

CHAPTER 7

PROJECT EVALUATION

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The United Republic of Tanzania is now implementing an economic recovery program (1986 - 1989) in which the highest priorities are placed on improving industrial productivity, modernizing infrastructure, and improving the international balance of payments. However, the country is far behind in modernizing its telecommunications facilities, a situation which is obstructing not only social, economic, and government activity, but also the very implementation of the recovery program. This failure to implement more timely modernization is particularly damaging in the capital city of Dar es Salaam, which is the center of national life and activity in Tanzania. Against this background, the implementation of this rehabilitation project can be expected to yield the following benefits.

(1) Advancement of economic recovery program

Government offices, international organizations, and foreign embassies are concentrated in the project areas. The improved telecommunications services which this rehabilitation project will facilitate rapid and smooth information transmission. This will improve the efficiency of both government activity and the aid projects carried on by foreign countries and international organizations, which will in turn promote the advancement of the economic recovery program. In order to achieve the objectives of the economic recovery program, certain public policies have been proposed, including fiscal and monetary policies to improve the efficiency of resource allocation, the rationalization of public sector activities, and the improvement of economic administration. Telecommunications will surely make a significant contribution as a supportive means of advancing the program.

(2) Promotion of greater economic activity

Telecommunications is supportive of such economic activities as industrial production and distribution. The improvement of communications services in the project areas where there is a concentration of financial institutions, corporate offices, hotels, and retail businesses, in addition to the institutions and organizations noted above in (1), can be expected to contribute significantly to stimulating greater economic activity. The Government of Tanzania is seeking to achieve an annual growth rate of 5% in its GDP as a result of the economic recovery program, in which high priority is being given to the development of agriculture and related shipping and transport fields. Improved telecommunications is expected to contribute greatly toward realizing these objectives.

(3) Enhancement of social welfare

Telecommunications makes it possible to transmit information rapidly in emergencies, such as calling a doctor for a sudden illness, notifying the fire department or other rescue personnel when a disaster occurs, and notifying the police when a crime is committed. Hence telecommunications contributes greatly to public welfare. In the event of a fire or other disaster, for example, prompt emergency calls can prevent the destruction and waste of public property. By preventing stagnation in industrial production, moreover, telecommunications can minimize economic losses as well as raise the living standard and quality of life, factors which are basic to the support of everyday life. This project will surely enhance the public welfare for the approximately 110,000 people (roughly 10% of Dar es Salaam's population) residing in the project areas. This effect should be further intensified by the fact that the government agencies which respond to emergencies are concentrated in these same project areas.

(4) Reduction of facility management and maintenance costs

The modernization of the external facilities, switching equipment, and junction facilities in the project areas will drastically reduce the numbers of faults. This will facilitate reductions in facility management and maintenance costs as well as maintenance staff reductions. According to NTT's maintenance statistics, the facility modernizations will cut malfunctions to 1/15 of their former level in external facilities, and to 1/10 of their former level in switching facilities.

After the implementation of this plan, the equipment will be equal to the materials being used at NTT, and TPTC's equipment maintenance control system will also be regulated, so the same level of efficiency can be expected.

The surplus management and maintenance funds and surplus maintenance personnel resulting from the implementation of this project can be reallocated to those areas yet to be rehabilitated. This will further enhance the effectiveness of the modernization and renovation

CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS

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8-1 Conclusions

Based on the analysis presented in the foregoing chapters, the implementation of this rehabilitation project will contribute greatly to the advancement of the economic recovery program now being undertaken in the United Republic of Tanzania, and to the promotion of greater economic activity and the enhancement of public welfare in that nation. The project areas embrace the sections of the capital city of Dar es Salaam which constitute the center of government and economic activity in Tanzania. The modernization of telecommunications facilities in these areas will not only benefit those areas, but will also have a wider effect on the entire nation.

The primary implementing authority in this project is TPTC, a public corporation which has adequate technical, staff, and managerial resources to handle the project. It is believed that TPTC will properly carry out facility management and maintenance operations following the completion of the project.

In view of the foregoing considerations, the application of grant aid by the Government of Japan for the implementation of this project is believed to be highly appropriate.

8-2 Recommendations

- (1) In order to implement this project smoothly and without delay, after exchange of notes (E/N), the Government of Tanzania will, as quickly as possible, implement budgetary measures to cover the portions of the project for which Tanzania is responsible.
- (2) Tanzania will have to take the following measures to ensure maximum utilization and effective maintenance and operation in the future of the telecommunications systems installed under this plan.
 - 1) Provide education to ensure availability of personnel with sufficient technical skill required for maintenance and operation, and ensure sufficient numbers of personnel.
 - 2) Implement improved funds procurement methods and increase income to facilitate procurement of required maintenance and repair parts from funds on hand.
 - 3) The general operating costs have a very big influence on the balance of revenues and expenditures, and consequently TPTC should work hard to reduce significantly the proportion of general operating costs in overall expenditures.

4) Introduce digital exchanges, optical fiber cables, and other advanced technology to implement sufficient control and supervision of increased equipment to prevent artificial interference from work at other locations and from communciations on other lines.

(3) The increased support and control resulting from implementation of this plan, as well as the increased assignment of maintenance personnel to the supervision of the equipment installed under it, will significantly expand and strengthen the technological network. Implementation of the plan will also produce much bigger returns on investment.

We can expect progress to result from the achievement of the goals of the Tanzania economic promotion plan and completion of the TPTC five-year development plan.

ANNEXES

Annex 1 Minutes of discussions (on survey)

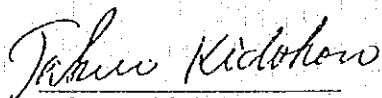
Minutes of Discussions
on
The Telecommunications Network Rehabilitation Project
in
Dar es Salaam Area
in
The United Republic of Tanzania

In response to the request by the Government of the United Republic of Tanzania, the Government of Japan has decided to conduct a basic design study on "The Telecommunications Network Rehabilitation Project in Dar es Salaam Area" (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent a basic design study team (hereinafter referred to as "the Team") headed by Mr. Takuo Kidokoro, Assistant Director, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, to Dar es Salaam in Tanzania from 16th January to 14th February, 1989.

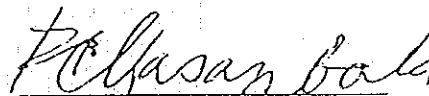
The Team had a series of discussions on the Project with the officials concerned of the Government of the United Republic of Tanzania headed by Mr. F.C. Kasambala, Director General, Tanzania Posts and Telecommunications Corporation (TPTC) and conducted a field survey in Dar es Salaam Area.

As a result of discussions, both parties have agreed to recommend to their respective governments that the major points of undertaking reached between them, attached herewith, should be examined towards the realization of the Project.

Dar es Salaam, 25th January, 1989



Takuo Kidokoro
Leader
Basic Design Study Team,
JICA



F.C. Kasambala
Director General
TPTC

Endorsed by



M.T. Kibwana
Commissioner for External Finance,
Ministry of Finance,
Economic Affairs and Planning

Attachment

1. The objective of the Project is to provide communications facilities and equipment for the rehabilitation of telecommunications network in Dar es Salaam Area.
2. The Tanzania Posts and Telecommunications Corporation (TPTC) shall be an executing and coordinating body for the Project.
3. The requests made by the Government of Tanzania are as follows:
 - (1) Rehabilitation of subscriber cable network consisting of cable work and associated civil work in the proposed areas being composed by following areas as shown in Annex I:
 - a) Oyster Bay Exchange Area.
 - b) A part of Central Exchange Area.

The Project area consisting of objective cabinet areas will be selected on cabinet area basis according to the priority order as shown in Annex II within the scope of the Grant.

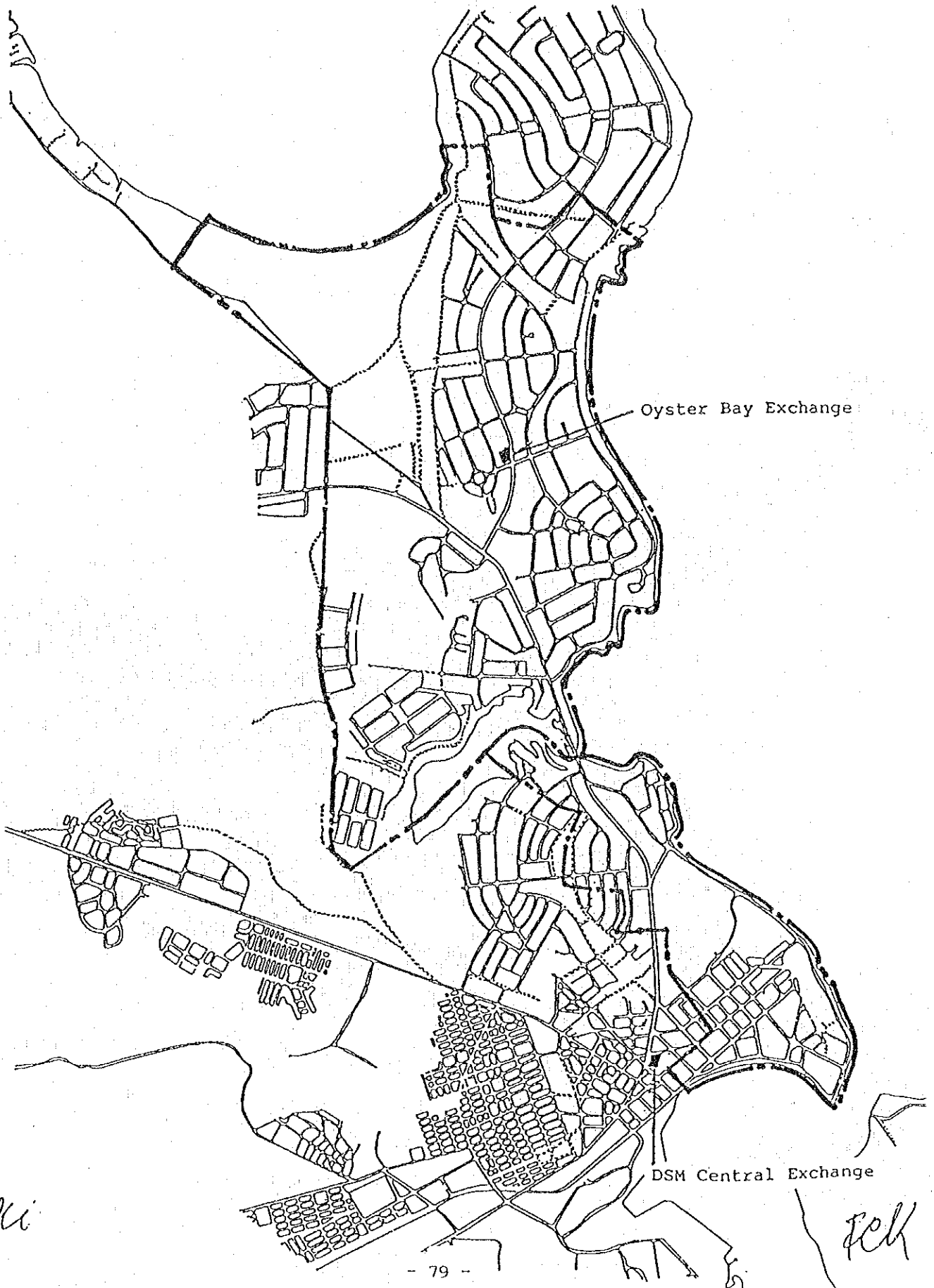
- (2) Rehabilitation of junction cable network by using fiber optic transmission system (FOTS) and associated civil work, between Oyster Bay and Central Exchanges.
 - (3) Replacement of existing old step by step exchange by using a mobile type digital local exchange (4,000 line units) in Oyster Bay Exchange.
4. The Team will convey the intention of the Government of the United Republic of Tanzania to the Government of Japan that the latter will take the necessary measures to cooperate in implementing the Project within the scope of the Japanese economic cooperation in grant form.
5. The Tanzanian side has understood the Japan's grant aid system explained by the Team, which includes a principle of the use of a Japanese consulting firm and Japanese general contractor for their execution of the Project.
6. The Government of the United Republic of the Tanzania will take necessary measures listed in Annex III on condition that the grant aid by the Government of Japan shall be extended to the Project.

T. Ki

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Annex I

Proposed area



T. Ki

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Annex II

Proposed Priority Order
for
Selection of Objective Cabinet Areas
in
The Proposed Area for the Project

<u>Cabinet Area No.</u>	<u>Priority Order</u>	<u>Major Subscriber Categories</u>
<DSM Central Exchange Area>		
CAB 5	5	Embassies, Offices Government official residences
CAB 6	11	Hotels, Residences
CAB 7	2	Government offices
CAB 8	14	Government official residences, Embassies, offices
CAB 12	6	Government offices, major offices
CAB 13	8	Embassies, Residences
CAB 20	12	Embassies, Hotels
EO 7	1	State house, Ministries
EO 8	9	TPTC H/Q, Head post office, Embassy, Major offices
<Oyster Bay Exchange Area>		
CAB 1	10	Embassies, Foreign officers' residences
CAB 2	3	President's residence, Embassies
CAB 3	4	Embassies, Government offices
CAB 6	13	UN official residences, offices
CAB 7	15	Residences
EO 1	7	Prime Minister's residence, Residences, Government offices

T. Ki

RCH

Annex III

Required Arrangement to be taken
by the Government of the United Republic of Tanzania

1. To provide data and information necessary for detailed design.
2. To provide the land and space necessary for implementing the Project.
3. To provide necessary permissions, licences and other authorizations for carrying out the Project.
4. To bear advising commissions of Authorization to Pay (A/P) and payment commission to the Japanese foreign exchange bank for Arrangement.
5. To ensure prompt unloading, tax exemption and customs clearance at ports of disembarkation in Tanzania and prompt internal transportation therein of products purchased under the Grant.
6. To exempt from customs duties internal taxes and other fiscal levies which may be imposed in Tanzania with respect to the supply of products and services under the verified contracts.
7. To accord without delay to Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such facilities as may be necessary for their entry into Tanzania and stay therein for the performance of their work.
8. To secure and bear all the expenses, other than those to be borne by the Grant, necessary for construction of facilities as well as for the transportation and installation of the equipment.
9. To maintain and use properly and effectively all the facilities including newly introduced system and materials provided under the Grant.
10. To provide electric power to the Project sites.
11. To coordinate and solve any matters related which may arise with third party and inhabitants living in the Project areas during the implementation of the Project.
12. To execute the following works:
 - (1) Removal works of existing faulty/deteriorate facilities, if necessary, after the transfer of working lines.
 - (2) Rehabilitation of internal wires in subscribers' premises.
 - (3) Provision of equipment if required and necessary rearrangement of wiring for interfacing between exchanges at other exchanges.

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Annex 2 Minutes of discussions (on draft report explanation)

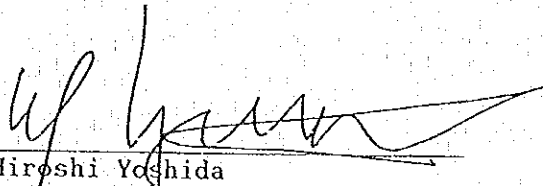
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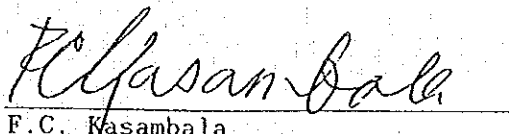
In response to the request by the Government of the United Republic of Tanzania, the Government of Japan has decided to conduct a basic design study on "The Telecommunications Network Rehabilitation Project in Dar es Salaam Area" (hereinafter referred to as "the Project"), and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent a basic design study team (hereinafter referred to as "the Team") headed by Mr. Takuo Kidokoro, Assistant Director, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs, to Dar es Salaam in Tanzania from 16th January to 14th February, 1989.

As a result of the study, JICA prepared a draft final report and dispatched a draft final report explanation team headed by Mr. Hiroshi Yoshida, Ministry of Posts and Telecommunications to explain and discuss it with the officials concerned of the Government of the United Republic of Tanzania headed by Mr. F.C. Kasambala, Director General, Tanzania Posts and Telecommunications Corporation (TPTC) from 17th April to 28th April, 1989.


