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2-1 Basic Concept of the Project

2-1-1 Objectives of the Project

This Project intends to establish a central education / research institute specialized in information and communication technology in Fiji, which will enable the South Pacific region to fully participate in the global information society and lead research and development and education in the ICT field with use of this centre, thereby promoting social economic development through mitigation of the "digital divide" in Fiji and Pacific island nations and development of ICT potential in the fields of human resources development, education, environmental preservation, society and culture in the field of media.

The objectives of this Project include an improvement of the insufficient ICT education and training functions of the USP, which is providing remote island countries on the Pacific Ocean with distance education activities using the USPNet, and an attainment of human resources security in the ICT field in Fiji and other Pacific island countries by constructing a new research and development environment for the field.

2-1-2 Outline of the Project

The USP is implementing a distance and flexibility learning program with help of USPNet for the remote Pacific Island countries. Thus, assistance in the ICT area of the USP can be regarded as a great contribution to alleviate the digital divide, one of the objectives of the project.

The number of applicants entering USP is constantly on the rise, and ICT (Information Communication Technology) and accounting hold an especially strong appeal to incoming students.

The assistance program of this project seeks to construct an ICT Centre comprising of common spaces, including a Multi-purpose Lecture Theatre for 300 people, a Department of Computer Science as the core of the Centre, IT Services which supports the ICT environment in the campus and operates the USPNet, a Department of Research and Development which is in charge of joint research and development with external organizations, and a Department of Engineering specialized in communication technologies, and to procure the equipment necessary for these facilities.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

This grant aid project was planned for the purposes of mitigating the digital divide and thereby contributing to the implementation of the National Information Communication Technology Development Plan of Fiji and other Pacific island countries, which aims at promoting socio-economic development, through construction of an ICT Centre for education and training and research and development concerning ICT, which extends for 6,659 ㎡ in the Laucala campus of the USP, and procurement of necessary equipment for the Centre. With this in mind, policies for planning the project have been derived, as follows, based on the request from the Fijian Government and the outcomes of the

field study and discussions.

(1) Basic Policy

The USP side initially requested the ICT Centre to be composed of a common area including two lecture halls with capacity of 1,000 and 500, a Department of Computer Science, an IT Service Division, a Department of Research and Development, a Department of Engineering, and a Geographical Information course. However, as a result of discussion, it was planned that the project will cover a Multi-purpose Lecture Theatre with a capacity of 300 people, a Common Area, a Department of Computer Science, an IT Service Division, a Department of Research and Development, and a Department of Engineering.

1) Gradation of Scale and Grade of Assistance

Those facilities deemed necessary for the new ICT Centre are extracted from the ICT-related division of the existing facilities. The requested facilities and their contents are selected based on the following policies.

① To give priority to the facilities held to be important in mitigating the digital divide and assisting the self-driven development.
② To give priority to the laboratories where students actually use computers.
③ To give priority to the facilities related to education, research, and development.
④ To include the facilities for creating and distributing digital contents related to the regional culture.
⑤ To exclude the existing and usable facilities.
⑥ To limit the use of air-conditioners to rooms where equipment and computers are provided, where as teaching staff rooms and administrative offices will basically be naturally ventilated.
⑦ To plan a barrier-free building to allow easy access for the disabled in spite of the slope of the construction site.
⑧ To establish a grade and scale of the facility in consideration of easy operation and maintenance.

2) Basic policy on selecting the equipment

Equipment to be provided under this project will be selected based on the following basic policies:

① The equipment should be assigned to facilities developed in this project.
② The equipment should directly benefit the students of USP.
③ The scope should match the contents of activity for the Centre.
④ Equipment with limited benefit effects will be excluded.
⑤ Equipment used mostly for personal purposes will be excluded.
⑥ Equipment used with less frequency will be excluded.

(2) Policy on Natural Conditions

Fiji Islands are situated in the Tropical Zone. The capital city of Suva is almost always rainy, even

in the ‘dry season’ from June to September. The city is sometimes hit by hurricanes in the ‘rainy season’ from November to April.

Therefore, the building plan should reflect the conditions below:

- To consider the reinforcement of the roofing structure and rain water-proofing against hurricanes.
- To provide eaves to protect the building from strong sunshine and heavy rain, with depth on the large side as a measure to prevent the adherence of dirt and water leakage on the exterior cladding
- To design the administrative rooms with a corridor facing an exterior equipped with a balcony in consideration of wind ventilation
- To adopt a ‘maintenance-free’ (sustainable) construction material and a construction method which minimizes damage from salty wind.
- To adopt the high heat-insulation material and an insulation method which maximizes energy saving in the air-conditioned rooms such as the computer laboratories

(3) Policy on Socio-economical Conditions

Many ‘colonial style’ building are seen in the capital city of Suva. For modern buildings, a construction method to prevent the direct exposure of the exterior concrete surfaces has been adopted these days in order to avoid dirt due to high temperature and humidity. There are more cases today where government buildings are refurbished by a technique that covers the concrete surface with surface-treated metal sheets than before. However, considering the fact that the USP has a firm building maintenance system together with the harmony with the existing facilities, the external walls will basically be finished with mortar.

In consideration of the heat insulation, the gable side of the outer wall will be finished with board with applying insulation materials to the inner wall. The outer wall will be finished with mortar, which allows easy maintenance.

As for the roof, in consideration of aesthetics, metal roofing will be partially applied, however, the remaining part will be flat roof for the outdoor equipment of air-conditioners to be installed and will be applied with water proofing sheet on the heat insulation material on the roof slab, taking workability into consideration.

(4) Policy on Construction and Procurement Conditions

1) Building Plan

Investment to Fiji’s construction market from abroad has been suspended since the illegal occupation of the parliament in 2000. However, the construction boom in Australia and New Zealand starting from late 2003 has induced an increment of private hotel construction in Fiji. The lack of general workforce and skilled workforce has become more conspicuous as a result, leading to strikes by the local construction workers on several occasions up to now.

Under these circumstances, it will be necessary to select materials and adopt construction methods which will shorten the construction period, and also to include the cost to dispatch Japanese engineers or supervisors from a third country to the construction site in the construction budget.

Construction materials are mostly imported from Australia and New Zealand. Considering their soaring prices, however, it will be imperative to study procurement from Japan and southeast Asian countries as an alternative.

Applications for building permits are not required prior to construction, although necessary documents must be submitted to the Public Works Department of Fiji.

The current situation and plan for major infrastructures are as shown below:

① Power Receiving

Power is already being distributed via a buried 11kV high-voltage cable from the Laucala Bay road, the front road of the USP, to the sub transformer station nearest the planned construction site. However, for the sake of the building layout of the new Centre, the USP will request a relocation of the sub station. The voltage is three-phase/415V/50Hz and single-phase/ 240V/50Hz.

② Generator

Every building in the USP is equipped with a generator as necessary. This Project will newly install a generator with capacity required.

③ Communication

・Since the telephone system differs according to the needs of the recipient country, the Project will only cover telephone piping work and setting up of cabling channels and laying of house cable to main rooms of the building. The recipient country shall be responsible for installing the necessary equipment.

・Since the ITS is capable of installing fiber optics within the premise, the Project shall only provide an outline of a computer network plan.

・A distance education program named Distance & Flexible Learning is being carried out via satellite communications connecting the 12 USP-participant countries. The USP is prepared to upgrade the satellite communications and is capable of carrying out the maintenance and management. Thus, the Project shall only provide an USPNet control room.

④ Air conditioning

・In accordance with the USP's facility and equipment standards, air conditioning is planned only for the server room and labs where computers are used, whereas teaching staff rooms and other ordinary rooms will basically not be air-conditioned.

⑤ Water supply and drainage

・Water will be branched from the buried water supply conduit (150Φ) under the front road to water pipes dedicated to the Centre and will be supplied via water meter. As for demarcation of the construction, Fiji will be in charge of introducing water from the water main to the meter and the Project will cover the rest. The water supply method shall be determined with consideration given to stabilizing of water supply pressure and security of supplied water since the water supply pressure is not constant.

・Sewerage and miscellaneous drainage will be separate and merged at the primary tank installed outside before discharged into the main sewer pipe (150φ) within the premise.

⑥ Rubbish

・The campus has an established rubbish collection system, which requires no plan of constructing a new incinerator, etc.

2) Equipment plan

The equipment planned in this project is roughly divided into audiovisual equipment, information processors, and equipment for experiments for the Department of Engineering.

Of this equipment, the information processors (such as PCs and servers) will ideally be procured locally, since there are two or more agents or manufacturer branches with sufficient maintenance schemes and experience within Fiji, all of which can provide after-sales service. However, as those agents or branches also import their equipment from New Zealand or Australia, it is also considered appropriate to directly procure equipment from the peripheral countries with frequent economic exchanges with Fiji.

In the absence of reliable agents or manufacturer branches within Fiji, other equipment will inevitably be procured from Japan or a third country. In view of the popularity of Japanese-made audiovisual equipment around the world, including Fiji, it is considered appropriate to procure these products from Japan. With regard to the equipment for experiments for the Department of Engineering, appropriate equipment will be selected among Japan-made products or products manufactured in third countries and procured from Japan or from the country of manufacture. Given the inability to secure sufficient local after-sales service for this equipment at present, it will be necessary to request the equipment procurement firm(s) to form sufficient after-sales service schemes (e.g., establishment of an agent or a liaison office in Fiji) in procuring this equipment.

(5) Policy on Practical Use of Local Contractions

1) Building Plan

Fiji Master Builder Association is established in Fiji with the participation of more than 10 companies, in addition to the association local Architects. However, only three companies were found to be supportive and reliable as general contractors according to the project cost survey—one

from New Zealand, one from Australia, and Indo-Fijian company.

The workforce for construction is insufficient due to the increment of building construction. It will be imperative to dispatch Japanese engineers and supervisors from third countries as skilled workforce cannot be expected locally.

2) Equipment Plan

As stated previously, there are no appropriate agents or manufacturer branches within Fiji, except for those representing the manufacturers of information equipment. Accordingly, it will be necessary to install equipment basically through the assistance of an engineer from Japan or from a third country. With regard to information equipment, it will be possible to implement installation work under the supervision of a Japanese supervisor, given that both agents and manufacturer branches in Fiji have engineers with proven records.

(6) Policy on Operation and Maintenance Abilities of the Implementing Agency

1) Building Plan

The financial balance of the university is not reported to be in deficit. The USP sustains a sound financial constitution, retaining about 10 percent of its annual expenses as budget for lighting, heating, communication, maintenance, and building repairs.

The 'Planning & Facilities' department is in charge of facility maintenance with the employment of 70 personnel, including cleaners, landscapers, store-men, computer technicians, repairmen (carpenters), plumbers, painters, electricians, and mechanical engineers. Working together, these personnel confer high-level functionality in operation and maintenance.

Personnel working in IT services also effectively eliminate equipment-related problems with their high-level operation and maintenance abilities.

However, concurrently with the inauguration of a new Vice Chancellor and execution of organization reforms, the maintenance division is expected to be controlled as a new building and repair department renamed 'Properties and Facilities.' As this is an organization reform plan with segregation of planning officers, maintenance clerks, and subordinate workers employed in both the Samoa and Vanuatu campuses as well, it is expected to be a more comprehensive and more reasonable operation and maintenance system.

2) Equipment Plan

The equipment planned in this project basically does not need expendable supplies. In addition, since this university has acceptable financial standing as mentioned previously, it is principally considered to have no problem in the capability of maintaining the equipment in financial terms. However, since the equipment planned in this project includes numerous personal computers, plans should also call for the procurement of liquid crystal display monitors with low power consumption and the installation of air conditioners in all rooms where the procured computers are expected to be installed. These additional measures will help secure stable maintenance for the computers.

With regard to the operation and maintenance system of the implementing agency evaluated from a technical point of view, equipment with specifications in conformity to the technical level of the agency or equipment equivalent to the level of the existing equipment is to be procured under the project. In principle, this will be accompanied by no problems. With regard to the maintenance system, on the other hand, the ITS, one of the target departments in this project, runs a maintenance service section which can respond to general failures of the planned equipment.

(7) Policy on Gradation of Building and Equipment

1) Building Plan

The grade of the new building is to follow the 'USP Standards & Specification." Further specifics on the heat insulation specifications will also be considered, as the air-conditioned space accounts for more than half of the total space of the ICT Centre in view of the special building usage. In addition, the offices for the staff should adopt a natural ventilation system in compliance with the USP standard.

In order to calculate the area for each room, e.g., staff office and computer laboratories, the USP standard and its special conditions should be taken into consideration. Accordingly, the total area or scale should be planned.

2) Equipment Plan

① Specification of Equipment

The specifications of the planned equipment should be of equipment grade based on equipment specifications conforming to their applications. In addition, the equipment to link to the existing equipment will be selected in due consideration to conformity.

② Number of Equipment

In principle, the planned equipment will be procured in the minimum quantities necessary for the launch of operations of this Centre. It would be recommended to the USP to continuously use the existing equipment in addition to the newly procured equipment in this project, or to improve and expand the equipment by procuring additional equipment on its own in the future.

(8) Policy on Method for Construction, Procurement and Schedule

1) Building Plan

The economies in Australia, New Zealand and Fiji have recently been booming and construction demand is also on the rise. Construction costs have tended to rise due to this background in the region. The development of resort facilities in Nadi and the construction of commercial buildings in the Suva district generate continuous activity. This has resulted in a shortage of labor all over the country and rising material costs. Both factors naturally drive up construction costs.

The only construction materials that can be stably produced locally are sand, gravel, timber, brick,

and concrete blocks. Other materials will have to be imported from abroad. Therefore, the available material in Fiji is comparatively costly in general, and the rising costs in Australia and New Zealand are driving up costs even more.

Taking this social economical background and the sloped construction site into consideration, board finishing will be partially adopted as construction methods which limit the amount of concrete and plaster works requiring intensive man-hours. Such measures will help shorten the construction period.

2) Equipment plan.

Since this project is a combined project for facilities and equipment, it will be desirable to execute tenders for the construction firm(s) and the equipment procurement firm(s) at the same time in order to ensure consistency between the equipment plans, facility plans, and layout planning. However, some of the equipment planned in this project is of a type now being rapidly improved through technological innovation (such as information equipment). Given that such equipment may become obsolete during the construction process extending over one year, it will not be appropriate to execute the tender simultaneously for equipment especially vital to the facilities, such as audiovisual equipment and other types of equipment which should be of the most advanced type possible.

For this reason, the tendering of equipment will be planned in two phases. The first phase will be executed for equipment especially vital to the facilities, concurrently with the tender for facility construction. The second phase will be executed for the other equipment at an appropriate time in accordance with the completion of the facilities.

In the meantime, the equipment installation process will be formulated in close liaison between the construction firm(s) and the equipment procurement firm(s), with due consideration given to the progress of the facilities construction.

2-2-2 Basic Plan

(1) Site Plan

1) Construction site

The construction site in the University of the South Pacific-Laucala Campus is located in the Laucala Bay district facing Laucala Bay, southeast of the capital city of Suva and approximately 3 Km eastward from central Suva, an area lined with multi-story government and commercial buildings. The land for the university is divided into the upper campus with major schools and departments and the Lower Campus with the Maritime studies department. The total land area amounts to 696,000 square meters. The site runs along a gentle slope from Laucala Bay east to west, with a height difference of about 30 meters between the highest and lowest points.

A shallow canal trench, pond, and swamp are located in the campus, considerably complicating the geographic features.

Some 60 buildings are clustered on the campus, including the administration building, cafeteria, dormitories, lecture halls, a library built under Australian Aid, a USPNet Satellite Base, and a parabola antenna built under Japanese Aid.

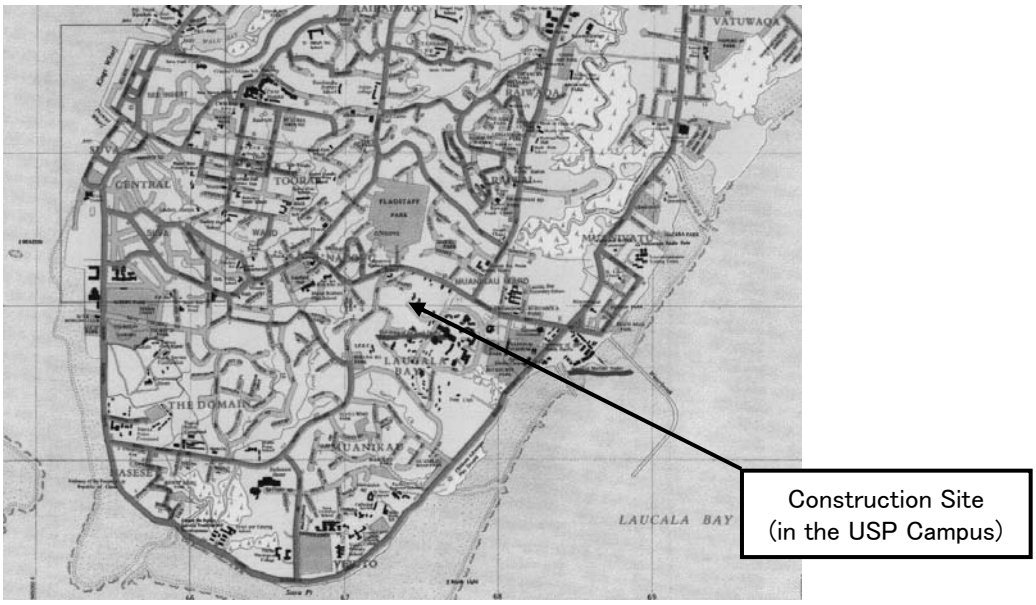


Figure 2-1 Site Location Map

2) Block Planning

The construction site is located in the western hillside of the upper campus. The existing buildings such as dormitories and storage structures should be dismantled and replaced with the new ICT centre.

