# CHAPTER 6 BASIC DRAWINGS

# CHAPTER 6 BASIC DRA WINGS

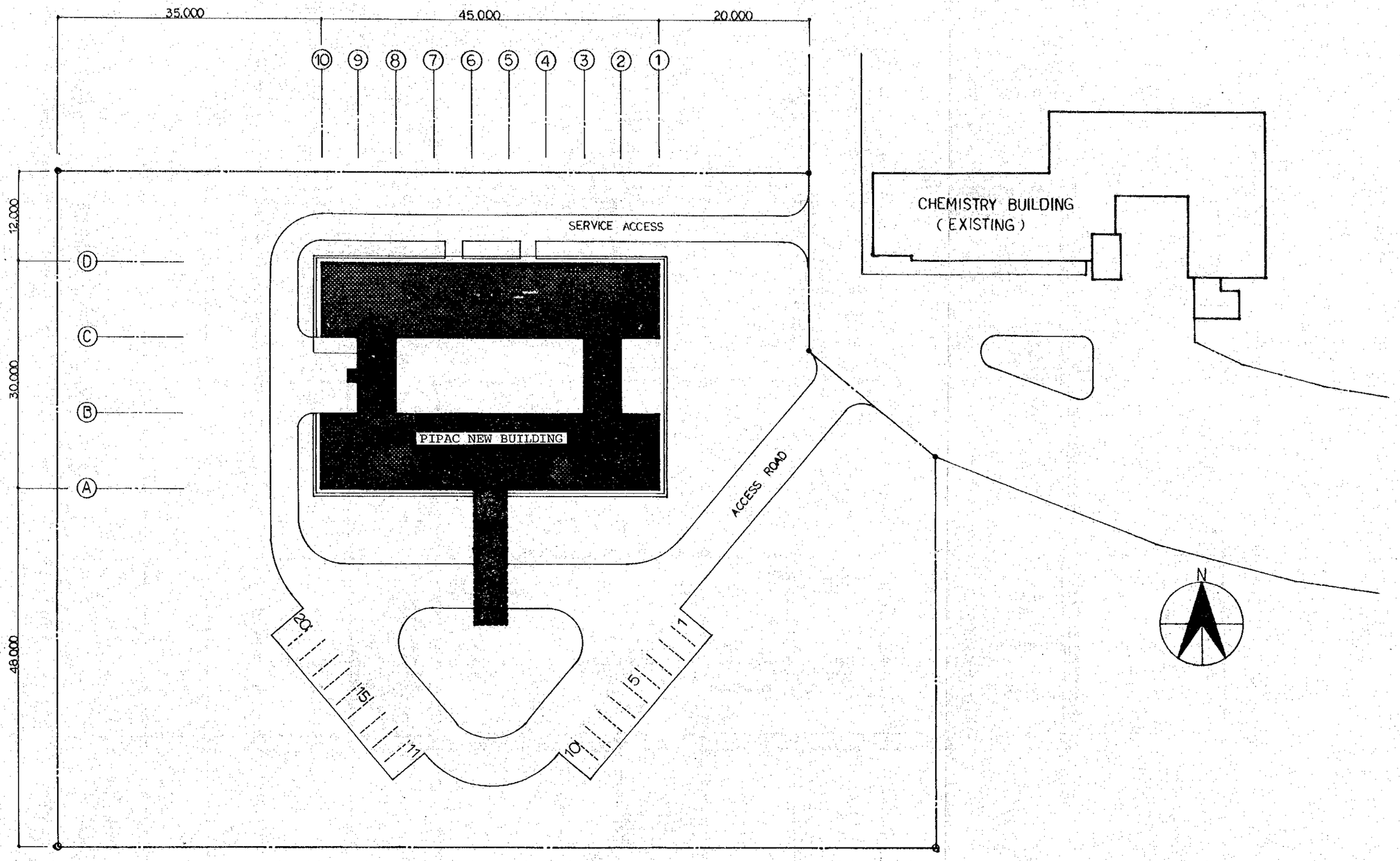
## 6-1 List of Floor Area

| | | | $m^2$ |
|---|---|---|---|
| 1F | 101 | Records Room | 25.0 |
| | 102 | Coumputer Room | 25.0 |
| | 103 | Director's Room | 40.0 |
| | 104 | Office Room | 60.0 |
| | 105 | Sample Reception | 20.0 |
| | 106 | Entrance Hall | 100.0 |
| | 107 | Locker Room | 40.0 |
| | 108 | W.C. (G) | 10.7 |
| | 109 | W.C. (L) | 12.3 |
| | 110 | Storage | 3.5 |
| | 111 | Janitor's Storage | 5.0 |
| | 112 | Staff Lounge | 50.0 |
| | 113 | Corridor (S) | 38.5 |
| | 114 | Hall with Staircase (E) | 70.0 |
| | 115 | Hall with Staircase & D.W (W) | 71.5 |
| | 116 | Corridor (N) | 50.0 |
| | 117 | Dark Room | 7.5 |
| | 118 | Cold Storage | 42.5 |
| | 119 | Pilot Plant | 40.0 |
| | 120 | S.D.M | 10.5 |
| | 121 | Storage | 29.5 |
| | 122 | Transformer Room | 40.0 |
| | 123 | Standby Generator Room | 40.0 |
| | 124 | Machine Room | 40.0 |
| | 125 | Sample Preparation Room | 40.0 |
| | 126 | Storage | 80.0 |
| | 127 | Night Lab. | 10.0 |
| | | First Floor Area Total | 997.5 |

| | | | $m^2$ |
|---|---|---|---|
| 2F | 201 | Library | 90.0 |
| | 202 | Seminar (L) | 80.0 |
| | 203 | Seminor (S) | 60.0 |
| | 204 | Training Lab. | 60.0 |
| | 205 | W.C (G) | 10.7 |
| | 206 | W.C (L) | 12.3 |
| | 207 | Hot Water Service | 3.5 |
| | 208 | Janitor's Storage | 5.0 |
| | 209 - 211 | Staff Room | 50.0 |
| | 212 | Corridor (S) | 58.5 |
| | 213 | Hall with Staircase (E) | 70.0 |
| | 214 | Hall with Staircase & D.W (W) | 71.5 |
| | 215 | Corridor (N) | 50.0 |
| | 216 - 218 | Staff Room | 50.0 |
| | 219 | Research Lab. | 120.0 |
| | 220 | Office Room | 15.0 |
| | 221 | Instrument Room | 25.0 |
| | 222 | Conference Room | 40.0 |
| | 223 | Stockroom | 90.0 |
| | | Second Floor Area Total | 961.5 |
| 3F | 301 | Research Lab. | 130.0 |
| | 302 | Office Room | 15.0 |
| | 303 | Instrument Room | 25.0 |
| | 304 | Office Room | 15.0 |
| | 305 | Instrument Room | 25.0 |
| | 306 | Research Lab. | 80.0 |
| | 307 | W.C (G) | 10.7 |
| | 308 | W.C (L) | 12.3 |
| | 309 | Hot Water Service | 3.5 |
| | 310 | Janitor's Storage | 5.0 |

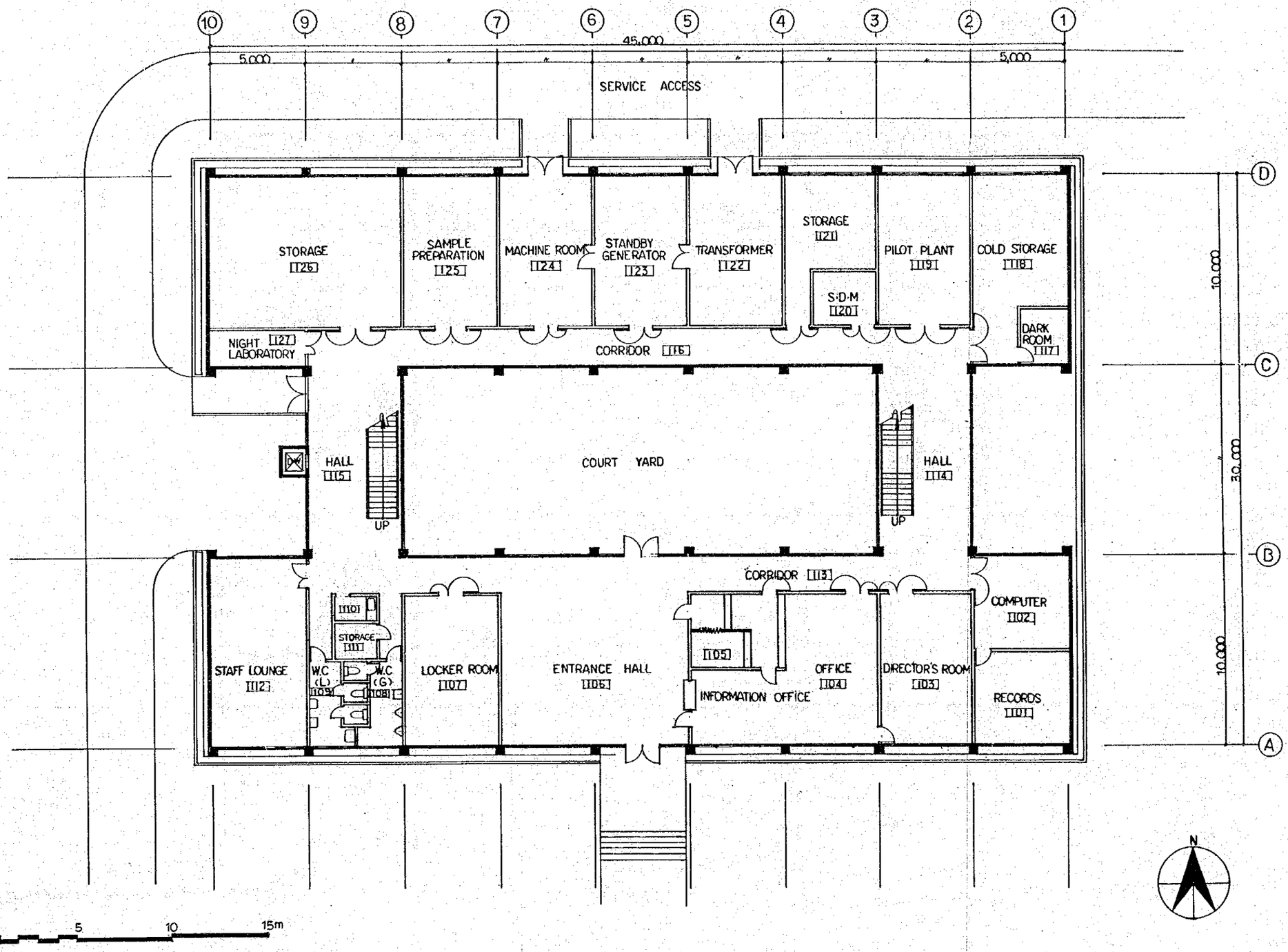
| | | | $m^2$ |
|---|---|---|---|
| 311 | Instrument Room | 50.0 | |
| 312 | Corridor (S) | 58.5 | |
| 313 | Hall with Staircase (E) | 70.0 | |
| 314 | Hall with Staircase & D.W. (W) | 71.5 | |
| 315 | Corridor (N) | 50.0 | |
| 316 | Electronics Shop | 50.0 | |
| 317 | Instrument Room | 40.0 | |
| 318 | Analytical Lab. | 120.0 | |
| 319 | Office Room | 15.0 | |
| 320 | Instrument Room | 25.0 | |
| 321 | Analytical Lab. | 130.0 | |
| | Third Floor Area Total | 1001.5 | |
| | D.W. Machine Room | 1.5 | |

All Floor Area Total 2966.0 $m^2$


35.000
45.000
20.000
10
9
8
7
6
5
4
3
2
1
12.000
30.000
48.000
D
C
B
A
SERVICE ACCESS
PIPAC NEW BUILDING
ACCESS ROAD
CHEMISTRY BUILDING
( EXISTING )
N
20
15
11
10
5
1
0
5
10
15
20m