Both parties had a series of discussions on the report and have agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Dar es Salaam, 25th April, 1989


Hiroshi Yoshida
Leader
Basic Design Study Team,
JICA


F.C. Kasambala
Director General
TPTC

Endorsed by:


M.T. Kibwana
Commissioner for External Finance,
Ministry of Finance

Attachment

1. The Tanzanian side has principally agreed to the basic design proposed in the Draft Final Report.
2. The Tanzanian side requests provision of interworking equipment and miscellaneous materials necessary for the equipment in Dar es Salaam Central Exchange, which is prerequisite for the Project. Both the Team and the Tanzanian side agreed that the Team will convey the request to the Government of Japan and that it will be found in the Final Report that whether or not the equipment shall be provided by the Japan's grant aid for the Project.
3. The Tanzanian side has understood Japan's grant aid system and confirmed that the necessary measures will be taken by the Tanzanian side as shown in Annex 1 which are manifested in the Annex II of THE MINUTES OF DISCUSSIONS on the Project signed on 25th January, 1989 including some additional required arrangement shown in Annex-2. In case the above-mentioned interworking equipment and miscellaneous materials should be provided by Japan's grant aid, the 12.(3) of Annex-1 would be changed as follows:
 - 12.(3) Installation of equipment and rearrangement of wiring for interfacing between exchanges at other exchanges.
4. The Tanzanian side ensures the provision of necessary budget for the adequate personnel services, maintenance and operation expenses of the objective facilities in the Project.
5. The Final Report (10 copies in English) on the Project will be submitted to the Tanzanian side by the end of June, 1989.

Annex-1

Required Arrangement to be taken
by the Government of the United Republic of Tanzania

1. To provide data and information necessary for detailed design.
2. To provide the land and space necessary for implementing the Project.
3. To provide necessary permissions, licences and other authorizations for carrying out the Project.
4. To bear advising commissions of Authorization to Pay (A/P) and payment commission to the Japanese foreign exchange bank for Arrangement.
5. To ensure prompt unloading, tax exemption and customs clearance at ports of disembarkation in Tanzania and prompt internal transportation therein of products purchased under the Grant.
6. To exempt from customs duties internal taxes and other fiscal levies which may be imposed in Tanzania with respect to the supply of products and services under the verified contracts.
7. To accord without delay to Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such facilities as may be necessary for their entry into Tanzania and stay therein for the performance of their work.
8. To secure and bear all the expenses, other than those to be borne by the Grant, necessary for construction of facilities as well as for the transportation and installation of the equipment.
9. To maintain and use properly and effectively all the facilities including newly introduced system and materials provided under the Grant.
10. To provide electric power to the Project sites.
11. To coordinate and solve any matters related which may arise with third party and inhabitants living in the Project areas during the implementation of the Project.
12. To execute the following works:
 - (1) Removal works of existing faulty/deteriorate facilities, if necessary, after the transfer of working lines.
 - (2) Rehabilitation of internal wires in subscribers' premises.
 - (3) Provision of equipment if required and necessary rearrangement of wiring for interfacing between exchanges at other exchanges.

Annex-2

Additional Required Arrangement
to be taken by
the Government of the United Republic of Tanzania

1. Necessary building modifications in Central Exchange.
2. Jumpering on MDF in Central and Oyster Bay Exchanges.
3. Rearrangement of drop wires in the objective area.
4. Removal of tie cable and multiple jumper wire to be installed for transferring from existing cables to new one in Oyster Bay Exchange.
5. Rearrangement of jumpering in cabinets to be installed by the Project.
6. Preparatory work for the site necessary for the installation of new facilities in Oyster Bay Exchange, such as levelling, etc.

Annex 3 Organization of basic design study team (on survey)

<u>Name</u>	<u>Duty in Charge</u>	<u>Affiliated to</u>
Takuo KIDOKORO	Leader	Assistant director, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs
Hiroshi YOSHIDA	Assistant Leader (Telecommunications Standard)	International Cooperation Division, Ministry of Posts and Telecommunications
Shinji EBIHARA	Project Manager (Network Planning)	Assistant to General Manager, Telecommunications Division, The Nippon Telecommunications Consulting Co., Ltd. (NTC)
Shuichi ISHIMOTO	Outside Plant	Senior Staff Engineer, Telecommunications Division, NTC
Kinetsu SAGAWA	Civil Work	Senior Staff Engineer, Telecommunications Division, NTC
Yoshio MORITOMO	Transmission	Senior Staff Engineer, Telecommunications Division, NTC
Tatsumi AMANO	Switching	Senior Staff Engineer, Telecommunications Division, NTC
Kyoichi TOGASHI	Cost Estimate	Senior Staff Engineer Telecommunications Division, NTC

Annex 4 Organization of basic design study team
(on draft report explanation)

<u>Name</u>	<u>Duty in Charge</u>	<u>Affiliated to</u>
Hiroshi YOSHIDA	Leader	International Cooperation Division, Ministry of Posts and Telecommunications
Makoto KASHIWAYA	Project Coordination	Second Basic Design Study Division, Grant Aid Planning and Survey Division, Japan International Cooperation Agency (JICA)
Shinji EBIHARA	Project Manager (Network Planning)	Assistant to General Manager, Telecommunications Division, The Nippon Telecommunications Consulting Co., Ltd. (NTC)
Shuichi ISHIMOTO	Outside Plant	Senior Staff Engineer, Telecommunications Division, NTC
Tatsumi AMANO	Switching	Senior Staff Engineer, Telecommunications Division, NTC

Annex 5 Itinerary of basic design study team (on survey)

<u>No.</u>	<u>Date</u>	<u>Activity</u>
1.	Jan. 16 Mon	- Basic design study team leaves at Japan
2.	17 Tue	- Arrival at London
3.	18 Wed	- Arrival at Dar es Salaam - Courtesy call to Japanese embassy and JICA office in Dar es Salaam
4.	19 Thu	- Courtesy call to Ministry of Communications and Works (MOCW) and TPTC
5.	20 Fri	- Submission of inception report to TPTC, and request of counterparts during survey
6.	21 Sat	- Explanation of inception report and discussion with TPTC - Collection of data and information at ministries and authorities concerned.
7.	22 Sun	- General survey in objective areas. - Agreement of survey progress and collected data among team members
8.	23 Mon	- Discussion for outline of minutes of discussions to be incorporated with TPTC - Field survey of existing facilities in objective areas and telephone exchange offices
9.	24 Tue	- Finalization of minutes of discussions with TPTC - Field survey of existing facilities in objective areas and telephone exchange offices - Collection of plant records for existing facilities at TPTC
10.	25 Wed	- Signing of minutes of discussions at Ministry of Communications and Works and reporting to Embassy of Japan
11.	26 Thu	- Team leader and assistant leader depart for Japan - Discussion for technical standards with TPTC - Field survey in objective areas
12.	27 Fri	- Discussion for design principle with TPTC - Field survey in objective area
13.	28 Sat	- Field survey in objective areas - Team leader and assistant leader arrive at Japan
14.	29 Sun	- Agreement of survey progress and collected data among team members
15.	30 Mon	- Field survey in objective areas

- Collection of data and information from TPTC, ministries and authorities concerned
- 16. 31 Tue - Field survey in objective areas
- Meeting with IBRD staff and collection of data and information necessary
- 17. Feb. 1 Wed - Field survey in objective areas
- Collection of data and information at ministries, TPTC, and authorities concerned
- Mr. K. Togashi joins with team
- 18. 2 Thu - Field survey in objective areas
- Collection of data and information at ministries, TPTC and authorities concerned.
- 19. 3 Fri - Field survey in objectives areas
- Discussion for maintenance and operation with TPTC
- 20. 4 Sat - Field survey in objective areas
- 21. 5 Sun - Team members meeting and assorting of collected data
- 22. 6 Mon - Field survey in objectives areas
- Collection of data and information at ministries, TPTC and authorities concerned.
- 23. 7 Tue - Field survey in objectives areas
- 24. 8 Wed - Field survey in objective areas
- Collection of data and information at ministries, TPTC and authorities concerned
- 25. 9 Thu - Discussion for survey result with TPTC
- 26. 10 Fri - Team members meeting and arrangement of collected data
- Preparation of the draft minutes regarding survey result
- 27. 11 Sat - Adjustment of the minutes and survey result with team members and TPTC staffs
- Report to Japanese Embassy and JICA office
- 28. 12 Sun - Basic design study team departs for Japan
(Mr. Ebihara, Mr. Ishimoto, Mr. Amano, Mr. Moritomo, Mr. Sagawa, Mr. Togashi)
- 29. 13 Mon - Leaving Frankfurt for Japan
- 30. 14 Tue - The study team arrives at Japan

Annex 7 List of persons met with basic design study team

1. Ministry of Finance (MOF)

- (1) Mr. M.T. Kibwana : Commissioner, External Finance
- (2) Mr. R. Mhagama : Deputy of Commissioner, External Finance
- (3) Mr. P.J. Mbeni : Senior Finance Management Officer,
External Finance Division

2. Ministry of Foreign Affairs (MOFA)

- (1) Mr. F. Mmasa : Staff Member (in charge of Japan)
- (2) Miss D. Mbezi : Staff Member (in charge of Japan)

3. Ministry of Communications and Works (MOCW)

- (1) Mr. A.S. Ndakidemi : Director of Communications

4. World Bank (IDA Second Loan)

- (1) Mr. E.J. Rueda-sabater : Deputy of Resident Representative

5. Tanzania Posts and Telecommunications Corporation (TPTC)

- (1) Mr. F.C. Kasambala : Director General TPTC
- (2) Mr. A.B. Mapunda : Deputy of Director General
- (3) Mr. S.B.J. Ngalambe : Director of Telecom Engineering
- (4) Mr. J.K. Assenga : Chief Telecom Controller, Corporate Planning
- (5) Mr. E.C. Mosha : Chief Executive Engineer,
Network Planning & Switching
- (6) Mr. H. Mtopa : Chief Executive Engineer, External Plant
- (7) Mr. J.E. Mhando : Principal Executive Engineer,
Network Planning & Switching
- (8) Mr. W.J.N. Miigo : Senior Public Relations Officer
- (9) Mr. Masudi Ali : Senior Sectional Engineer, Multiplex
- (10) Mr. A.B. Nangi : Senior Sectional Engineer,
Exchange Maintenance
- (11) Mr. KA.M.A. Mohamed : Assistant Engineer, Exchange Planning

6. Posts and Telecommunications Training Centre (PTTC)

- (1) Mr. L.B. Minde : Wing Head, Postal Services
- (2) Mr. J. Dcosta : Section Head, Radio

Annex 6 Itinerary of basic design study team (on draft report explanation)

<u>No.</u>	<u>Date</u>	<u>Activity</u>
1.	Apr. 17 Mon	- Basic design study team leaves at Japan
2.	18 Tue	- Arrival at Amsterdam
3.	19 Wed	- Leaving at Amsterdam
4.	20 Thu	- Arrival at Dar es Salaam - Courtesy call to Japanese Embassy and JICA office
5.	21 Fri	- Courtesy call to Ministry of Communications and Works (MOCW), Ministry of Finance and TPTC - Submission of draft report to TPTC - Explanation of the report to TPTC
6.	22 Sat	- Discussion regarding the report and draft minutes with TPTC
7.	23 Sun	- Team members meeting
8.	24 Mon	- Finalization of minutes of discussions on the draft report with TPTC
9.	25 Tue	- Signing of minutes of discussions at TPTC and reporting to Embassy of Japan and JICA office
10.	26 Wed	- Leaving Dar es Salaam for Japan
11.	27 Thu	- Leaving London for Japan
12.	28 Fri	- The team arrives at Japan

Annex 8 List of data collected

1. Annual Development Plan 1987/88
2. Statistical Abstract 1984
3. Hali ya Uchumi wa Taifa Katika Mwaka 1987
4. Document of the World Bank
5. Movement of Donor Countries for Telecommunications (Memorandum)
6. The Tanzania Posts and Telecommunications Corporation, Six Years of Progress
7. New Tariff, effective 1st December 1988
8. Bank of Tanzania, Economic & Operations Report 1987
9. Country Report Tanzania/EIU
10. TPTC Staff College
11. Transmission Plan
12. Telecom Organization
13. Specification of Cables
14. Subscribers Maintenance Statistics
15. Operational Performance 1983-1987
16. Annual Report and Accounts 1985/86
17. Population Census 1978
18. Rehabilitation and Upgrading of the Telecommunications Network, SIDA & SWEDTEL 1988
19. Kitabu Cha Orodha ya Simu Tanzania 1984/85

BASIC DESIGN DRAWINGS

C O N T E N T S

- Figure 1 Key map
- Figure 2 Duct route plan in Central Exchange Area (1/2 - 2/2)
- Figure 3 Duct route plan in Oyster Bay Exchange Area
- Figure 4 Junction cable plan between Oyster Bay and Central Exchanges
- Figure 5 Primary cable plan in Central Exchange Area
- Figure 6 Secondary cable plan in Central Exchange Area (1/6 - 6/6)
- Figure 7 Primary cable plan in Oyster Bay Exchange Area
- Figure 8 Secondary cable plan in Oyster Bay Exchange Area (1/9 - 9/9)
- Figure 9 Site layout in Oyster Bay Exchange
- Figure 10 Configuration of inside plant
- Figure 11 Trunking diagram of Oyster Bay digital exchange
- Figure 12 Simplified trunking between Oyster Bay and Central Exchanges
- Figure 13 Equipment layout in transmission room in Central Exchange
- Figure 14 Power supply in Central Exchange
- Figure 15 Power supply system in Oyster Bay Exchange