The land configuration can be depicted as an easy slope from west to east, connecting the Laucala Bay ahead. The centre of USP is located 700 meters from the seashore.

Although the new building was supposed to be developed in the north-south direction on the site, the north edge in the USP campus master plan faces the trench and pond, while the south edge faces a steep valley. When considering the layout of the new building, the main axis of the structure should therefore match the natural gradation in the west-east direction.

① Policy of Block Planning

The layout plan should be basically considered as follows:

- Symbolic Space Configuration
- To emphasize the west-east axis from the Malae courtyard surrounded by the library and administration building in order to obtain the view toward the Bay from the Site.

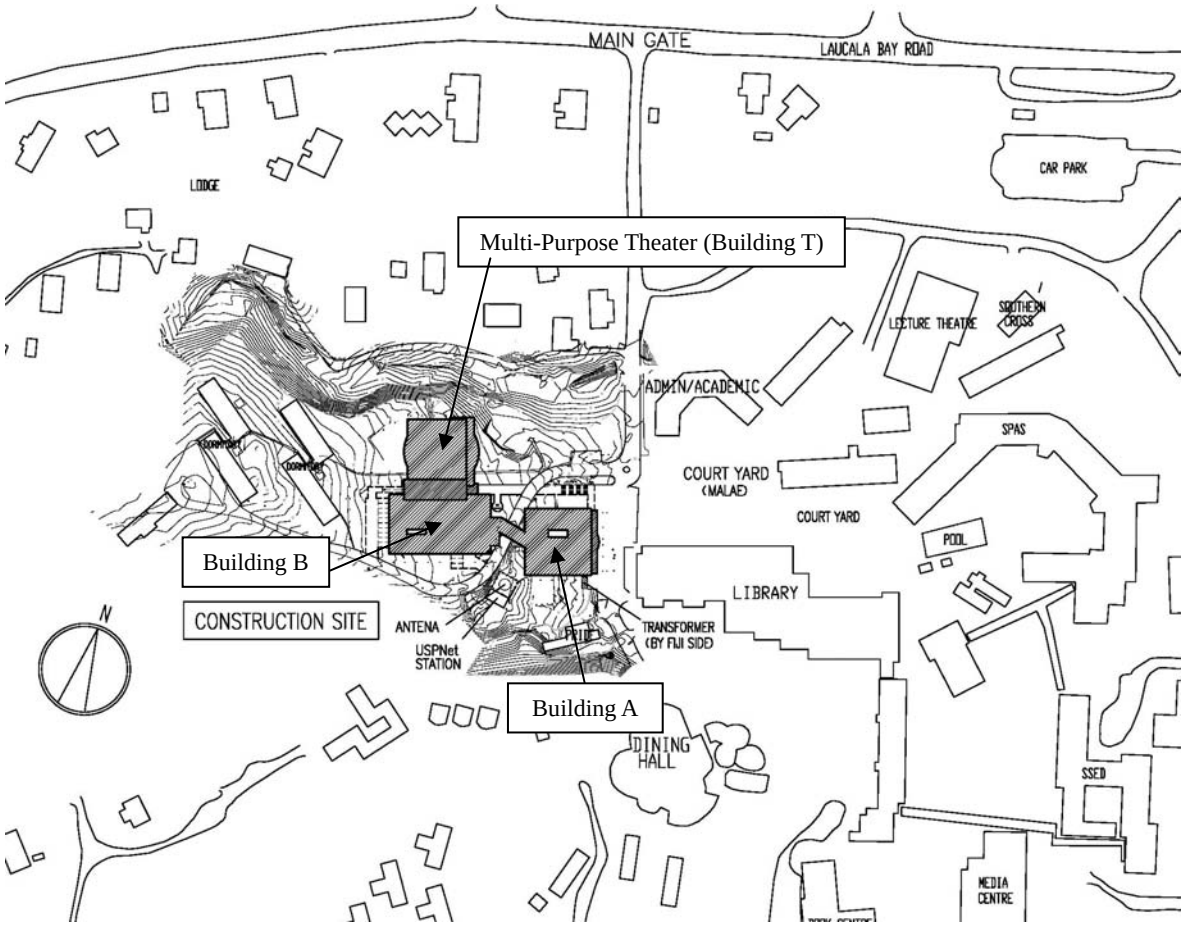


Figure 2-2 Block Planning

- To establish the front yard for the ICT Centre
- The front yard, utilizing the front open space and being united with the east courtyard, should be used as a motif to strengthen the existence of the ICT Centre as a symbol of Japanese Aid. The existing road (crossing the site) should be utilized as a route to the dormitories in the western edge and to the area behind the ICT Centre. Thus, the road should be maintained and re-utilized for the Project.
- The approach route for students should be from the library.
- Easy access routes for the disabled should be placed not only at the main entrance of the complex building, but at every entrance.

  As the building is multi-story, it should be equipped with an elevator.
- Building Zoning Plan with area efficiency:
- The building should reflect 'area efficiency,' e.g., by allocating, air-conditioned rooms on both sides of the inner corridor.

② Block Plan

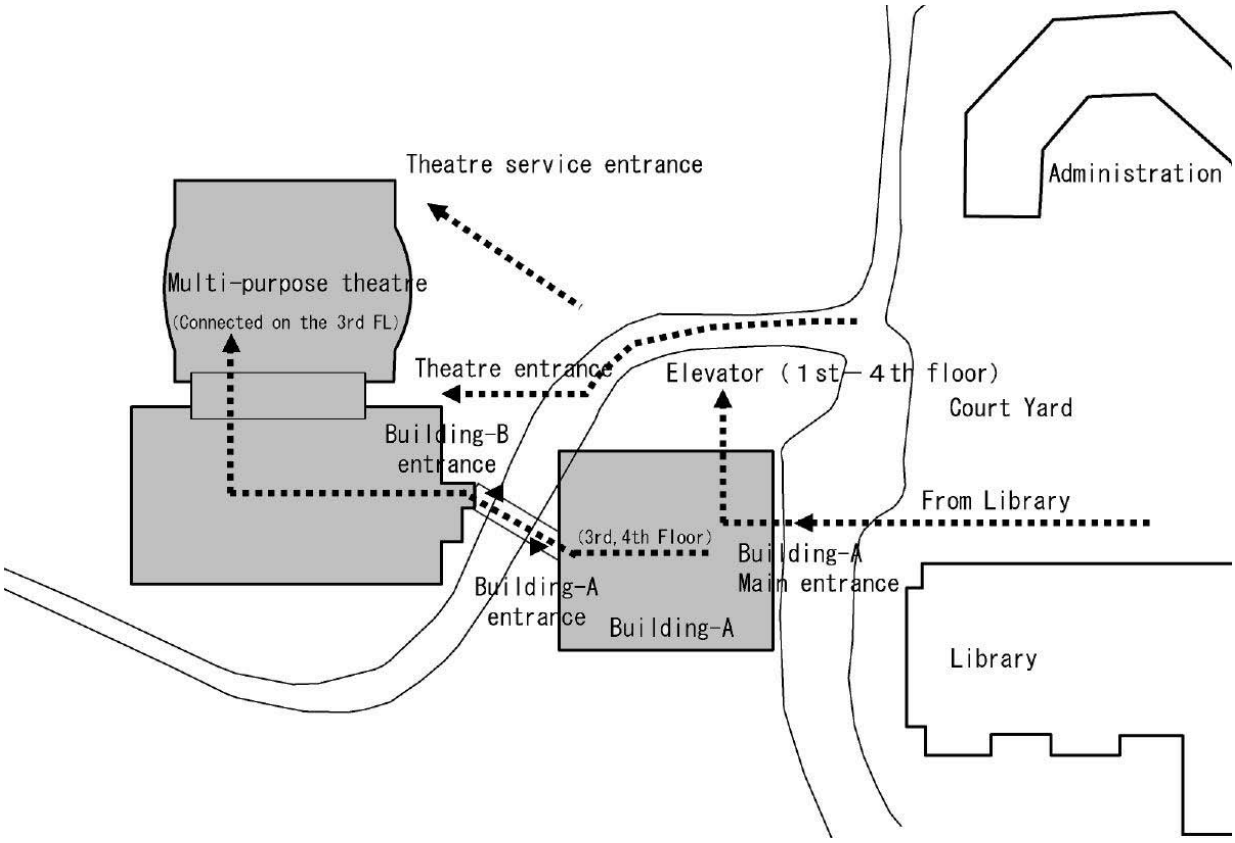


Figure 2-3 Zoning Plan

(2) Building Plan

1) Planning

The ICT Centre should consist of the Common Area, Department of Computer Science, IT Services, Department of Engineering and Research, and the communication service of the Department of Engineering. The area allocated to each department should be determined based on the curriculum scheme. The request for construction of facilities for GIS was excluded from the project on the ground that the existing facility is usable enough.

① Curriculum Scheme

The curriculum of USP is systematized so that each department gets the Programs that can be supplied with the existing capacity of the education staff, facility, and equipment, and so that the students take necessary programs among the courses available.

The educational staff, e.g., the department head, settles the program necessary to obtain the certificate of courses and puts it on the USP Calendar. Therefore, the status of the curriculum should be confirmed in the annual Calendar, as was done in the present survey, to ensure that the drafted courses are related to this Project and will be expandable in the future.

Each program generally consists of 'Lectures' and 'Tutorials.' 'Practice' and 'Experiments' are also implemented when needed.

The ratio of the general program is settled as 3 hours a week for lectures and 1 hour a week for tutorials. The 1-hour lecture and 3-hour tutorial program will be further deliberated in the future, however, as students have pointed out that “mass education” can sometimes hinder their comprehension. In any case, the draft of the new curriculum calls for a 1-hour lecture and 3-hour tutorial. For the moment, it remains physically difficult to deal with an ideal program.

The actual method for practice and experiments differs from course to course. The Department of Engineering fixes 3 hours/week for practice. The students are given a practice assignment on a designated theme to be completed using a personal computer or computer in the laboratory. This is what is defined as “self-study” or “practice.” Though variable among students with different ability, interviews indicate that the computer work time per assigned theme should be set at 8 hours.

② Research & Development / Incubation Program

Research & Development / Incubation Activities are advocated as one of the counterpart's basic concepts toward this Project. Under this program, the ICT centre will promote research, development, and industrialization jointly with outer organizations (business enterprises) by utilizing its equipment, facilities, and other properties.

Since these activities have not yet been carried out in USP, the feasibility of program implementation and requests related to the program were confirmed with the IT-related industries covered under the survey.

The responses from these organizations indicate that the program seems very effective and worthwhile, and the concrete theme is proposed as follows. However, six rooms were not recognized to be fully utilized from the beginning of the construction. Out of these six, several were requested for the use of the IT-related companies, assuming operational rates at around 50 percent.

Domestic IT enterprises are requesting utilization of the program and their research themes as follows;

- Telecom Fiji Limited
  Telecommunications, networking, communications, data engineering
- Fiji Electricity Activity
  Electric engineering, internet and networking, Power Live communications
- Amalgamated Telecommunications Holding Limited
  Special ICT Training, Open Source Software development
- ICT, land and Rural Farmers and Early Warning Systems
  Meteorology, Climate change, Creation of on-line markets, Marketing
- National Small and Micro Enterprises
  Cyber business incubator-web-based approach; provide services to small business.
- Bio-Genetics / Technology / Robotics
  Biotech companies

③ Facility Contents of the Division

〔Common Space〕

The common area is the combination of the 'administration Division,' the division responsible for operating and administrating the new ICT Centre, and the 'Common Space' commonly used by staff and students. The Green Room (a small video conference room) was excluded from the scope of the project on the ground that the Video Conference Room and the Conference Room will cover the need. In addition, the request for four 200-capacity hall, one 500-capacity hall, and one 1000-capacity hall was excluded from the scope of the project on the ground that the needs for them can be covered by using the existing facilities and a 300-capacity Multi-purpose Lecture Theatre. As a result, the Common Space will consist of the following rooms:

a. Multi-purpose Lecture Theatre (300 person)
b. Office- Director ICT
c. Office-Core Staff
d. Reception/Secretary
e. Visiting Staff Office
f. Video Conference Room
g. Conference Room
h. Common Room for Staff
i. ICT Resource Room / Digitization Room
j. Radio Pasifik' Room

〔Department of Computer Science〕

The Department of Computer Science, the department to form the core position of the ICT and to share venues with the Department of Mathematics, will be solely moved to the ICT Centre, due to the current lack of laboratories, computers, and air conditioning. Of the requested rooms, the construction of PC Laboratory will be excluded from the scope of the project and the PC Laboratory for ITS expected to be provided in this project will be also used for the Department of Computer Science to cover the need. The construction of the Small Server Room will be excluded from the scope of the project and the existing servers will be relocated to the Server Room for ITS. The construction of the Seminar Room will be excluded from the scope of this project and the need will be covered by existing facilities and the Multi-purpose Lecture Theatre. As a result, this department will consist of the following rooms:

a. Academic Staff Office
b. Technical Staff Office
c. Administration Staff Office
d. Tutor Office

Five types of computer laboratories will be provided to meet various usage and configuration requirements.

e. Research Laboratory
f. Dedicated Networking Teaching Laboratory
g. Dedicated Computer Teaching Laboratory
h. Postgraduate Laboratory
i. Technical Laboratory/Workshop

〔IT Services〕

IT services are an important division responsible for operating the computers and network of the USP campus. As it is currently scattered on every floor of the "Media Centre," its core facilities will be relocated to the ICT Centre in order to reduce inconvenience and solve the current shortage of space. The requested Telephony Communication Workshop will be excluded from the scope of this project and the existing facilities will be utilized to cover the needs. As a result, this division will consist of the following rooms:

a. Office- Director ICT
b. Office- Secretary
c. General office ICT
d. Meeting room

ITS will operate two types of computer laboratories, as follows:

e. Professional & Development Laboratories
f. General Access Laboratories

The following dedicated rooms will be provided for the IT Services in light of its function as the department in charge of maintenance and inspection of university computers and networks.

g. Computer Workshop
h. Server room
i. Storage (Equipment Warehouse)
j. Help Desk & Waiting Area
k. USPNet Control Room

〔Research and Development (Incubation) Department〕

The Research and Development Department is an educational-industrial complex where USP incubates researchers in coordination with IT-related companies within Fiji. As it is expected to play an important role in the creation of future job opportunities, it will be newly established within the ICT Centre. It will be composed of the following rooms:

a. Office- Research/Incubator

b. Test Bed/Incubator

〔Department of Engineering〕

This faculty specializes in education on hardware in the ICT field and is closely related with this project. The present Department of Engineering, a faculty which chiefly consists of two specialty disciplines, mechanical engineering and electrical/electronic engineering, is expected to be segmented into three specialty disciplines, viz., electrical/electronic engineering, information and communications, and mechatronics (with the aim of enhancing the information and communication and mechatronics fields).

To fulfill future plans, this project will develop laboratories intended for experiments and practice in the information and communications field and related facilities within this centre. The Engineering Department will be comprised of the following rooms.

a. Office Engineering

b. Technical Staff Office

c. Postgraduate Room

d. Computer Laboratory

e. Information and Communication Engineering Laboratory

f. Storage/Research

④Volume of the facilities

a. Volume and background of the proposed plan

The Research and Development Department, the Department of Engineering, and the Geographic Information Services were not included in the plan requested in 2002. However, the Research and Development Department and the Geographic Information Course were added in the feasibility study and the Department of Engineering was further added in the B/D Study. The Geographic Information Services were finally excluded, assuming that the existing facilities could still be utilized.

Courses of the Department of Engineering not directly related to the ICT Centre were excluded from the plan in this project. The Lecture Hall and tutorial, spaces where individual students were not to practice on personal computers, were also omitted. In addition, the Personal Computer Laboratory (Computer Laboratory) for shared use was integrated into the IT Services for more efficient management.

As for the Common Area, the request made in 2002 included two lecture halls, and the preliminary study detailed these as a large lecture hall accommodating 1,000 people and a multi-purpose centre accommodating 500 people.

This Project finalized the specifications as a single multi-purpose lecture theatre with a smaller capacity of 300 people, which can be used for lectures and various other purposes, and excluded the large hall to be mainly used for ICT beginners' courses.

The volume required of the ICT Centre at its opening in February 2008 will be calculated in accordance with the curriculum received by the USP and the number of people who take the course. Basic units such as the individual Computer Laboratory and teachers' room will conform to the USP Facility Standard, except under special circumstances.

Table 2-1 Transition of the requested volume and details (Unit: m^2)

	Department	Requested plan (2002)	Feasibility study (2004)	B/D Study (2005)	Proposed plan
1	Common area	5,263.00	4,148.40	3,462.00	1,389.00
2	Computer Course	1,355.00	1,151.62	2,718.00	1,198.00
3	IT Services	1,770.00	1,145.62	3,405.00	1,037.00
4	Research and Development Department	0	876.00	332.00	156.00
5	Department of Engineering	0	0.00	1,036.00	310.00
6	Geographic information Services	0	454.82	448.00	0.00
7	Corridor, hall, machine room, etc.	1,678.00	1,555.29	4,290.40	2,328.00
	Grand total	10,066.00	9,331.75	15,691.40	6,418.00

b. Volume of the Multi-purpose Lecture Theatre

There are three large lecture halls in USP, such as hall for 242 students, for 280 students and for 400 students. The subjects taught in these halls number of use as of 2005 are described as in the Table below.