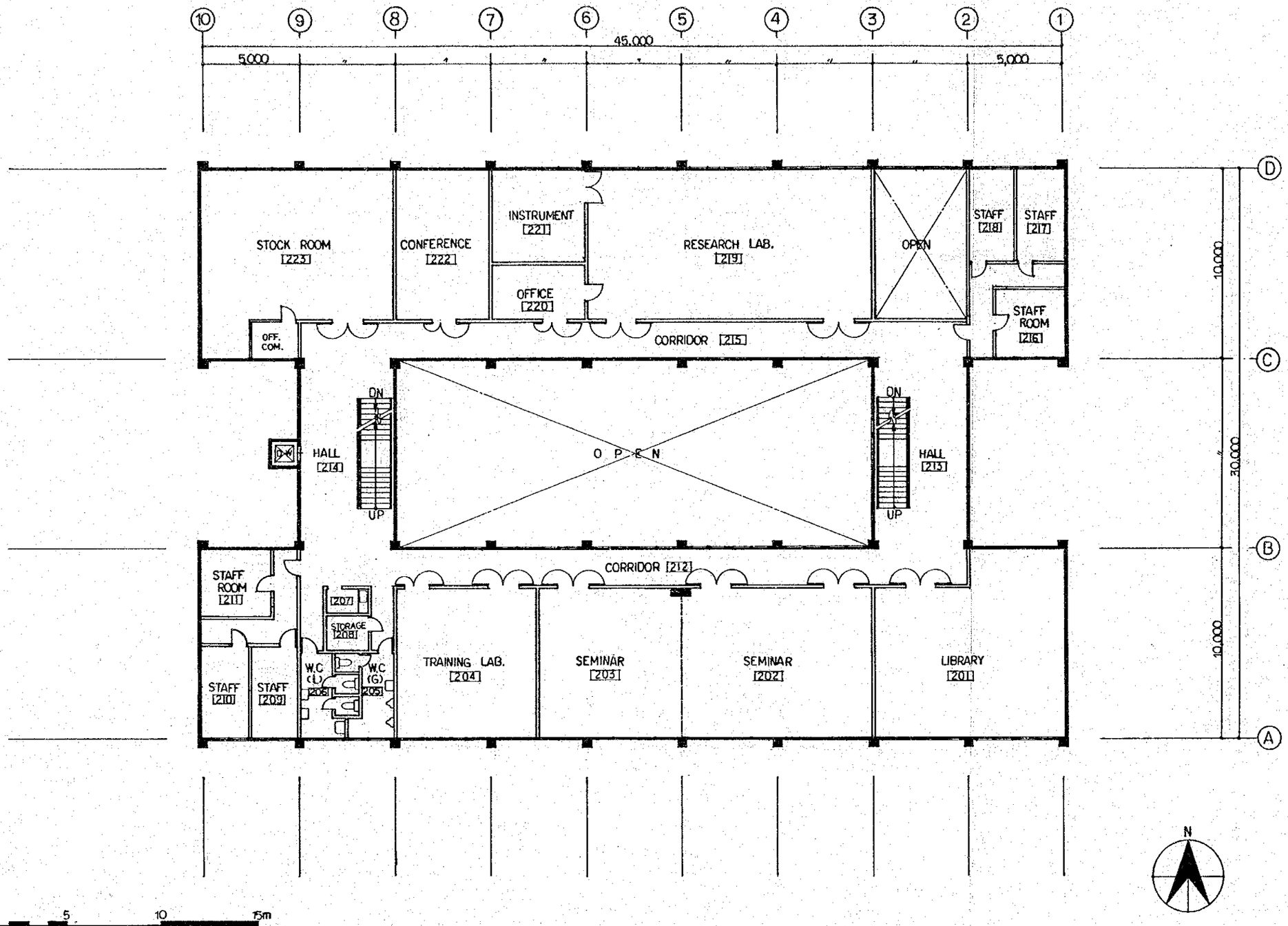


# SITE PLAN 01



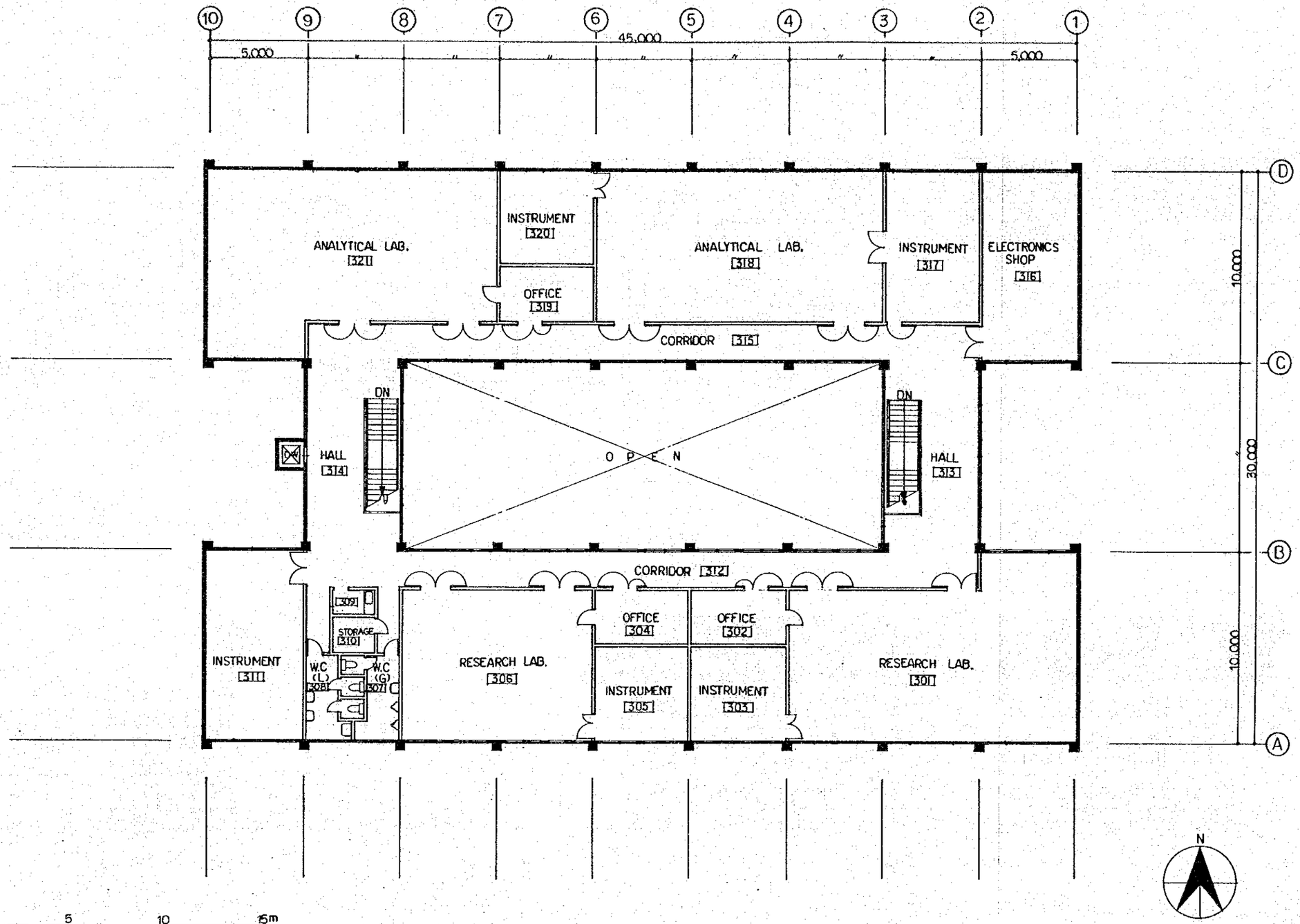



# FIRST FLOOR PLAN 02



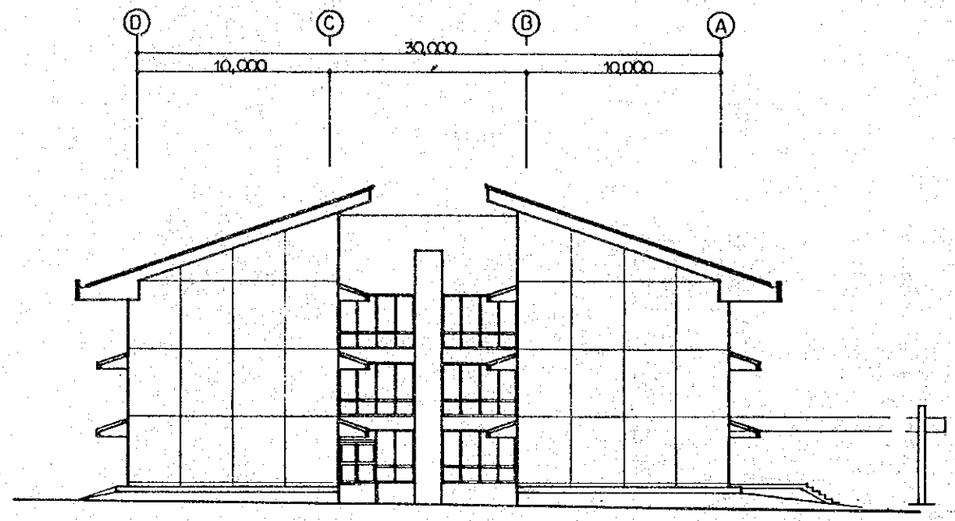



# SECOND FLOOR PLAN 03

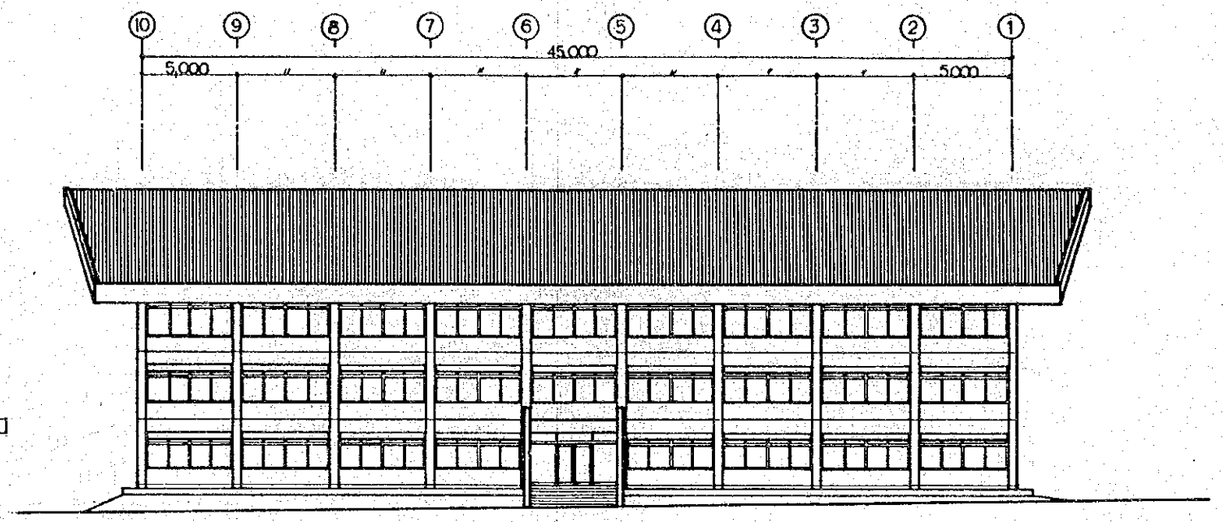




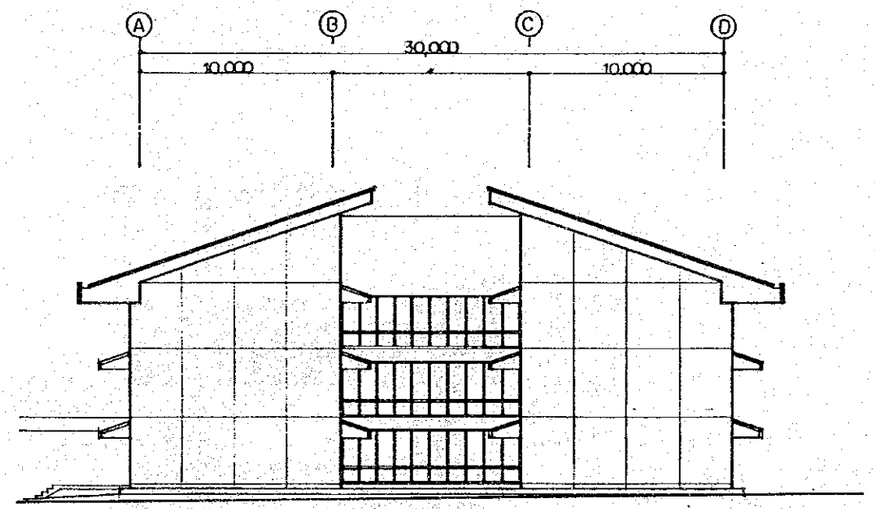

# THIRD FLOOR PLAN 04



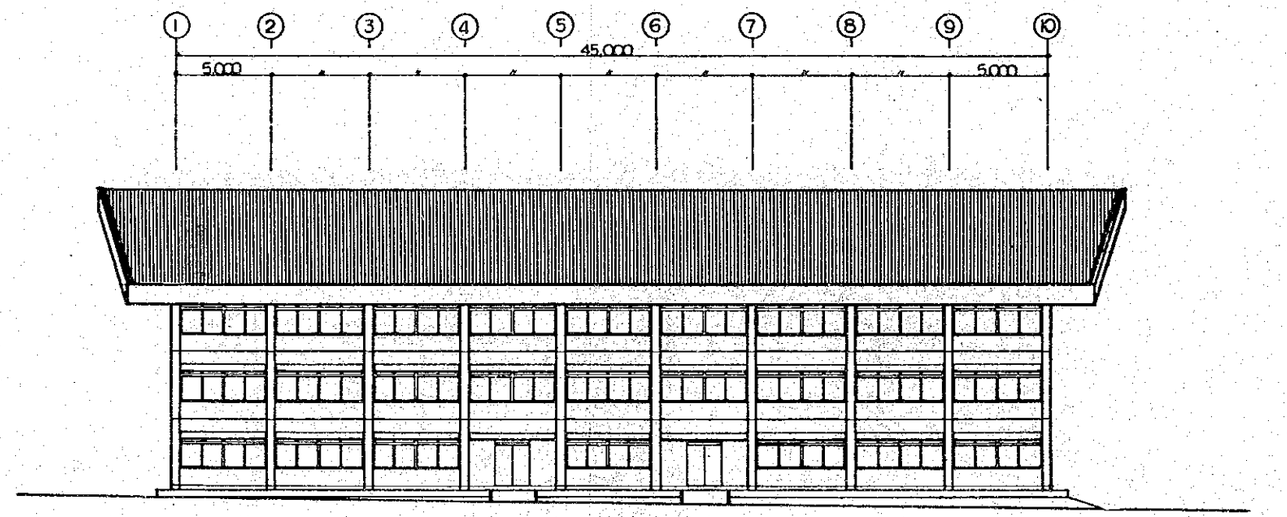

WEST ELEVATION



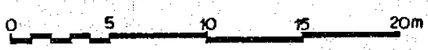

SOUTH ELEVATION




EAST ELEVATION

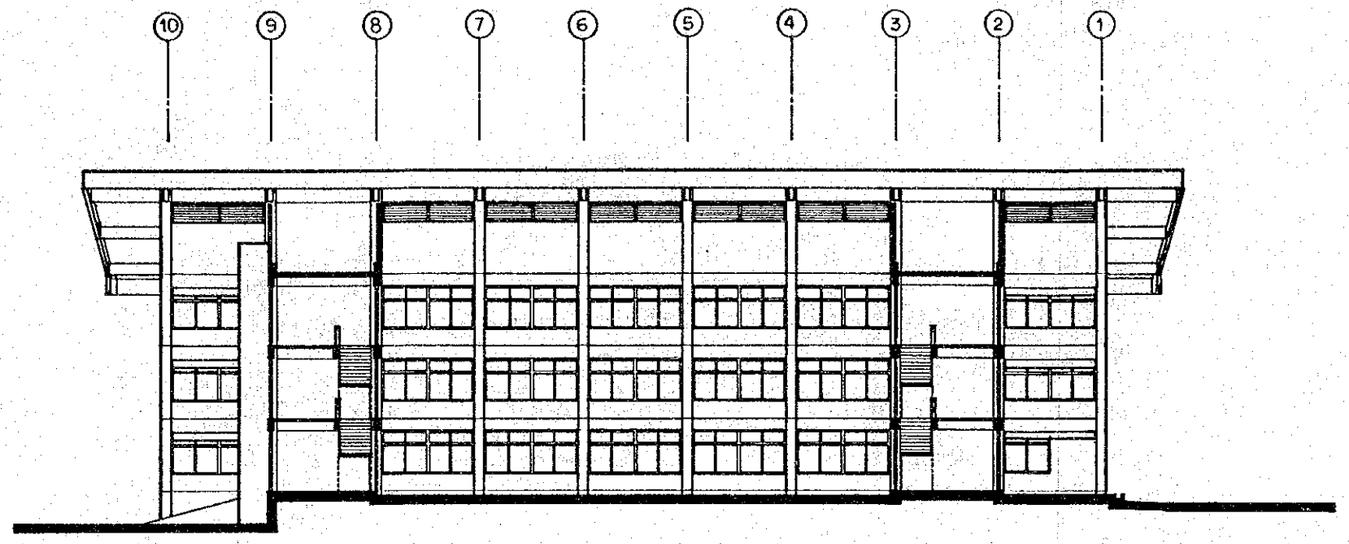



NORTH ELEVATION

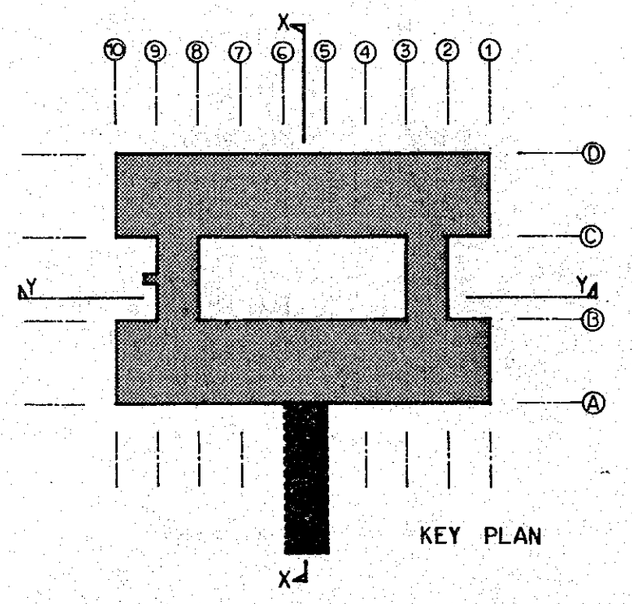




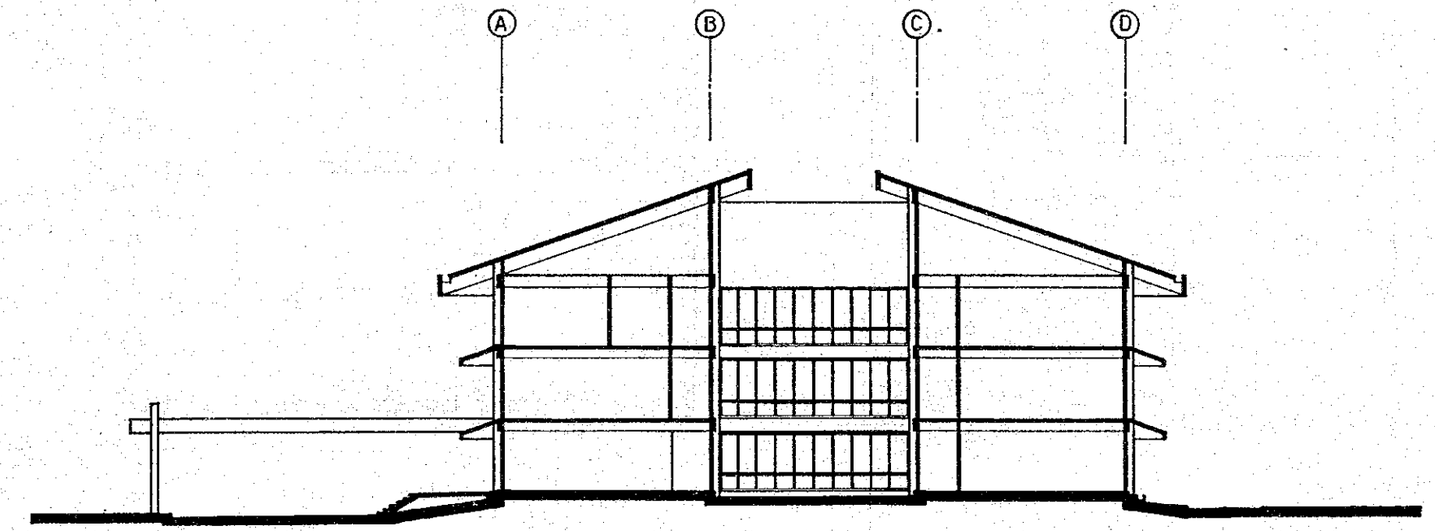

# ELEVATION 05




Y-Y SECTION




KEY PLAN

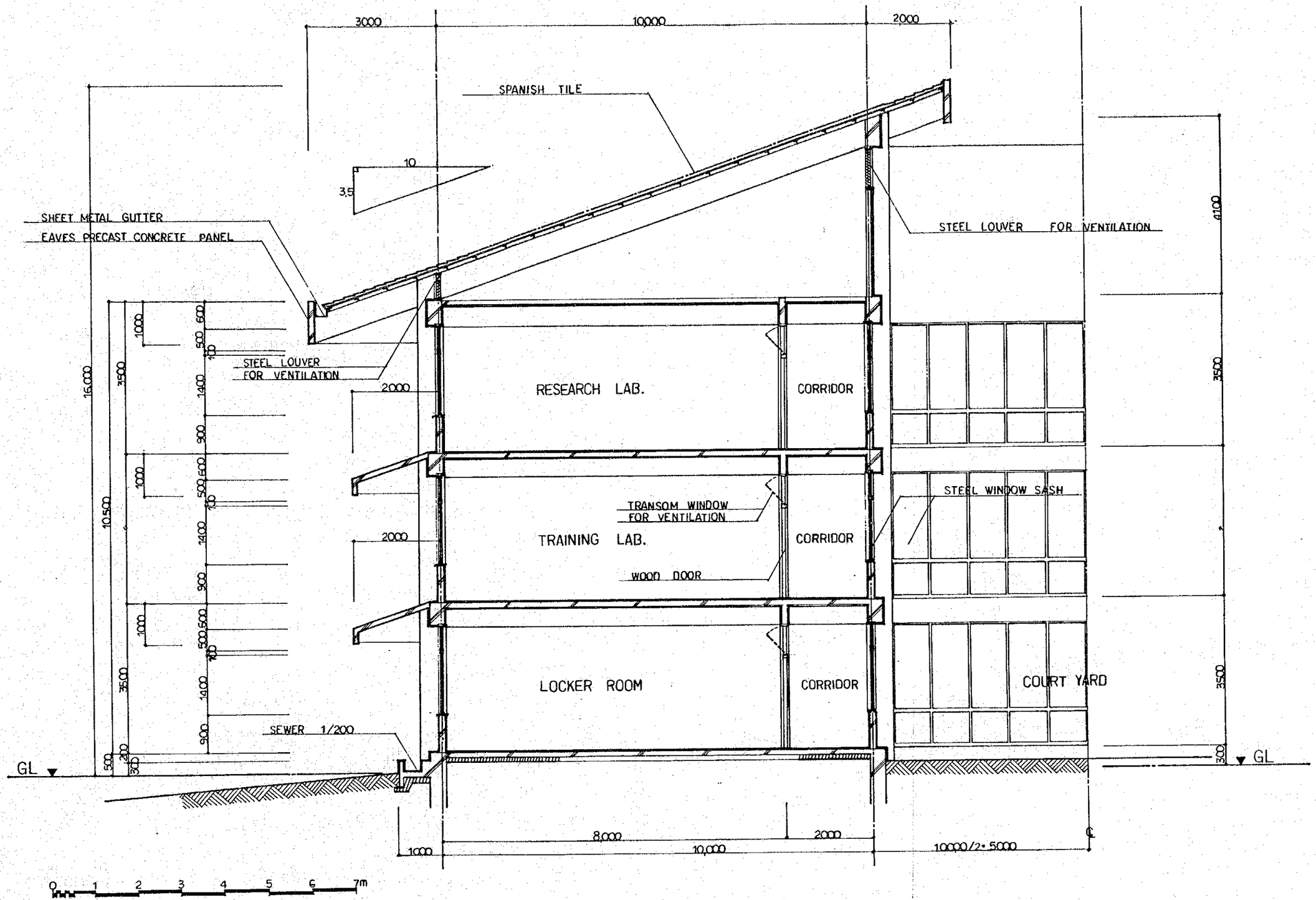



X-X SECTION

0 5 10 15 20m



# SECTION 06






# SECTIONAL DETAL 07

# CHAPTER 7 PROJECT IMPLEMENTATION SCHEDULE

# CHAPTER 7 PROJECT IMPLEMENTATION SCHEDULE

## 7-1 Management System

### 7-1-1 Authorities Concerned

Product Standard Agency, Ministry of Trade and Industry is fully responsible for the satisfactory fulfillment of this project wherein this authority implements the duties on behalf of the government of the Philippines, manages the project and supervises PIPAC.

The director of this agency and the executive director of PIPAC has signed the minutes of discussions of the meeting held with the basic design study team.

### 7-1-2 Organization

Figure 2-6-11 shows the present organization chart of PIPAC. However, PIPAC is now planning to expand its organization as shown in the fig. 2-6-12 preparing for the completion of the project and the founding of the new laboratory expected in April, 1984. The new organization has an assistant director placed under the executive director. The personnel are to deal with planning and management, areas necessary to attain satisfactory results in service expansion, especially in the training & seminar and the research & development departments.

Fig. 2-6-13 shows the organization at the completion of the five-year program from 1984 to 1988. In this program, an electronics and instrument department is to be newly founded along with the expansion of existing departments such as the research & development department, analytical services department, training & seminar department and general services department. This department will be very important in developing an effective use of electronic analytical equipment in the Philippines as

mentioned in future expectations in sec. 2-7. As for the staff, the professors of Ateneo de Manila University are working as the directors of the research & development dept., analytical services dept. and training & seminar dept., including the executive director at present. Though, when starting the five-year program in 1984, the personnel from PIPAC are planned to serve in the positions of executive director, assistant director and director of the analytical services dept., and at the time of completion of the program, all of the directors are planned to be of the PIPAC regular staff.

### 7-1-3 Executing Conditions of the Project

The leasehold right of the project site (10,000 square meters) has already been donated from Ateneo de Manila University to PIPAC. The Product Standard Agency, Ministry of Trade and Industry, shall be fully responsible in taking every service required to the government of the Philippines under the provisions of the Exchange of Notes for the realization of the Project.

PIPAC bears full responsibility for completing the Philippine's scope of work stated in sec. 7-4-2.

Ateneo de Manila Univ. is prepared for co-operating with PIPAC as far as possible such as determining a site road exclusively for construction use for security, for the execution of construction.

## 7-2 Plan for Disposition of Personnel

PIPAC, now managed by 26 staff members, including the executive director and the directors of each department, is planning to increase the staff to 35 at the start of the five-year program and to 66 by the completion of the program.