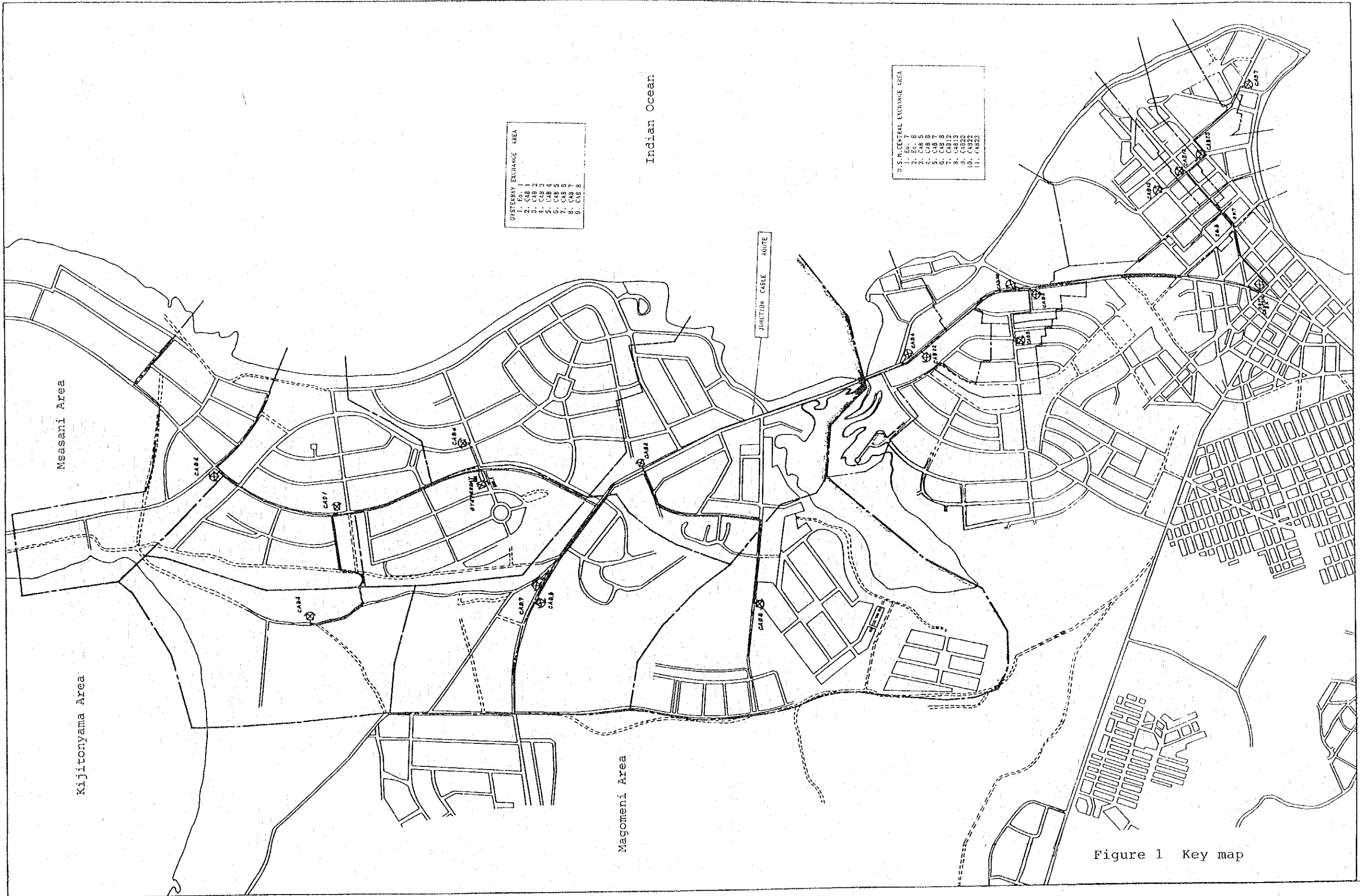


Figure 1 Key map

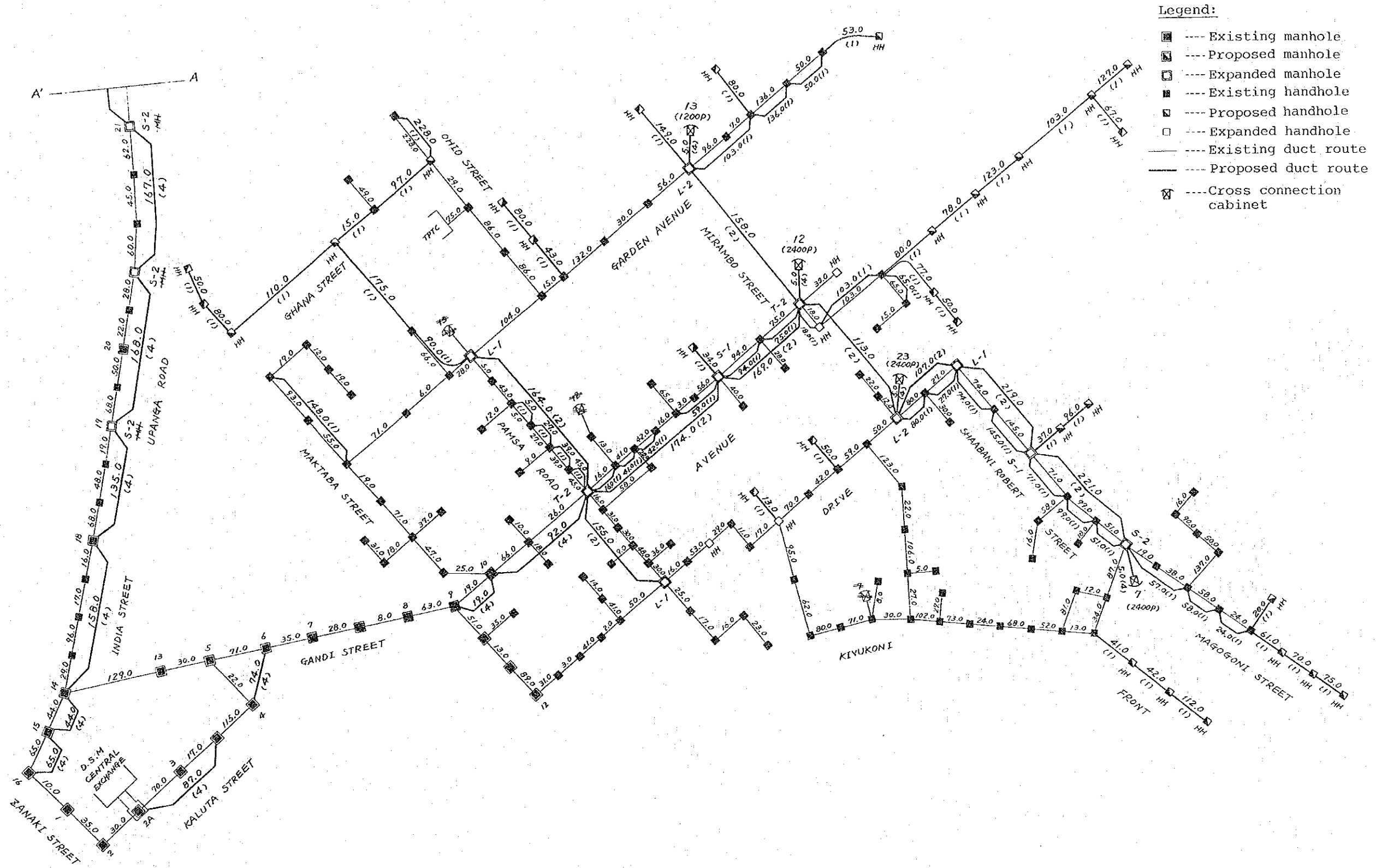


Figure 2 Duct route plan in Central Exchange Area (1/2)

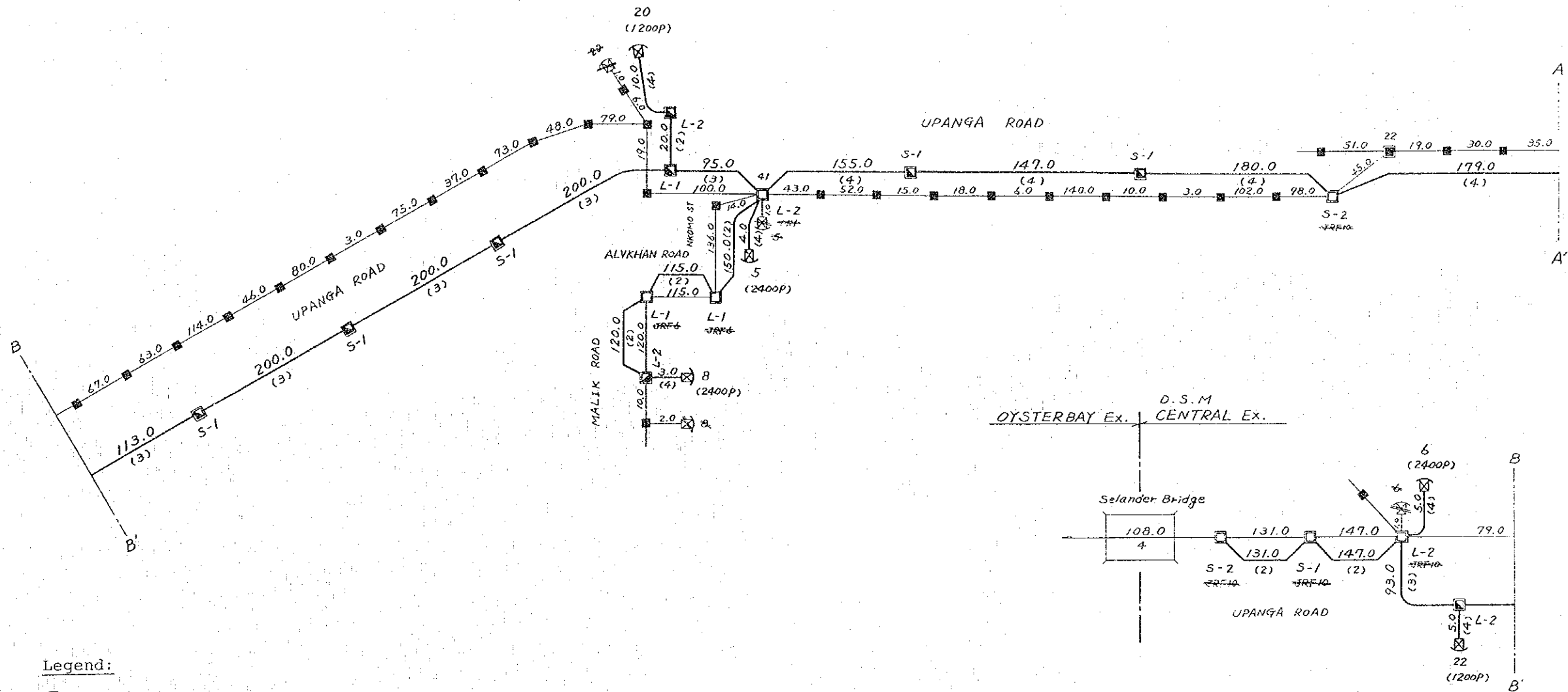


Figure 2 Duct route plan in Central Exchange Area (2/2)