Condition 1: Since the maximum capacity of the lecture halls except for the above lecture halls is 150, the coursed for more than 150 students should be picked up.

Condition 2: The coursed exceeding the capacity of the lecture halls should be divided into small groups, in order to minimize the burden for the lecturers.

Table 2-2 Booking Data of Existing Large lecture halls

No	Course	Number of Students	Courses /week	2 Groups (person/ group)	3 Groups (person/ group)	Courses for 400 Lecture Hall	Courses for 280 Lecture Hall	Courses for 242 Lecture Hall
1	AF101	770	2	385	257		6	
2	AF108	461	3	231				6
3	AF203	447	2	224				4
4	AF302	346	2			2		
5	AF308	202	3					3
6	AFF01	165	3					3
7	BF201	189	3					3
8	BI104	250	3				3	
9	BIF02	162	3					3
10	CH101	387	3			3		
11	CH201	171	3					3
12	CHF02	180	3					3
13	CS100	559	2				4	
14	CS111	331	3	280		3		
15	CS121	484	2					4
16	CS222	336	2	242		2		

17	CS323	276	3				3	
18	CSF21	207	3					3
19	EC102	600	3	300		6		
20	EC201	328	2			2		
21	EC203	337	3			3		
22	EC302	230	3				3	
23	EC304	170	3					3
24	ED250	194	2					2
25	ED252	190	2					2
26	EL001	293	2			2		
27	EN106	155	4					
28	GE101	212	3					3
29	LL114	487	2	244			4	
30	LLF11	466	3	233			6	
31	MA101	694	3	347	232		9	
32	MA102	294	3			3		
33	MA111	439	3	220				6
34	MA130	151	3					3
35	MA211	215	3					3
36	MA231	182	4					4
37	MAF11	386	3			3		
38	MG101	570	3	285		6		
39	MG202	205	3					3
40	MG204	230	3					3
41	MG314	170	3					3
42	PH102	299	2			2		
43	PH106	246	3				3	
44	PHF02	162	3					3
45	SE100	294	3			3		
46	SO100	195	2					2
47	SOF01	225	4					4
48	TS106	178	3					3
Total						40	41	82

Sources : USP Time Table of Lecture Halls

Assuming that the available time per week in a lecture hall is approximately 40 hours (10 hours/day × 5 days × 80%), the lecture halls for 280 and 400 students are said to be sufficient. However, the lecture hall for 242 students is extremely insufficient, considering the needs as double as the containing capacity.

Currently, USP is trying to take measures for these courses as below:

・To divide the course to small groups and disperse them to small lecture rooms.

・To use the large lecture hall, but to disperse the abundant numbers to small lecture rooms with the TV monitors broadcasting the ongoing lectures.

・To contain the overflowed students even in the fulfilled lecture hall.

・To utilize the large lecture hall located long distance away from the main campus.

However, as these are unreasonable measurement that could increase the heavy workload to the lecturers based on the increment of the number of same lectures, and could lower the quality of lectures, these measurement lead to the dissatisfaction to the students.

This circumstance is anticipated to be deteriorated, due to the increment of students in the future and their inclination to the popular courses, thus the need to build one large lecture hall for 250 to 300 students is validated.

c. Volume of the computer laboratories and the information and communication engineering laboratories

The sizes required of the laboratories at the opening in 2008 will be calculated based on the curriculum received from the USP and the number of people to take courses which intensively utilize the computer laboratories and information and communication engineering laboratories.

The following table outlines out the relationships among the existing facilities, requested volume, and planned volume of the Computer Laboratory:

Table 2-3 Volume of Computer Laboratories (ICT-related courses, Unit: number of personal computers)

	Name	Existing	Requested	Planned			
				Number of existing PCs to be used	Number of PCs to be procured		Number of PCs planned to be installed in each room
					Japan Side	USP Side	
Department of Computer Science	Research lab	—	50	—	—	25	25
	Dedicated Networking teaching Lab	—	40	—	40		40
	General Access Computer Lab	16	300	50	0		0
	Dedicated Computer Teaching Lab	34	160		110		160
	Postgraduate laboratory	24	40	24	—		24
IT Services	Laboratory A (Professional)	20	100	20	—	30	50
	Laboratory B (General Access)	276	400	—	120		120
	Laboratory C (R & D)	0	10	—	0		0
Research and Development Department	Computer Labs Research	0	20	—	0		0
Department of Engineering	Computer Lab	20	60	—	12		12
	Engineering Lab	12		12	3		15
Geographic Information Services	Geospatial Science Computer Learning Space	18	45	—	0		0
	25seat general access Laboratory	—	25	—	0		0
	Geospatial Database Server Simulation Lab	—	5	—	—		—
	10 'Seat' Research Laboratory	—	5	—	0		0
Total		420	1230	106	285	55	446

The shortfall of PCs in the Research lab and the Laboratory A (Professional) — 55 units in total— will be newly procured by the USP side.

i) Department of Computer Science

・Research lab

While ten 5-person rooms were requested for the master's and doctoral courses by the USP, five 5-person rooms are considered appropriate from the following calculation.

In consideration of the ratio between the numbers of postgraduate students and numbers of students enrolled in master's and doctoral courses (2:1 ratio), the general statistics of the USP indicate that the appropriate number of master's and doctoral courses in 2008 will be approximately 25. This is about half of the number of postgraduate students currently enrolled (52).

・Dedicated Networking Teaching Laboratory

One laboratory equipped with 40 computers is estimated to be necessary, based on the following calculation basis.

Assuming that the estimated number of students in fiscal 2006 using the relevant laboratories reported by the USP is taken as a cardinal number, that the annual rate of increase in student enrollment is 20% (Note 1), and that each student devotes eight hours a week of self-study and practice, the hour・unit of personal computers required per week during the first semester with a larger number of students is calculated as follows:

403 students × 8 hours / week = 3,224 hours・units / week

Assuming that the daily available time per personal computer in a laboratory is 14 hours (from 8:00 AM to 10:00 PM) and that the availability factor is 80% (Note 2), the weekly available time per personal computer in a laboratory will be 79 hours・unit/week (14 hours/day × 7 days / week × 80% ≒ 79 hours / week). Accordingly, the minimum quantity of personal computers required will be 40.8 units (3,224 hours / unit / week ÷ 79 hours / week ≒ 40.8 units).

Note 1: Since analysis of the past annual rates of increase in student enrollment by existing courses indicates dispersion on the order of 15% to 50%, the number of required personal computers was calculated based on the average rate of increase being 20%.

Note 2: An actual availability factor of usual university facilities is approximately 65%; however, 80%, which is regarded as an upper limit in operation theory, was adopted in this calculation.

Table 2-4 Number of Students of Dedicated Networking Teaching Laboratory

1st Semester		2002	2003	2004	2005	2006	2007	2008
EN2xx	Data Communications	-	-	-	-	280	336	403
Total								403

2nd Semester		2002	2003	2004	2005	2006	2007	2008
CS312	Computer Networks	105	143	116	121	146	175	210
CS3xx	Security	-	-	-	-	120	144	158
Total								368

・Dedicated Computer Teaching Laboratory

The dedicated computer teaching laboratories are laboratories for students of the Department of Computer Science to practice more specialized curricula. From the following calculation, four dedicated computer teaching laboratories equipped with 40 computers are estimated to be required.

[Calculation condition]

- With regard to the number of students in courses using the laboratory in question, the time and number of personal computers required for courses using statistical data will be calculated based on a mean value of verifiable multi-year data.
- The time and number of personal computers required for courses not using statistical data will be calculated based on the estimated number of students in fiscal 2006 reported by the USP.
- The annual rate of increasing enrollment after the standard value will be taken as 20%.
- The self-study and practice time per student will be taken as eight hours a week.
- Number of hours available for self study: 79 hours/week (with the availability factor taken as 80%)

  14 hours/day × seven days × 80% ≒ 79 hours/week

The hour・unit / week of personal computers required:

Calculated on the basis of the first semester with a larger number of students

1442 students × 8 hours / week = 11,536 hours・units / week

The hour・unit of personal computers required per week

11,536 hours・units / week ÷ 79 hours/week = 146 units/week

Number of laboratories required

146 units ÷ 40 units/laboratory = 3.65 laboratories ≒ 4 laboratories

Table 2-5 Number of Students Using the Dedicated Computer Teaching Laboratories

	1st Semester		2002	2003	2004	2005	2006	2007	2008
CS3	CS221	Distributed Information System Theory and Application	-	-	-	143	172	206	247
CS3	CS222	Database Management System	-	-	401	336	369	442	531
CS5	CS311	Computer Systems	-	103	132	69	101	122	146
CS5	CS3xx	Multimedia System	-	-	-	-	120	144	173
CS5	CS3xx	Digital Image Processing	-	-	-	-	120	144	173
CS5	CS3xx	Data Mining	-	-	-	-	120	144	173
	Total								1,442

	2nd Semester		2002	2003	2004	2005	2006	2007	2008
CS4	CS224	Advanced Database Systems	-	-	-	-	150	180	216
CS6	CS332	Advanced Distributed System & Information Systems Networking	-	-	-	-	300	360	432
CS6	CS392	Topics in Computer Science	224	255	81	187	224	269	323
CS6	CS3xx	Internet Computing	-	-	-	-	230	276	331
	Total								1,302

・Postgraduate laboratory

The USP estimates the number of students in fiscal 2008 as 100, based on the result of a hearing survey conducted by the USP. However, this number becomes about 52 when the following basis is used for the calculation. If the calculation assumes the above as a precondition the appropriate size for the postgraduate laboratory will be one laboratory equipped with 24 personal computers, as follows.

[Calculation condition]

・Number of postgraduate students in fiscal 2005: 30

・(Estimated) increase in student enrollment: 20%/year

・Number of practice hours per student: 37 hours/week

(5 hours × 5 weekdays, 12 hours on weekends)

・The time taken for students in the course in question to access : 79 hours / week

Estimated number of students in the course in 2008:

30 students×1.2^3 ≒ 52 students

The hour・unit of personal computers required:

52 units×37 hours / week = 1,925 hours・units / week

Thus, the number of personal computers required a week is 24 units (1,925 hours・units / week ÷79 hours / week = 24.35 units).

ii) Information Technology Services (ITS)

・Laboratory A (Professional & Development Laboratory)

This laboratory is a facility to provide adult education courses for CISCO and Red Hat. (Currently there is one laboratory equipped with 20 personal computers)

While the USP requested four laboratories equipped with 25 personal computers, only two laboratories equipped with 25 personal computers are estimated to be required. This is based on the assumption that eight weekly hours of practice will be required for the courses provided in the laboratory in question (six courses) and that the daily operating time will be four hours (from 5:00-9:00 PM, for the courses intended for working people and extracurricular students). In the meantime, the free time not committed for the courses in question (3,400 hours・units) will be used to make up for the shortage of Laboratory B.

[Number of laboratories required]

48 hours・laboratory / week ÷ (4 hours /day × 6 days / week) = 2.0 = 2 laboratories

・Available time per day: 4 hours (5:00 PM-9:00 PM)

・Seating capacity per laboratory: 25 persons

・Weekly hours laboratory for which laboratories are required: 48 hours・laboratory / week

[Free time hours・unit]

・ Available time・unit per day from Monday to Saturday: 9 hours (8:00 AM-5:00 PM)

・ Available time per day on Sunday: 14hours (8:00 AM-10:00 PM)

・ Hours available for other courses: 3,400 hours・units / week

Monday – Saturday

25 units × 2 laboratories × 9 hours / day × 6 days = 2,700 hours・units / week

Sunday

25 units × 2 laboratories × 14 hours × 1 day = 700 hours・units

Table 2-6 Practice Courses to be Provided in the Laboratory A (Professional & Development Laboratory)

Course	Weekly hour of required laboratory work
Cisco Networking Academy	8
Red Hat Linux	8
Intro to Linux	8
Security+	8
Scripting – Perl	8
MYOB	8
Total	48

・Laboratory B (General Laboratory)

In reference to the preparation of a PC laboratory requested by the ITS and the Department of Computer Science, this project will provide two 60-person laboratories supplemented by the existing ITS's laboratory on the basis of the following calculation.

Number of laboratories required for Group Course No. 1

The practice hours of the course in question will be fixed by a timetable. The daily available time on personal computers for practicing purposes will be limited to school hours on weekdays, viz., nine hours (9:00 AM-6:00 PM). If the number of required rooms is calculated based on the following conditions and the assumption that three hours per week will be required as practice hours for the respective courses, the result is becomes 60-person laboratories. In the meantime, the free time for the two laboratories is estimated at 4,800 hours・units/week.

[Calculation method]

・Hour・room required for the practice per week: 78 hours・rooms/week (see the table)

Number of students ÷ 60 (students/room) × 3 hours/ week

・Available hours per room during the school hours on weekdays: 36 hours/week

9 hours/day 5 days / week × 0.8 = 36 hours/week

・Number of PC rooms required for the class: 2 rooms

78 hours・rooms/week ÷ 36 hours/week = 2.16 ≒ 2 rooms

・Number of hours / week available for self study: 79 hours/week・units (with the availability factor taken as 80%)

14 hours/day × seven days / week × 80% ≒ 79 hours/week・units

・Free time available for classes other than this class: 4,800 hours・units / week

79 hours・rooms/week × 60 units/laboratory × 2 rooms-60 units/laboratory × 78 hours・rooms/week = 4,800 hours・units/week

The hour・unit of personal computers required for Group Course No. 2

The practice of the relevant course adopts a method where the students receive assignments from the course they are expected to be completed by self study.

While the time required for the students to complete their self study will vary with their abilities, the USP indicated that the average time required will be about eight hours per assignment. If calculated based on this assumption, the number of PCs required by the students of all the courses of this group per week becomes 30,008 hours・units/week. (See the table)

The hour・unit of personal computers required for Group Course No. 3

While this course is provided entirely on the remote education basis, the relevant laboratory is used by students inhabiting in the vicinity of the university for their self study. With the per capita average occupation time estimated to be approximately three hours per week, the number of PCs required for students of the relevant course per week is calculated as 141 hours・units / week. (See the table)

Calculation of the number of laboratories required for Group Courses No. 2 and No. 3.

Calculation based on the following conditions indicate that Group No. 2 and Group No. 3 can provide the practice in the existing ITS laboratory.

[Calculation method]

- Free time of Laboratory A (Professional): 3,400 hours・units/ week
- Free time・units of Group No. 1: 4,800 hours・units/ week
- Hour・unit of personal computers required for Group No. 2: 30,008 hours・units/ week
- Hour・unit of personal computers required for Group No. 3: 141 hours・units/ week
- Hours・units/week of PCs necessary outside the Centre: 21,949 hours・unit / week
  30,008+141-3,400-4,800 = 21,949 hours・unit / week
- Number of existing PCs: 276 units
  Weekly available hours・units: 276 units × 79 hours/week = 21,804 hours・unit /week
  Required hours・units/week　Existing available hours・units/week

Table 2-7 Classes and assignments using Laboratory B (General Access Lab)

	1st Semester		Estimated number of students in 2008	Assessment
Group No.1	EC203	Economic Statistics	391	21 hours / week are required
	BI400	Research Methods in Biology	13	3 hours / week are required
	GE303	Geography and Development in the Pacific	66	6 hours / week are required
	GM202	Geomatics II	77	6 hours / week are required
	GM203	Survey Computations II	77	6 hours / week are required
	MA130	Basic Statistics	151	9 hours / week re required
	PS103	Research Methods in Behavioral Science	13	3 hours / week are required
	RE101	Real Estate Principles	80	6 hours / week are required
	SE100	Social Survey Methods and Data Analysis	274	15 hours / week s are required
	SE303	Business Demographics	17	3 hours / week are required
	Total for the above			78 hours / week /week
Group No.2	CS100	Computing Fundamentals	966	7,728 hours・units
	CS111	Introduction to Computing Science	400	3,200 hours・units
	CS121	Introduction to Information Technology	248	1,984 hours・units
	CS211	Computer Organization	180	1,440 hours・units
	CS222	Database Management System	581	4,648 hours・units
	CS2xx	Software Engineering I	403	3,224 hours・units
	CS323	Information Systems Analysis & Design	680	5,440 hours・units
	CS391	Topics in Computer Science	120	960 hours・units
	CS3xx	Artificial Intelligence	173	1,384 hours・units
	Total for the above			30,008 hours・units/week
Group No.3	HU101	Introduction to Library/Information Studies	16	48 hours・units
	HU103	Organizing Library/Information Centre Resources	1	3 hours・units
	HU205	Management of the Library/Information Centre	11	33 hours・units
	HUC11	Introduction to Library, their Systems Services	19	57 hours・units
	Total for the above			141 hours・units/week

iii) Department of Engineering

・Computer Lab for Engineering

The number of students in the 1st semester as of 2005 was 160. When the ICT Centre is completed and the Information and Communication and Mechatronics Courses are newly established in 2008, the 1st year, the number of students is expected to total 200.