The column in table 7-2 titled 1981 shows the disposition of personnel at present. The subcolumn at the left of columns 1984 and 1988 shows the PIPAC plan and the right subcolumns show the disposition that are used for management analysis.

The following are several remarks concerning the disposition program of PIPAC. First, the net number of staff members excluding the ones engaged in management and administration is insufficient to achieve the necessary operation rate, about 50 percent of the capacity of the granted facilities and equipment at the start of the five-year program in 1984. Because skills will be insufficiently developed in the first year, the training program for personnel indicated in the right subcolumn of 1984 will be necessary. Secondly, to insure sound service performance at the completion of the five-year program, the personnel program must be achieved, at least by the third year of the program.

Thirdly, it is advisable to cut down the final expansion plan (1988) of the research & development program. PIPAC is expecting to expand the department (presently four (4) personnel) to 23 in 1988. Though the department accounts only for 5 percent when compared to the analytical services dept., research & development dept. and training & seminar dept. in percentage of total income in 1981, while the analytical services department accounts for 80 percent. Therefore, it will be safe and reasonable to attach importance to the analytical services department rather than the research & development department. It is desirable to reduce the number of personnel in the research & development dept. and increase those in the analytical services dept. by that number. Table 7-2 shows the modified disposition of personnel in 1988, as indicated above. The column titled 1986 is the third year achievement of the program, 1985 showing the halfway point in the program.

## Table 7-2: SCHEDULE FOR DISPOSITION OF PERSONNEL
(nos. of personnel)

| Organization | Present | Future Plan | | | | |
|---|---|---|---|---|---|---|
| | 1981 | 1984 | | 1985 | 1986 | 1988 |
| | | PIPAC Plan | Modified Plan | Modified Plan | Modified Plan | PIPAC Plan |
| Administration | | | | | | |
| Executive Director | (1) | 1 | 1 | 1 | 1 | 1 |
| Assistant Director | - | 1 | 1 | 1 | 1 | 1 |
| Accountant | - | (1) | 1 | 1 | 1 | 1 |
| Legal | (1) | (1) | (1) | (1) | (1) | (1) |
| Personal Administration | - | - | 1 | 1 | 1 | 1 |
| Librarian | - | - | - | 1 | 2 | 2 |
| Clerical Staff | 2 | 2 | 2 | 3 | 5 | 5 |
| Security & Safety | - | 1 | 1 | 1 | 1 | 1 |
| Internal Audit | - | - | - | - | - | - |
| | 2(2 | 5(2) | 7(1) | 9(1) | 12(1) | 13(1) |
| Research & Development | | | | | | |
| Director | (1) | (1) | (1) | (1) | 1 | 1 |
| Senior Chemist II | - | - | 1 | 2 | 3 | 4 |
| Chemist | 2 | 2 | 2 | 4 | 7 | 12 |
| Technician | 1 | 1 | 2 | 4 | 5 | 6 |
| | 3(1) | 3(1) | 5(1) | 10(1) | 16 | 23 |
| Analytical Services | | | | | | |
| Director | (1) | 1 | 1 | 1 | 1 | 1 |
| Senior Chemist I | 1 | 1 | 2 | 2 | 2 | 3 |
| Chemist | 8 | 9 | 11 | 12 | 12 | 11 |
| Technician | 4 | 4 | 6 | 8 | 8 | - |
| Laboratory Aide | (3) | (3) | (3) | 2(3) | 3(3) | 5 |
| | 13(4) | 15(3) | 20(3) | 25(3) | 26(3) | 20 |
| Training & Seminar | | | | | | |
| Director | (1) | (1) | (1) | (1) | (1) | (1) |
| Coordinator | - | - | 1 | 1 | 1 | 1 |
| Staff | - | (5) | - | 1 | 1 | 1 |
| | 0(1) | (6) | 1(1) | 2(1) | 2(1) | 2(1) |
| Electronics & Instrument | | | | | | |
| Senior Technician | - | - | 1 | 1 | 1 | 1 |
| Maintenance Technician | - | - | 1 | 2 | 3 | 4 |
| Laboratory Aide | - | - | (1) | 1 | 1 | 1 |
| | 0 | 0 | 2(1) | 4 | 5 | 6 |
| Grand Total | 18(8) | 23(12) | 35(7) | 50(6) | 61(5) | 64(2) |

(Note) Part-time employer in the parenthesis

The new staff members will be hired from the graduates of the faculty of chemistry in universities like Ateneo de Manila University or University of the Philippines, etc. As PIPAC itself is a training institute in practical chemistry, there will be no problem in training. PIPAC is already giving training seminars to the staff.