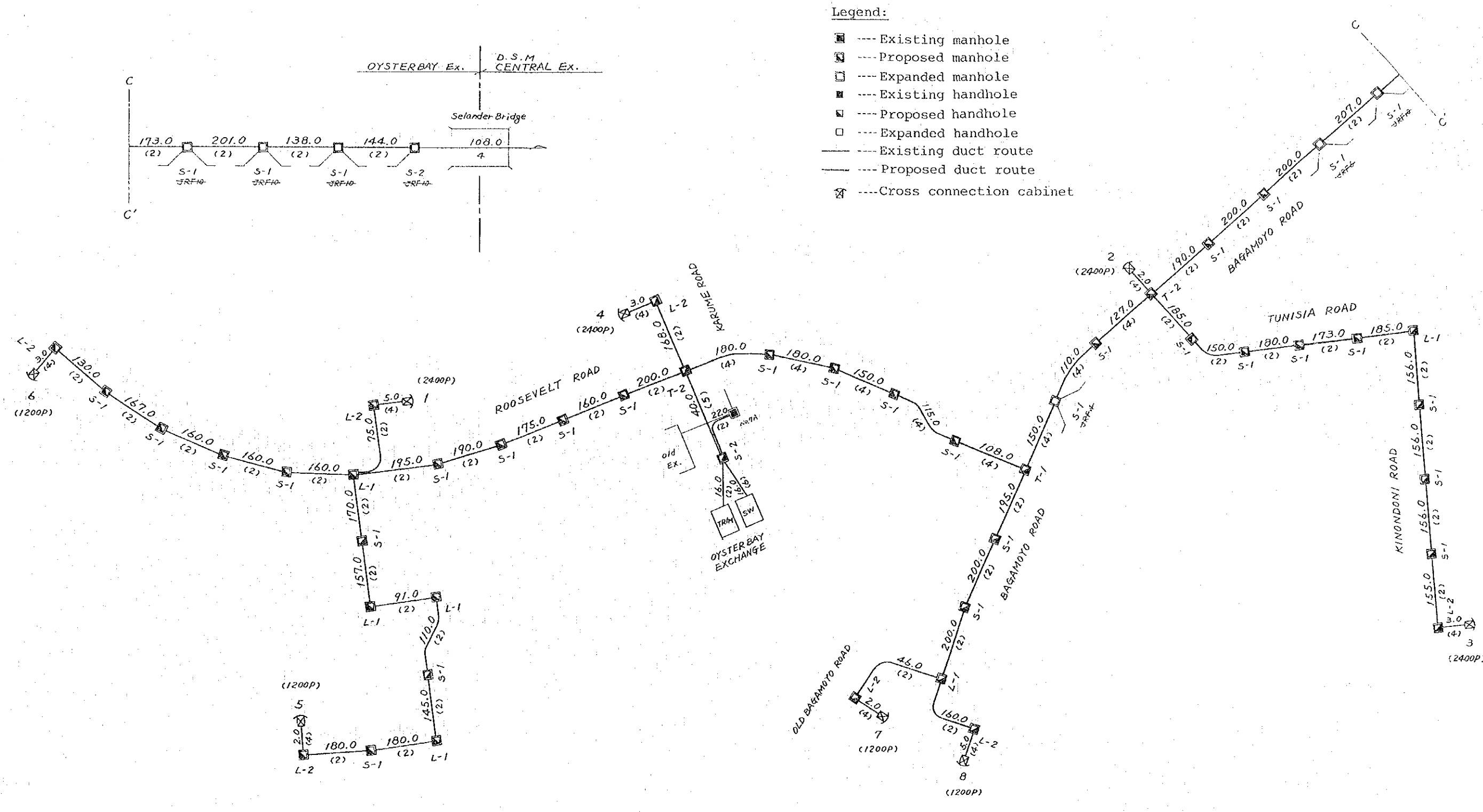


Figure 3 Duct route plan in Oyster Bay Exchange Area

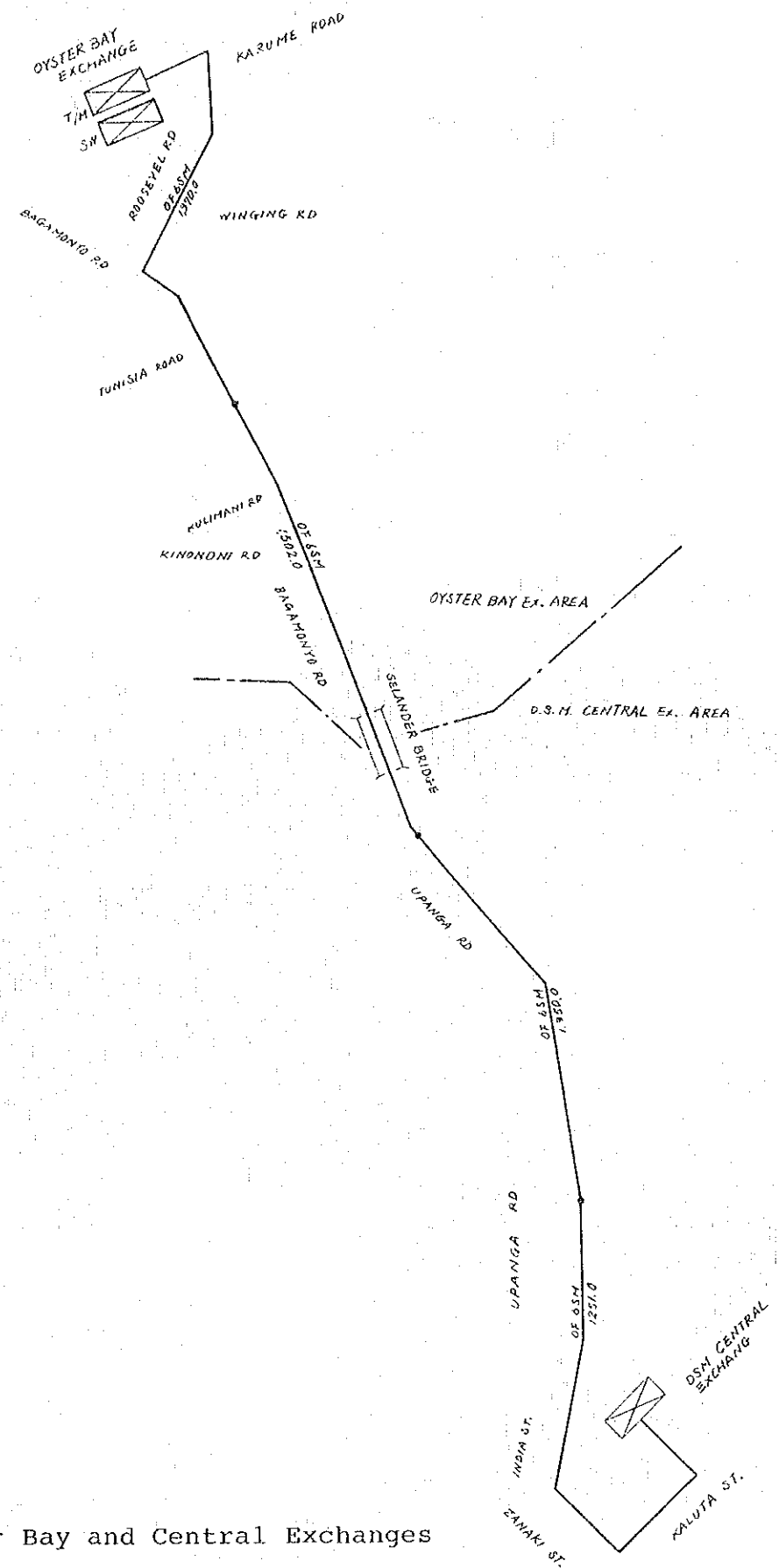


Figure 4 Junction Cable plan between Oyster Bay and Central Exchanges

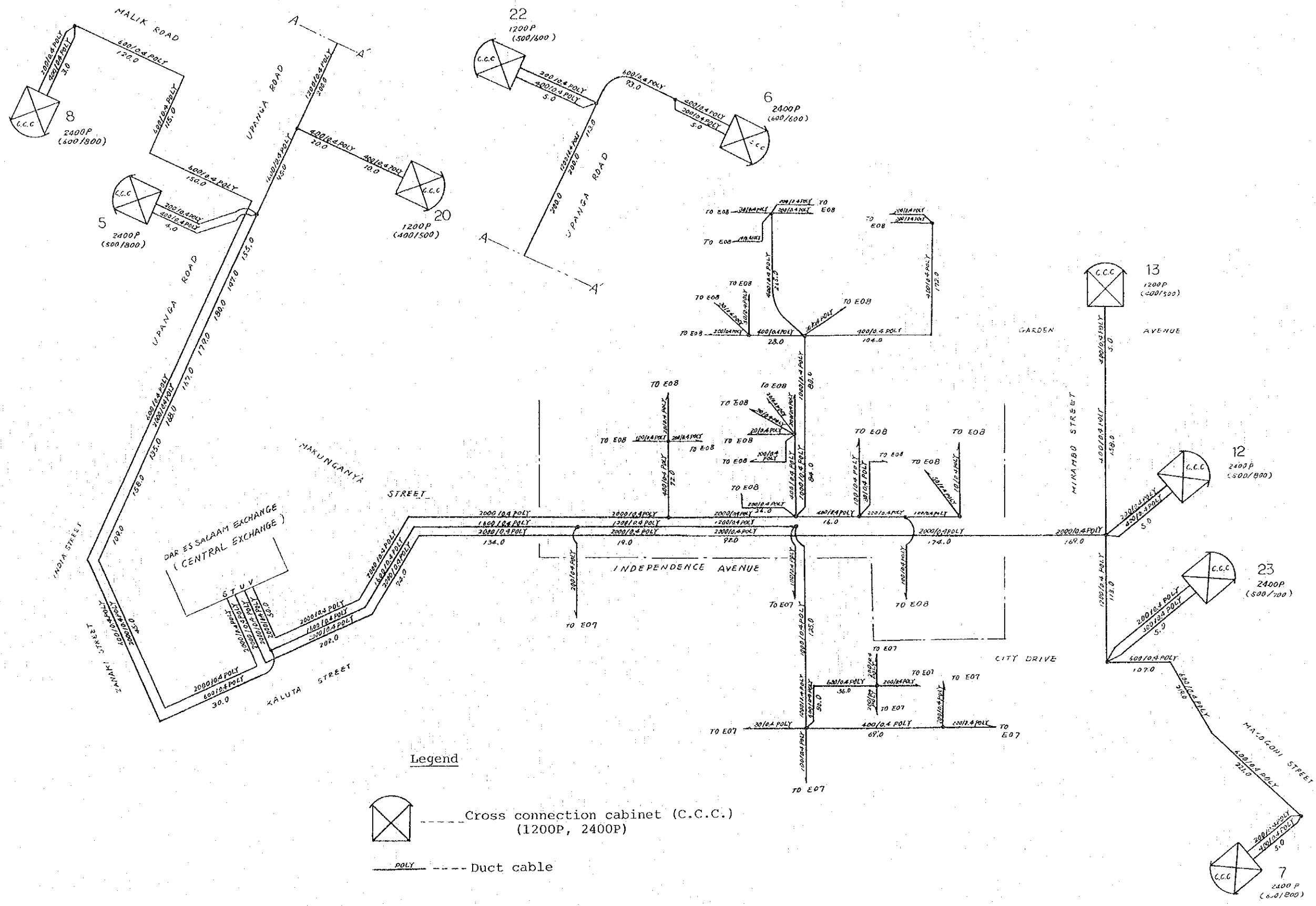
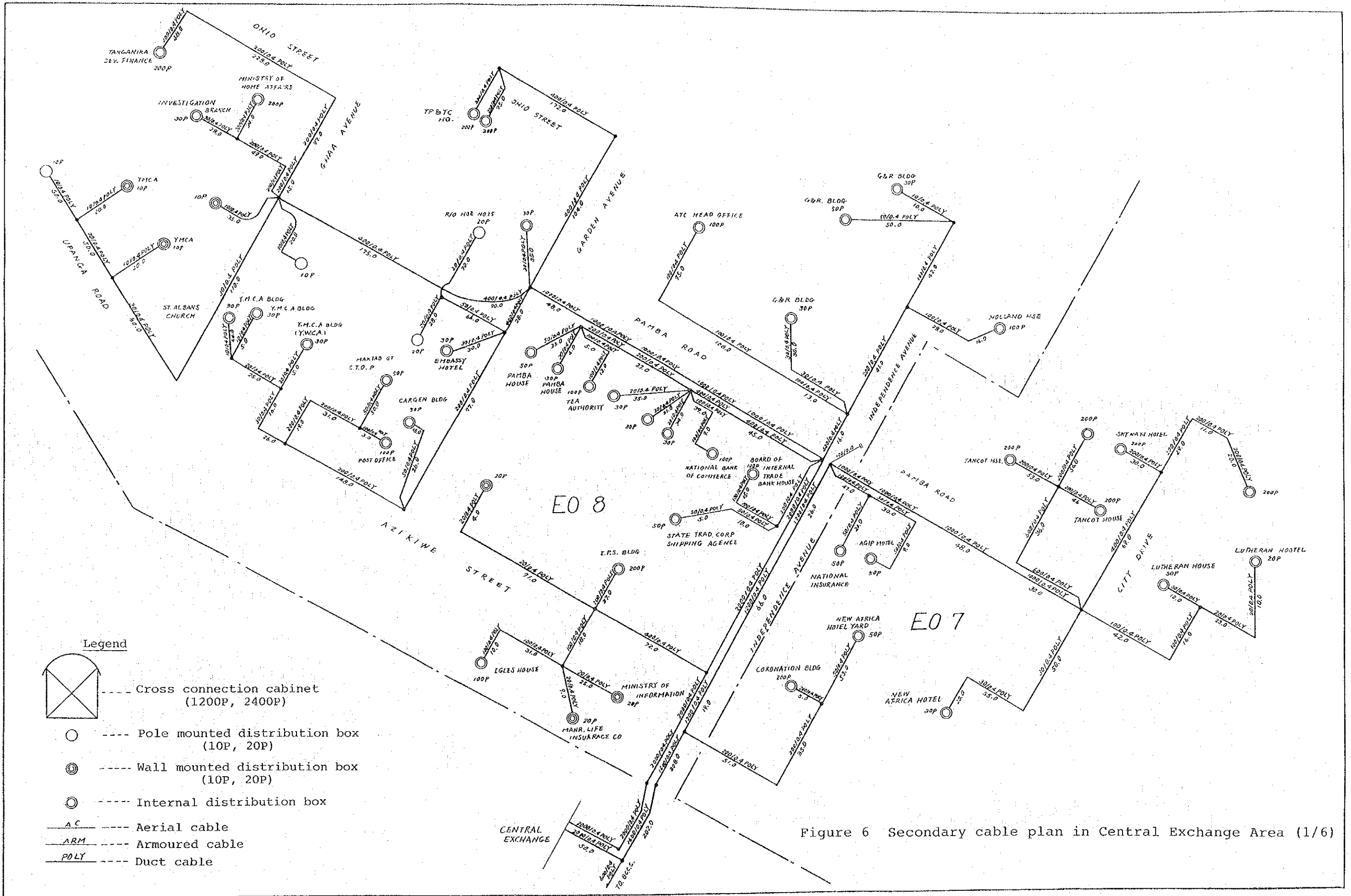


Figure 5 Primary cable plan in Central Exchange Area



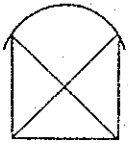



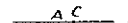
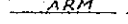
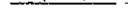
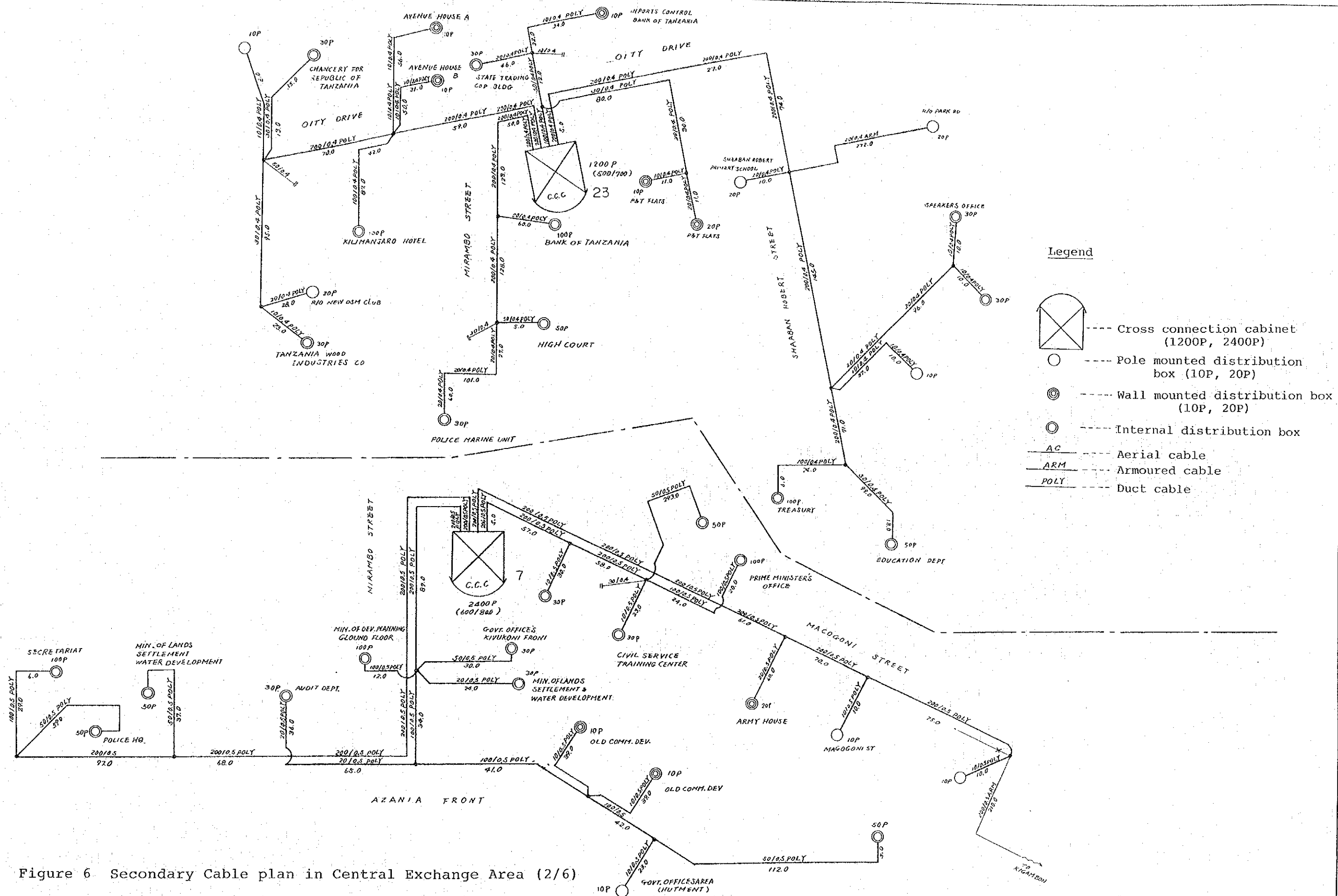
- Legend**
-  --- Cross connection cabinet (1200P, 2400P)
 -  --- Pole mounted distribution box (10P, 20P)
 -  --- Wall mounted distribution box (10P, 20P)
 -  --- Internal distribution box
 -  --- Aerial cable
 -  --- Armoured cable
 -  --- Duct cable

Figure 6 Secondary cable plan in Central Exchange Area (1/6)



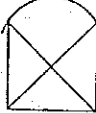



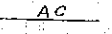
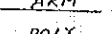
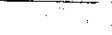
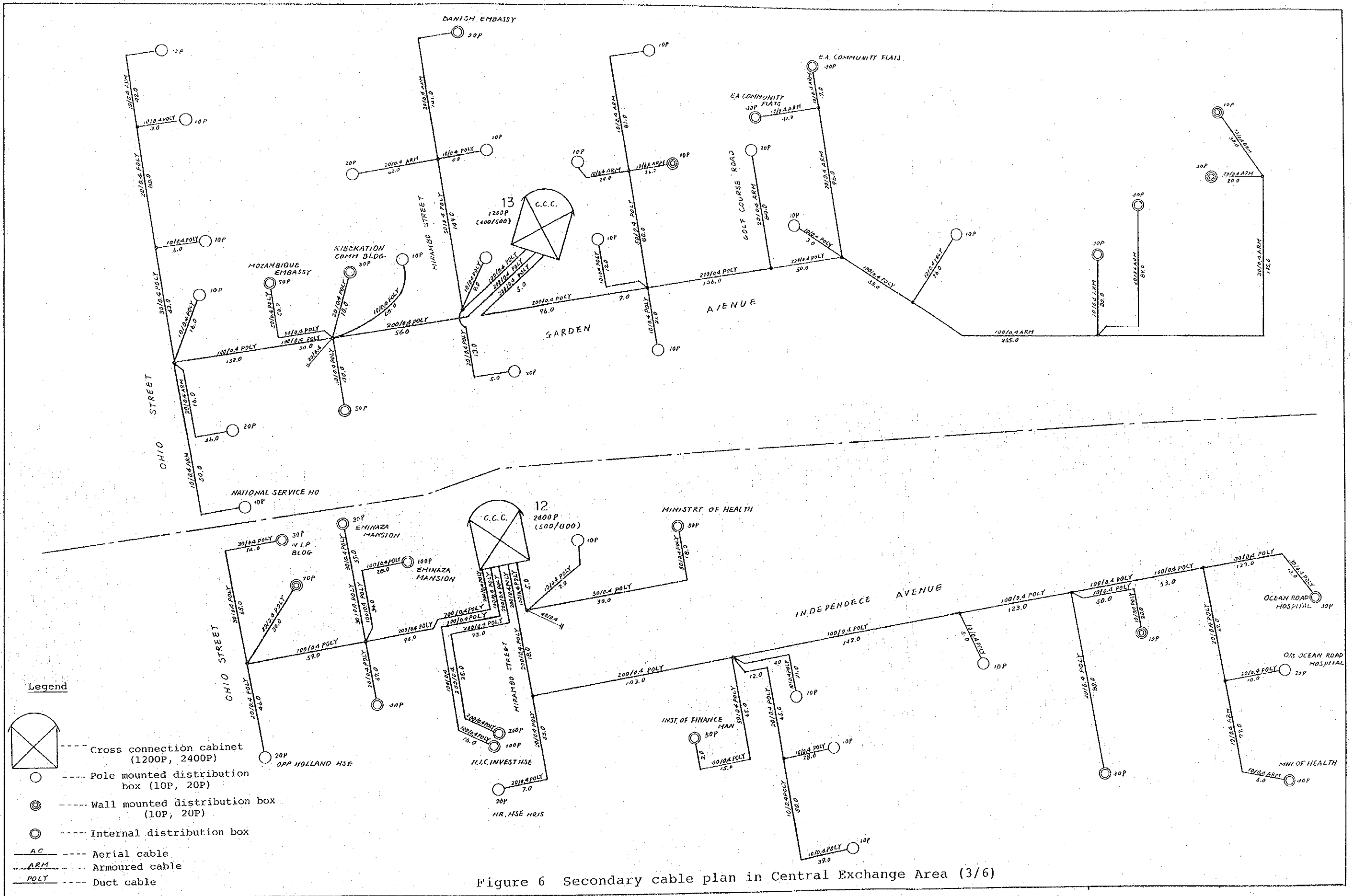
- Legend**
-  --- Cross connection cabinet (1200P, 2400P)
 -  --- Pole mounted distribution box (10P, 20P)
 -  --- Wall mounted distribution box (10P, 20P)
 -  --- Internal distribution box
 -  --- Aerial cable
 -  --- Armoured cable
 -  --- Duct cable