On the following calculation basis, it is estimated that the Department of Engineering will need one PC laboratory equipped with 12 computers loaded with dedicated software for the Information and Communication Course.

Table 2-8 Number of students in Department of Engineering

	2008	2009		2010			2011			
	First year	First year	Second year	First year	Second year	Third year	First year	Second year	Third year	Fourth year
Information and communications	60	60	45	60	45	35	60	45	35	35
Electrical/electronics	80	80	65	80	65	50	80	65	50	50
Mechatronics	60	60	45	60	45	35	60	45	35	35
Total	200	355		475			595			

[Calculation method]

・Courses held in the laboratory are summarized as follows with regard to the first semester in which more classes are held.

Table 2-9 Classes of the Department of Engineering to be held in computer laboratories

No.	Subject	Student level	No. of hours (/week)	No. of students	Total number of hours per semester
EN102	Engineering drawing	1st year of the Electricity and Electronics course 1st year of the Information and Communications course 1st year of the Mechatronics course	3	60 80 60	600
EN4xx	Graduation research	4th year of the Information and Communications course	3	35	105
EN4xx	Digital signal processing	4th year of the Information and Communications course	3	35	105
EN4xx	Satellite communications	4th year of the Information and Communications course	3	35	105
EN4xx	Elective subject (1 out of 6 optional subjects)	4th year of the Information and Communications course	3	35	105
Total					1,020

The above classes require a PC per student. Based on the table above, the total hours and number of units of PCs to be used in a week is calculated as 1,020 hour-unit/week

Next, assuming 80% as the operational rate, the number of hours per week for a PC to be used in a week can be calculated as 79 using the following equation.

14 hours/day × seven days × 80% ≒ 79 hours/week

Therefore, the total number of computers necessary is derived as follows, and it can be concluded that 12 units is sufficient for running the laboratories.

1,020÷79＝12.9≒12 units

・Information and Communication Engineering laboratory

This Engineering laboratory is used to conduct experimental subjects related to Information Communication. Of the curricula presented by the Department of Engineering, the following courses are applied to experimental subjects.

Incidentally, since the experiment is reportedly expected to be conducted with 30 students as a group, the numbers of groups in individual courses were calculated based on the assumption that there will be 30 students, provided that the information and communication engineering laboratory in question will be designed with a seating capacity for 30 persons.

Table 2-10 Specialized Engineering course in Information and Communication

Code No.	Name of course	Semester	Estimated number of students to take the course (number of groups)	
			First semester	Second semester
EN2xx	Basic communication engineering	III	110 (4G)	
EN3xx	Communication network	IV		110 (4G)
EN4xx	Graduation research I	VII	35 (2G)	
EN4xx	Satellite communications	VII	35 (2G)	
EN4xx	Optional course	VII	35 (2G)	
EN4xx	Graduation research II	VIII		35 (2G)
EN4xx	Wireless communications	VIII		35 (2G)
EN4xx	Optional course	VIII		35 (2G)
Total			215 (10G)	215 (10G)

・Experiment implementation time: 30 hours

10 groups × three hours = 30 hours

・Weekly available hours per room: 36 hours

9 hours (class hours) × five days × 0.8 (utilization factor) = 36 hours

・Number of laboratories required: 1 rooms

30 hours (experiment implementation time) ÷ 36 hours (available hours) ≒ 0.83 = one room

d. Calculation of sizes for the Research and Development Department

This department will be provided with space and human resources by the centre for joint research and development with external organizations (such as corporations) mainly to promote the research, development, and commercialization of technologies related to the Information and Communication. In specific terms, six corporations have made requests so far. However, given that all six of the laboratories will not be in use all of the time, the number of necessary laboratories is assumed to be three, provided that the availability factor will be 50%.

i) Laboratory (incubation)

・Number of rooms: 3

・Area per room: 12 m^2

Sufficient space for the stationing of up to two persons

・Interior: The laboratory will be equipped with laboratory functions enabling the installation of personal computers.

ii) Information and communication engineering laboratory (Test Bed)

・Number of rooms: 1

Sufficient space for division into two rooms

・Area per room: 160 m^2

This room can be divided into two rooms by providing removable walls. In addition, the interior will be dividable through the placement of booths.

・Interior: The information and communication engineering laboratory will be equipped with devices enabling the installation of personal computers and experimental equipment.

⑤Floor planning

[Common area]

The Common area will be a common space shared by the Administration Division, the division responsible for operating and managing the ICT Centre, staff, and students.

a. Multi-purpose Lecture Theatre (Building T)

The Multi-purpose Lecture Theatre will be a lecture hall with the capacity to seat 300 students, which will be usually used for a general lecture room for IT-related courses provided to a large number of students. In addition to regular lectures, the hall is expected to be used as an international conference hall for IT-related academic conference. Furthermore, the hall aims to play a role of a base for the transmission of information toward the objective of this project ― alleviation of the digital divide among islands ― by recording, storing, and distributing languages and cultures of 12 South Pacific islands, which participate in USP, to the respective countries in a form of digital video with IT technologies put into full use.

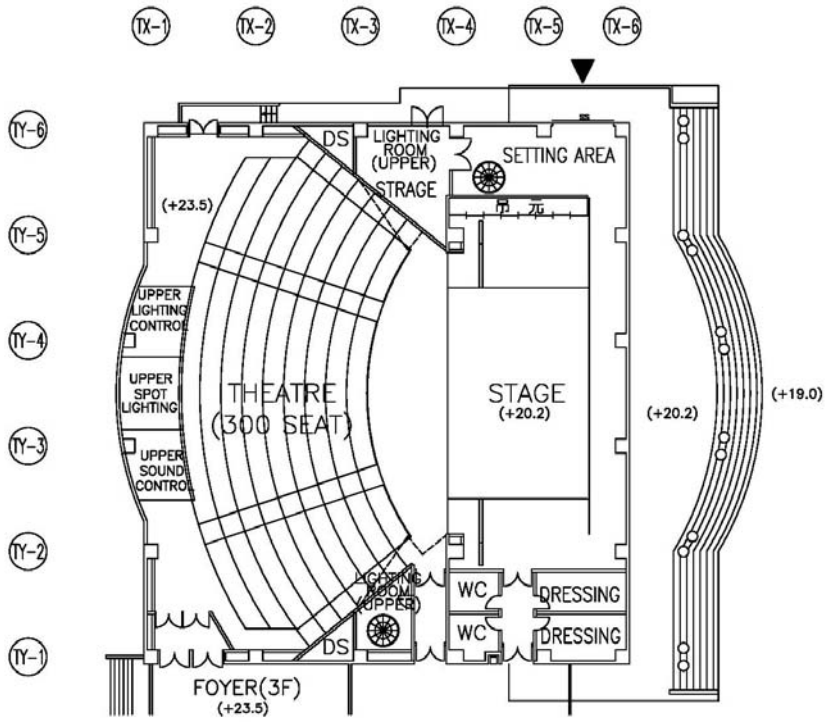


Figure 2-4 Multi-purpose Lecture Theatre Floor Plan

i. Audience (Building T Two-Third Floor)

・The audience will be seated in a semicircular-stadium-style configuration around the apron stage with shorter visual distance to the stage. This will enable the presentation of lectures with the travelers (house curtains) left closed.

・The number of seats to be secured for the audience will be around 300, a number suitable for the appreciation of dramas or lectures, with 0.72 m^2 (60 cm wide and 1.2 m deep) allocated per each member of the audience, in compliance with the USP Facility Standard.

・Spaces for the handicapped will be secured in the front row and rearmost row.

ii. Stage (Building T, Second Floor)

・ The stage will be constructed in a “proscenium” style capable of accommodating and concealing curtains and lighting required for the presentation of lectures and drama performances.

・ The space to be secured for the stage will be wide enough to use for small-scale dramas or dances performed by 10 to 20 people (12 m wide (space between the curtains) × 8 m deep). In addition, a rollup-type screen will be installed at approximately the centre of the stage as an aide to lectures, taking the projection angle and distance.

・ The front of the audience will be used as an apron stage for various purposes, including lectures, dramas, and use as a transfer space for camera photographers without installing a step between the stage and audience.

・ The digital video recorded by the camera will be distributed to USP-participant countries and so on through the USPNet.

・ The specifications for the stage settings will be as follows.

Table 2-11 Stage Settings Specifications

No	Name	Intended use	Stage Settings Specifications	Construction category
1	Traveler / House draw curtain (gold background)	Used to open and close the stage (lectures will be presented with the stage left closed)	22 m wide, approximately 7.5 m high, gold background, electrical motor-driven type	Included in the scope of this project
2	Traveler / House draw curtain (black background)	Used to open and close the stage (and as a scene-change curtain for dramas)	22 m wide, approximately 7.5 m high, black background, electrical motor-driven type	To be constructed separately from this project
3	Borders / Teasers	Curtains hung from the upper part of the stage to cover the stage flyings from the sight of the audience.	22 m wide, approximately 1.5 high, black background, hand-driven type	Included in the scope of this project
4	Side Legs / Curtains at the wings	Curtains hung from the right and the left sides of the stage to cover broadcasters and tools on the stage from the sight of the audience.	3 m wide, approximately 8 high, black background, hand-driven type	Included in the scope of this project
5	Suspension light	Hung from the pipe batten, chiefly to provide lighting effects on the stage.	650W Fresnel lens spotlight, hand-driven type	To be constructed separately from this project (only installation of three pipe battens will be included in the scope of this project)
6	Border light	Equipped directly behind the teasers to illuminate the stage.	200W nine-light halogen lamp, hand-driven type	To be constructed separately from this project (Three batten included.)
7	Draw curtain	Used to switch stage scenes.	20 m wide, approximately 6.5 m high, black background, electrical motor-driven type	To be constructed separately from this project
8	Projection screen	A curtain on which an images are projected during lectures.	300-inch white background curtain exclusively for image projection, electrical motor-driven type	Included in the scope of this project

9	Cyclorama	An effect curtain fixed at the innermost section of the stage to project images such as backgrounds	20 m wide, approximately 6.5 high, white background, electrical motor-driven type	Included in the scope of this project
10	Horizon light	A light to illuminate the cyclorama	200W nine-light halogen lamp, hand-driven type	To be constructed separately from this project
11	Ceiling light	Lighting effect equipment illuminating the stage from the upper part of the audience	1KW plane-convex lens spotlight	Included in the scope of this project
12	Gridiron	A work platform to hang curtains, lightings, and so on over the stage	Pulleys and cables will be placed on H-section steels arranged in the shape of lattice	Included in the scope of this project

Note: The above mentioned stage system will include pipe battens, cables, pulleys, and up-and-down/opening/closing mechanism for hanging stage settings.

iii. Backstage rooms (dressing room, anteroom) (Building T, Second Floor)

・Although backstage rooms are basically required for the area (on per broadcaster), the plan calls for the provision of only one backstage-cum-dressing room for female students and one backstage-cum-anteroom for professors and lecturers, based on the premise that male students will use vacant classrooms, etc. for dressing and resting.

iv. Spotlight booth, light control room, acoustic control room (Building T, Fourth Floor)

.・Space will provided for a pin spot to illuminate stage characters.

.・Space will be provided for the installation of a light control desk for the collective control of the illuminations for the stage and audience.

・Space will be provided for the installation of a mixer to control the acoustics on the stage.

v. Lobby, foyer, rehearsal space

・The staircase between the Building B and the Building T and the corridor on the Third Floor of the Building B will also be used as a foyer. (The lobby and foyer are two very important public spaces for use mainly before performances, after performances, and during breaks).

・The Conference Room on the Third Floor of the Building B will be used as a rehearsal room, as needed.

b. Office- Director ICT (Building A, Third Floor)

It has been decided that the “assistant director” of USP will also serve as the Director ICT. A private room is to be provided to the Director ICT.

・The standard area for USP director level personnel, 20 m^2 or more, will be secured according to the USP Facility Standard.

c. Office- Core Staff (Building A, Third Floor)

Offices (private rooms) will be provided for the three staff (one staff from each department) to be involved in the operation and management of the ICT Centre.

・The area to be secured for each office will be at least 12 m^2, the standard area for lecturer level personnel according to the USP Facility Standard.

d. Reception/Secretary (Building A, Third Floor)

A Reception and Secretary's Counter (two personnel) will be provided at the entrance of the Administration Division for visitors. This counter will be equipped with a fax machine and copy machine.

・The area to be secured will be at least 8 m^2 × 2 = 16 m^2, the standard area for administrative staff level personnel according to the USP Facility Standard.

・A reception counter for visitors, a fax machine, a copy machine, and the like will be placed in this space.

e. Visiting Staff Office (Building A, Third Floor)

In light of the nature of the ICT Centre—an academic institute comprised of multiple departments, where professionals in various fields are to be invited both from within Fiji and the rest of the world—three rooms will be provided to accommodate three invited staff members (one for each of the three departments).

・ The area to be secured will be at least 12 m^2, the standard area for senior lecturer level personnel in each office according to the USP Facility Standard.

f. Video Conference Room (Building B, Third Floor)

The Video Conference Room will be a conference room equipped for use as a stage for distance learning programs for the 12 participant nations and video conferences over USPNet. This room will have the capacity to seat 50 personnel, about the same level accommodated now.

・ A conference space for 50 personnel will be secured.

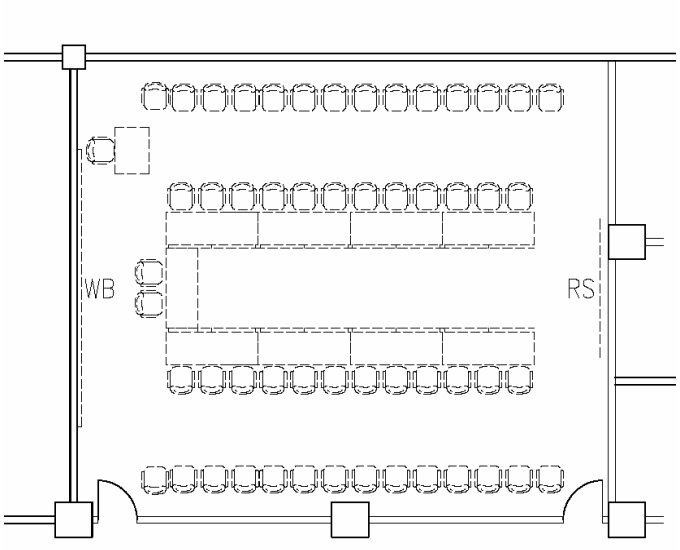


Figure 2-5 Video Conference Room Floor Plan

g. Conference Room (50 parson) (Building B, Third Floor)

This facility will be designed as a large conference room where administrative staff of the ICT Centre and the heads and administrative staff of individual departments can gather together under one roof (capacity to seat 50).

・ Conference space for 50 personnel will be secured.

・ The room will be soundproofed to enable use as a rehearsal room for the Multi-purpose Lecture Theatre.

h. Common Room for Staff (Building A, Third and Fourth Floors)

A lounge will be provided for small meetings, information exchanges, etc., among professors, academic staff, administrative staff, and so on.

・A space will be secured for small conferences of approximately five personnel.

・The lounge will be equipped with a sink cabinet for preparing and serving tea.

i. ICT- Resource Room/Digitization Room (Building A, Second Floor)

A small data room (digitization room) where visitors can read and compile ICT-related books, theses, reference materials, will be provided.

Digitization function will be organized by Library, so this room will be provided equipment that visitors can browse and compile Library-owned media.

j. Radio Pasifik' Room (Building B, Second Floor)

This radio station is operated by students as part of the practice. The radio programs broadcast from the station play an important role as a communication linking USP with isolated neighboring islands. As the present broadcasting station within the Media Centre is far too small, it will be transferred to a larger space in the ICT Centre.

i. Reception, waiting hall

・A reception counter and waiting space for broadcasters, inquirers, and observers will be provided.

ii. Studio

・ Storage space will be secured for six personnel (including a broadcaster, timekeeper, and program director) and installation space will be secured for part of the broadcasting equipment. Sound-absorbing and soundproofing material will be equipped in the room interior.

iii. Audio-tuning studio

・ Space will be secured to accommodate two recording and editing engineers and to install a mixer, program-recording equipment, etc.

iv. Staff Office

・ Space will be secured to accommodate three program production staff. (The space to be secured will be at least 6 m^2 × 3 = 18 m^2, the standard per capita area for the rank-and-file administrative staff level personnel according to the USP Facility Standard.)

v. Manager Office

・ The area to be secured will be at least 12 m^2, the standard area for administrative manager level personnel.

[Department of Computer Science]

a. Academic Staff Office (Building A, Second, Third and Fourth Floor; Building B; Fourth Floors)

There are 12 academic staff at present, including professors, assistant professor, and lecturers. In preparation for the planned staff increase in the new departmental scheme in 2008, private rooms will be provided for 18 staff out of the request for 20 staff.

・ The area to be secured for each office will be at least 12 m^2, the standard area for senior lecturer level personnel according to the USP Facility Standard.

b. Technical Staff Office (Building B, Fourth Floor)

With regard to the Staff Office for technical staff engaged in the maintenance and inspection of computers and software, a room for two personnel will be provided (similar to the case as it is now).