## 7-3 Construction Pranning

Prevention of construction accidents especially by construction vehicles will be given more than usual consideration because the project site is located in the middle of the university campus. For this purpose, a proposal has been offered by Ateneo de Manila Univ. to set a campus road exclusively for construction use. Attention will be given to safety procedures such as appointing special security staff or building strong temporary fences so that unauthorized persons cannot enter the project site.

The project site is located on a grade sloping westward with a 1/50 gradient and on the bottom of a valley running north to south. A considerable flow of water is expected in the rainy season. The finish grading including earth work will be completed before the rainy season. And precautions to prevent storm water from flowing into the site ground will be made, such as raising the ground level around the building with surplus soil from excavation and backfilling and installing a drainage gutter around the project site.

There are 520 (2) big acacia trees in the middle of the site to be cut down. The resulting holes may superimpose on the position of the foundations of the project building. Open test holes show that the adobe layer lies deep in the ground at No. 2 hole. Therefore it is essential to confirm that the adobe layer will be exposed which is to be the bed

rock for each foundation. In case the adobe layer cannot be confirmed or any doubt arises as to the strength of the adobe layer, precautions will be made such as confirming the allowable soil bearing capacity by a plate loading test.

The local annual average temperature is 27°C and the dry season monthly high temperature in April and May reaches 33°C. Therefore cement retarder will be mixed in the concrete and the concrete will be kept wet at the time of placing and curing. In the selection of a local ready-mix concrete manufacturer, a condition will be nearness to the site so that the transportation period will be within a certain limit considering the traffic congestion in Manila.

Facility installation work is expected to take up a considerable portion of the construction work of the project building, which is characteristic for a laboratory building. Various kinds of pipe systems including electric wires are to intersect the ceilings of rooms and corridors. Though facilities tended to be left aside from the main construction work in the past, a sufficient period shall be alloted to it in planning the construction schedule of this project.

As most of the analytical equipment is sensitive electronic equipment, the construction work shall be completed for the most part at the time of installation of the equipment. The construction schedule will be coordinated with the analytical equipment installation schedule.

## 7-4 Scope of Work

Under the condition that the grant aid of the Japanese Government is decided, the following arrangements are to be within the areas of responsibility of each government.

### 7-4-1 Japanese Scope of Work

(1) Construction of the Proposed Building on the PIPAC land, after the transplantation of the existing trees, which is included in the Philippine scope of work;

(2) Providing the usual building facilities, such as the water supply, drainage, plumbing, LPG, ventilation and electric systems such as main feeder, lighting, receptacle outlets, interphone and fire alarms;

(3) Paving the roads within the site and the parking lot;

(4) The installation and adjustment of the analytical equipment provided by Japanese grant aid;

(5) Providing the electric power system, water supply, drainage and LPG as far as the outlets, which are necessary for the existing analytical equipment to be moved into the new building. (Connection to the outlets will be the Philippine's responsibility);

(6) The purchase and installation of the furniture for laboratory use (work tables, draft chambers and laboratory basins, etc.); and

(7) Bearing fees for the application of the building permit and providing services necessary for acquiring the permit.

### 7-4-2 Philippine Responsibilities

(1) Securing the land necessary for the construction of the facilities;

(2) Transplantation of existing trees in the land by one month before the commencement of the construction work;

(3) Installing a telephone wiring system to room No. 104, the office;

(4) Repair or replacement of the water main from which a branch pipe is to lead to the new building in order to secure sufficient necessary

capacity, if needed;

(5) Repair or replacement of the transformer to secure sufficient capacity for the substation from which electricity is to be supplied to the new building, if needed;

(6) Bearing all expenses necessary for construction of the facilities other than those to be borne by the grant, such as gates, gate houses, exterior lighting, plant, etc;

(7) Bearing all the responsibility and expenses necessary for the purchase, moving, repair, installation, adjustment and inspection of the analytical equipment except for that which will be provided under grant aid;

(8) The supply of temporary electricity and water free of charge during construction. However, the temporary wiring and pipe installation from the point designated by the Philippine side to the point necessary for construction will be within the Japanese area of responsibility;

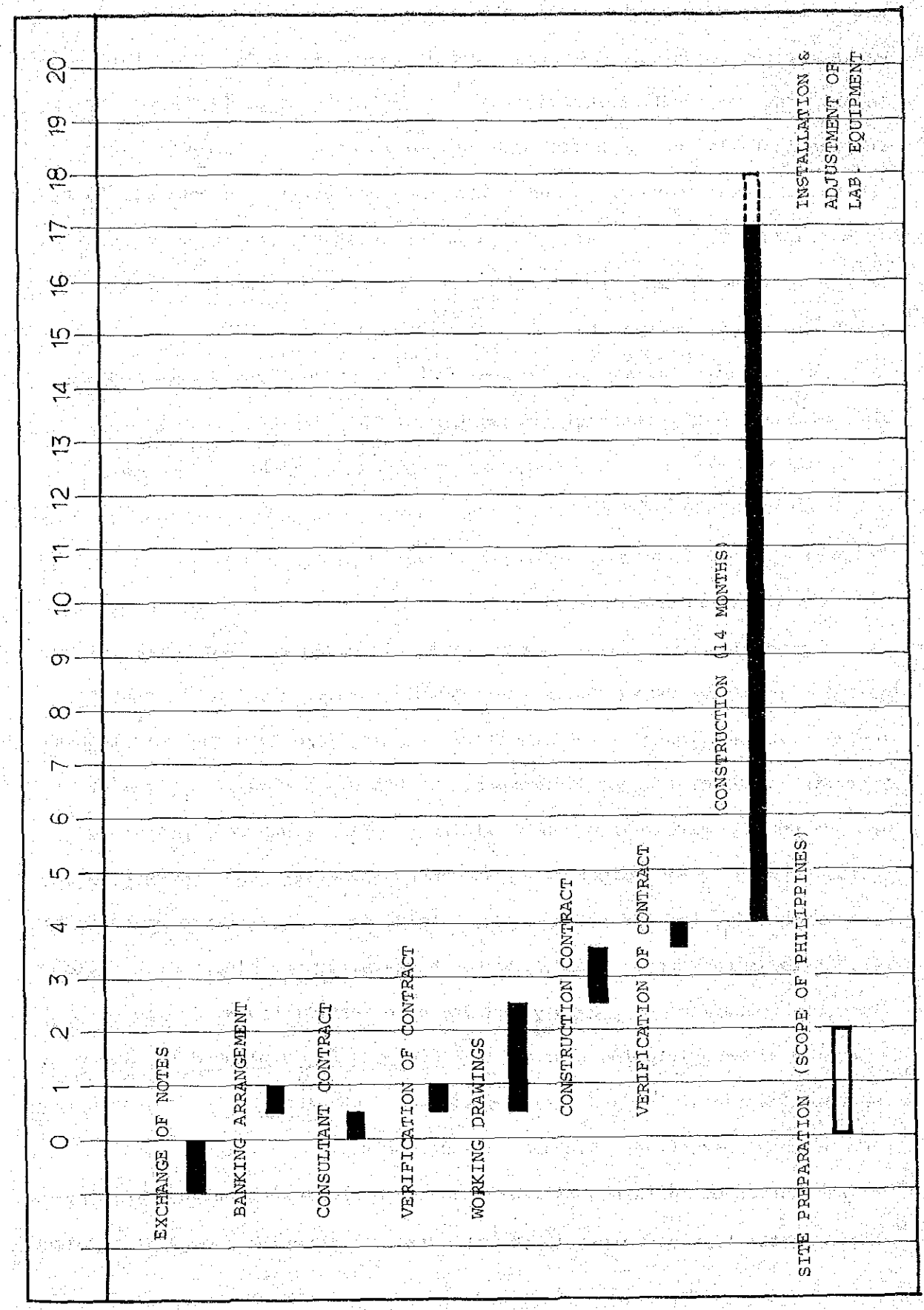
(9) A permit to use pay telephone installed at the existing PIPAC offices; and

(10) Purchase and installation of the furniture utensils and accessories other than for laboratory use (portable fire extinguishers, curtains, etc.) and of those which will not connect to buildng facilities, pipe and/or wiring systems.

## 7-5 Tentative Construction Schedule

A tentative construction schedule to go into effect after the exchange of notes is shown in the following page. It is expected to take about four (4) months before the commencement of the work; two (2) months for furnishing working drawings after the consultant contract, one (1) week for discussion

## Table 7-5: TENTATIVE CONSTRUCTION SCHEDULE



and approval of all the tender documents, three (3) weeks for cost estimation and bidding by the tender construction companies, and three (3) weeks for the construction contract and its approval by the government of Japan. The construction period is expected to take about 14 months including the installation and adjustment of the analytical equipment. Since the rainy season on Luzon Island, where the project site is located, lasts from mid-June to November with frequent thunderstorms, the concrete casting of the structure will be completed before the rainy season if possible. At least the foundation work has to be finished by then.

The construction period may have to be extended one (1) more month if most of the concrete casting work is done in this season.

## 7-6 Maintenance Schedule

1) Building Maintenance

In general, a physical life span of a reinforced concrete construction building means the period until the concrete changes alkaline to neutral (over pH 12) and loses protection of reinforcing bars, and the bars become rusty to lose its structural strength. Though the period of neutrality depends on th environment of the building as well as concrete proportion ratio, especially the weight ratio of cement and water (water-cement ratio) and workmanship, the life is usually 40 to 80 years. Life span of building facilities is said to be shorter, 20 to 25 years for the electric installations, 15 to 20 for water supply and drainage installations, and 10 to 15 years for air-conditioning equipment. This project is planned to expose the building facilities and piping system as much as possible for the purpose of easy inspection, maintenance and repairs.

Exhaustion of buildings is indicated as the following curve. This curve starts at the time of completion of building construction though it is almost

flat then. Inspection, maintenance and repairs are to compensate the exhaustion to expand the life of the building from T to T' point.

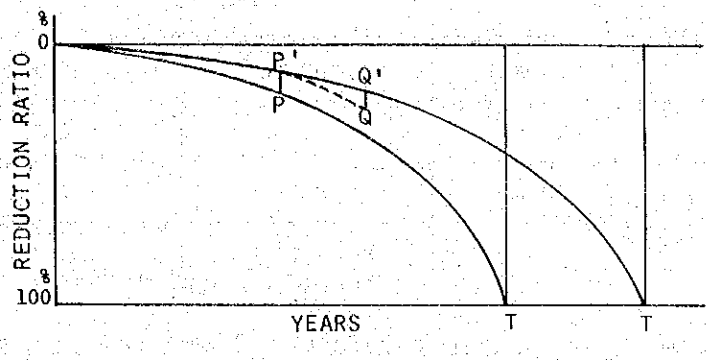



**Fig. 7-6-1: REDUCTION CURVE OF BUILDING**

Annual maintenance cost varies country to country but usually shares 0.6 percent to 1.4 percent of the construction cost. The Japan Housing Corporation imposes 1.1 percent on the inhabitants. The maintenance cost of 0.3 percent of the building cost is regarded reasonable for this project considering the type of the building and that no interests are to be charged on the construction costs.

2) Running Cost

As for the running costs of the project building, relatively precise figure can be obtained based on the running costs of the chemistry building where PIPAC has been accommodated by converting it to the project building size. According to the management plan, the operation rate in 1984, the first year, will be 50 percent of full operation, 70 percent in the second year and reach 100 percent in the third year and after. When the running costs are assumed to proportion to the operation rate, they will be as shown in the following table.

**Table 7-6-2: RUNNING COST**

| Year / Items | 1984 | 1985 | 1986 |
|---|---|---|---|
| Electricity | 3,100 KWH | 4,300 KWH | 6,150 KWH |
| Water | 250 $m^3$ | 350 $m^3$ | 505 $m^3$ |
| L P G | 90 kg | 125 kg | 180 kg |
| Cost | ₱ 5,050 | ₱ 7,000 | ₱ 10,050 |

Costs in this table include the price rise up to 1984. Costs for chemical reagents and consumables in the analytical services, research & development and training & seminars are estimated ₱ 291,100 at the time of full operation. (See table 8-4-1)

3) Maintenance of Analytical Equipment and Laboratory Furniture

Durability period of the analytical equipment and laboratory furniture is considered about 10 years, which also requires regular inspection, maintenance and repairs. This period can be extended with proper maintenance like the building. However, the supply of spare parts might stop along with the development of new equipment. Necessary amount of spare parts shall always be kept in hand. The annual maintenance cost of the analytical equipment and laboratory furniture is estimated more or less two (2) percent of the purchased price.

## 7-7 Technical Assistance

The present Philippine chemistry related laboratories and research centers are, as mentioned in sec. 2-4, relatively well equipped in number with high-level machinery. But considerable percentage of the equipment

is out of order due to the shortages of maintenance technique, spare parts or manufacturer's services after sale. PIPAC is planning to found an electronics and instrument group of its equipment including those to be granted. This electronics and instrument group attempts to gain income by serving as an advisor or consultant to outside laboratories on maintenance, repairs or purchase of equipment, and to hold training and seminars for the diffusion of repairing technology.

The Philippine officials enthusiastically calls for the technical assistance from the government of Japan to develop technology in a new field in the Philippines. The request is about programing assistance such as furnishing curriculums of general guidance on electronic technology for the above training and seminars, selecting priority of equipment studied in the seminars, establishing practical teaching methods, and deciding optimum number of participants and seminars, or seminar schedules, as well as technical guidance on maintenance or repairs. They ask at least two (2) specialists to be dispatched to the Philippines.

This field is behind other scientific technique in the Philippines. Technology acquired by the technical assistance is expected effective to not only chemical analysis but every field of scientific research using the analytical equipment and highly contributable to the improvement of capability of analytical researches and rehabilitation of various equipment which is out of failure at present.

# CHAPTER 8 FINANCIAL ANALYSIS

# CHAPTER 8 FINACIAL ANALYSIS

## 8-1 Present Situation

### 8-1-1 Management System

PIPAC is a private, non-stock, non-profit corporation approved by the National Science Development Board and Technology Authority (NSDB). PIPAC has no stock owners, and is exempted from any taxes and pays no profit dividends. (See Note) The authority for decisions in the organization rests with the Board of Trustees, consisting of the members shown in table 2-6-1. The organization consists of three (3) service departments and one (1) administration department.