Figure 6 Secondary Cable plan in Central Exchange Area (2/6)



Legend

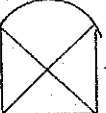






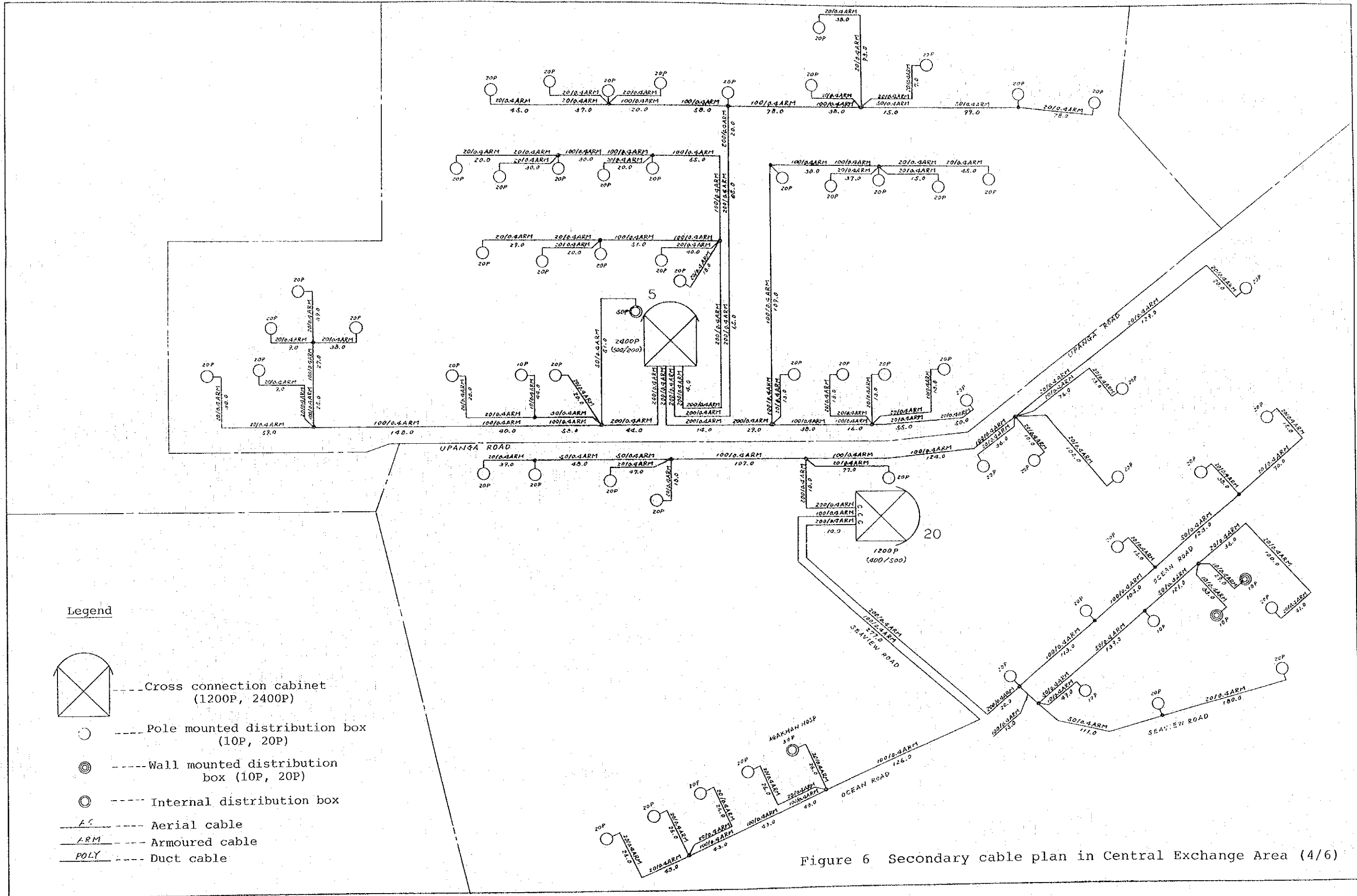
-  Cross connection cabinet (1200P, 2400P)
-  Pole mounted distribution box (10P, 20P)
-  Wall mounted distribution box (10P, 20P)
-  Internal distribution box
-  AC Aerial cable
-  ARM Armoured cable
-  POLY Duct cable

Figure 6 Secondary cable plan in Central Exchange Area (3/6)



Legend

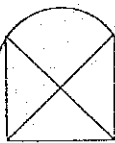






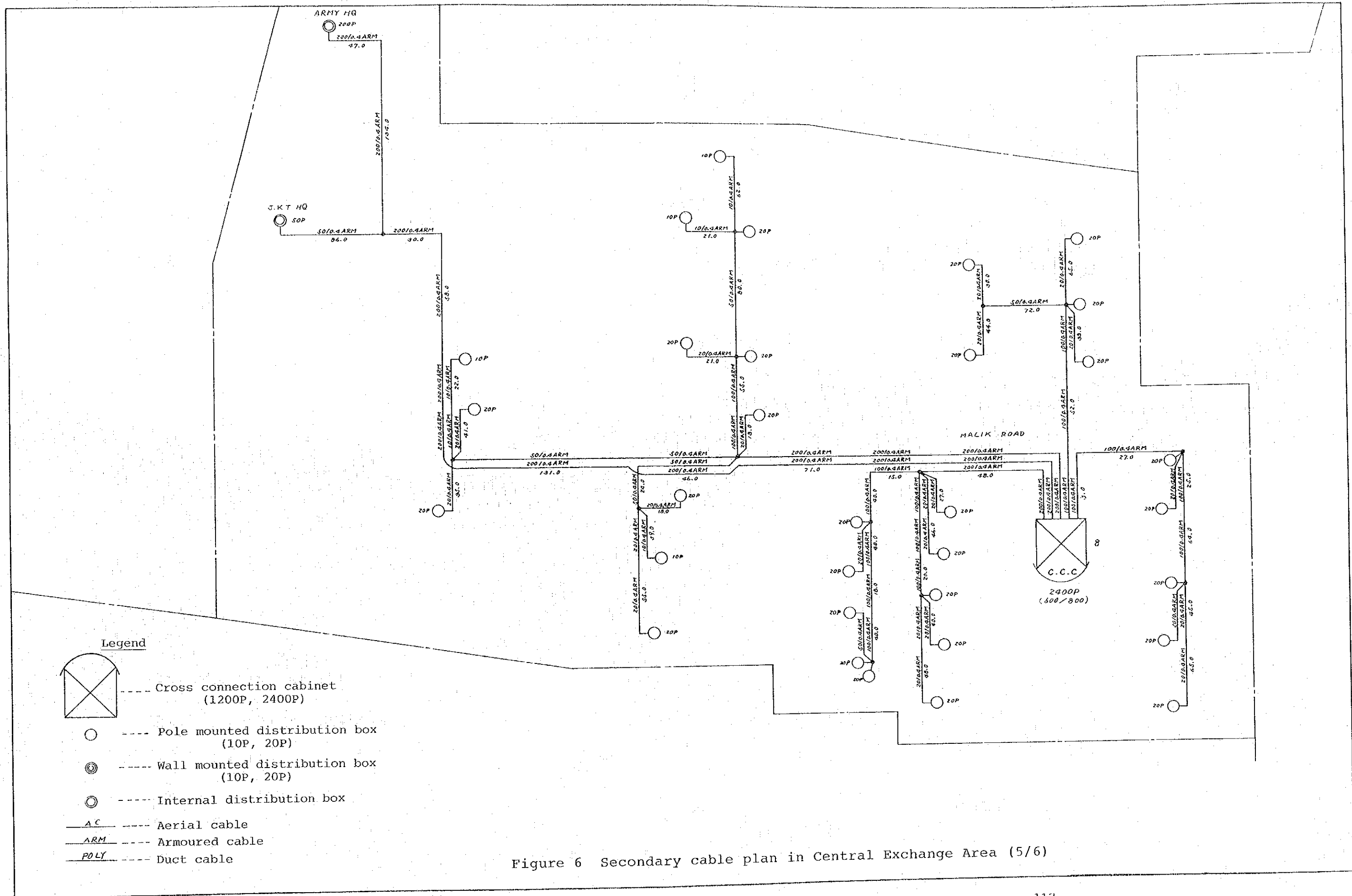
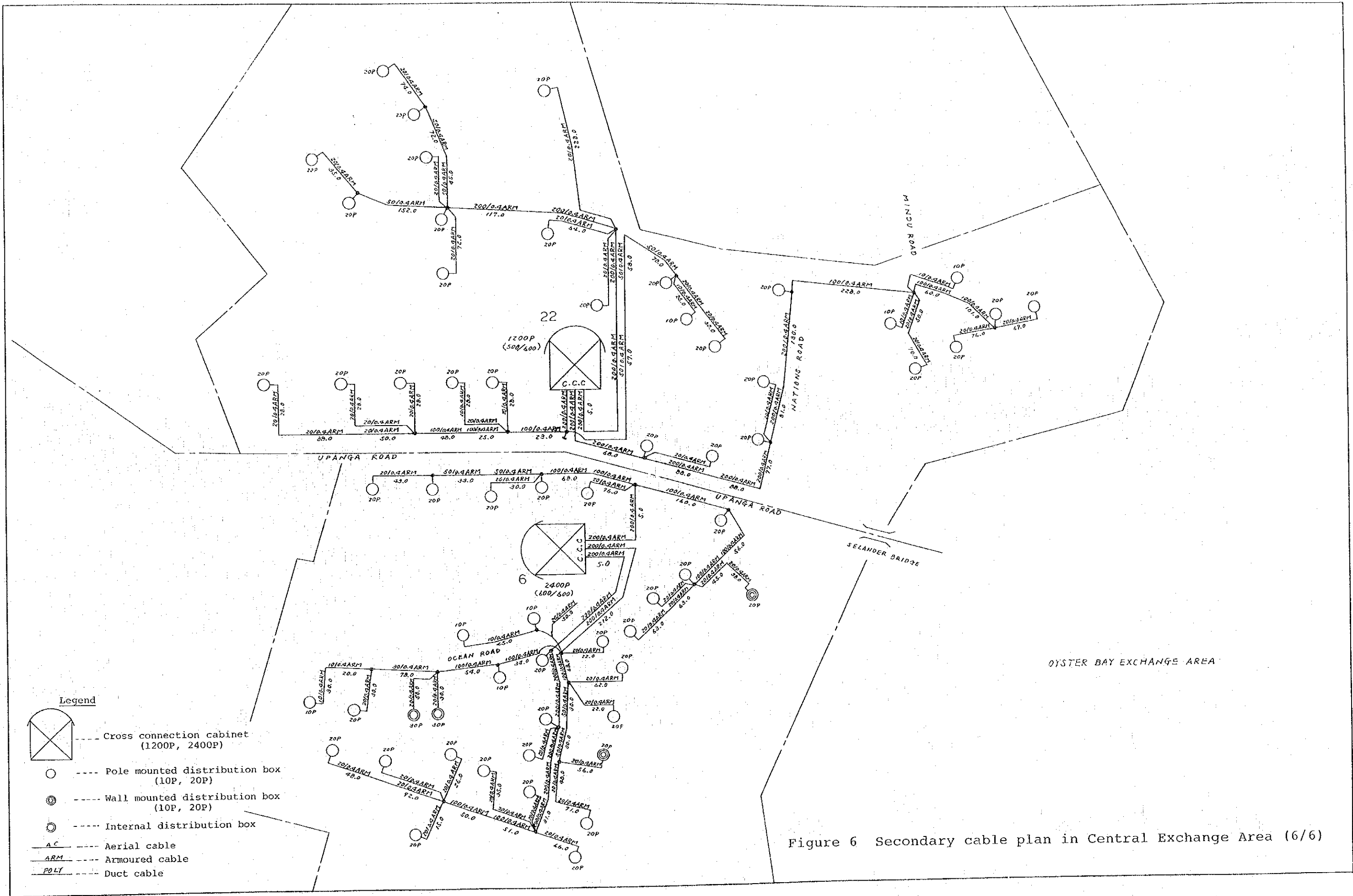
-  --- Cross connection cabinet (1200P, 2400P)
-  --- Pole mounted distribution box (10P, 20P)
-  --- Wall mounted distribution box (10P, 20P)
-  --- Internal distribution box
-  --- Aerial cable
-  --- Armoured cable
-  --- Duct cable

Figure 6 Secondary cable plan in Central Exchange Area (4/6)





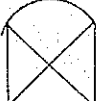






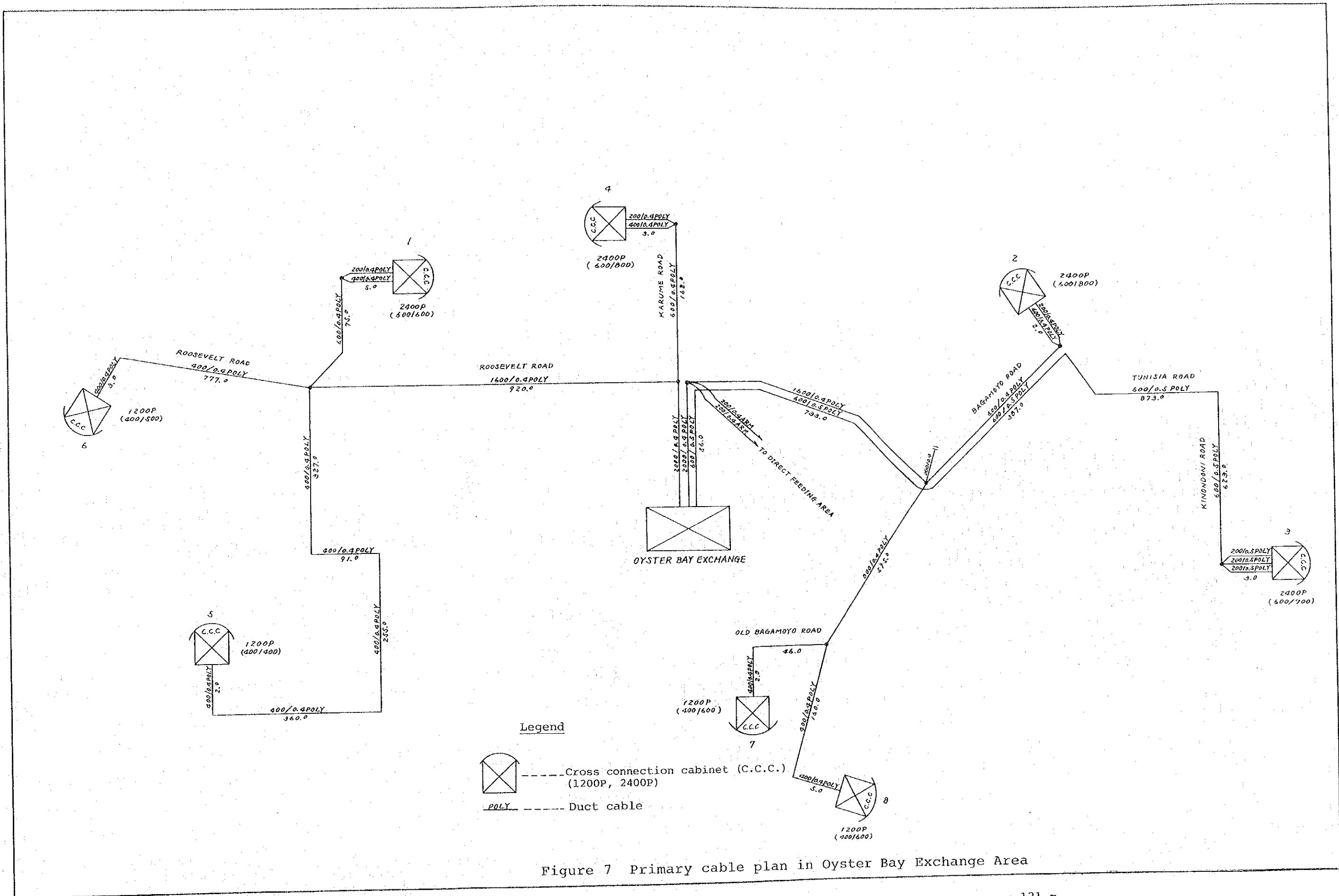
- Legend**
-  Cross connection cabinet (1200P, 2400P)
 -  Pole mounted distribution box (10P, 20P)
 -  Wall mounted distribution box (10P, 20P)
 -  Internal distribution box
 -  Aerial cable
 -  Armoured cable
 -  Duct cable