・ The area to be secured for the room will be at least (8 m^2+equipment space 4 m^2) × 2 = 24 m^2, the standard area per room for senior engineer level personnel according to the USP Facility Standard.

c. Administrative Staff Office (Building A, Fourth Floor)

A space for two personnel will be provided as an office for secretaries (for administrative staff) in this course (similar to the case as it is now). This space will be equipped with a fax machine and copy machine.

・ The area to be secured will be at least 8 m^2 × 2 = 16 m^2, standard area for administrative staff level personnel according to the USP Facility Standard.

・ Space will be provided to install a fax machine, a copy machine, etc.

d. Tutor Office (Building A, Second Floor)

There are now 12 instructors providing tutorial (tutors). In preparation for the planned staff increase in the new departmental scheme in 2008, private rooms will be provided for 16 staff out of the request for 20 staff.

・ The one room will be used by two personnel.

・ The area to be secured for the room will be at least 6 m^2 × 2 = 12 m^2, the standard area per room for tutor level personnel according to the USP Facility Standard.

As laboratories using computers, the following five types of laboratories will be provided according to the intended use and pattern of use.

e. Research Laboratory (Building A, Fourth Floor)

A research laboratory intended for use by students enrolled in the Master's, Doctoral, and Post-Degree Courses (five rooms with the capacity for 5 persons each)

・ In consideration of the research conducted by individual teams, one of the five rooms will be used by five students.

・ The area to be secured for the room will be at least 6 m^2 × 5 = 30 m^2 , the standard area per room for tutor level personnel according to the USP Facility Standard.

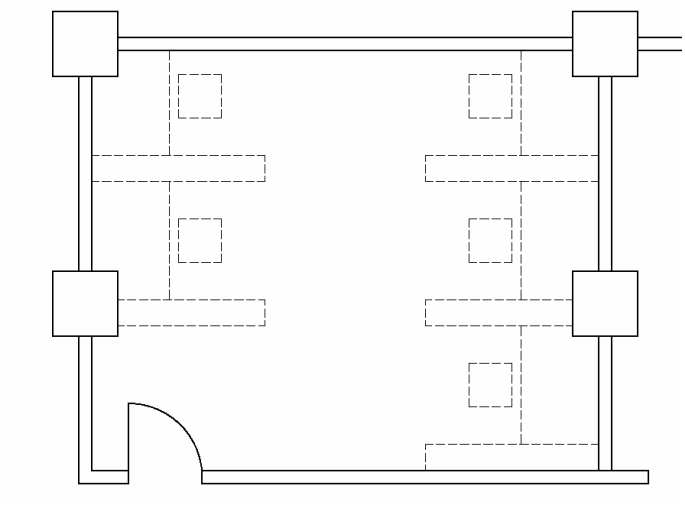


Figure 2-6 Research Laboratory Floor Plan

f. Dedicated Networking Teaching Laboratory (Building B, Fourth Floor)

A laboratory intended for use for experiment and practice related to the PC network of the Department of Computer Science and the Department of Engineering (One room with the capacity to accommodate 40 persons)

・The area to be secured for the room will be at least 3 m^2/person × 40 = 120 m^2, the standard area per room for students according to the USP Facility Standard.

(Note: 3 m^2/person is the standard area for a room with a capacity to accommodate 21 persons or more)

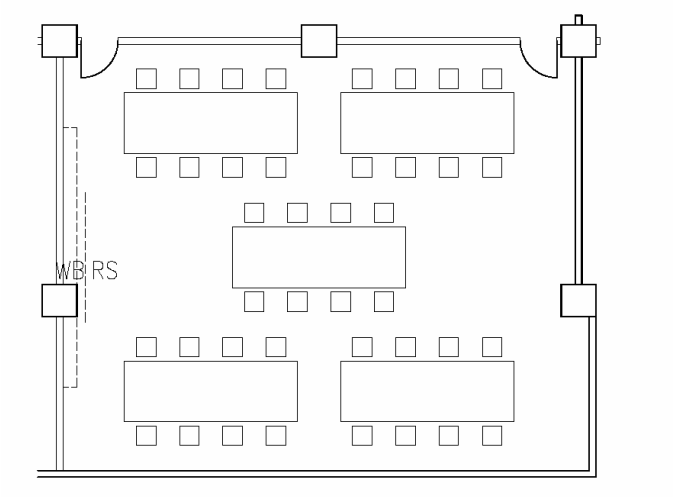


Figure 2-7 Dedicated Networking Teaching Laboratory Floor Plan

g. Dedicated Computer Teaching Laboratory (Building B; Fourth Floor)

A special laboratory exclusively for practice in more specialized subjects in the Department of Computer Science (four rooms with the capacity to accommodate 40 persons each)

・ The area to be secured for the room will be at least 3 m^2 × 40 students = 120 m^2, the standard area per room according to the USP Facility Standard.

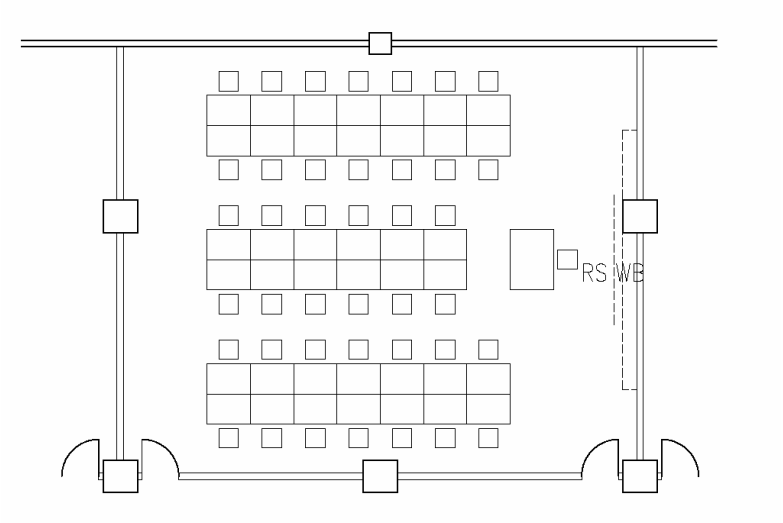


Figure 2-8 Dedicated Computer Teaching Laboratory Floor Plan

h. Postgraduate Laboratory (Building B, Fourth Floor)

A special practice laboratory exclusively for use of Certificate / Diploma students (one room with the capacity to accommodate 24 persons)

- Although the USP Facility Standard specifies the standard area per student as 3 m^2, the space to be secured for this laboratory will be at least 2.5 m^2 × 24 persons = 60 m^2.

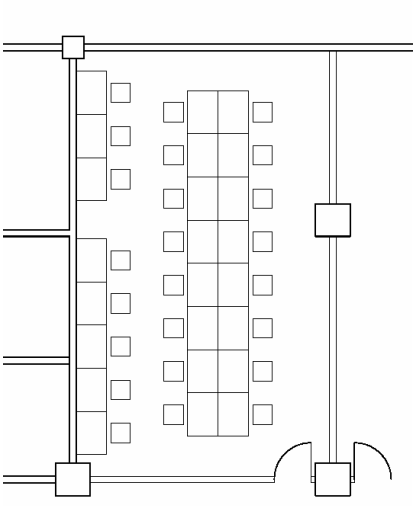


Figure 2-9 Postgraduate Laboratory Floor Plan

i. Technical Laboratory/Workshop (Building B, Fourth Floor)

This room will be used as a workshop for the maintenance and inspection of computers and as a storage area for equipment.

- A space will be secured for the installation of racks to accommodate personal computers and parts under maintenance or inspection.

[IT Services (Information Technology Services)]

This important division, which manages computers and the network installed within the USP Campus, is presently divided and dispersed over several different floors of the Media Centre. In order to eliminate inconvenience and expand the present lack of space, the division will be transferred to a single location within the ICT Centre.

a. Office- Director ITS (Building A, Second Floor)

The Office- Director (private room) for the IT Service Division will be provided

- The area to be secured will be at least 20 m^2, the standard area for a director according to the USP Facility Standard.

b. Office- Secretary (Building A, Second Floor)

Space will be provided for a secretary belonging to the IT Services. This space will be equipped with a fax machine and copy machine.

- The area to be secured will be at least 8 m^2, the standard area for administrative staff level personnel according to the USP Facility Standard.
- Space will be provided to install a fax machine, copy machine, etc.

c. General Office ITS (Building A, Second Floor)

At the moment there are 50 administrative staff stationed in the IT Services, a large room for only 20 staff will be provided, and the shortage of spaces to be covered by the existing facilities.

- The area to be secured for the room will be at least 6 m^2 × 20 persons = 120 m^2, the standard area for rank-and-file administrative staff according to the USP Facility Standard.

d. Meeting Room (Building A, Second Floor)

A small room will be provided for group meetings of the staff.

- A space will be provided for meetings of approximately six persons.

The IT Services will manage the following two types of computer laboratories:

e. Laboratory A (Professional & Development Laboratory) (Building A, Fourth Floor)

A training laboratory chiefly intended for adult education courses provided by the IT Services such as Red Hat and CISCO Academy (two rooms with the capacity to accommodate 25 persons each)

- The area to be secured for the room will be at least 3 m^2 × 25 students = 75 m^2, the standard area per room according to the USP Facility Standard.

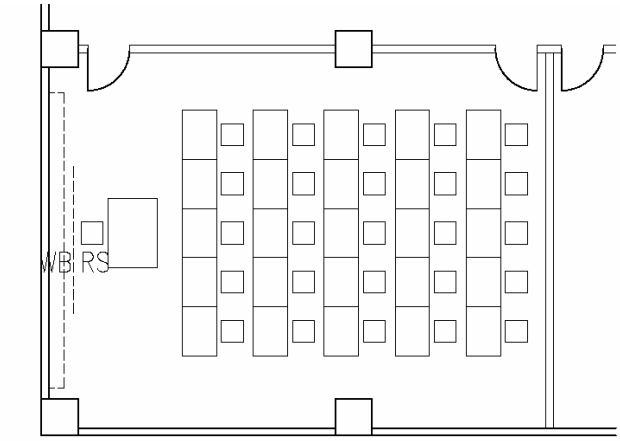


Figure 2-10 Laboratory A (Professional & Development Laboratory) Floor Plan

f. Laboratory B (General Access Laboratory) (Building A, Third Floor)

The laboratory will be freely available to students for PC practice in the computer-related subjects taught in all of the university's course programs, as well as for functions such as self-study on PC, Internet browsing, writing of theses, etc. (two rooms with the capacity to accommodate 60 persons each)

In addition, the Professional and Development Laboratories and the General Access Laboratories need to be secured in the minimum quantities to satisfy respective demands. In other words, it is difficult to share a room for both purposes or integrate the functions into a room.

- Although the standard area stipulated by the USP Facility Standard is at least 3 m^2 × 60 persons = 180 m^2, an area of only 162 m^2 or more (per capita area of 2.7 m^2) will be secured due to constraints imposed by the desk layout and other factors.

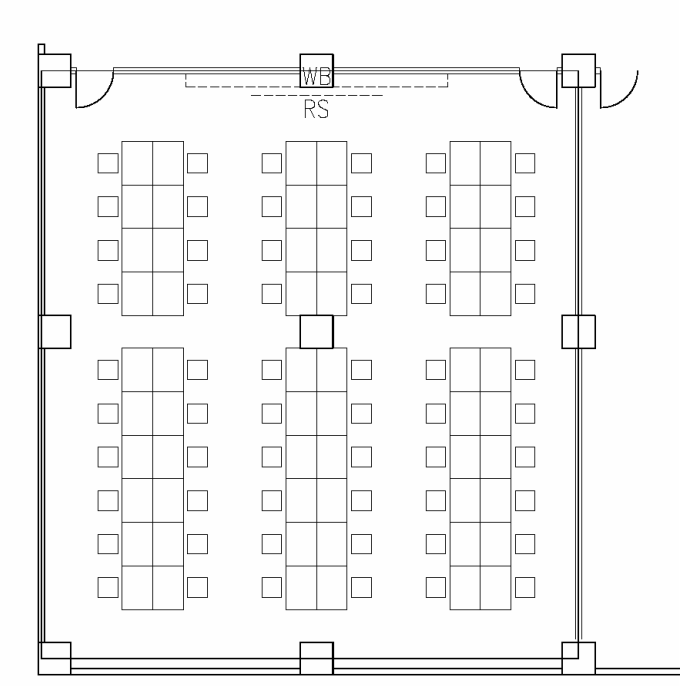


Figure 2-11 Laboratory B (General Access Laboratory) Floor Plan

In consideration of the function of the division involving the maintenance and inspection of computers and the network, the IT Services will be provided with the following.

g. Computer Workshop (Building A, Second Floor)

Warehouse and repair room for computer equipment

- Space will be secured to install a rack for the temporary storage of computer equipment under repair.

h. Server Room (Building A, Second Floor)

The Server Room is a space for installing and managing the main server with which the IT Service Division administers the protocols throughout the country. In accordance with the transfer of the IT Service Division, the room is relocated inside the ICT Centre. For the security sake, one single room will be allocated for this purpose.

While there are 32 server machines in the existing server room at present, space to place ten 19-inch racks to accommodate server machines, network system equipment, and electrical transmission equipment for the USPNet will be secured in the server room within the new centre in order to prepare for the USPNet improvement plan for the near future. The floor of the server room will be constructed as a free access floor where Ethernet cables, optical fiber cables, and power cables can be easily laid.

- Twenty servers will be installed by integrating the requested 34 units, including the ITS server machines, network equipment, and electrical transmission equipment for the USPNet (all requiring installation work). Space will also be provided for sixteen 19-inch racks, including ten units for immediate use and six for future expansion.
- Space will be secured to install one rack for the exclusive use of the Department of Computer Science.
- Space will be secured to install a desk, bookshelf, etc. for the server manager.
- The entrance door will be provided with a electric lock system for security.

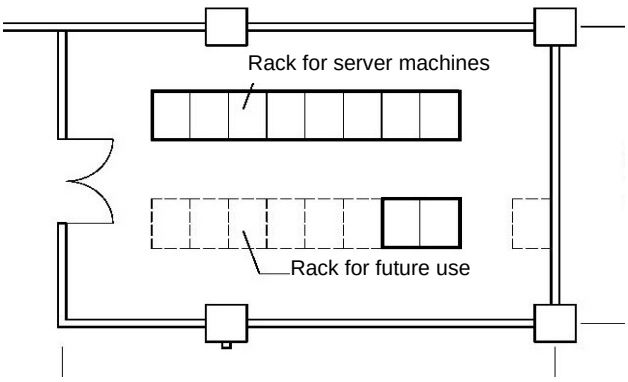


Figure 2-12 Server Room Floor Plan

i. Storage (Equipment Warehouse) (Building A, Second Floor)

Storage space for the network equipment and parts will be provided.

・ Space will be secured to install a rack for the storage of personal computers and parts for the network.

j. Help Desk & Waiting Area (Building A, First Floor)

A section will be established to respond to requests for repair and technical inquiries from other departments and students.

・ The area to be secured for the administrative staff will be at least 8 m^2 × 6 persons = 48 m^2, the standard area =according to the USP Facility Standard.

・ In addition to the office, a waiting space wide enough to install a counter and chairs will be secured.

k. USPNet Control Room (Building B, Third Floor)

The USPNet Control Room is a nucleus facility intended to distribute distance learning programs to the 12 participant countries via satellite communications. The facility engages in the recording, distribution and recordkeeping of classes. It will be transferred from the current location in the Media Centre to the ICT Centre in parallel with the relocation of the IT Services, a division to which it has close technical ties.

i. Reception, Waiting Space

・ A reception counter and waiting space for broadcasters, inquirers, and observers will be provided.

ii. Main Control Room

・ An area of at least the current 42 m^2 will be secured as space for the placement of the console (the existing equipment will be transferred) for recording and distributing programs. Sound absorbing and soundproofing devices will be installed in the room interior.

iii. Device Rack Room

・ An area of at least the current 16 m^2 will be secured as space to install the recording devices (the existing equipment will be transferred).

iv. Workshop

・ An area of at least the current 36 m^2 will be secured as a space to place, repair, and store recording devices such as monitors and amplifiers.

v. Staff Office

・ A space for four program production staff will be secured. (The per capita space for rank-and-file administrative staff will be 6 m^2 or more according to the USP Facility Standard.)

vi. Manager Office

・ The space to be secured will be at least 12 m^2, the standard area for the administrative manager level according to the USP Facility Standard.

[Research and Development (Incubation) Department]

a. Office- Research/Incubator (Building B, Second Floor)

Requests for establishing laboratories have been received from six top-ranking IT-related companies in Fiji (Telecom Fiji Ltd., Fiji Electric Authority, Amalgamated Telecommunications Holdings Ltd., ICT Land & Rural Farmers, National Small & Micro Enterprises, Bio-genetics). Notwithstanding, partnerships with these companies and agreements for shared use of the laboratories are not expected to commence immediately after the opening of the ICT Centre. Thus, the number of laboratories to be established has been set as three in total, or half the number of laboratories requested so far.

・The area to be secured will be at least 12 m^2 per room, the standard area for the lecturer level according to the USP Facility Standard.

b. Test Bed/Incubator (Building B, Second Floor)

Given that the laboratory may require various types of measuring equipment and test centres in addition to computers, a large room that can be flexibly partitioned with removable walls, etc., will be provided. In addition, future expansions of the room will be taken into consideration in the layout plan.

・The area to be secured will be 40 m^2 × 3 companies = 120 m^2 or more on the assumption that each company will use approximately 40 m^2.

