 20 or less dwelling units, 2 nos. of 15A and 2 nos. of twin 13A power points are to be provided; or
For 21 units or above, 2 nos. of 30A isolators and 2 nos. of twin 13A power points are to be provided;

e) Two 40W fluorescent tube lamps, with on/off switch. Circuit breaker to be located with the TER;

f) For earthing requirements inside the TER, see Part 4 paragraph 5.11.

g) The number of 110mm ∅ uPVC lead-in pipes to be provided shall be as follows:

No. of units	No. of lead-in pipes
2 to 20	4 (2 x 2)
21 to 120	6 (2 x 3)
121 to 200	8 (2 x 4)

Note: Where an MDF room is provided in a residential block which is linked by underground telecommunication uPVC pipes to other TER(s) within the same residential development boundary, the number of lead-in pipes to be provided to the MDF room shall be increased by four numbers.