Figure 6 Secondary cable plan in Central Exchange Area (6/6)



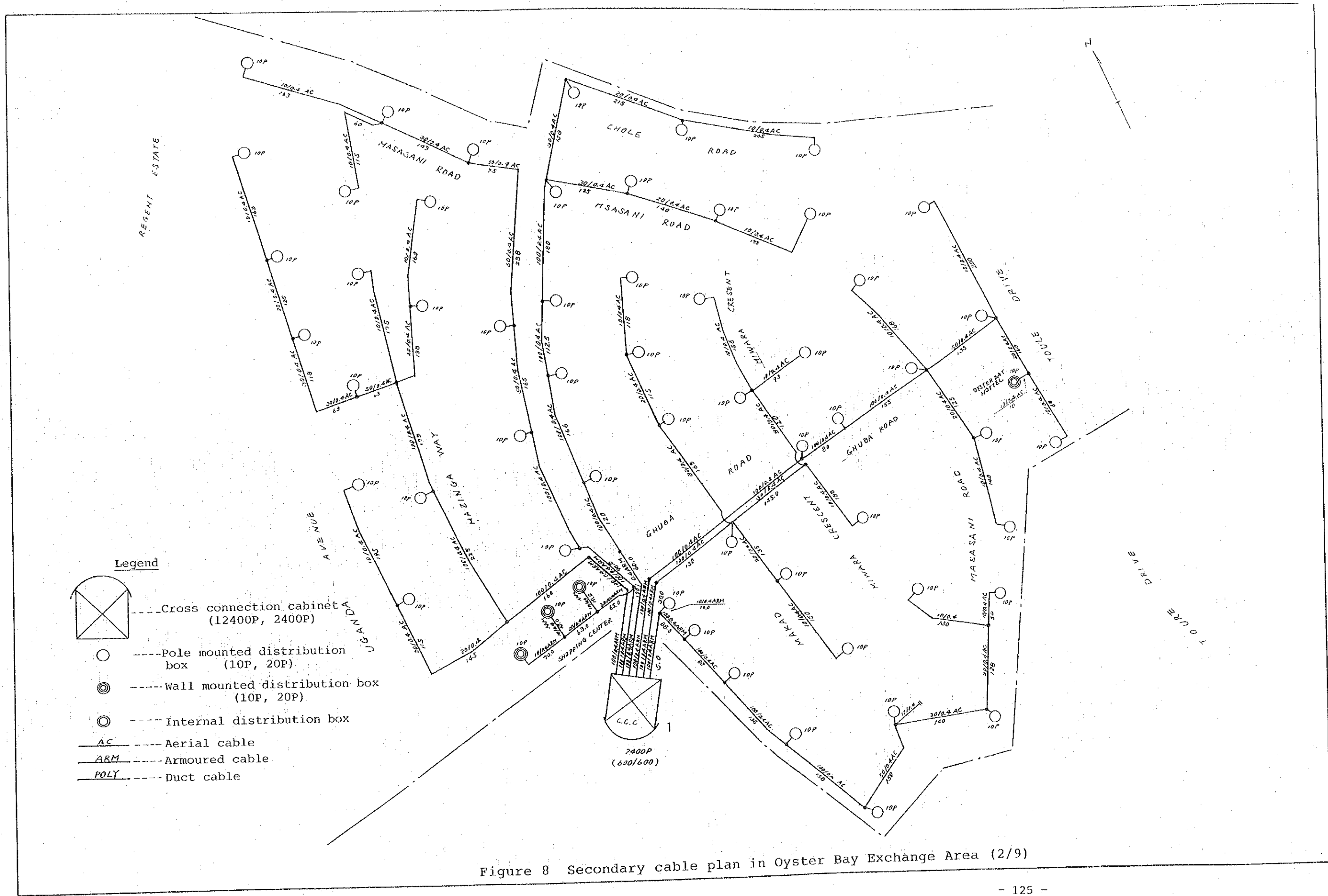


Figure 8 Secondary cable plan in Oyster Bay Exchange Area (2/9)

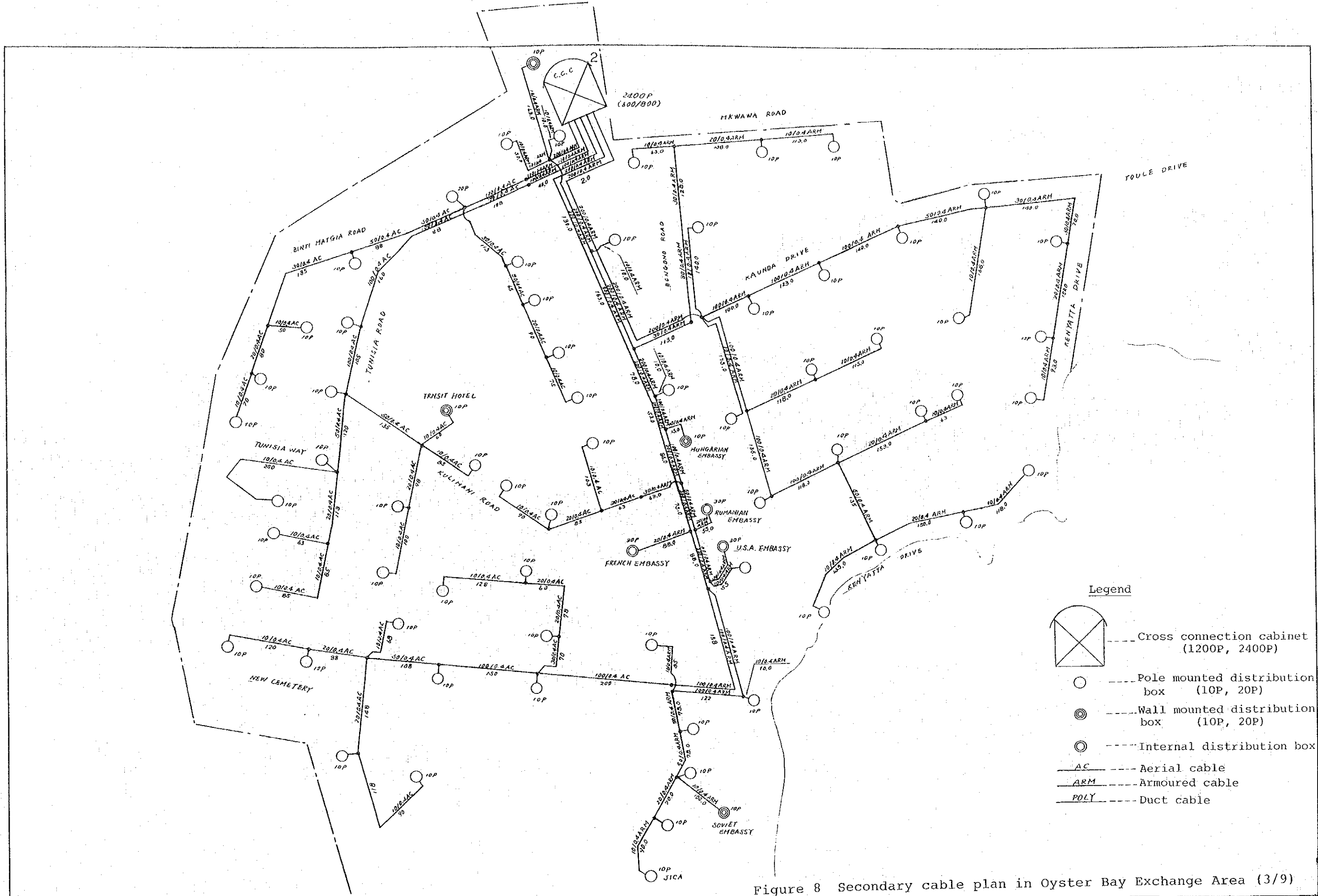
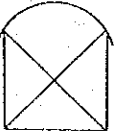



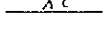
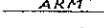
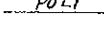


Figure 8 Secondary cable plan in Oyster Bay Exchange Area (3/9)



Legend

-  Cross connection cabinet (1200P, 2400P)
-  Pole mounted distribution box (10P, 20P)
-  Wall mounted distribution box (10P, 20P)
-  Internal distribution box
-  AC Aerial cable
-  ARM Armoured cable
-  POLY Duct cable

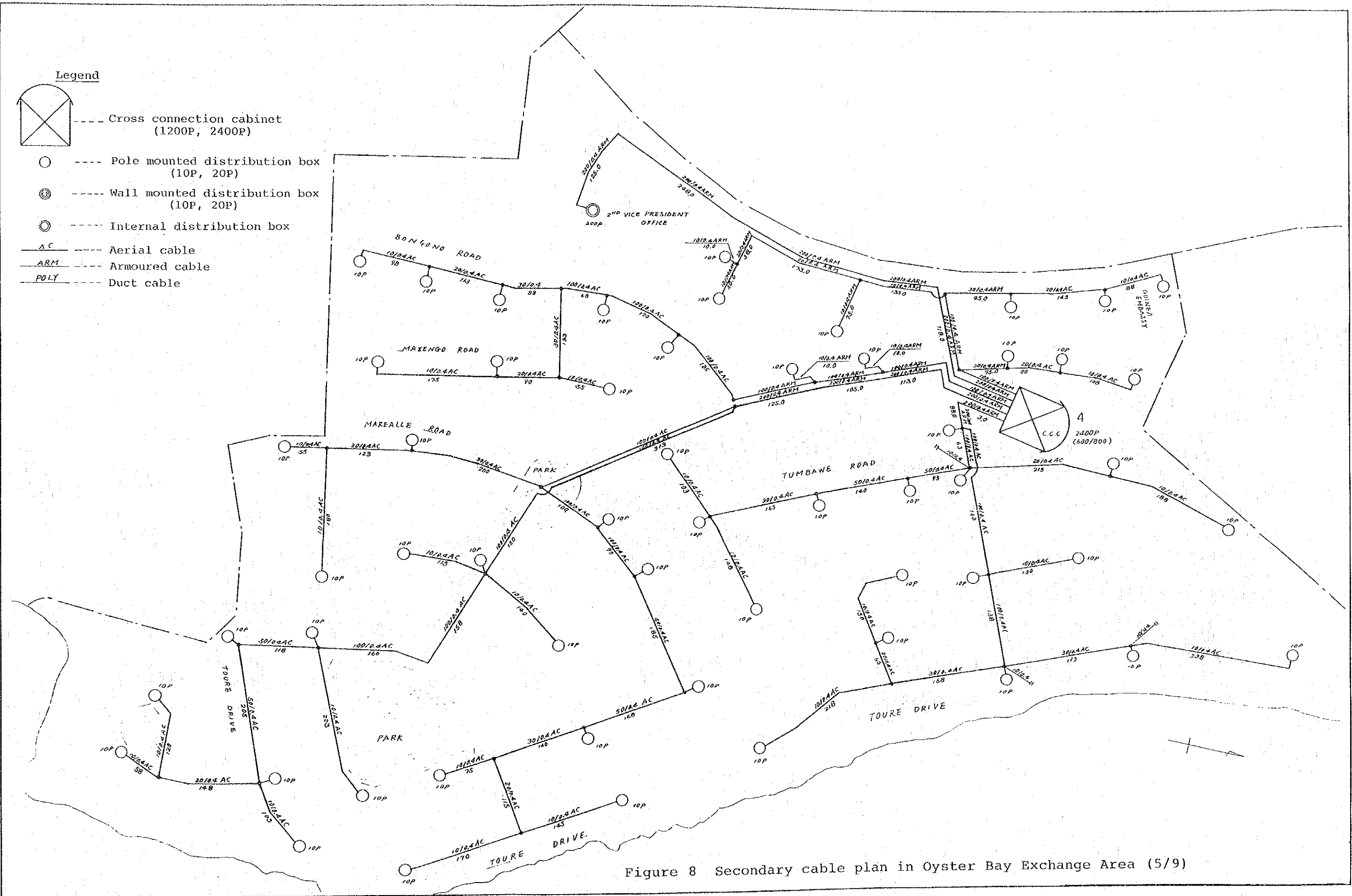
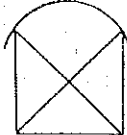





Figure 8 Secondary cable plan in Oyster Bay Exchange Area (5/9)

KIJITONYAMA EXCHANGE AREA

Legend

-  Cross connection cabinet (1200P, 2400P)
-  Pole mounted distribution box (10P, 20P)
-  Wall mounted distribution box (10P, 20P)
-  Internal distribution box
- AC Aerial cable
- ARM Armoured cable
- POLY Duct cable

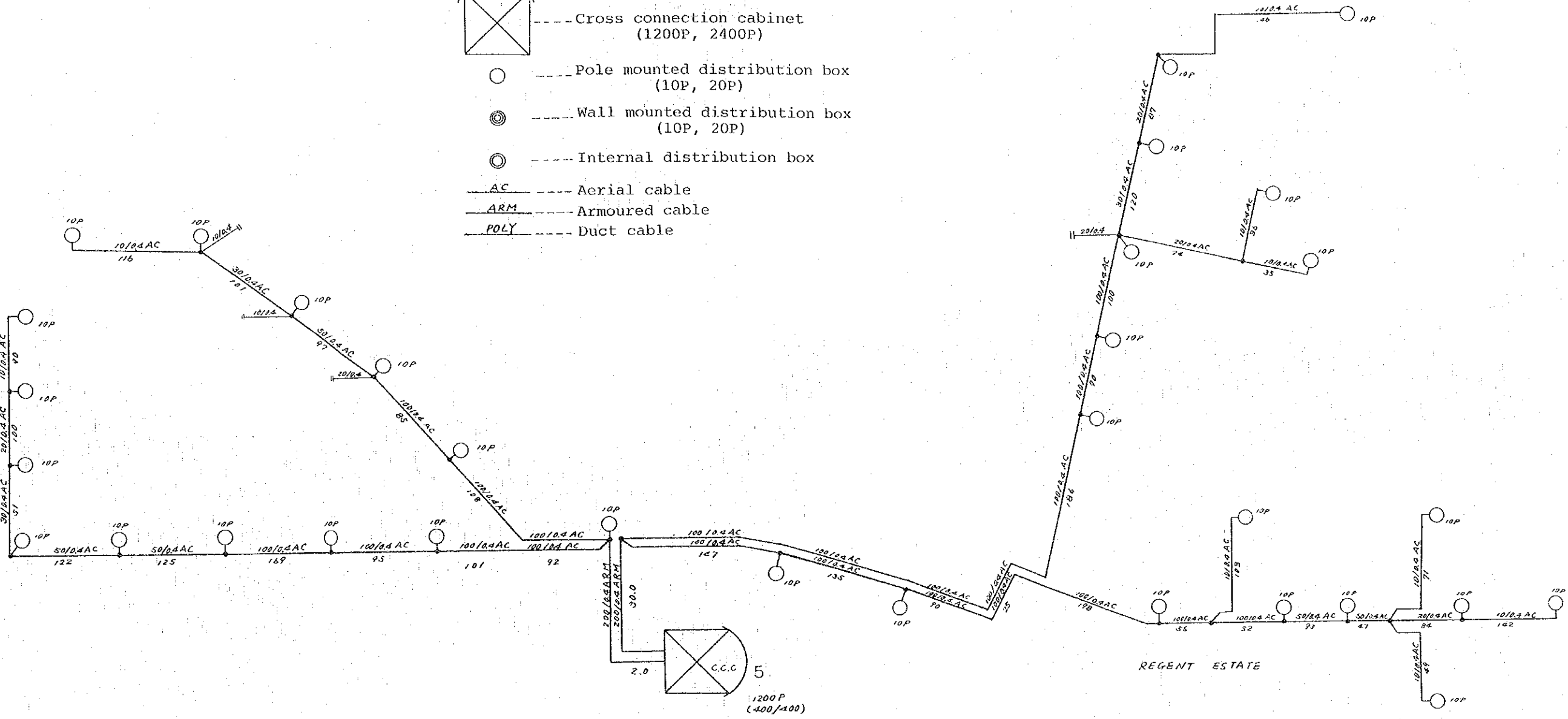


Figure 8 Secondary cable plan in Oyster Bay Exchange Area (6/9)