・Each room will be dividable into two rooms with the usage of removable walls.

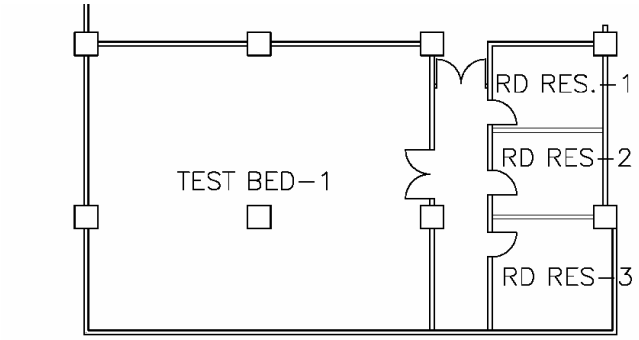


Figure 2-13 Office- Research/Incubator/ Test Bed/Incubator

[Department of Engineering]

a. Office- Engineering (Building B, Third Floor)

A private room will be prepared as the office for the head of the Department of Engineering in the ICT Centre.

・The area to be secured will be 18 m^2 or more, the standard area for the professor level according to the USP Facility Standard.

b. Technical Staff Office (Building B, Third Floor)

A room will be provided for three technical staff personnel engaged in the maintenance and inspection of computers and software in the Staff Office (similar to the case as it is now).

・The area to be secured for the room will be at least 6 m^2 × 2 persons = 12 m^2, the standard area per room for engineer level personnel according to the USP Facility Standard.

c. Postgraduate Room (Building B, Third Floor)

A room will be prepared for postgraduate students from the Department of Engineering (one room with the capacity to accommodate 4 persons).

・Although the standard area stipulated by the USP Facility Standard is at least 3.5 m^2 × 4 persons = 14 m^2, the area to be secured will be only 12 m^2 or more (per capita area of 3.0 m^2) due to constraints composed by the desk layout and other factors.

d. Computer Laboratory (Building B, Third Floor)

One computer laboratory will be provided for exclusive use of the Department of Engineering (one room with the capacity to accommodate 12 persons).

・The area to be secured for the room will be at least 3.75 m^2 × 12 persons = 45 m^2, based on the per capita standard area per student according to the USP Facility Standard.
(Note: 3.75 m^2/person is the standard area for a room with a capacity to accommodate 20 persons or less)

e. Information and Communication Engineering Laboratory (Building B, Third Floor)

The original request from USP called for four types of laboratories (course exercises in the fields of Electrical Engineering, Electronic Engineering, Communications, and Mechatronics). In light of the purpose of this centre, however, the plan provides for only one engineering laboratory for experiments and practice in subjects closely associated with ICT in the related three courses (electrical/electronic engineering, information and communications, and mechatronics). The laboratory will accommodate 30 persons and will be well equipped for practice and training in groups of three.

・While the standard area stipulated by the USP Facility Standard is at least 3.0 m^2 × 30 persons = 90 m^2, a space will be secured to install experimental desks (1.2m × 1.2m) in the laboratory and a window-side space will be placed to install shelves for storage of the equipment for experiments.

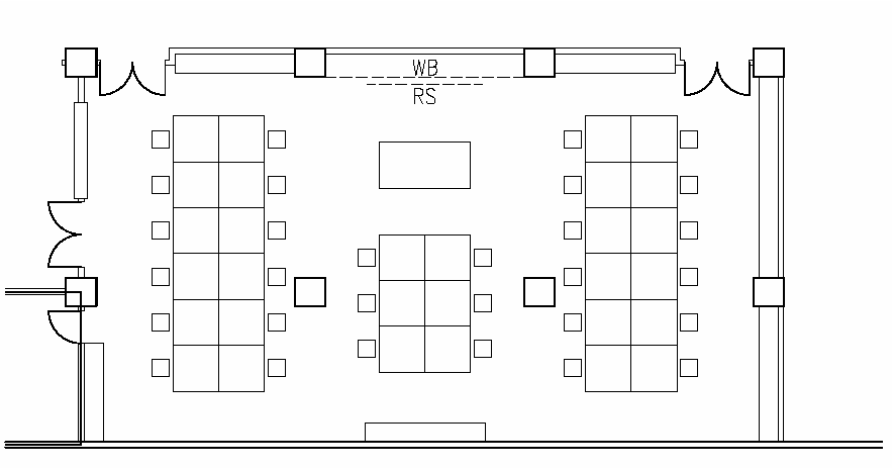


Figure 2-14 Informal and Communication Engineering Laboratory

f. Storage/Research (Building B, Third Floor)

One room will be provided as an annex to the Engineering Laboratory for use for activities such as practice wiring and assembly, as well as maintenance and storage of the various equipment used for the aforementioned laboratories.

- Space will be secured to install personal computers for practice and racks for the storage of parts necessary for assembly.

⑥ Table of the Calculated Area Plan

Table 2-12 Area Table by Building

(m^2)	Area by floor	Building A	Connection bridge	Building B	Multi-purpose Lecture Theatre building		Remarks
					Foyer	Multi-purpose Lecture Theatre	
Building roof	36	18		18		104	Rooftop elevator machine room etc.
Fourth Floor	2,059	774	59	1,122		445	
Third Floor	2,059	774	59	1,102	129	450	
Second Floor	1,752	733		450	119		
First Floor	303	303				999	
Sub Total							
Total	6,659	2,602	118	2,692	1,247		

Table 2-13 Table of Calculated Areas

Name of department	Building	Floor	Name of room	Existing area			Requested area			Planned area			Nbr of users		Remarks (USP Facility Standard)
				Number of rooms	Area	Total	Number of rooms	Area	Total	Number of rooms	Area	Total	Student	Staff	
Common Area (COMM)	T	2,3	Multi-purpose Lecture Theater	-			1	750.0	750.0	1	869.0	869.0	300		2.0㎡/person
			Lecture Hall	-			4	300.0	1200.0	0		0.0			
	A	3	Office- Director ICT	-			1	24.0	24.0	1	22.0	22.0		1	24㎡/person
	A	3	Office- Core Staff	-			10	12.0	120.0	3	12.0	36.0		3	12㎡/person
			Office- Senior Staff	-			24	12.0	288.0	0		0.0			
	A	3	Reception/Secretary	-			1	40.0	40.0	1	24.0	24.0		2	12㎡/person
	A	3	Visiting Staff Office	-			6	12.0	72.0	3	12.0	36.0		3	12㎡/person
			Lecture Room	-			4	53.0	212.0	0		0.0			
	B	3	Video conference Room	-			1	200.0	200.0	1	120.0	120.0	50		2.5㎡/person
			Green Room	-			1	50.0	50.0	0		0.0			2.0㎡/person
	B	3	Conference Room (50 Parson)	-			1	100.0	100.0	1	90.0	90.0			2.0㎡/person
			Interaction Room	-			2	15.0	30.0	0		0.0			
	A	3,4	Common Room for Staff	-			0	0.0	0.0	2	24.0	48.0			
	A	2	ICT-Resource Room	-			1	30.0	30.0	1	24.0	24.0			Combined use
			Digitization Room	1		12.0	1	56.0	56.0						
	B	2	Radio Pasifik' Room	1		29.9	1	290.0	290.0	1	120.0	120.0	17		
			COMM Sub Total						**3462.0**			**1389.0**	**367**	**9**	
Computer Course (CS)	A,B	2,3,4	Academic Staff Office	9		99.9	20	12.0	240.0	18	12.0	216.0		18	12㎡/person
	B	4	Technical Staff Office	1		10.5	1	48.0	48.0	1	24.0	24.0		2	12㎡/person
	A	4	Administrative Staff Office	3		35.1	1	48.0	48.0	1	24.0	24.0		2	12㎡/person
	A	2,3	Tutor Office	5		53.6	20	12.0	240.0	8	12.0	96.0		16	6㎡/person
	A	4	Research Laboratory	-			10	60.0	600.0	5	30.0	157.0	5 each		6㎡/person
	B	3	Dedicated Networking Teaching Laboratory	-			1	100.0	100.0	1	120.0	120.0	40		3.0㎡/person
			General Access Laboratory	1		62.9	5	120.0	600.0			0.0			
	B	4	Dedicated Computer Teaching Laboratory	-			4	80.0	320.0	4	120.0	480.0	160		3.0㎡/person
	B	3	Postgraduate Laboratory	1		7.4	1	80.0	80.0	1	60.0	60.0	24		3.0㎡/person
			Seminar Room	1		37.4	6	45.0	270.0			0.0			
	B	4	Technical Laboratory/Workshop	-			1	160.0	160.0	1	21.0	21.0		2	
			Small Server Room	-			1	12.0	12.0			0.0			
			CS Sub Total						**2718.0**			**1198.0**	**249**	**40**	
IT Services (ITS)	A	2	Office- Director ITS	1		18.8	1	24.0	24.0	1	24.0	24.0		1	
	A	2	Office- Secretary	1		16.1	1	12.0	12.0	1	12.0	12.0		1	
	A	2	General Office	1		104.3	1	720.0	720.0	1	126.0	126.0		20	6㎡/person
	A	2	Meeting Room	1		76.6	1	25.0	25.0	1	24.0	24.0			
	A	4	Laboratory A（Professional & Development Laboratory）	1		107.7	4	81.0	324.0	2	75.0	150.0	50		3.0㎡/person
	A	3	Laboratory B（General Access Laboratory）	7		974.9	8	160.0	1280.0	2	162.0	324.0	120		3.0㎡/person
			Laboratory C (R&D)	-			1	50.0	50.0			0.0			
			Telephony Workshop	-			1	160.0	160.0			0.0			
	A	2	Computer Workshop	1		40.9	1	160.0	160.0	1	35.0	35.0		2	
			Communication Workshop				1	160.0	160.0			0.0			
	A	2	Server Room	1		34.4	1	156.0	156.0	1	54.0	54.0			
	A	2	Storage (Equipment Warehouse)	1		11.2	1	50.0	50.0	1	36.0	36.0			
	A	1	Help Desk & Waiting Area	1		70.6	1	60.0	60.0	1	72.0	72.0		3	
			Hub Earth Station Staff Room	-			1	24.0	24.0			0.0			
	B	3	USPNet Control Room	1		67.3	1	200.0	200.0	1	180.0	180.0			
			ITS Sub Total						**3405.0**			**1037.0**	**170**	**27**	
Research and Development Department (RD)	B	2	Office- Research/Incubator	-			6	12.0	72.0	3	12.0	36.0			12㎡/person
	B	2	Test Bed/Incubation	-			1	160.0	160.0	1	120.0	120.0			12㎡/person
			Test Bed -2/Incubation				1	100.0	100.0						
			RD Sub Total						**332.0**			**156.0**			

Department of Engineering (ENG)	B	3	Office- Engineering	1		12.5	1	24.0	24.0	1	24.0	24.0		1	24㎡/person
	B	3	Technical Staff Office	2		23.6	1	27.0	27.0	1	12.0	12.0		2	9.0㎡/person
	B	3	Postgraduate Room	1		6.1	1	90.0	90.0	1	12.0	12.0	4		3.0㎡/person
	B	3	Computer Laboratory	1		80.5	1	45.0	45.0	1	51.0	36.0	12		3.0㎡/person
	B	3	Information and communication Engineering Laboratory	1		143.6	1	250.0	250.0	1	196.0	196.0	30		8.3㎡/person
			Engineering Laboratory-2	1		190.9	1	250.0	250.0			0.0			8.3㎡/person
			Engineering Laboratory-3	1		181.5	1	250.0	250.0			0.0			
	B	3	Storage/Research	1		143.6	1	100.0	100.0	1	30.0	30.0			
			Storage/Research-2	1			1	50.0	50.0			0.0			
			ENG Sub Total						**1036.0**			**310.0**	**46**	**3**	
Geographic Information Course (GIS)			Office- Director	1		12.0	1	30.0	30.0						30㎡/person
			Office- Lecturers & Officers	6		72.0	1	100.0	100.0						15㎡/person
			Postgraduate Room	1		12.0	1	30.0	30.0						5.0㎡/person
			Geospatial Science Computer Learning Space	1		90.0	1	118.0	118.0						4.5㎡/person
			Geospatial Database Server Simulation Lab	-			1	30.0	30.0						
			10 Seat Research Laboratory	-			1	30.0	30.0						6.0㎡/PC
			Equipment Room	1		57.0	1	70.0	70.0						
			Data Warehouse	-			1	40.0	40.0						
							1								
			GIS Sub Total						**448.0**			**0.0**			
Other Common area			**Shared toilet and corridor**						**11401.0**			**4090.0**			
			Machine Room						**3990.4**			**1985.0**			
			Total Floor Area									**217.0**			
			Foyer						**300.0**			**126.0**			
			Total						**15691.4**			**6659.0**			

Note 1: The shaded region indicates requested rooms that were excluded from the scope of this project after examination.

2) Sectional and Elevation Plan

① Sectional Plan

a. The construction site is on sloped land with a mostly uniform gradient of 1 in 13, forming a height difference of about 18 m from east to west. A pond and an irrigation canal are located at the northern side of the site, and the southern side of the site leads to a cliff. In view of the somewhat narrow width of the site of 60 m to 80 m, the buildings will basically be laid out in an east-west direction in a stepped formation.

b. The construction site is a hard bedrock with an N value of 50 or higher at a depth of 1 m to 2 m below the ground surface. Accordingly, the foundation work will be adopt a spread foundation method without pile driving.

c. The building will be divided into the three wings in consideration of the shape and height difference of the site, the locations of the on-the-premise roads, and the major purposes of the buildings: the Building A (consisting chiefly of the Administration Division), the Building B (consisting of various laboratories), and the Building T (the building for the Multi-purpose Lecture Theatre). The Building A and Building B will be connected by a connection bridge, and the Building B and the Building T will be individually connected by the foyer and stairways.

d. The floor height of the Building A will be determined based on the following conditions:

First Floor : Determined by the height difference of the site (5.5 m).

Second Floor : Determined by the ceiling height of the living space (3.5 m) (required ceiling height (2.8 m) + height of the ceiling fans, etc. (0.7 m)).

The floor height of the third floor will be determined by the required height from the road surface of the connection bridge, 3.8 m.

Third Floor, Fourth Floor: Determined by the ceiling height of the various laboratories, offices, etc. (3.5 m) (same as above).

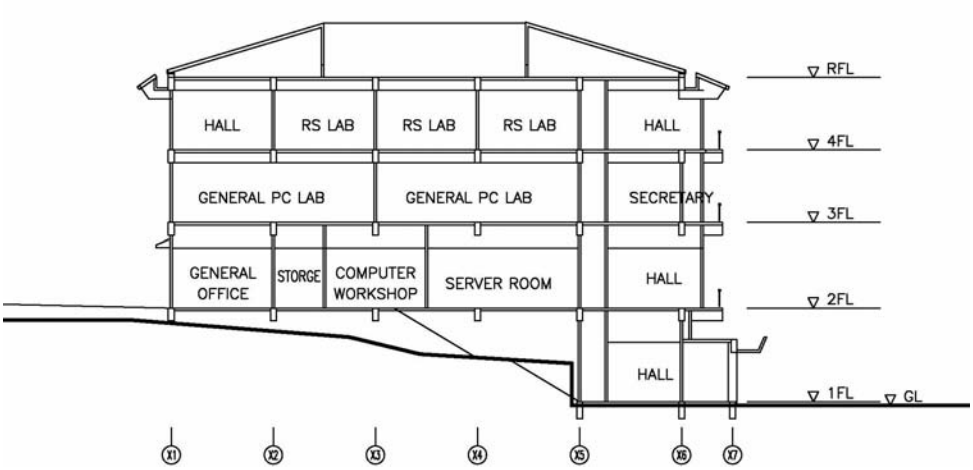


Figure 2-15 Cross Section of the Building A

e. The floor height of the Building B will be determined based on the following conditions:

Second Floor: Determined by the ceiling height of living space (required ceiling height (3.0 m) + the height of the ceiling fans, etc. (0.5m)).

Third Floor, Fourth Floor: Determined by the ceiling height of various laboratories, offices, and so on (3.5 m) (same as above).

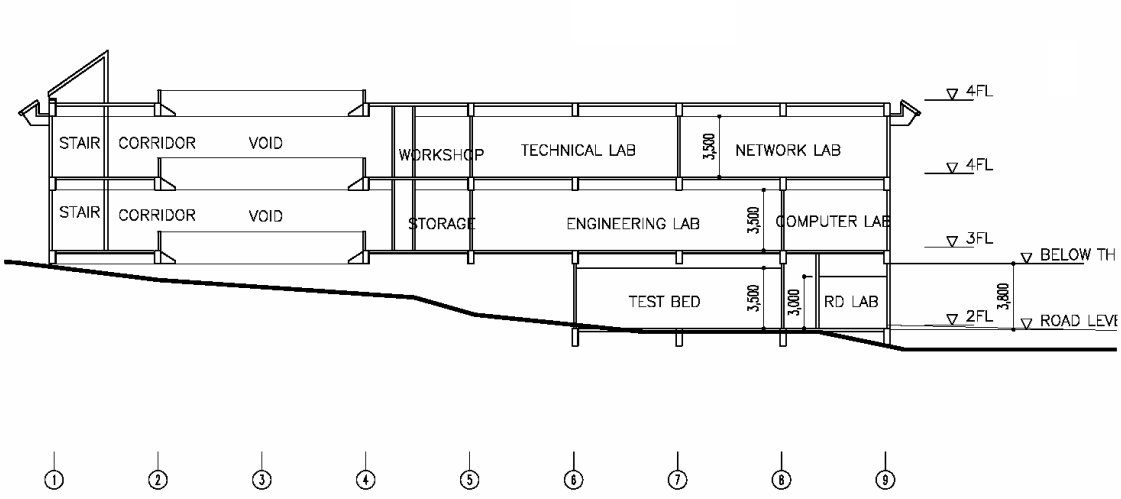


Figure 2-16 Cross Section of the Building B

f. The floor height of the Building T will be determined based on the following conditions:

Determined by the total of the ceiling height of the Multi-purpose Lecture Theatre (9 m), the

ceiling (maintenance space) (3m), and the height of the smoke exhaust system space in the upper part of the stage (approximately 4m). With the height difference of the construction site put into full use, the stage will be located on the east side with low elevation and the audience will be seated in a stepped formation from the second floor to third floor, in accordance with the elevation of the land.