Analytical Services

Training and Seminars

Research and Development

Administration

Each of three (3) service departments is supervised by a director, while the administration department is supervised by the executive director. These four (4) directors serve concurrently as professors and assistant professors of Atneo de Manila Univ. Chemistry Department. The total staff except for the directors are 18 full time and 3 part-time staff members as in fig. 2-6-11.

(Note)

NSDB has a regulation that direct expenses shall not be less than 60 % of the service income and general and administrative expenses shall be less than 30 %. This regulation is to require inexpensive services in return for the privilege of tax exemption, and to prevent lax management.

There were only the analytical services and administration departments till 1979. It was only in the past year or two that it was decided to make the research and development department and training and seminar department independent for the sake of improvement. Therefore the organization is weighted the analytical services department from both the personnel and financial aspects.

### 8-1-2 Financial Situation (See Table 8-1-2)

1) Income

Annual income except for donation income in the past five (5) years is as follows: (in 1000 pesos)

| | 1977 | 1978 | 1979 | 1980 | 1981 | average annual growth rate(%) |
|---|---|---|---|---|---|---|
| Analytical Services | 206.1 | 321.8 | 306.3 | 473.9 | 551.9 | (27.9) |
| Training & Seminars | 72.0 | 6.4 | 51.2 | 46.9 | 102.2 | ( 9.2) |
| Research & Development | -- | 33.1 | 54.5 | 27.3 | 32.8 | ( -- ) |
| Profit Income | 0.6 | 17.6 | 41.0 | 64.0 | 75.1 | (43.7)* |
| Total | 278.7 | 378.9 | 453.0 | 612.1 | 762.0 | (28.6) |

(Note) * growth rate in the past four years.

And the constitution ratio per each department are: (%)

| | 1977 | 1978 | 1979 | 1980 | 1981 | five-year average |
|---|---|---|---|---|---|---|
| Analytical Services | 74.0 | 84.9 | 67.6 | 77.4 | 72.4 | 75.2 |
| Training & Seminars | 25.8 | 1.7 | 11.3 | 7.7 | 13.4 | 12.0 |
| Research & Development | -- | 8.7 | 12.0 | 4.5 | 4.3 | 5.9 |
| Profit Income | 0.2 | 4.7 | 9.1 | 10.4 | 9.9 | 6.9 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

## Table 8-1-2: STATEMENT OF OPERATIONS AND CHANGES IN FUND BALANCE FOR FIVE YEARS 1977~1981

(in Pesos)

| Items | 1977 | 1978 | 1979 | 1980 | 1981 |
|---|---|---|---|---|---|
| INCOME | | | | | |
| Analytic Service Income | ₱ 206,123 | ₱ 321,803 | ₱ 306,299 | ₱ 473,914 | ₱ 551,913 |
| Training and Seminar Fees | 72,000 | 6,400 | 51,150 | 46,850 | 102,240 |
| Research and Development | -- | 33,100 | 54,540 | 27,280 | 32,798 |
| Grant Income | -- | -- | 76,800 | -- | -- |
| Other Income | 610 | 17,624 | 41,004 | 64,041 | 75,135 |
| Donation Income (ATENEO) | 69,116 | -- | -- | -- | 101,950 |
| Total (Grant is for Scientific Research & Development) | 347,849 | 378,927 | 529,793 | 612,085 | 864,036 |
| EXPENSES | | | | | |
| Analytic Service | 104,912 | 199,300 | 221,528 | 392,043 | 45,214 |
| Training and Seminar | 39,809 | 8,718 | 102,094 | 23,445 | 42,653 |
| Research and Development | -- | 27,349 | 29,352 | 14,357 | 66,460 |
| Travel and Scholarship | -- | -- | 15,655 | 8,424 | 17,052 |
| Total | 144,721 | 235,367 | 368,629 | 438,269 | 579,379 |
| General and Administrative Expenses | 12,118 | 7,872 | 25,251 | 47,086 | 51,353 |
| TOTAL | 156,839 | 273,239 | 393,880 | 485,355 | 630,732 |
| EXCESS OF INCOME OVER EXPENSES | 191,010 | 135,688 | 135,913 | 126,730 | 233,304 |
| FUND BALANCE AT THE BEGINNING | 72,188 | 263,198 | 398,886 | 534,799 | 661,529 |
| FUND BALANCE AT THE END OF THE YEAR | ₱ 263,198 | ₱ 398,886 | ₱ 534,799 | ₱ 661,529 | ₱ 894,833 |

The annual income increased from ₱278,700 to ₱762,000 in five years with the average annual increase rate equalizing 28.6 percent calculated at compound interest. Breaking this down according to departments, about 75 percent of the total income is from the analytical department, and 10 percent from interest income. The rest is the incomes from the training and seminars, and research and development departments.

2) Income and Funds Balance

Trends in income and funds balance in the past five (5) years are as follows (unit = 1000 pesos) :

| | 1977 | 1978 | 1979 | 1980 | 1981 | average annual growth rate (%) |
|---|---|---|---|---|---|---|
| Income | 278.7* | 378.9 | 453.0 | 612.1 | 762.0* | (28.6) |
| Expenses | 156.8 | 273.2 | 393.9 | 485.4 | 630.7 | (41.6) |
| Excess | 121.9 | 135.7 | 135.9 | 126.7 | 131.3 | ( 1.9) |
| Capital Balance | | | | | | |
| at the beg. | 72.2 | 263.2 | 398.9 | 543.8 | 661.5 | (74.0) |
| at the end | 263.2 | 398.9 | 543.8 | 661.5 | 894.3 | (35.0) |

(Note) * except for donation income

Income increased by 28.6 percent annually, as mentioned above, 2.73 times in five years, while expenses increased by 41.6 percent, over four times in five years. The increase of expenses is due to the increase of personnel costs resulting from an expansion of staff and increase in salaries. As a result, the excess of income, which is equivalent to profit in private enterprises, continues at a 1.9 percent annual increase rate.

One reason that income did not increase in line with expenses was that

service charges were not raised from 1975, which is due mainly to the regulation by NSDB of juridical foundations in terms of income and expense. The ratio of net income(excess of income over expenses) to gross income (excess/income x 100) decreased from 35.8 percent in 1978 to 30.0, 20.7 and 17.2 percent on a yearly basis.

The funds balance shows a proper increase, which already exceeded the donation from West Germany to PIPAC at the beginning by the end of 1981. PIPAC has savings deposits almost equal to its annual income (895,000 pesos = 26,850,000 yen at the end of 1981) that earn non-operating income (interest) and makes a great contribution to sound finance (the interest rate is 15.25 percent for one-year fixed deposit). Both PIPAC's past development and present funds condition are favorable from a financial point of view.

On the other hand, the net income to gross income ratio has been decreasing, in addition to which expenses are expected to increase when PIPAC moves to the new building. The question of raising service charges, which have hardly been raised at all for almost eight (8) years, will have to be studied.

3) Details of Expenses

Details of expenses in 1981 are as follows (partially estimated) :

- Analitical Services

| | |
|---|---|
| Personnel costs (fixed) | 276,276 |
| Personnel costs (variable) | 36,000 |
| Depreciation | 23,577 |
| Chemical reagents, etc. | 86,719 |
| Sub total | 362,572 |

- Training & Seminars

| | |
|---|---|
| Personnel costs (fixed) | none |
| Personnel costs (variable) | 31,010 |
| Chemical reagents, etc. | 4,224 |
| Sub total | 35,234 |

- Research & Development

| | |
|---|---|
| Personnel costs (fixed) | 25,001 |
| Personnel costs (variable) | 13,580 |
| Chemical reagents, etc. | 18,265 |
| Sub total | 56,846 |

- Administration

| | |
|---|---|
| Personnel costs (fixed) | 99,334 |
| Other expenses | 58,495 |
| | 157,829 |

Variable personnel costs consist of payment to a person who is working on a project by the hour. The staff is rarely assisted from outside. Personnel costs are mostly payment to the permanent staff of PIPAC, who are all non-regular staff at present.

Item-wise, expenses are as follows:

| | (₱) | (%) |
|---|---|---|
| Fixed personnel costs | 340,611 | 55.6 |
| Variable personnel costs | 80,590 | 13.2 |
| Sub total | 421,201 | 68.8 |
| Chemical reagents, etc. | 109,208 | 17.8 |
| Depreciation | 23,577 | 3.8 |
| Administrative costs | 58,495 | 9.6 |
| Sub total | 191,280 | 31.2 |
| Total | 612,481 | 100.0 |

Fixed manpower costs constitute 68.8 percent of total expense. In view of this, a proper manpower schedule corresponding to the income schedule is the most important financial item to be considered in the project.

4) Service Charges

(1) Analytical Services

Fees for each analytical services are fixed in detail, devided into about 370 categories, for example:

(in Peso)

| | Preparation | Analysis |
|---|---|---|
| Crude Protain, in Soya beam | -- | 150/130 |
| Calcium, indicalcium phosphate | 50 | 100/70 |
| Dissolved solid, in water | -- | 50/50 |
| Mercury, in sludge | -- | 150/70 |

In the above example, "Analysis 150/130" means where there are more than one sample in one analysis, the service fee is ₱ 150 for the first sample and ₱ 130 for the rest. "Preparation 50" means ₱ 50 is required to each sample as preparatory treatment for analysis.

Service charge per sample of each analysis in the past four (4) years are as follows:

(Peso/Sample)

| | 1978 | 1979 | 1980 | 1981 | average annual growth rate (%) |
|---|---|---|---|---|---|
| Atomic Ab. Spectr. | 54.5 | 60.7 | 85.2 | 87.9 | 17.1 % |
| Gas Chromat. | 49.5 | 52.7 | 83.5 | 85.3 | 19.9 |
| Infrared Spectr. | 70.4 | 76.9 | 142.9 | 109.9 | 16.2 |
| UV-VIS Spectr. | 57.2 | 65.3 | 69.7 | 79.6 | 11.6 |
| Gravimetry | 20.1 | 22.1 | 23.5 | 23.0 | 4.8 |
| Classical | 54.9 | 64.4 | 59.0 | 70.7 | 8.8 |
| Total (weighted) | 43.1 | 43.5 | 69.3 | 52.8 | 7.0 |

(2) Training and Seminar

One (1) standard seminar, consisting of 8-hours of lectures and 12-hours of practical analysis, costs ₱ 1,200 per person. The charge is ₱ 600 if he attends lectures only. These charges have not been changed since the beginning. (There is a special discount for students.)

Over the past three years, the actual average fee per participant in one seminar was ₱ 1,000 and the number of participants was 15 to 16 persons.

(3) Research and Development

There are no standard charges, since the research and development service is estimated for each request. The average charge of 21 cases in the past three (3) years was ₱ 5,500.

## 8-2 Financing Plan

### 8-2-1 Capital Requirements for Facilities

The additional capital estimated to be necessary for the project is one billion yen (about 35,424,000 pesos) plus PIPAC's portion of 20 million yen (about 708,000 pesos); 1,020 million yen in total.

(Note) peso-yen conversion rate is based on 1 peso = 28.23 yen.

### 8-2-2 Balance Sheet of the Existing Facilities

The present assets and liabilities of PIPAC will revert to new PIPAC organization. Future assets and liabilities are estimated as follows if the present services are assumed to continue to 1984.

(in 1000 pesos)

| | (1981 END) | (1984 BEG) |
|---|---|---|
| Current Assets | 859.9 | 1,142 |
| Cash & Deposit | 640.1 | 922 |
| A/C Receivables | 87.5 | 88 |
| Material inventory | 28.0 | 28 |
| Other current assets | 3.0 | 3 |
| Stock | 101.3 | 101 |
| Fixed Assets | 95.3 | 41 |
| Investment | 180.8 | 181 |
| (Less) Depriciation | ( 85.5) | (140) |
| Liabilities | 60.4 | 60 |
| Funds Balance | 894.8 | 1,123 |
| Total Assets | 955.2 | 1,183 |

In the past, the amount of cash and deposits increased an average of 43 percent in five (5) years (calculated at compound interest), 30 percent in four (4) years, 32 percent in three (3) years and 18 percent in 1980/1981. Even if the service income does not increase very much, interest income and dividends of donated stocks are steady. So cash and deposits are estimated to increase 20 percent on the average in one year. (calculated at compound interest) Fixed assets are estimated to depreciate by ₱ 27,000 per year. It is assumed the rest of the items will continue unchanged from 1981 to 1984 so as to make the calculation of the required capital possible.

### 8-2-3 Total Project Cost and Capital Schedule

Table 8-2-3 shows existing, additional and combined project costs, in which net worth excluding cash and deposits just before the start of

operations in 1984 is 201 (in thousands of pesos, same hereinafter), that will be alloted for the investment in kind. The necessary additional capital will be 36,178 among which 35,424 is to be granted by Japan through JICA. The difference of 754 has to be taken care of by PIPAC, while cash and deposits owned by PIPAC are estimated to be 922, sufficient to manage the difference of 754. And PIPAC will have 168 excess cash and deposits ( = 924 - 754 ) at the beginning of the new foundation. In conclusion, PIPAC is to make a new start with the following source of funds.

| | |
|---|---|
| Grant requested | ₱ 35,424,000 |
| PIPAC actual investment | ₱ 201,000 |
| PIPAC new investment | ₱ 754,000 |
| Surplus cash | ₱ 168,000 |
| | ₱ 36,547,000 |

## 8-3 Service Income Schedule

### 8-3-1 Service Charge

Expectations of future expansion of services provided by PIPAC on account of the increase of demand and the improvement of facilities have already been mentioned in sec. 2-7, Future Expectations of PIPAC. Though the research and development department has a small specialist staff at present and the staff of the analytical services dept. serves concurrently if necessary, PIPAC is planning to improve the capability of this department and the number of specialist staff is to become 16 persons after the completion of the new facilities. As the future demand for services of the research and development is impossible to foresee based on past records, the minimum project income is estimated based on the capacities of manpower

and equipment considering the Philippines five-year development plan.

As for the past and present unit prices for services, the analytical services prices increased on the average 7 percent annually during 1978 through 1981 while the training and seminars have kept their unit price unchanged since the establishment of PIPAC. A price raise is assumed to be inevitable owing to the increase in personnel costs, etc. The range of the increase will be studied to accord with financial analyses. First, the income is estimated based on the current price system in 1981 which has not been raised as of July 1982.