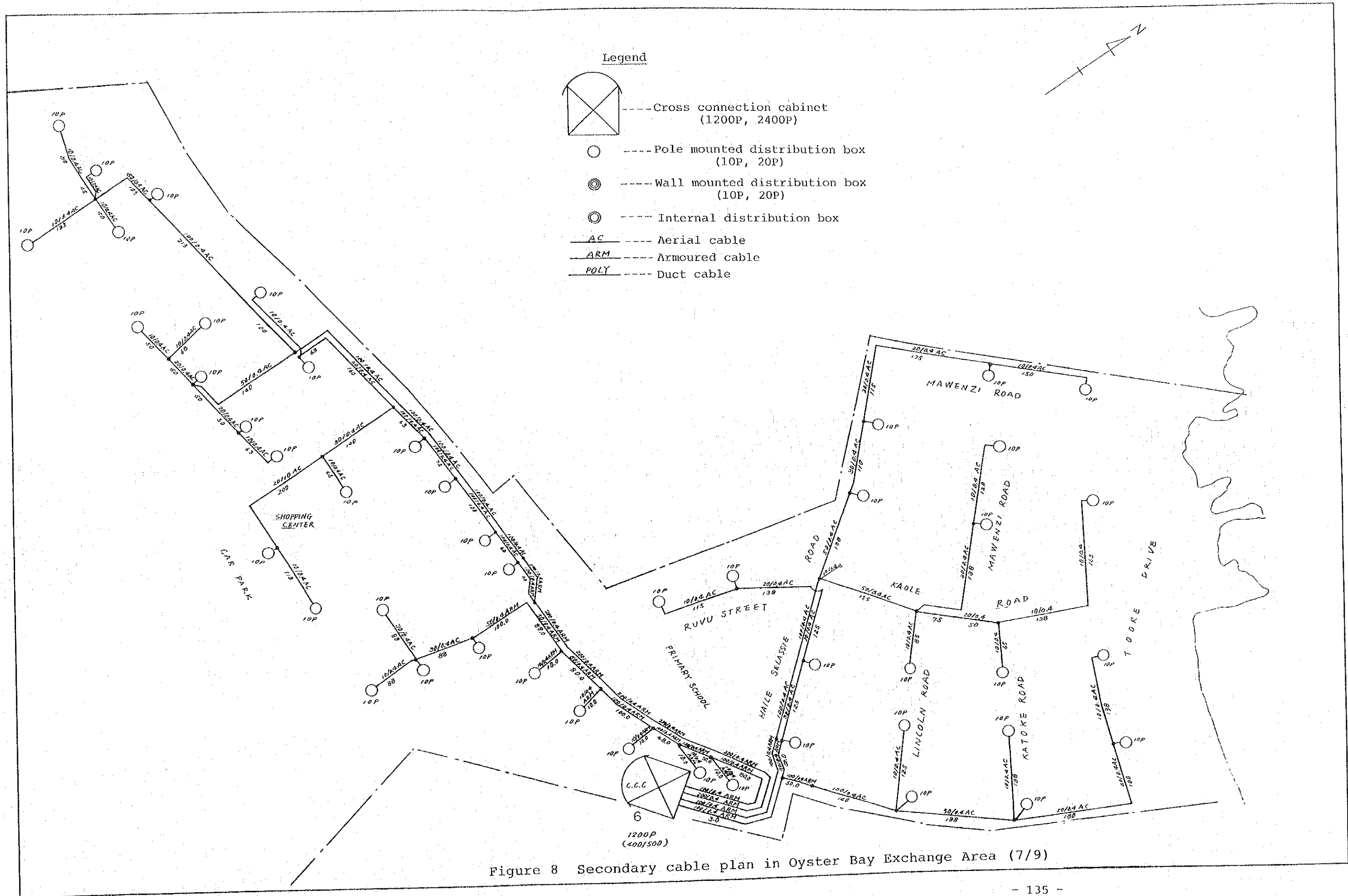
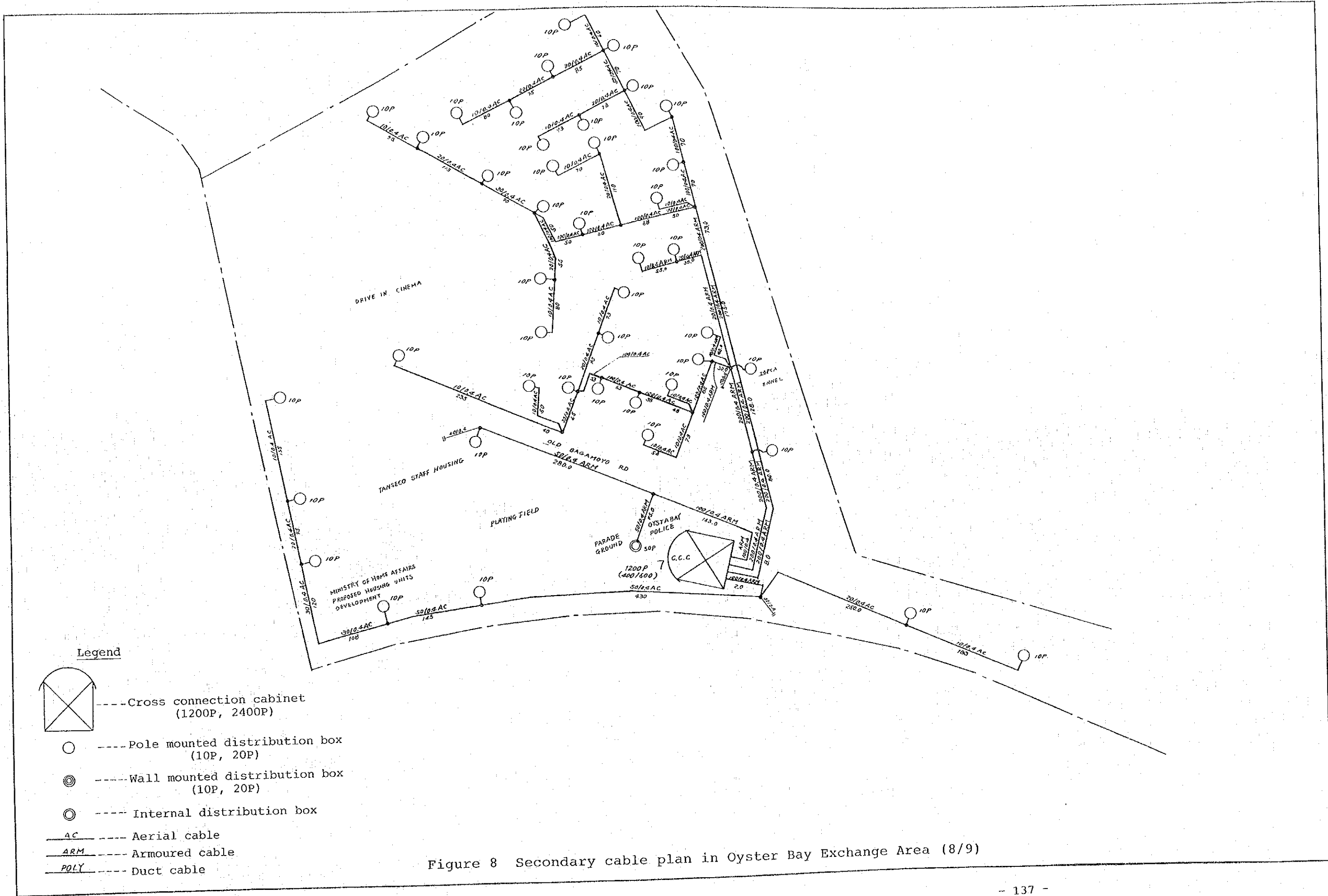


Figure 8 Secondary cable plan in Oyster Bay Exchange Area (7/9)



Legend

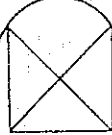



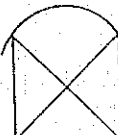



-  --- Cross connection cabinet (1200P, 2400P)
-  --- Pole mounted distribution box (10P, 20P)
-  --- Wall mounted distribution box (10P, 20P)
-  --- Internal distribution box
- AC --- Aerial cable
- ARM --- Armoured cable
- POLY --- Duct cable

Figure 8 Secondary cable plan in Oyster Bay Exchange Area (8/9)

- Legend**
-  --- Cross connection cabinet (1200P, 2400P)
 -  --- Pole mounted distribution box (10P, 20P)
 -  --- Wall mounted distribution box (10P, 20P)
 -  --- Internal distribution box
 - AC --- Aerial cable
 - ARM --- Armoured cable
 - POLY --- Duct cable

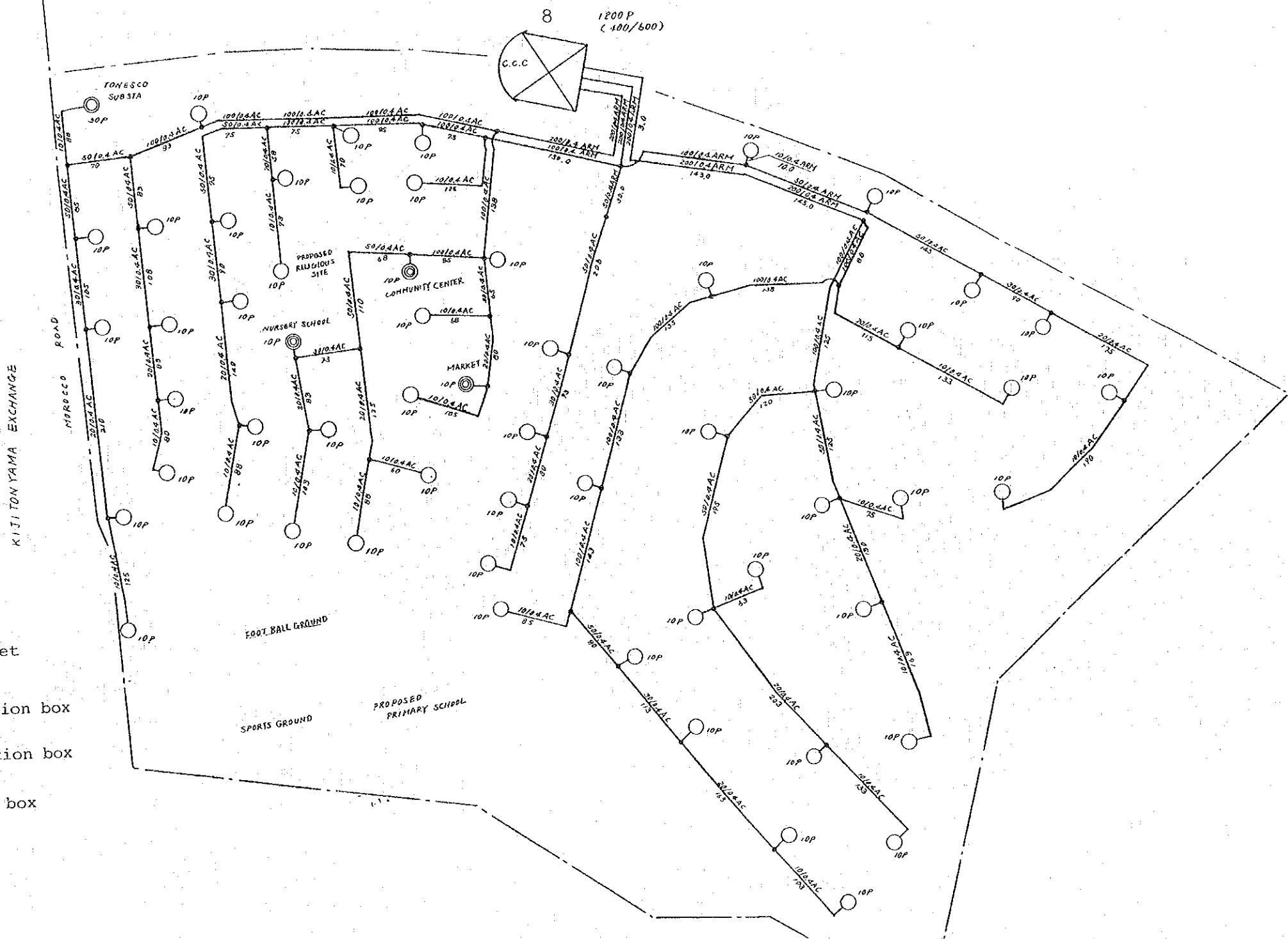
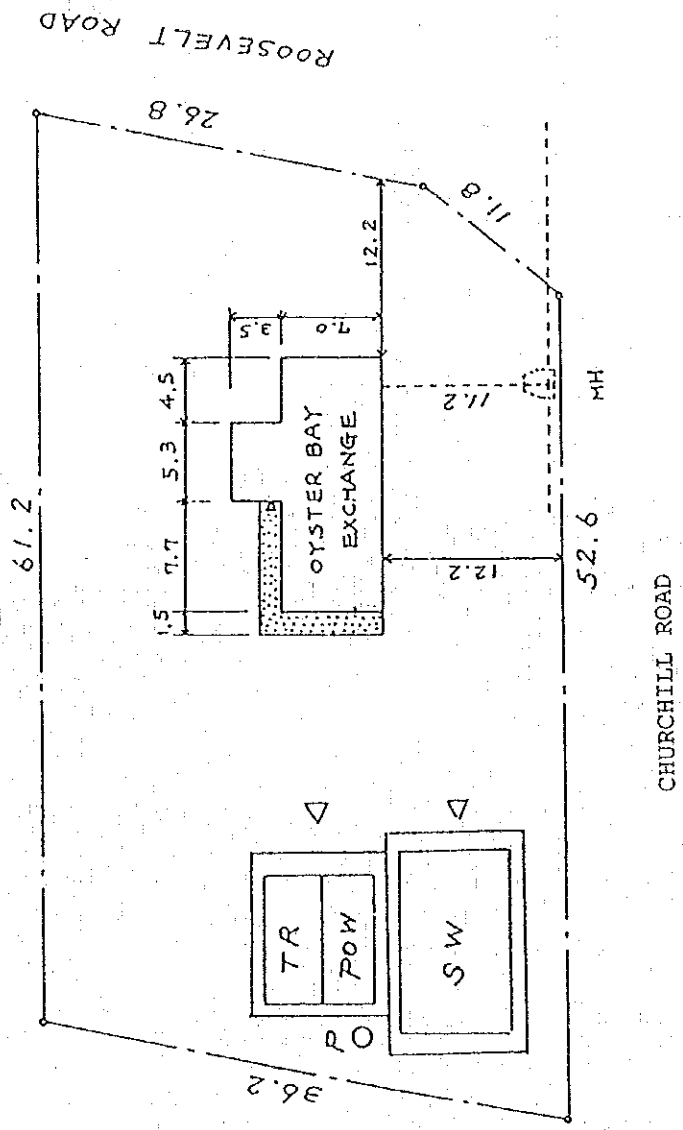


Figure 8 Secondary cable plan in Oyster Bay Exchange Area (9/9)