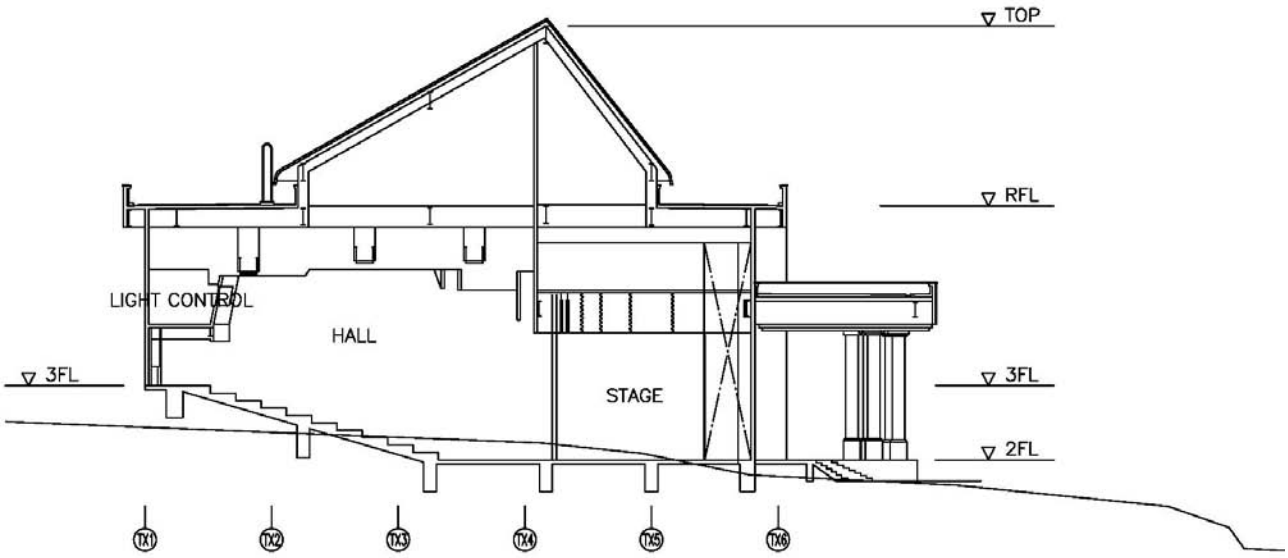


Figure 2-17 Cross Section of the Building T

g. Each Building will be provided with deep eaves and balconies to prevent direct sunlight from intruding into the rooms insofar as possible.

h. Canopy roofs will be placed over flat roofs in the Building A and Building B to secure air space and thereby insulate the structures from heat.

i. The ridge will be a flat roof in principle, and a canopy roof will be constructed on top of it using a steel frame structure at points requiring higher heights, such as the maintenance space and smoke exhaust system space.

② Elevation Plan

a. Building A: As the east side and north side structures are located in the most visible position from the courtyard in the front, they will be designed with round columns and balconies of the type often used to produce an academic atmosphere.

b. Building B: Although located away from the frontal courtyard on the east side, it will be designed uniformly with round columns and balconies of a type similar to those used in the Building A.

c. Building T: The east side will be designed in a functional and academic mode using various motives. For example, it will be provided with a platform running to the courtyard (a gathering place for the students), together with a slightly curved eave covering supported by a double-paired column for rain and sun cover.

d. Skyline: Designed in a rhythmic mode by making the most of the layout of the building complex. The ridges of the pitched roofs of the Building A and Building B will run East-West, while the pitched roof of the Building T will run North-South. This will give the skyline a dynamic appearance (as opposed to a monotonous one) when viewed from the courtyard on the east side of the campus.

3) Structural Planning

① Planning Standard and Load Conditions

The earthquake load and the wind load will follow the Fiji Standard (national Building Code of Fiji 1990). The earthquake load will be designed based on NZS4203, the wind load will be based on AS1170, and the live load will be based on the Japanese Standard.

② Foundation Plan

According to the report on the latest geological survey, the earth of the construction site is made up of a layer of residual soil to the depth of 1 m and Suva Marl underneath. The upper part of the Suva Marl is weathered. The building will be supported by a spread foundation over the Suva Marl underneath the residual soil layer as the supporting layer.

③ Structure Classification

The structure classification will be a reinforced concrete (RC) structure. However, a steel-frame (S) construction will be adopted for the roof of the Multi-purpose Lecture Theatre for functional reasons. As the corridor connecting the Building A and Building B will be constructed over a road, a steel-frame (S) construction will be adopted in consideration of the use of the road and the construction method.

④ Framing Plan

The framing plan will be a reinforced-concrete rigid-frame structure with earthquake-resisting walls in both the X-direction and the Y-direction. The steel frame columns and beams for the roof of the Multi-purpose Lecture Theatre will be Japan-made H-shape steel. The floors over floors in contact with the ground will be constructed with structural slabs to protect the structure from the disturbances to the ground resulting from the demolition of the existing building and the probable need for earth filling due to the height difference.

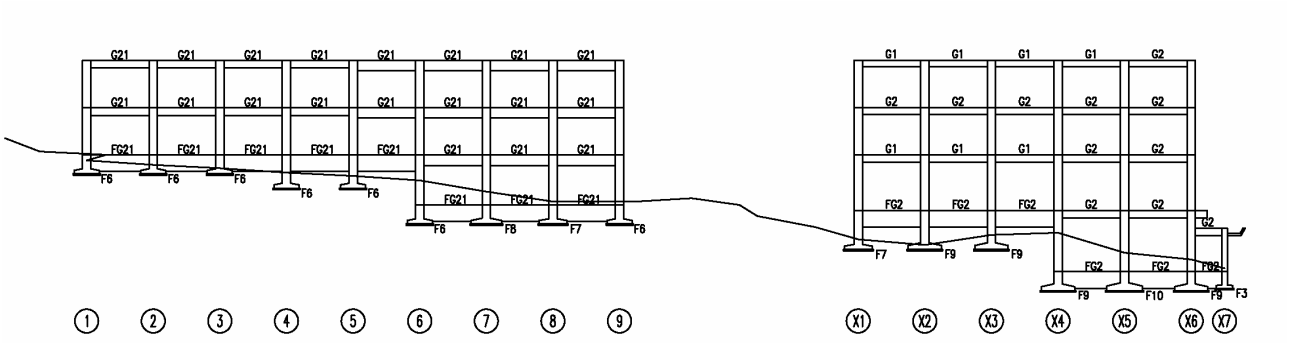


Figure 2-18 Framing Elevation

⑤ Design Load and Calculation Policy

The earthquake load will be calculated with safety coefficient against the earthquake taken into consideration based on the Fiji Standard. The wind load will be also calculated based on the Fiji Standard in order to reflect the circumstances of Fiji. The live load and the calculation formula will be based upon the Japanese Building Standard.

a. Earthquake Load (NZS4203)

The base sheer coefficient for the primary design will be calculated based on the Fiji Standard.

Lateral force coefficient C = Cb (T,1)・R・Z・Ls

Cb (T,1) = 0.80: Basic seismic hazard acceleration coefficient

(T = 0.3 sec, Intermediate soil sites)

R = 1.3: Risk factor (safety coefficient against earthquakes. The largest value in the Fiji Standard)

Z = 0.6: Zone factor

Ls = 1/6: Limit state factor (for Serviceability)

Figure C will be calculated as 0.104 and rounded of to C = 0.1.

This base sheer coefficient is equivalent to 50% of the Tokyo Standard.

b. Wind Load (AS1170)

The wind load will be calculated based on the Fiji Standard.

Design wind speed Vz = V・M (z,cat)・Msh・Mt・Ms

V = 57 m/s: Basic wind speed (for permissible limit state)

M (z,cat) = 1.00: Terrain and structure height multiplier

(Terrain category 2, Height = 10 m, Region C)

Msh = 1.0: Shielding multiplier (no shielding)

Mt = 1.0: Topographic multiplier (Flat site)

Ms = 1.1: Structure importance multiplier (maximum figure)

The figure Vz will be calculated as 62.7 m/s, therefore,

Wind pressure Qz = 0.6・Vz 2 = 2360 N/㎡

This wind load is equivalent to 1.5 times that adopted in Tokyo.

c. Live Load

The live load will be set in reference to the Japanese Building Standard.

Table 2-14 Live Loads Plan

Floor	Room	Live load (N/㎡)			Remarks
		Floor	Frame	Earthquake	
	Various Laboratories, Classrooms	2900	2100	1100	
	Offices, Conference Rooms, Restrooms	2900	1800	800	
	Multi-purpose Lecture Theatre, Stage	3500	3200	2100	
	Test Bed	4900	3900	2500	Equivalent to Physical Experimental Laboratory
	Storage	3900	2900	2000	

Note) The live load for machine rooms and outdoor equipment storage will be planned separately in consideration of the layout plan.

⑥ Structural material

Concrete: Ordinary concrete or ready mixed concrete procurable near the site.

Steel Bar: Imported from Japan

Steel Frame: The H-shape steel will be imported from Japan and the roof purlin materials will be imported from Australia or Japan.

Floor slab: A reinforced concrete floor slab (shingle board) will be adopted.

4) Plan for Air-Conditioning and Ventilation Facilities

① Air Conditioning and Ventilation Facilities

The air-conditioned area will be kept to a minimum in order to keep maintenance costs low. The most effective air-conditioning system will be adopted.

a. Cooling conditions

Given that the site is located in a high-temperature, high-humidity tropical zone, the air-cooling system will be required to remain in operation throughout the year. Measures to eliminate the high humidity will also be required.

b. Air-Conditioning System

A natural ventilation will be designed in principle, and a minimum number of rooms will be equipped with air-cooling machines. The air-conditioning system installed in the Server Room will have a 200% capacity above the normally required level, as an emergency safeguard in the event of equipment failures. In addition, a floor-blowing-type air-conditioning system will be installed in the server room to ensure that the room can be air-conditioned efficiently.

The light control room, sound control room, and spotlighting rooms will be of an indoor floor-standing type, in consideration of their impacts on the equipment. The light controls, sound controls, and spotlights installed in other rooms will be ceiling types requiring less installation space.

With the exception of the Server room and places where high heat or the like is generated, the air conditioners installed will be part of a building multi-air-conditioning system with smaller installation area required. The outdoor units will be installed intensively on the rooftop for easier maintenance, and they will be resistant to heavy salt damage in consideration of the close proximity to the sea.

Rooms with large areas will be provided with ceiling fans to ensure that they can be efficiently air-conditioned. The following rooms will require air-conditioners:

Table 2-15 Air-Conditioned Rooms List

Floor	Department	Room	Air Conditioning System
B-2F	CMN	Radio Pacifik	Ceiling Type Building Multi Air-Conditioning system
B-3F	CMN	Video Conference Room	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
B-3F	CMN	Green Room	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
B-3F	CMN	Storage	Ceiling Type Building Multi Air-Conditioning system
B-3F	CMN	Conference Room	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
A-4F	CS	Research Laboratory	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
B-3F	CS	Dedicated Networking Teaching Lab	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
B-3F	CS	Postgraduate Laboratory	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
B-3F	CS	Technical Laboratory (Workshop)	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
B-4F	CS	Dedicated Computer Teaching Lab	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
B-4F	ENG	Computer Lab	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
B-4F	ENG	Engineering Lab	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
B-4F	ENG	Storage 1 / Research	Ceiling Type Building Multi Air-Conditioning system
A-2F	ITS	Workshop (Computer)	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
A-2F	ITS	Server Room	Floorstanding Floor Blowing Type Air Conditioning System
A-2F	ITS	Storage Room	Ceiling Type Building Multi Air-Conditioning system
A-3F	ITS	Laboratory B (General Access)	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
A-4F	ITS	Professional Laboratory	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
A-4F	ITS	Development Laboratory	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
B-3F	ITS	USPNet Control Room	Ceiling Type Building Multi Air-Conditioning system
B-2F	RDI	Office - Research / Incubator	Ceiling Type Building Multi Air-Conditioning system
B-2F	RDI	Test Bed	Ceiling Type Building Multi Air-Conditioning system＋Ceiling fan
T-2F	THR	Stage	Floorstanding Duct-Type Air Conditioning System
T-2F	THR	Apron Stage	Floorstanding Duct-Type Air Conditioning System
T-2F	THR	Green Room (Dressing Room)	Ceiling Type Building Multi Air-Conditioning system
T-2-3F	THR	Multi-purpose Lecture Theatre	Floorstanding Duct-Type Air Conditioning System
T-2F	THR	Light Control	Floorstanding Air Conditioning System
T-2F	THR	Sound Control	Floorstanding Air Conditioning System
T-2F	THR	Spot Light	Floorstanding Air Conditioning System

② Ventilation Facilities

A natural ventilation will be designed in principle, and the spaces and rooms not equipped with air-conditioners will be equipped with ceiling fans (600 - 900 mm in diameter).

a. Ventilation System

The following outlines the ventilation systems to be used for the respective rooms:

Table 2-16 Ventilation Plan

Room	Ventilation Times (Times/Hour)	Ventilation System	Remarks
Power room	-	Mechanical Air-Supply, Mechanical Air-Exhaust	Calculated based on the heat generation
Generator Room	-	Mechanical Air-Supply, Mechanical Air-Exhaust	Calculated based on the firing rate
Machine Room	5	Mechanical Air-Supply, Mechanical Air-Exhaust	
Restrooms	15	Natural Air-Supply, Mechanical Air-Exhaust	
Air-conditioned rooms (classrooms, Conference Room, video Conference room, etc.)	-	Natural Air-Supply, Mechanical Air-Exhaust	Calculated based on the number of personnel ($30m^3$/>/person)
Storage	5	Natural Air-Supply, Mechanical Air-Exhaust	
Elevator Motor Room		Mechanical Air-Supply, Mechanical Air-Exhaust	Calculated based on the heat generation
Sink Room	10	Natural Air-Supply, Mechanical Air-Exhaust	

③ Smoke Exhaust System

The smoke exhaust system for the Building A and Building B will be a natural ventilation system. The smoke exhaust system for the Stage Section of the theater will be a mechanical ventilation system in accordance with the laws of Fiji.

④ Piping Materials

a. Refrigerant pipe･･･Coated copper pipe for refrigerants

b. Drainpipe･･･PVC

5) Water Supply, Drainage and Sanitary Facilities Plan

① Water Supply Facilities

A main pipe of 150 mm in diameter is buried under the front road. The water pressure is reportedly 15-50 m/head (approx. 1.5-5kgf/cm^2), but this may decline as time passes and the water supply decreases. Accordingly, a water receiver tank will be adopted to maintain the required water pressure.

In addition, clean water and low-quality water will be separated for sanitary reasons. The clean water will be stored in a water-receiver tank installed within the machine room. The low-quality water will be stored with the use of an underground pit.

The existing water receiver tank located within the site will be relocated by the work implemented by the Fiji Government.

a. Branch from the main pipe

A water pipe of 40-50 mm in diameter will be provided for the building. This pipe will run from the main pipe (150 mm in diameter) buried in the front road. The water supplied from the pipe will be passed through a water meter. However, the work required for the branching from the main pipe and piping to the water meter will be provided by the Fiji Government, while the work from this point will be included in the scope of this Project.

b. Water Supply System

Due to the fluctuation of water pressure, a pressure pump will be adopted in addition to the water receiver tank for clean water and the underground water tank for the low-quality water, in order to keep the pressure and the amount of water stable.

c. Assumed Water Volume

853 personnel (expected number of students) × 55 (Liters / person･day) = 46,915 L/day (daily water consumption)

89 personnel (expected number of instructors) × 120 (Liters / person･day) = 10,680 L/day (daily water consumption)

Daily water consumption 46,915 +10,680 = 57,595

57,595 (L/D) ÷ 10 (H/D) = 5,760 L/H (Assumed Average Amount of Supply Water per Hour)

5.7 (m^3)× 2 = 11.4 m^3/H (Assumed Maximum Amount of Supply Water per Hour)

If the utilization ratio between the clean water and low-quality water is taken as approximately 4:6, the assumed water volumes are estimated as follows:

Water receiver tank for clean water 11.4 m^3/H × 4/10 × 3 H = 13.68 m^3→ 14m^3

Water tank for low-quality water 11.4 m^3/H × 6/10 × 3 H = 20.52 m^3→ 21m^3

② Drainage Facilities

The sewage water and wastewater will be divided in the building, flow together in the outdoor water drain box, and connect to the sewer main (150 mm in diameter) on the premises. In the meantime, the storm sewer will be included in this construction project.