The current service charges are set as follows:

(1) Analytical Services

| | Peso/Sample |
|---|---|
| Atomic Absorption Spect. | 88 |
| Gas Chromatograph | 85 |
| UV-VIS Spectrophoto | 80 |
| IR Spectrometer | 110 |
| Other equipment | 85 |
| Classical Analysis | 71 |
| Gravimetric Analysis | 23 |

(See table 8-3-22)

(2) Training and Seminars

Participants : 24 (per one seminar)

Nos. of seminars : 8 times/year in 1984
10 times/year in 1985
12 times/year in 1986

Tuition : ₱ 1,000 (per participant in one seminar)

It is assumed seminars are held once a month at the most
(See table 8-3-23)

(3) Research and Development

Since the scale of services may differ, service charges are not to be established. The annual total sales is estimated considering the number of staff, etc. (table 8-3-24)

### 8-3-2 Income Schedule

Detailed expectations of incomes from each department based on the present price system are shown in tables 8-3-21 , 8-3-22 , 8-3-23 and 8-3-24 . Total incomes are shown below. The effect of inflation is ignored.

(1000 pesos)

| | Analytical Services | Training & Seminar | Research & Development | Total |
|---|---|---|---|---|
| 1984 | 745 | 192 | 200 | 1,137 |
| 1985 | 1,084 | 240 | 360 | 1,684 |
| 1986 | 1,497 | 288 | 560 | 2,345 |
| 1987 | 1,497 | 288 | 650 | 2,435 |
| after 1988 | 1,497 | 288 | 700 | 2,485 |

The analytical services and the training and seminar departments are assumed to reach (maximum) income at full operation in the third year while it is assumed research and development will take five (5) years to attain it because this department is to be newly expanded. Interest and stock dividend incomes are excluded. The following chart compares the actual 1981 income and the estimated 1988 income.

| | 1981 | | 1988 | | Income ratio ('88/'81) |
|---|---|---|---|---|---|
| | Income (₱1000) | Composition (%) | Income (₱1000) | Composition (%) | |
| Analytical Service | 551.9 | 80.3 | 1,497 | 60.2 | 2.7 |
| Training & Seminar | 102.2 | 14.9 | 288 | 11.6 | 2.8 |
| Research & Development | 32.8 | 4.8 | 700 | 28.2 | 21.3 |
| Total | 686.9 | 100.0 | 2,485 | 100.0 | 23.6 |

Though the total income is estimated to grow 360%, this figure is considered highly possible considering the increase of the capacity of equipment and staff. It might be remarked that the research and development department's income ratio to total income is estimated to expand from 4.8 percent in 1981 to 28.2 percent in 1984 and the amount of income 21.3 times. Though this jump can be seen an extraordinary estimate, this department is considered the same as a new department and the figure should be regarded as an attainable goal.

## 8-4 Operation Costs

### 8-4-1 Variable Cost (See table 8-4-1)

1) Electricity

Electric charges are composed of demand and consumption adjusted according to fuel cost. Unit prices of electricity paid by Ateneo de Manila University for the chemistry building including PIPAC are as follows:

| | Peso/KWH |
|---|---|
| January 1979 | 0.398 |
| January 1980 | 0.435 |
| January 1981 | 0.751 |
| December 1981 (=January 1982) | 0.831 |

That is, electricity rates were raised around 28 percent a year during three (3) years from January 1979 to December 1981.

Price rises in the next two (2) years by the time of new start of running in 1984 assumed to be 50 percent considering that petroleum and crude oil price rises will moderate.

₱ 0.831/KWH x 1.5 = ₱ 1.25/KWH

Consumption is estimated at 6144 KWH/month at the time of full operation. The first year's consumption is expected to be 50 percent of this figure, the second year 70 percent, and 100 percent in the third year and after.

2) Liquid Petroleum Gas (LPG)

The current price is ₱ 270.7 per one 50 kg gas cylinder and ₱ 5.414/kg. Since LPG is an energy cost, the price is assumed to rise 50 percent by 1984 as same as electricity

₱ 5.414/kg x 1.5 = ₱ 8.121/kg

Consumption is estimated to be 180 kg/month.

3) Water

The current price system is the sum of following three (3) charges.

(1) 1 to 1,000 cubic meters ₱ 1.53 per cubic meter

Over 1,000 cubic meters ₱ 1.76 per cubic meter

(2) ₱ 20 service charge per month

(3) 10% of the corresponding water bill as an environmental charge

The monthly consumption is assumed to be 505 $m^3$/month in the third year when the water consumption reaches a maximum.

The present price is calculated thus:

$$\frac{(₱\ 1.53 \times 505\ m^3 + ₱\ 20)(1.1)}{505\ m^3} = ₱\ 1.727/m^3$$

The water rate is assumed to rise 12 percent per year, lower than that of energy costs (electricity, LPG). Therefore the unit price in 1984 is estimated as:

$$₱\ 1.727/m^3 \times (1.12)^2 = ₱\ 2.17/m^3$$

The consumption rate is estimated of 50 percent in the first year, 70 percent in the second, and 100 percent in the third year and after. As the water charge includes some fixed costs, the same unit price will be applied ignoring the small fluctuation of unit price depending on consumption.

4) Chemical Reagents and Analytical Consumables

Past records of the expense ratio of chemical reagents and analytical consumables to total income during the past three years are as follows:

| | Service income (₱000) | chemical reagents etc. (₱000) | percentage (%) |
|---|---|---|---|
| (Analytical Services) | | | |
| 1979 | 342 | 28 | 8.2 |
| 1980 | 486 | 72 | 14.8 |
| 1981 | 544 | 87 | 16.0 |
| Total | 1,372 | 187 | 13.6 |
| (Research & Development)---including non-profit research | | | |
| 1979 | 54.5 | 7.3 | 13.4 |
| 1980 | 27.3 | 1.4 | 5.1 |
| 1981 | 32.8 | 18.3 | 55.8 |
| Total | 114.6 | 27.0 | 23.7 |
| (Training & Seminars) | | | |
| 1979 | 36.2 | 1.7 | 4.7 |
| 1980 | 61.9 | 3.4 | 5.5 |
| 1981 | 126.6 | 4.2 | 3.3 |
| Total | 224.7 | 9.3 | 4.1 |

Chemical reagent and analytical consumable costs comprise 23.7 percent of service income in research and development because non-profit research is included. The services of this department range to various fields and some of the service charges were considered improper. In 1981, two (2) cases were recorded where costs exceeded income. Since the past records are insufficient in number and not dependable, cost for chemical reagents and analytical equipment is assumed to be 10 percent of service income.

In the training and seminars, it is only natural that the ratio of chemical reagents and analytical equipment costs should stay low because about half of service income is from lectures; a 4 percent increase is regarded as proper.

As many records of past analytical services are available, empirical values are considered dependable, and the result is 14 percent.

Total costs at the time of full operation is calculated as:

| | | |
|---|---|---|
| Analytical Services | ₱ 1,497,000$(\frac{14}{100})$ | = ₱ 209,580 |
| Training & Seminar | ₱ 288,000$(\frac{4}{100})$ | = ₱ 11,520 |
| Research & Development | ₱ 700,000$(\frac{10}{100})$ | = ₱ 70,000 |
| | | ₱ 291,100 |

This figure is based on prices as of 1981. Then it will be multiplied by a 12 percent annual escalation to determine 1984 costs.

$$₱\ 291{,}000 \times (1.12)^3 = ₱\ 408{,}975$$

Annual costs are estimated to be ₱ 409,000 with 50 percent of this figure in the first year, 70 percent in the second year and 100 percent after that.

5) Honorariums for Training and Seminars

At present, training sessions and seminars are mainly held at night or on weekends. The major reasons are an insufficiency of space for

seminars in the daytime; the schedules of instructors and assistants (most of them are the directors and staff members of PIPAC), and to utilize the free time of the participants. Instructors (mostly directors of PIPAC, teaching concurrently in Ateneo de Manila Univ. and part-time staff members of PIPAC) and assistants are paid ₱ 150/hour and assistants for laboratory work are paid ₱ 75/hour, in addition to their basic salaries. This cost is to be eliminated after the completion of the new facilities because most of the directors (instructors) will be full-time staff members, as space will be sufficient. A number of seminars can be held in the day-time on week-days. Overtime work by assistants for laboratory work will be paid on an overtime bases. Considering the possibility that some lecturers from out-side will be invited and some of the directors will remain part-time, the present instructors' payment schedule is estimated to apply to one-third of the seminars. Assistants for laboratory work are not to be paid extra other than overtime payments, which are already considered in personnel costs.

One seminar will consist of 10 hours of lectures

1/3 x 10 hrs/sem. x ₱ 150/h = ₱ 500/sem.

Instructors' payment per simenar is to be ₱ 500.

### 8-4-2 Fixed Costs (See table 8-4-2)

1) Direct Personnel Costs

All personnel costs are estimated here except for the administrative costs. The personnel schedule is shown in table 8-4-21. Annual salaries and wages for each position including fringe benefits are shown in table 8-4-22 and total personnel costs in table 8-4-23. The personnel schedule is planned to be completed in the third year after the completion of new facilities. Direct personnel costs are estimated as follows:

| | |
|---|---|
| 1984 | ₱ 793,600 |
| 1985 | ₱ 1,037,700 |
| 1986 and after | ₱ 1,243,000 |

2) Maintenance and Repair Costs

According to empirical figures in a similar project, 0.3 percent of the building purchase price and 2 percent of analytical equipment purchase cost should be set aside for maintenance and repairing costs.

3) Insurance

Fire insurance is estimated to cost so much of the original prices:

building : 0.0735 percent (annual)

equipment: 0.1013 percent (annual)

4) Administrative Costs

Administrative costs are divided into personnel costs and others. Tables 8-4-21 , 8-4-22 and 8-4-23 shall be referred as the determination of personnel costs. Annual cost is estimated as follows assuming that the personnel schedule is completed in the third year.

| | |
|---|---|
| 1984 | ₱ 271,000 |
| 1985 | ₱ 303,600 |
| 1986 and after | ₱ 352,600 |

Other expenses are shown in table 8-4-24 . The total annual expense is expected to be ₱ 99,510, of which ₱ 7,860 is for advertising.

5) Depreciation Period

The depreciation period is estimated based on the straight line depreciation method. No salvage value is considered.

| | | |
|---|---|---|
| building | : | 40 years |
| analytical equipment | : | 10 years |
| existing fixed assets | : | 2 years |

Most of the present fixed assets of PIPAC will lose their value by 1984. Those having book value as of 1984 are assumed to depreciate in two (2) years.

## 8-5 Financial Projection

### 8-5-1 Operating Costs

Table 8-5-1 shows the total operating costs and their makeup at the time of full operation based on an item by item costs as estimated in sec. 8-4. Major costs before depreciation are total personnel cost of 64.2 percent, direct personnel costs (50 percent) and indirect personnel costs (14.2 percent). Next is the cost for chemical reagents and analytical consumables, which make up 16.5 percent. The rest are minor components. Since costs for chemical reagents and analytical equipment are a variable cost that fluctuates in accordance with service income, they cannot be eliminated although their reduction is proposed. Considering the fact that personnel costs comprise 64.2 percent of total expenses before depreciation, adjustment shall be considered in case expected service income cannot be attained, such as to postpone the employment schedule or to utilize part-time workers as far as practicable.

### 8-5-2 Cash Flow

Table 8-5-21 is a projected income and cash flow statement when PIPAC provides services without any changes in current service charges. In this statement, the initial cash balance of 168 (thousand pesos) will be insufficient for the cash requirements in the first year of 542, and the result

will be 374 thousand pesos shortage. The cash balance will continue negative till 1987, when a cash surplus of only 5,000 pesos a year will result. With such a system, stable menagement of PIPAC is impossible. Apparently service charges need to be raised.

Table 8-5-22 shows the statement assuming service charges are raised by 20 percent. Annual income will turn positive from the third year. The principal cause for the first and second years shortage are the large personnel costs compared with incomes. (Direct and indirect personnel costs made up 78 percent of total income, which will decrease to less than 54 percent at the time of full operation.) This tendency is common because initial investment is necessary to employ the required number of personnel in the first one or two years along with their training in order to continue projected income from the third year.

147 (thousand pesos) in the first year and 43 in the second year have to be alloted so as not to suffer a cash shortage with a 20 percent price raise. In this case, however, depreciation of the analytical equipment as well as the building is impossible. In other words purchase of new equipment or changing over to new equipment is impossible. Even though the interest income excluded from the statement may be worth around 10 percent of the beginning cash balance, the depreciation period cannot be less than 10 years.

Table 8-5-23 shows a statement with a 30 percent price rise. In this statement the balance of income and expenses will turn to be positive from the second year, the ending cash balance will be 5,846 in 1993, which is sufficient for a equipment purchase cost of 5,243. The cash shortage at the end of the first year can be alloted with 32 thousand pesos. Though a statement with 25 percent price rise is not shown, the tendency is more or less the same as that with a 30 percent rise, with a required cash of more than 90 thousand pesos for the first years' shortage and it will take

12 years to compensate for the purchase cost of the equipment.

In conclusion, the current service charges need to be raised by at least 30 percent by the time of the beginning of new management in 1984. It is recommended that prices be raised gradually, into two or three phases. It is estimated that PIPAC will have 922 thousand in cash from its operation at the beginning of new management and an additional 32 thousand cash funds will be necessary. Considering the allowance, a cash fund of about one million pesos is recommended.

## Table 8-2-3: PROJECT COST

(1,000 Pesos)

| | | Existing | Additional | Combined |
|---|---|---|---|---|
| I. | Fixed Capital | 41 | 34,502 | 34,543 |
| II. | Working Capital other than Cash | 160 | 1,676 | 1,836 |
| | Total | 201 | 36,178 | 36,379 |
| III. | Source of Funds | | | |
| | Grant from Japan | - | 35,424 | 35,424 |
| | PIPAC | | | |
| | Investment in cash | - | 754 | 754 |
| | Investment in kind | 201 | - | 201 |
| | Excess cash[1)] | 168 | - | 168 |
| | PIPAC Total | 369 | 754 | 1,123 |
| | Total | 369 | 36,178 | 36,547 |

(Note) 1) Cash at the beginning of 1984 (₱922,000) - Investment in cash (₱754,000) = ₱168,000

**Table 8-3-21: SUMMARY OF INCOME**
**(w/o price increase from 1981)**

(Unit: ₱1,000)

| | Analytical Services | Training & Seminar | Research & Development | Total |
|---|---|---|---|---|
| Past Record | | | | |
| 1979 | 342 | 36 | 55 | 433 |
| 1980 | 486 | 62 | 27 | 575 |
| 1981 | 544 | 127 | 33 | 704 |
| Future Plan | | | | |
| 1984 | 745 | 192 | 200 | 1,137 |
| 1985 | 1,084 | 240 | 360 | 1,684 |
| 1986 | 1,497 | 288 | 560 | 2,345 |
| 1987 | 1,497 | 288 | 650 | 2,435 |
| 1988 onwards | 1,497 | 288 | 700 | 2,485 |

Refer to the attached tables 8-3-22, 8-3-23 and 8-3-24.