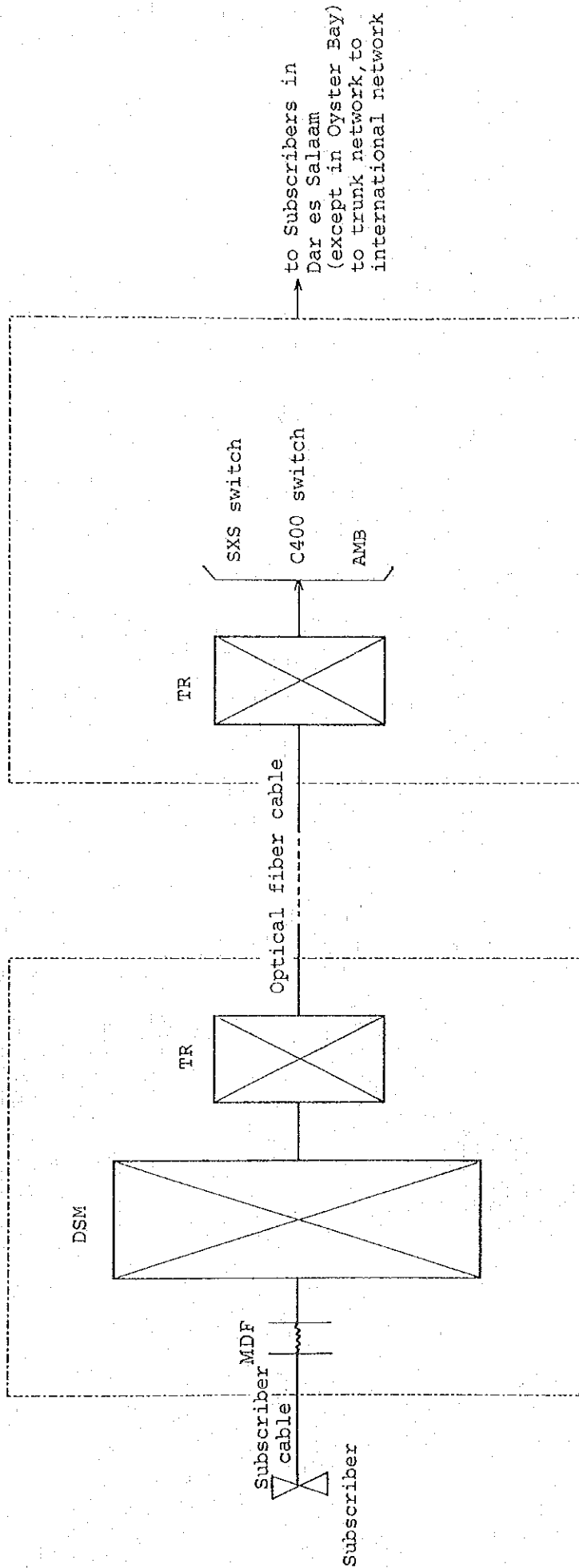


Note:
 TE : Transmission facilities for OPT-F Cable system
 POW: Engine Generator (E/G) with Fuel tank
 SW : Digital switching facilities
 P : TANESCO Power IN-PUT

Figure 9 Site layout in Oyster Bay Exchange

Oyster Bay Exchange

Dar es Salaam Central Exchange



Note: DSM: Digital switch
 TR : Fiber optic transmission equipment

Figure 10 Configuration of inside plant

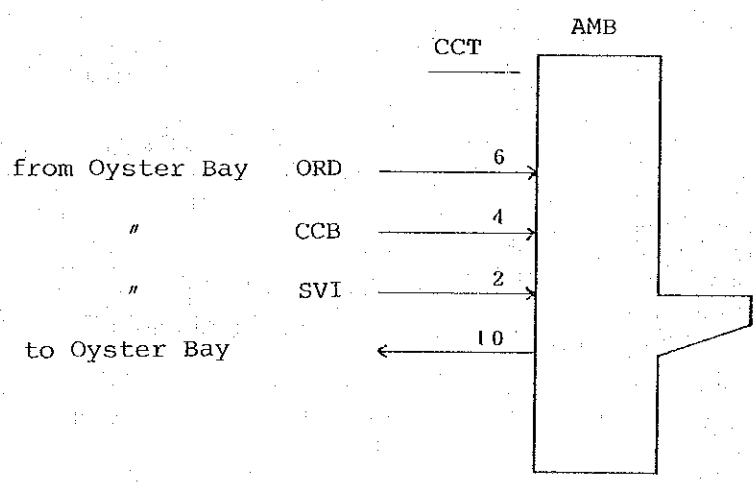
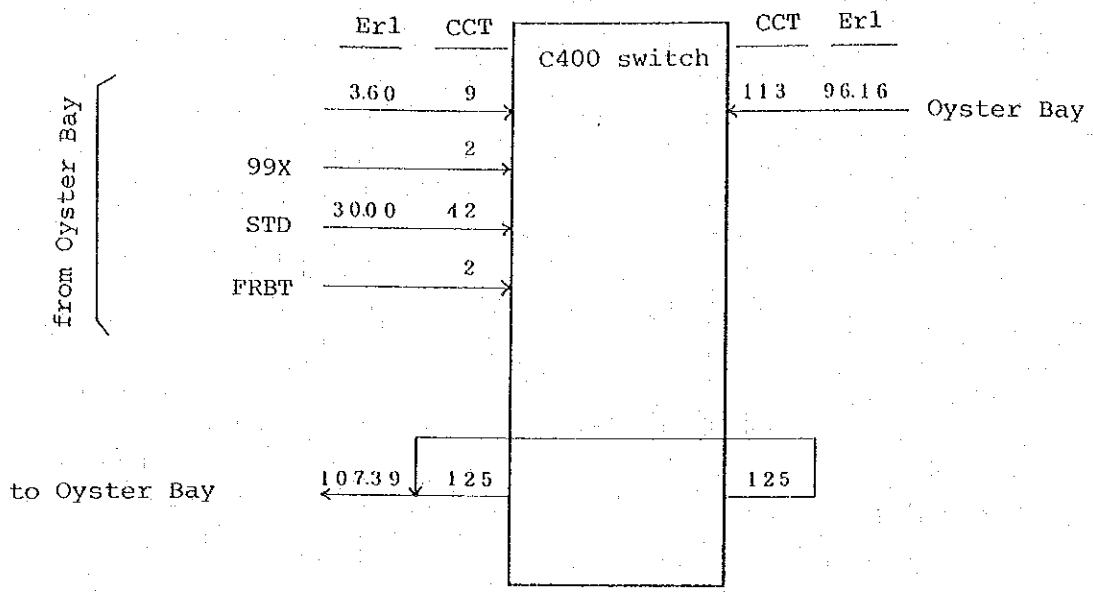


Figure 12 Simplified trunking between Oyster Bay and Central Exchange

Floor space for transmission equipment

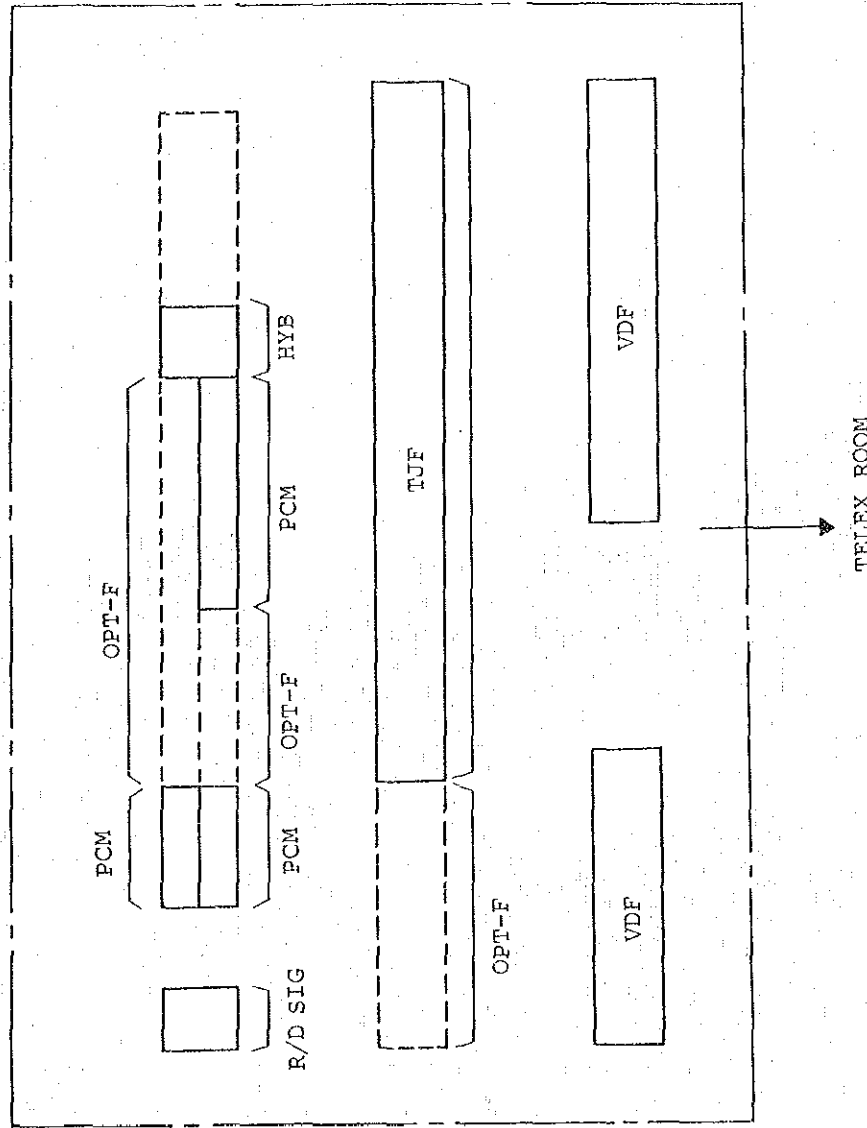
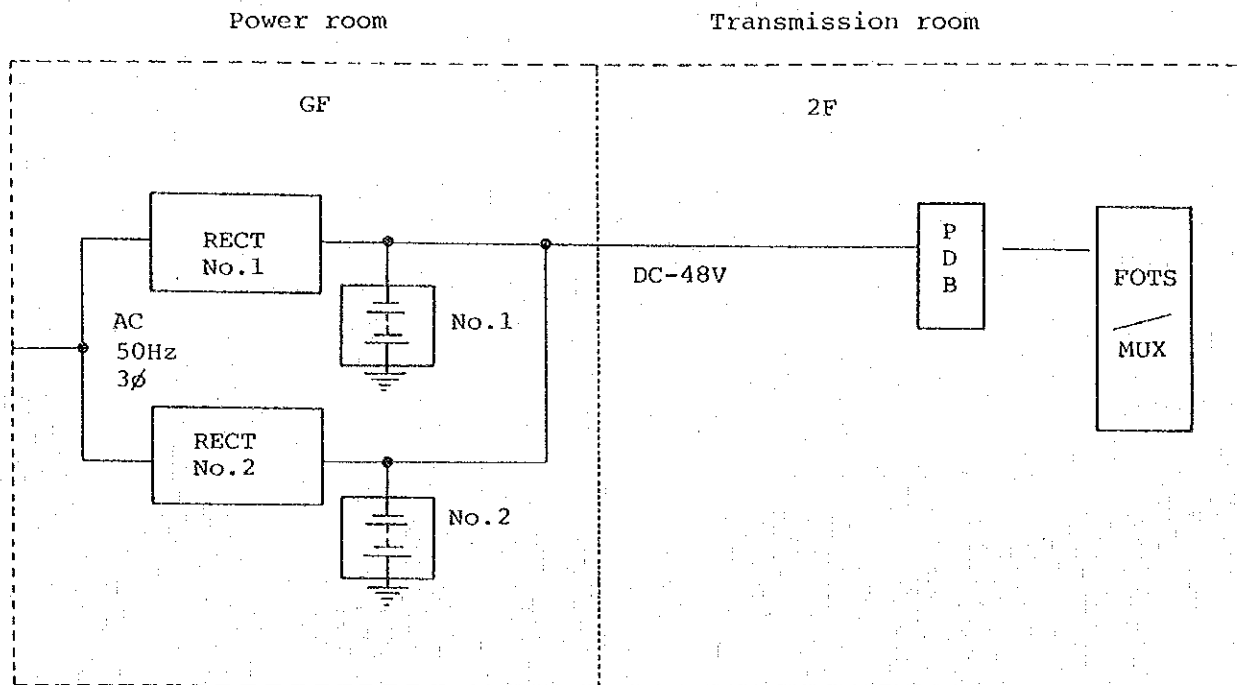


Figure 13 Equipment layout in transmission room in Central Exchange



DC POWER SUPPLY SYSTEM: DUAL SYSTEM
 BATTERY: SEALED TYPE LEAD ACID BATTERY
 CAPACITY (holding time): 4 HOURS

Figure 14 Power supply system diagram in Central Exchange

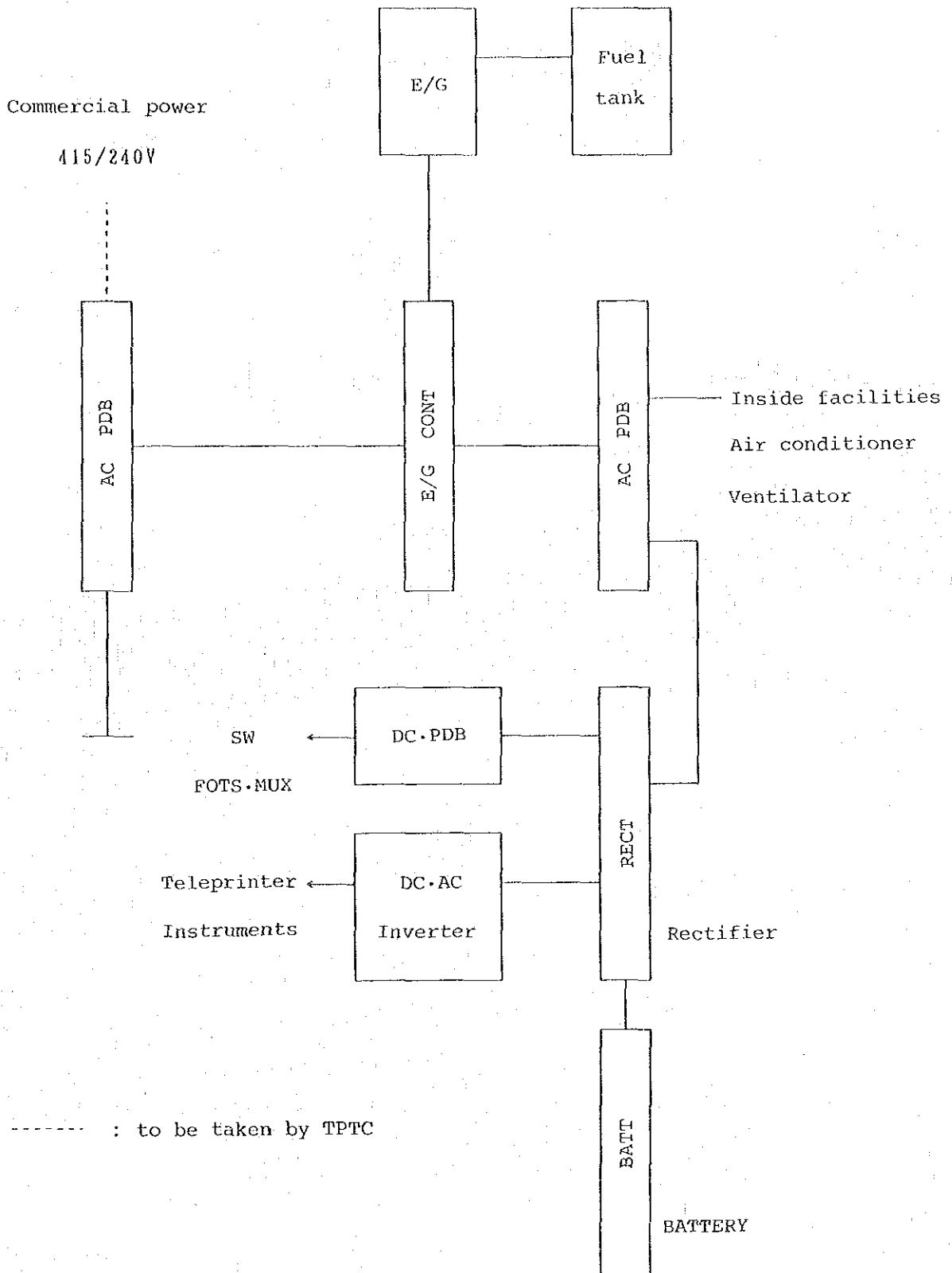


Figure 15 Power system diagram in Oyster Bay Exchange

JICA