## Table 8-3-22: INCOME FROM ANAFYTICAL SERVICES (w/o price increase from 1981)

| | Past Records | | | | | Future Plan | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Amt. of Equip.[1] | Nos. of Samples | | | ₱/Sample in 1981 | Amt. of Equip.[3] | Nos. of Sample | | | Income (₱1,000) | | |
| | | 1979 | 1980 | 1981 | | | 1984 | 1985 | 1986- | 1984 | 1985 | 1986- |
| (Equipment Analysis) | | | | | | | | | | | | |
| Atomic Abs. Spect. | 1 | 1,631 | 2,654 | 2,185 | 88 | 1+(3) | 3,000 | 4,500 | 6,000 | 264.0 | 396.0 | 528.0 |
| Gas Chromatograph | 2 | 1,708 | 1,102 | 1,008 | 85 | 2+(3) | 1,500 | 2,000 | 3,000 | 127.5 | 170.0 | 255.0 |
| UV-VIS Spectrophoto | 1[2] | 735 | 1,306 | 992 | 80 | (2) | 2,000 | 2,500 | 3,000 | 160.0 | 200.0 | 240.0 |
| IR Spectrometer | 1[2] | 78 | 140 | 191 | 110 | (2) | 200 | 400 | 600 | 22.0 | 44.0 | 66.0 |
| Other Equipment | | - | - | - | 85 | | 100 | 200 | 400 | 8.5 | 17.0 | 34.0 |
| Sub-total | | 4,152 | 5,202 | 4,376 | - | | 6,800 | 9,600 | 13,000 | 582.0 | 827.0 | 1,123.0 |
| (Hand-Treat Analysis) | | | | | | | | | | | | |
| Classical Analysis | | 404 | 407 | 622 | 71 | | 1,000 | 2,000 | 3,000 | 71.0 | 142.0 | 213.0 |
| Gravimetric Analysis | | 3,306 | 1,404 | 5,298 | 23 | | 4,000 | 5,000 | 7,000 | 92.0 | 115.0 | 161.0 |
| Sub-total | | 3,710 | 1,811 | 5,920 | - | | 5,000 | 7,000 | 10,000 | 163.0 | 257.0 | 374.0 |
| Grand Total (samples) | | 7,862 | 7,013 | 10,296 | | | 11,800 | 16,600 | 23,000 | | | |
| Income (₱1,000) | | 342 | 486 | 544 | | | | | | 745.0 | 1,084.0 | 1,497.0 |

Notes: 1/ Existing analytical equipment

2/ Analytical equipment owned by Ateneo de Manila University, which shall be returned to the university.

3/ Analytical equipment in the parenthesis shall be newly granted.

## Table 8-3-23: INCOME FROM TRAINING SEMINARS (w/o price increase from 1981)

| | Nos. of Equip.[1] | Past Record | | | | | | Future Plan | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1979 | | 1980 | | 1981 | | Amt. of Equip.[3] | Times of Seminars | | |
| | | Times | Partic. | Times | Partic. | Times | Partic. | | 1984 | 1985 | 1986- |
| Gas Chromat. | 2 | 1 | 41 | 1 | 29 | 1 | 32 | 5 | 2 | 3 | 3 |
| Atomic Abs. Spect. | 1 | - | - | 1 | 18 | 1 | 4 | 4 | 2 | 2 | 3 |
| | | | | | | 2 | 3 | | | | |
| | | | | | | 3 | 7 | | | | |
| IR Spectro. | 1[2] | - | - | 1 | 1 | 1 | 20 | 2 | 1 | 1 | 2 |
| | | | | 2 | 8 | | | | | | |
| UV-VIS Spectro. | 1[2] | 1 | 5 | - | - | 1 | 18 | 2 | 2 | 2 | 2 |
| Special Seminar | 3 | - | - | 1 | 4 | - | - | 5 | 1 | 2 | 2 |
| Nos. of Seminars | | 2 | | 5 | | 6 | | | 8 | 10 | 12 |
| Participants | | | 46 | | 60 | | 94 | | 192 | 240 | 288 |
| Partic./Seminar | | | 23 | | 12 | | 16 | | 24[4] | 24[4] | 24[4] |
| Income (₱1,000) | | | 36.15 | | 61.85 | | 126.60 | | 192 | 240 | 288 |
| Income/Participant (Pesos) | | | 786 | | 1,031 | | 1,347 | | 1,000[4] | 1,000[4] | 1,000[4] |

Notes: 1/ Existing analytical equipment

2/ Equipment owned by Ateneo De Manila University, which shall be returned to the university.

3/ Total amount of equipment after expansion

4/ Projected assumption.

## Table 8-3-24: INCOME FROM RESEARCH DEVELOPMENT (w/o price increase from 1981)

(Unit: ₱1,000)

| | Past Record | | | | Future Plan | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 78 | 79 | 80 | 81 | 84 | 85 | 86 | 87 | 88- |
| Long-term Project | | | | | | | | | |
| Energy development | | | | | 150 | 200 | 200 | 200 | 200 |
| Biomass | | | | | | | 100 | 150 | 200 |
| Consultation Services for; | | | | | | | | | |
| Materials, goods, products | | | | | 50 | 80 | 100 | 100 | 100 |
| Analytical equipment | | | | | | 50 | 100 | 100 | 100 |
| Governmental (Pollution, etc.) | | | | | | 30 | 60 | 100 | 100 |
| Total | 33 | 55 | 27 | 33 | 200 | 360 | 560 | 650 | 700 |

## Table 8-4-1: OPERATING COST ITEMS (in 1984 prices)

Variable cost

The following consumption except (5) is estimated for full capacity operation, namely 1986 onwards.
For 1984 and 1985, 50% and 70% consumption are assumed respectively.

(1) Electricity

Consumption : 6,150 KWH/month
Unit price : ₱ 1.254/KWH

(2) Liquified Petroleum Gas (LPG)

Consumption : 180 Kg/month
Unit price : ₱ 8.121/Kg

(3) Water

Consumption : 505 $m^3$/month
Unit price : ₱ 2.13/$m^3$

(4) Chemical Reagents and Analytical Consumables

₱ 409,000/year at full operation

(5) Honorariums for Training and Seminars

1/3 of the seminars are assisted by outside and/or part-time lecturers who are paid at ₱ 150/h for 10 hours lecture per seminar.

1/3 x 10hrs/sem. x ₱150/h = ₱ 500/sem.

Technicians and chemists for laboratory work are not to be paid extra because they shall be full time employees.

## Table 8-4-2: OPERATING COST ITEMS
## (in 1984 prices)

Fixed Costs

(1) Direct Personnel Costs (see the attached table)

| | |
|---|---|
| 1984 | ₱793,600/year |
| 1985 | ₱1,037,700/year |
| 1986 onwards | ₱1,243,000/year |

(2) Maintenance and Repairing Costs

| | |
|---|---|
| Building: | 0.3% of erected cost per year |
| Equipment and furniture: | 2% of installed cost per year |

(3) Insurance

| | |
|---|---|
| Building: | 0.0735% of erected cost per year |
| Equipment and furniture: | 0.1013% of installed cost per year |

(4) Administrative Costs (see the attached tables)

| | | |
|---|---|---|
| Personnel cost: | 1984 | ₱271,000/year |
| | 1985 | ₱303,600/year |
| | 1986 onwards | ₱352,600/year |
| Expenses: | ₱99,510/year | |

(5) Depreciation

Straight line depreciation is applied.

| | |
|---|---|
| Building and consulting fee: | 40 years |
| Equipment and furniture: | 10 years |
| Existing assets: | 2 years |

## Table 8-4-21: PERSONNEL SCHEDULE (nos. of personnel)

| Administration | 1984 | 1985 | 1986 onwards |
|---|---|---|---|
| Institute Director | 1 | 1 | 1 |
| Assistant Director | 1 | 1 | 1 |
| Accountant | 1 | 1 | 1 |
| Legal | (1) | (1) | (1) |
| Personnel Administration | 1 | 1 | 1 |
| Librarian | - | 1 | 2 |
| Clerical Staff | 2 | 3 | 5 |
| Security and Safety | 1 | 1 | 1 |
| | 7(1) | 9(1) | 12(1) |
| Research & Development | | | |
| Director | (1) | (1) | 1 |
| Senior Chemist II | 1 | 2 | 3 |
| Chemist | 2 | 4 | 7 |
| Technician | 2 | 4 | 5 |
| | 5(1) | 10(1) | 16 |
| Analytical Services | | | |
| Director | 1 | 1 | 1 |
| Senior Chemist I | 2 | 2 | 2 |
| Chemist | 11 | 12 | 12 |
| Technician | 6 | 8 | 8 |
| Laboratory Aide | (3) | 2(3) | 3(3) |
| | 20(3) | 25(3) | 26(3) |
| Training & Seminar | | | |
| Director | (1) | (1) | (1) |
| Coordinator | 1 | 1 | 1 |
| Staff | - | 1 | 1 |
| | 1(1) | 2(1) | 2(1) |
| Electronics & Instrumentation | | | |
| Senior Technician | 1 | 1 | 1 |
| Maintenance Technician | 1 | 2 | 3 |
| Laboratory Aide | (1) | 1 | 1 |
| | 2(1) | 4 | 5 |
| Grand Total | 35(7) | 50(6) | 61(5) |

Note: Part-time employees in parentheses.

## Table 8-4-22: SALARIES AND WAGES

(Pesos)

| | 1982 | | 1984 |
|---|---|---|---|
| | Total (CLA)[3]/mo. | Total/year[1] | Total/year[2] |
| Institute Director (F.T.) | - | - | 121,000 |
| ( - do - (P.T.) | 2,800 (430) | 34,600 | 43,400 |
| Director (F.T.) | 6,000 ( - ) | 73,000 | 91,570 |
| ( - do - (P.T.) | 3,000 ( - ) | 37,000 | 46,410 |
| Assistant Director (F.T.) | 4,000 ( - ) | 49,000 | 61,470 |
| ( - do - (P.T.) | 2,000 ( - ) | 25,000 | 31,360 |
| Senior Chemist I | 2,700 (490) | 33,400 | 41,900 |
| Senior Chemist II | 1,800 (420) | 22,600 | 28,530 |
| Chemist | 1,300 (420) | 16,900 | 21,200 |
| Laboratory Aide | 850 (420) | 11,050 | 13,860 |
| Personnel Administration | 1,270 (420) | 16,510 | 20,710 |
| Accountant | 1,500 (420) | 19,000 | 23,830 |
| Librarian | 1,000 (420) | 13,000 | 16,310 |
| Clerical Staff | 1,000 (420) | 13,000 | 16,310 |
| Security & Safety | 700 (420) | 9,100 | 11,420 |
| Training Coorignator | 1,500 (420) | 19,000 | 23,830 |
| Training Staff | 1,200 (420) | 15,600 | 19,570 |
| Senior Technician | 1,500 (420) | 19,000 | 23,830 |
| Technician & Maintenance | 1,200 (420) | 15,600 | 19,570 |

Notes: 1/ including 13th month salaries with a maximum ceiling, ₱1,000.

2/ assuming 12% pay raise per annum (25.44% for two years)

3/ Cost of Living Allowance

Remarks:
- 8% of total salaries and wages will be assumed as fringe benefits.
- 5% of the same will be assumed for provisions for overtime work except for the directors.

## Table 8-4-23: PERSONNEL COSTS
(1,000pesos in 1984 prices)

| | 1984 | 1985 | 1986 onwards |
|---|---|---|---|
| Administration | | | |
| Institute Director | 121.0 | 121.0 | 121.0 |
| Assistant Director | 61.5 | 61.5 | 61.5 |
| Accountant | 23.8 | 23.8 | 23.8 |
| Legal | estimated in the admin. expenses | | |
| Personnel Administration | 20.7 | 20.7 | 20.7 |
| Librarian | - | 16.3 | 32.6 |
| Clerical Staff | 32.6 | 48.9 | 81.6 |
| Security and Safety | 11.4 | 11.4 | 11.4 |
| | 271.0 | 303.6 | 352.6 |
| Research & Development | | | |
| Director | 31.4 | 31.4 | 91.6 |
| Senior Chemist II | 28.4 | 56.7 | 85.1 |
| Chemist | 42.4 | 84.8 | 148.4 |
| Technician | 39.1 | 78.3 | 97.9 |
| | 141.3 | 251.2 | 423.0 |
| Analytical Services | | | |
| Director | 91.6 | 91.6 | 91.6 |
| Senior Chemist I | 83.8 | 83.8 | 83.8 |
| Chemist | 233.2 | 254.4 | 254.4 |
| Technician | 117.4 | 156.6 | 156.6 |
| Laboratory Aide | 20.8 | 48.5 | 62.4 |
| | 546.8 | 634.9 | 648.8 |
| Training & Seminar | | | |
| Director | 31.4 | 31.4 | 31.4 |
| Coordinator | 23.8 | 23.8 | 23.8 |
| Staff | - | - | - |
| | 55.2 | 74.8 | 74.8 |
| Electronics & Instrumentation | | | |
| Senior Technician | 23.8 | 23.8 | 23.8 |
| Maintenance Technician | 19.6 | 39.1 | 58.7 |
| Laboratory Aide | 6.9 | 13.9 | 13.9 |
| | 50.3 | 76.8 | 96.4 |
| Grand Total | 1,064.6 | 1,341.3 | 1,595.6 |
| Excl. Admin. | 793.6 | 1,037.7 | 1,243.0 |

## Table 8-4-24: ADMINISTRATIVE EXPENSIVES

(in pesos)

| | | 1980 | 1981 | 1984[1/] | Full capacity[3/] |
|---|---|---|---|---|---|
| 1. | Audit, bookkeeping & Accounting services | 10,800 | 16,550 | Permanent staff | |
| 2. | Office supplies | 7,427 | 7,647 | 10,740 | 21,480[4/] |
| 3. | Telephone | 2,299 | 2,324 | 3,270 | 6,540[4/] |
| 4. | Representation | 2,677 | 1,608 | 3,060[2/] | 6,120[4/] |
| 5. | Advertising | - | 2,800 | 3,930 | 7,860[4/] |
| 6. | Scholarship & Travel grants | 8,424 | 17,052 | 17,900[2/] | 35,800[4/] |
| 7. | Transportation & postage | 931 | 973 | 1,370 | 2,740[4/] |
| 8. | NSDB fee | 530 | 612 | 860 | 860 |
| 9. | Legal | - | 1,000 | 1,410 | 1,410 |
| 10. | Miscellaneous | 4,611 | 7,282 | 8,350[2/] | 16,700 |
| | Sub Total | 37,699 | 57,848 | 50,840 | 99,510 |
| 11. | Repairs | 5,266 | 1,550 | Transfer to another item | |
| 12. | Rental & utilities | 12,000 | 12,000 | - do - | |
| 13. | Allowance for trans. & repres. | 31,200 | 31,200 | - do - | |
| 14. | Donation | - | 5,000 | Unusual expenses | |
| | Grand Total | 86,165 | 107,598 | | |

Notes: 1/ assuming that the same facilities are utilized. 12% per annum escalation is applied from 1981 to 1984 - $(1.12)^3 = 1.405$

2/ the average of 1980 and 1981 is used as the basic indes.

3/ after completion of the new facilities (approx. 3 times of existing) and at full operation in 1984 prices.

4/ 2 times of 1984[1/] case is assumed after the completion of the new facilities.
Indirect cost like the administrative expenses does not follow proportionately to the capacity increase.

**Table 8-5-1: OPERATING COST**

| | Cost (₱1,000) | Composition (%) |
|---|---|---|
| Electricity | 93 | |
| LPG | 18 | |
| Water | 13 | |
| Utility Cost | 124 | (5.0) |
| Chemicals & Consumables | 409 | (16.5) |
| Honorarium For Training/Seminar | 6 | (0.2) |
| Variable Cost | 539 | 21.7 |
| Labour Cost | 1,243 | (50.0) |
| Maintenance & Repair | 220 | (9.0) |
| Insurance | 25 | (1.0) |
| Direct Fixed Costs | 1,488 | 60.0 |
| Personnel Costs | 353 | (14.2) |
| Expenses | 100 | (4.1) |
| Administration | 453 | 18.3 |
| Operating costs before depreciation | 2,480 | 100.0 |
| Depreciation | 1,415 | |
| Grand total | 3,495 | |

## Table 8-5-21: PROJECTED INCOME AND CASH FLOW STATEMENT
### (w/o price increase from 1981)

( ₱1,000 )

| | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|---|---|---|---|---|---|
| A. Income | | | | | | | | | | |
| Analytical Services | 745 | 1,084 | 1,497 | 1,497 | 1,497 | | | | | |
| Training & Seminars | 192 | 240 | 288 | 288 | 288 | | | | | |
| Research & Development | 200 | 360 | 560 | 650 | 700 | | | | | |
| Sub-total | 1,137 | 1,684 | 2,345 | 2,435 | 2,485 | 2,485 | 2,485 | 2,485 | 2,485 | 2,485 |
| B. Expenses | | | | | | | | | | |
| Utilities & Supplies | 270 | 377 | 539 | | | | | | | |
| Direct Personnel Costs | 793 | 1,038 | 1,243 | | | | | | | |
| Maintenance & Repair | 220 | 220 | 220 | | | | | | | |
| Insurance | 25 | 25 | 25 | | | | | | | |
| Administrative (Personnel) | 271 | 304 | 353 | | | | | | | |
| Administrative (Expenses) | 100 | 100 | 100 | | | | | | | |
| Sub-total | 1,679 | 2,064 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 |
| C. Surplus Before Depreciation (A-B) | (542) | (380) | (135) | (45) | 5 | 5 | 5 | 5 | 5 | 5 |
| D. Beginning Cash Balance | 168 | (374) | (754) | (889) | (934) | (929) | (924) | (919) | (914) | (909) |
| E. Final Cash Balance (C+D) | (374) | (754) | (889) | (934) | (929) | (924) | (919) | (914) | (909) | (904) |
| Depreciation | | | | | | | | | | |
| Building & Consultant fee | 678 | 678 | 678 | | | | | | | |
| Equipment | 524 | 524 | 524 | | | | | | | |
| Furniture, etc. | 234 | 234 | 213 | | | | | | | |
| Depreciation total | 1,436 | 1,436 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 |

## Table 8-5-22: PROJECTEN INCOME AND CASH FLOW STATEMENT
### (sales price 20 percent increase)

( ₱1,000 )

| | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|---|---|---|---|---|---|
| A. Income | | | | | | | | | | |
| Analytical Services | 894 | 1,301 | 1,796 | 1,796 | 1,796 | | | | | |
| Training & Seminars | 230 | 288 | 346 | 346 | 346 | | | | | |
| Research & Development | 240 | 432 | 672 | 780 | 840 | | | | | |
| Sub-total | 1,364 | 2,021 | 2,814 | 2,922 | 2,982 | 2,982 | 2,982 | 2,982 | 2,982 | 2,982 |
| B. Expenses | | | | | | | | | | |
| Utilities & Supplies | 270 | 377 | 539 | | | | | | | |
| Direct Personnel Cost | 793 | 1,038 | 1,243 | | | | | | | |
| Maintenance & Repair | 220 | 220 | 220 | | | | | | | |
| Insurance | 25 | 25 | 25 | | | | | | | |
| Administrative (Personnel) | 271 | 304 | 353 | | | | | | | |
| Administrative (Expenses) | 100 | 100 | 100 | | | | | | | |
| Sub-total | 1,679 | 2,064 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 |
| C. Surplus Before Depreciation (A-B) | (315) | (43) | 334 | 442 | 502 | 502 | 502 | 502 | 502 | 502 |
| D. Beginning Cash Balance | 168 | (147) | (190) | 144 | 586 | 1,088 | 1,590 | 2,092 | 2,594 | 3,096 |
| E. Final Cash Balance (C+D) | (147) | (190) | 144 | 586 | 1,088 | 1,590 | 2,092 | 2,594 | 3,096 | 3,598 |
| Depreciation | | | | | | | | | | |
| Building & Consultant fee | 678 | 678 | 678 | | | | | | | |
| Equipment | 524 | 524 | 524 | | | | | | | |
| Furniture, etc. | 234 | 234 | 213 | | | | | | | |
| Depreciation total | 1,436 | 1,436 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 |

## Table 8-5-23: PROJECTED INCOME AND CASH FLOW STATEMENT
(sales price 30 percent increase)

( ₱1,000 )

| | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 |
|---|---|---|---|---|---|---|---|---|---|---|
| A. Income | | | | | | | | | | |
| Analytical Services | 969 | 1,409 | 1,946 | 1,946 | 1,946 | | | | | |
| Training & Seminars | 250 | 312 | 374 | 374 | 374 | | | | | |
| Research & Development | 260 | 468 | 728 | 845 | 910 | | | | | |
| Sub-total | 1,479 | 2,189 | 3,048 | 3,165 | 3,230 | 3,230 | 3,230 | 3,230 | 3,230 | 3,230 |
| B. Expenses | | | | | | | | | | |
| Utilities & Supplies | 270 | 377 | 539 | | | | | | | |
| Direct Personnel Cost | 793 | 1,038 | 1,243 | | | | | | | |
| Maintenance & Repair | 220 | 220 | 220 | | | | | | | |
| Insurance | 25 | 25 | 25 | | | | | | | |
| Administrative (Personnel) | 271 | 304 | 353 | | | | | | | |
| Administrative (Expenses) | 100 | 100 | 100 | | | | | | | |
| Sub-total | 1,679 | 2,064 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 | 2,480 |
| C. Surplus Before Depreciation (A-B) | (200) | 125 | 568 | 685 | 750 | 750 | 750 | 750 | 750 | 750 |
| D. Beginning Cash Balance | 168 | (32) | 93 | 661 | 1,346 | 2,096 | 2,846 | 3,596 | 4,346 | 5,096 |
| E. Final Cash Balance (C+D) | (32) | 93 | 661 | 1,346 | 2,096 | 2,846 | 3,596 | 4,346 | 5,096 | 5,846 |
| Depreciation | | | | | | | | | | |
| Building & Consultant fee | 678 | 678 | 678 | | | | | | | |
| Equipment | 524 | 524 | 524 | | | | | | | |
| Furniture, etc. | 234 | 234 | 213 | | | | | | | |
| Depreciation total | 1,436 | 1,436 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 | 1,415 |

# CHAPTER 9 PROJECT EVALUATION

# CHAPTER 9 PROJECT EVALUATION

## 9-1 Economic Evaluation

(1) The difference between the income aimed at if this project were managed by a profit-seeking insitution, and income kept considerably low because it is a non-profit institution is regarded as economic benefit. This economic benefit is regarded as being received by the companies for which PIPAC provides services and by the Philippine industry.

If it is intended to pay the direct operating costs and depreciation of all the fixed assets including the building, a total income of 37,775,000 pesos will be required over 10 years from 1984. This is the minimum income with no profits. On the other hand, PIPAC's income over 10 years with a 30 percent service charge rise is estimated as 29,261,000 pesos. The differrence of 8,514,000 pesos is regarded economic benefit for the Philippine industry received over 10 years.

This economic benefit can be estimated higher since dividends and interests, owed on debts from banking institutions for working capital would be added to the service charges if it were a profit-seeking organization.

(2) Projected number of PIPAC's staff is 35 in 1984 and will be 66 after PIPAC's services show proper expansion and start full operation from 1986. This project is to provide opportunities for employment for at least this number of staff members which leads a secure life and for not a few people including the families of the staff members.

(3) As is mentioned in sec. 8-5-2, all the fixed and variable costs including running costs for electricity and water, maintenance costs for the

building and furniture, spare costs for chemical reagents and laboratory consumables and depreciation costs except for the building, as well as the personnel costs will be covered by a thirty (30) percent service charge rise. Under this conditon, few problems are expected as for the future financial aspect of PIPAC after the compleiton of the project.

(4) The total number of laborers concerned to the project construction is estimated as 28,800. This project is to provide opportunities for employment for these workers and furthermore, to give great contribution to the local construction material manufacturers by utilizing domestic product and materials like cement, concrete, doors and windows.

## 9-2 Social Evaluation

(1) As for the chemistry related analytical services, about one-third of the requests are turned down due to the insufficient availability of laboratory space and the number of staff. This project aims directly to fulfill these needs for chemcial analyses as well as to improve the capacity of PIPAC up to 230 percent of the present capacity to respond the increasing demand. PIPAC is expected to highly contribute to the fulfillment for the requests for chemical analysis from the industry which will result to the development of the Philippine industry.

(2) The number of training and seminars mainly on the electronic chemical equipment is also limited because of the same reasons mentioned above. This project aims to increase the number of training and seminars to double and the number of participants to triple. As there are no other similar training and seminars, and the necessity for this type of equipment in the modern chemical analysis and research is on the increase, PIPAC is to play an important role both for the industrial and scholastic sectors.

(3) There are few research institutions to which the Philippine industry can commission chemistry related researches and analyses today. Therefore, it is difficult to estimate how large the apparent and potential demands are, though it is expected to be considerably large assummed by the past number of commissions to PIPAC. PIPAC is planning to develop the analytical services as a major income source in the future. This is also significant to the future development of the Philippine industry. The income increase from these services is expected to be around 20 times of the present income in this project. This will be a great contribution to the accomplishment of the Five-Year Science and Technology Development Plan by NSTA (National Science and Technology Authority) as for chemical technology.

(4) A repair and maintenance department for the electronic analytical equipment is to be founded in this project for the purpose of the self-sufficiency in the maintenance of the equipment requested from PIPAC, the consulting services to other chemistry laboratories as for the repairs or purchase of equipment, and the diffusion of their technology through the training and seminars. This department will also contribute to the rehabilitation of the unused equipment on account of various reasons installed in many laboratories in the Philippines. It can be said to have the most immediate effect on improving the capacity of research and analysis activities.

(5) PIPAC's activities mentioned above are highly profitable to the development of the Philippine industry, especially to the small and medium size companies that are not capable of chemical analyses by them own. Its activities will lead to the growth of ingenous industry utilizing the local manpower and resources, which is aimed at by the government policies, and to the increase of manpower employment along with it. This project is also

expected contributable in this aspect.

(6) The problem of pollution along with the development of industry is no exception in the Philippines. It shares a large percentage among the analysis and research items of PIPAC. The improvement of PIPAC's capability after the realization of this project will be highly contributable to the precautions of environmental pollution control and sound residential environment.

(7) As is indicated in the fact that the Product Standard Agency bears full responsibility for this project, PIPAC's role in the establishment of the product standards in the Philippines chemistry will become more important by this project, which will lead to up-level the Philippine industry.

(8) PIPAC serves as an official qualifying organization on agricultural and marine exports at present. The improvement of PIPAC's capability is expected to be also greatly profitable to the exporting industry.

# CHAPTER 10 CONCLUSIONS AND RECOMMENDATIONS

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## 10-1 Conclusions

"Profit" seeked for by the private enterprises can not be expected in this project even if a 30 percent service charge rise is realized, cash surplus and depreciation of equipment is possible in 10 years but building will not be depreciated. If PIPAC plans to allow for depreciation of all the fixed assets including the building, around 68 percent price rise will be necessary. This figure is impracticable considering that PIPAC is a public foundation. Therefore, this project is hardly realized if the capital requiring the principal and interest payment is allotted for its operation.

On the other hand, as mentioned in the previous chapter, the economic as well as social benefits resulted by the completion of the project is regarded tremendous.

This project cannot be realized but by Grant Aid. A large effect is confirmed by Grant Aid from the government of Japan.

## 10-2 Recommendations

Finally the following indispensable recommendations are presented to the government of the Philippines and PIPAC regarding the realization of this project:

(1) PIPAC shall raise gradually the present service charges by around 30 percent by the onset of operation in the new facilities in 1984.

(2) PIPAC shall prepare about one million pesos (about 28 million yen)

including the cash surplus gained by the present services as the initial funds for the running costs and the purchase of accessories for the new facilities.

(3) A regular institute director shall be appointed to clarify the responsibility of the new organization and to provide active services. All the directors of each department are also recommended to be full-time staff members by the time of completion of the five-year development program.

(4) Considering the fact that the personnel costs shares almost 65 percent of the total costs, PIPAC shall carefully schedule and carry out the employment and disposition of personnel. Adjustment shall be considered in case projected service income cannot be attained, such as to postpone the employment schedule or to utilize part-time workers, to prevent the expense increase.

(5) The financial statement of this project may not be stable especially for the first few years. Active advertising and promotion are necessary, especially the promotion of research and development services is the most important. These efforts shall be commenced upon the decision of the grant aid.

(6) The government of the Philippines shall provide necessary capital funds for the PIPAC's public service activities.

(7) Since all the fixed assets of PIPAC are returned to the society as the economic benefits, the government of the Philippines shall provide necessary assistance for PIPAC in case the reconstruction of the building after the depreciation period or the expansion of the building within the depreciation period is necessary.