③ Fire-Extinguishing Equipment

As no Standard for Fire Equipment has been established in Suva City, the Fire-Extinguishing Equipment provided will conform to the Japanese Fire Code. However, the hydrant for fire-fighting (100 mm in diameter) will be directly connected from the main pipe.

The following Fire-Extinguishing Equipment will be proposed:

a. Portable Fire Extinguisher (installation of a box for the portable fire extinguisher will be included in this construction project)

b. Indoor Fire Hydrant (Type 2 Fire Hydrant)

The water tank for fire-fighting will be also used as the low-quality water tank.

④ Sanitary Facilities

Water-saving equipment will be introduced for effective use of water resources, as well as in consideration of the convenience of the facility users.

Closet bowl	･･･Low tank
Closet bowl for the handicapped	･･･Low tank (touch switch type)
Urinal	･･･Stool type, with removable trap
Washbasin	･･･Wall type. Single faucet, equipped with a liquid soap container
Washbasin for the handicapped	･･･Wall type. Automatic faucet, equipped with a liquid soap container
Sink for cleaning	･･･Deep-rim sink for cleaning
Handrail	･･･L-form handrail, movable handrail
Mirror	･･･Corrosion-resistance type

⑤ Piping materials

a. Water supply pipe･･･PVC

b. Drainpipe･･･PVC

c. Fire-fighting pipe･･･Carbon steel pipe for piping (white)

6) Electrical Equipment Plan

① Main Power Equipment

a. Power Receiving

The electricity will be distributed to the low-voltage distribution panel for users from FEA of Fiji after the electricity is received through the high-voltage distribution panel provided by FEA in the rented transformer room at the site of the high-voltage line (3 way x 3 wire, 11KV x 50 Hz) buried under the front road and stepped down by the indoor dry-type transformer to 3 way x 4 wire, 415V/240V.

The distributed voltage: 3 way x 4 wire, 415V/240V, 50 Hz

b. Power Receiving Facilities

The total load-carrying capacity of this building is estimated at approximately 860 KW, including the load of the lighting fixture & receptacles (300 KW), the server-related load (53 KW), and the power load (500 KW). (Equivalent to effective electric power of approximately 1080 KVA)

If the load demand factor is taken as 0.7 and the safety margin as 1.1, the electric capacity will stand at approximately 830 KVA, which will require the selection of a transformer with a 1000 KVA capacity.

As the voltage fluctuation is anticipated to be somewhat moderate, in the range of about 6% (not a level expected to influence the equipment), an automatic transformer will not be provided.

c. Emergency Generator

An in-house generator will be provided in consideration of approx. 30 minutes of black light due to 20-30 times lightning per annum. The driving time of the in-house generator will be designed for 8 hours so that power can be additionally supplied during scheduled outages.
The generator specifications are as follows:

Predicted voltage: 270KVA

Type	:	Diesel engine (fuel: diesel oil)
Cooling System	:	Radiator System
Main Load	:	Fire-Extinguishing Pump, Emergency Light, load of the server room (including the air conditioner), load of equipment for USPNet, Disaster Equipment

② General Electricity

a. Power Distribution Facilities Plan

The Power Board & the Distribution Board will be located by dividing the circuit to avoid operational problems, and the electricity will be distributed to each required load.
One lighting distribution board will be installed on each floor of the Building A and Building B, and one power board for air conditioners will be installed on the roof level.
In addition, distribution boards for receptacles will be installed in the classrooms of areas where individual desks are expected to be provided with personal computers. This will allow the provision of numerous receptacle circuits and facilitate maintenance.

The Building T (Multi-Purpose Theatre) will be provided with one lighting distribution board and one power board. The alarm from the power equipment will be displayed on the monitor in the Security Room on the first floor. The contents of the alarm will be designed as follows.
Abnormality in Emergency Generator, Abnormality in Fire-Extinguishing Pump, High Water Alarm for Water Tanks, Abnormality in Air Conditioner in the Server Room.

b. Lighting Fixtures & Outlets

The Lighting Fixtures and the receptacles will be provided at necessary locations. The lighting fixtures of main rooms will be fluorescent lights with better efficiency than incandescent lamps. The average intensity of illumination will be designed as follows:

Table 2-17 Lighting Intensity Plan

Room	Design illumination (lx)	Type of lighting fixtures
Offices	300	Pipe Pendant Type FL40Wx2
Meeting Room	300	Pipe Pendant Type FL40Wx2
Information and communication engineering laboratory	300	Pipe Pendant Type FL40Wx2
Classrooms	300	Pipe Pendant Type FL40Wx2
Multi-purpose theatre	300	Recessed metal halide lighting fixture MH 250Wx1
Machine Room	200	Lighting fixture with light reflector FL40Wx2 (raceway mounted)
Stores	100	Pipe Pendant Type FL40Wx2
Corridor	100	Recessed open bottom lighting fixture FL40Wx2 (average illumination)

・The following switching systems will be adopted:

: Rooms - Tumbler switch

: Outdoor light - Photo Switch + timer

: Metal halide lighting fixture - ON/OFF switch by MCCB

・Emergency lighting fixtures will be battery-integrated 10 W halogen types and battery-integrated fluorescent lighting fixtures.

・The lighting fixtures for the Multi-purpose Lecture Theatre will be classified in the equipment category.

・The number of receptacles (outlets) installed in each room will be decided with the following as a guideline.

: General stores - One per approximately 200-300 m^2

Offices - One per approximately 15 m^2 (one per approximately 25 m^2 in case of a floor receptacle, one per approximately 9 m^2 in case of a floor receptacle)

: Meeting Room - One per approximately 25 m^2

: Information and communication engineering Laboratory- One per two computers (a table tap with six cable entry points)

: Classrooms - One per two computers (table tap with six cable entry points)

: Multi-purpose Lecture Theatre - One per approximately 150 m^2

: Server Room - One per 25 m^2 for cleaning and maintenance + two per rack for equipment operation

: Corridor - One per approximately 25-30 m of walking distance

③ Telephone & Communication Facilities

a. Communication

- With regard to the contents of the equipment for the telephone exchange and the telephone sets, as the system varies according to the needs of the Fiji Government (such as the IP telephone exchange, etc.), the scope of construction by Japanese Grant will cover work up to the withdrawal of the telephone line from outside of the site and construction of house cable and wiring to the main rooms (the living space where the university staff work). The installation of the equipment will be left to the construction by the Fiji Government.
- The work to withdraw the outside line involved in the scope of construction by Japanese Grant will entail the withdrawal of only two empty PVC conduits of 100 mm in diameter.
- With regard to the demarcation of the construction for the metal telephone, the withdrawal of the telephone line from outside of the site to the facilities will be done by the Fiji Government, and the wiring of the telephone line after the main distribution frame and installation of the equipment will be included in the scope of construction by Japanese Grant.

b. Public Address System

The amplifier will be provided in the ITS General Office on the second floor to enable announcements on the public address system on the premises. The amplifier will be a wall-suspended type.

c. Interphone Equipment

The interphones will be provided for security reasons in the rooms below:

The main phones will be installed in the Reception / Secretary on the third floor, in the ITS General office on the second floor, and in the Security Room on the first floor of the Building A. A small phone will be installed in the Entrance of the Building A.

d. Television Community Antenna Equipment

TV equipment will be installed in managers' rooms, directors' rooms, and the video Conference room.

Receivable video signals will be VHF and UHF.

e. Automatic Fire Alarm System Equipment

The automatic fire alarm system will be provided in this building. The system will connect to the fire station through the telephone lines.

The receiver will be installed in the Security Room on the First Floor of the Building A. The sensors will be selected in consideration of the purpose, ceiling height, and interior environment of each room.

f. LAN System

With regard to the demarcation of the construction for the LAN System, wiring and equipment installation works will be done by the Fiji Government and installation of conduit and cable racks will be involved in the scope of construction by the Japanese Grant.

g. Security System

With the aim of preventing the theft of equipment and protecting information within the Server Room, a card-reader-type electric lock system will be provided with the door of the Server Room to transfer alarm signals to the Security Room in the event of incidents.

h. Toilet Call System

Toilets for the handicapped will be provided with an alarm paging system for emergency.

i. Lightning Rod Equipment

The lightning equipment will be installed since this area is frequently struck by thunder.

7) Construction material Plan

Major exterior and interior finishes are shown below:

Table 2-18 Exterior Finish Schedule

Section		Finish
Exterior	Roof	Pitched roof: Aluminum galvanized sheet iron plate fluorine baking finish shingle board, flat roof: Thermoplastic Polyolefin Sheet, Insulation Poly Isocyanurate Board
	Outer wall	Colored Aluminum composite panel, Mortar VP Painting, Heat Insulation Material (Cable Side)
	Fittings	Colored Aluminum sash, partly steel fittings

Table 2-19 Interior Finish Schedule

Name of department	Room	Finish		
		Floor	Wall	Ceiling
Common Area (*) Rooms in need of soundproofing measures	Multi-purpose Lecture Theatre	Long vinyl sheet on wood flooring	Fancy plywood, punched plaster board	Calcium silicate board. Rock wool acoustic board
	Office- Director ICT	Unit Carpet	Painting	Rock wool acoustic board
	Office- Core Staff Office	Vinyl Flooring	Ditto	Ditto
	Office- Senior Staff	Ditto	Ditto	Ditto
	Video Conference Room (*)	Unit Carpet	Punched plaster board	Ditto
	Conference Room (*)	Ditto	Fancy plywood	Ditto
	ICT-Resource Room / Digitization Room	Vinyl Flooring	Painting	Ditto
	Radio Pacifik' Room (*)	Unit Carpet, Vinyl Flooring	Punched plaster board (sound absorbing and soundproofing)	Punched plaster board (sound absorbing and soundproofing)
Department of Computer Science	Academic Staff Office	Vinyl Flooring	Painting	Rock wool acoustic board
	Technical Staff Office	Ditto	Ditto	Ditto
	Administrative Staff Office	Ditto	Ditto	Ditto
	Tutor Office	Ditto	Ditto	Ditto
	Research Laboratory	Ditto	Ditto	Ditto
	Dedicated Networking Teaching Laboratory	Ditto (partially OA floor)	Ditto	Ditto
	Dedicated Computer Teaching Laboratory	Ditto (partially OA floor)	Ditto	Ditto
	Postgraduate Laboratory	Ditto	Ditto	Ditto
	Technical Laboratory/Workshop	Ditto (partially OA floor)	Ditto	Ditto
IT Services	Office- Director	Unit Carpet	Painting	Rock wool acoustic board
	Office- Secretary	Vinyl Flooring	Ditto	Ditto
	General Office	Ditto	Ditto	Ditto
	Laboratory A (Professional & Development Laboratory)	Ditto (partially OA floor)	Ditto	Ditto
	Laboratory B (General Access Laboratory)	Ditto (partially OA floor)	Ditto	Ditto
	Computer Workshop	Ditto	Ditto	Ditto
	Server Room	Vinyl Flooring (OA floor)	Ditto	Ditto
	Help Desk	Vinyl Flooring	Ditto	Ditto

	USPNet Control Room	Unit Carpet (partially OA floor)	Punched plaster board (sound absorbing and soundproofing)	Punched plaster board (sound absorbing and soundproofing)
Research and Development Department	Office- Research / Incubator	Vinyl Flooring	Painting	Rock wool acoustic board
	Test Bed / Incubation	Ditto	Ditto	Ditto
Department of Engineering	Office- Engineering	Vinyl Flooring	Painting	Rock wool acoustic board
	Technical Staff Office	Ditto	Ditto	Ditto
	Postgraduate Room	Ditto	Ditto	Ditto
	Computer Laboratory	Ditto (partially OA floor)	Ditto	Ditto
	Information and Communication Engineering Laboratory	Ditto	Ditto	Ditto
Other Common area	Toilets	Porcelain tile	Porcelain tile	Calcium silicate board
	Corridors	Ditto	Ditto	Ditto
	Machine room	Dust paint	Repair of reinforced concrete	No ceiling

(3) Basic Plan for Equipment

1) Consideration of Requested Equipment

The contents of the final requests summarized as a result of the field survey are categorized into the following six fields. Our view on those requested equipment is as follows:

① Equipment for the shared area

Of the equipment requested in this field, equipment needed for the Multi-purpose Lecture Theater, Video Conference Room, Green Room, Conference Room, and ICT Library will be involved in the scope of construction by Japanese Grant.

The equipment requested for this field are intended for use in the Multi-purpose Lecture Theatre, Office-Director ICT, Office- Senior Staff, Video Conference Room, Green Room, Conference Rooms, ICT Library, Information Digitization Room and 'Radio Pacifik' Room. Of those equipment, the equipment intended to be installed in Green Room and Information Digitization Room, which were excluded from the scope of the facilities plan, and the equipment intended for Office-Director ICT, Office- Senior Staff, and 'Radio Pacifik' Room, which do not directly benefit the students, will be excluded from the scope of this project because those equipment will benefit only specific people.

Of other requested equipment, the equipment closely related to facilities such as stage lighting equipment and curtains will be excluded from the scope of the equipment plan and will be examined in the facilities plan. The equipment other than those excluded from the equipment plan are basically categorized into the audiovisual equipment for supporting education, the equipment for the video Conference room, and the furniture for education purposes. The furniture for education purposes was excluded from the scope of the equipment plan on the ground that it should be procured at the expense of the Fiji Government for such reasons as their easy availability within Fiji.

In the meantime, with regard to the audiovisual equipment and the equipment for Video Conference Room that were list up individually, as many of them do not fulfill their functions without being integrated as a system, they were organized and integrated into system equipment including required components (such as the audiovisual system for Multi-Purpose Lecture Theater).

② Equipment for the Department of Computer Science

The equipment needed for the PC Information and communication engineering Laboratory, Dedicated Networking Teaching Laboratory, and Postgraduate Laboratory, all of which are for the exclusive use of this department, will be included in the scope of construction by Japanese Grant.

The equipment requested in relation to this department are intended for use in the Staff Offices, Tutor Office, Research Laboratory, Laboratory Exclusively for Computer Course, Dedicated Networking Teaching Laboratory, and Postgraduate Laboratory of this department. Of those equipment, the equipment for staff were excluded from the scope of the equipment plan on the ground that they do not directly benefit the students. In addition, the requested equipment for the Research Laboratory, Tutor Office and the Postgraduate Laboratory will be excluded from the scope of the equipment plan in consideration of the contents of the request being based on the future plan and forecast, probable usability of existing equipment and the equipment of the General Access PC Laboratory, and the contents of the requested equipment including personal computers being easily available within Fiji. As for the requested equipment for the Dedicated Networking Teaching Laboratory and Laboratory Exclusively for Computer Course, which are within the scope of the equipment plan, the equipment will be procured in the estimated minimum quantities required on condition that the existing equipment and the General Common PC Laboratory will be efficiently used.

③ Equipment for ITS

The equipment requested for this field are intended for use in the Staff Offices and the Laboratory Exclusively for ITS, General Common PC Laboratory, Workshop, Server Room, Help Desk, and USPNet Control Room, which are managed by this department. Of those requested equipment, the equipment for the Common Area like the Staff Offices, Workshop, Help Desk, and the Professional Laboratory for the courses for general public will be excluded from the scope of the equipment plan on the ground that they do not directly benefit the students. As a result, the equipment included in the scope of the equipment plan will be those equipment to be installed in the Server Room, General Common PC Laboratory, USPNet Control Room that will play a central role in the information system in this university. As for the equipment within the scope of the equipment plan, the equipment will be procured in the minimum quantities required. It would be recommended to continuously use the existing equipment or procure other necessary equipment at the expense of USP in accordance with altered circumstances. On the other hand, the individually requested equipment for use in the USPNet Control Room were organized and integrated into system equipment as in the case of the above equipment for the shared area.

④ Equipment for Research and Development

Given that the need for the requested equipment will be difficult to evaluate without first determining the specific theme for the research and development, the equipment in question will be excluded from the scope of the equipment plan

⑤ Equipment for the Department of Engineering

Equipment was requested for the laboratory in relation to the Information and Communication Engineering Laboratory for Electric / Electronic Engineering Courses, the said Laboratory for the Information and Communications Course, and the said for the Mechatronics Course. Of this requested equipment, that for the Electric/Electronic Engineering Laboratory and Information and communication engineering Laboratory for Mechatronics were excluded from the scope of the construction plan. Therefore, only the equipment for the Information and communication engineering Laboratory for the Information and Communications will be included in the scope of the equipment plan.

The procurement quantities were planned in consideration that the equipment are intended for use in experiments conducted in 10 groups per department. The quantities of basic general-purpose equipment (such as measuring instruments) were planned in 10 units (sets) in principle. On the other hand, the quantities of the experimental system units were all planned in one set assuming that each task will be performed in rotation.

⑥ Equipment for the GIS Department

Given that the department in question was not included in the construction plan, the requested equipment required for the relevant department will be excluded from the scope of the equipment plan.

2) Master plan

In principle, the equipment to be included in the plan will be limited to equipment which directly benefits the students. Of the equipment requested in the above target fields, therefore, administrative equipment, the equipment used by the staff, and the equipment to be used for services provided to students for a fee will be excluded from the scope of the equipment plan. However, basic infrastructure equipment such as audiovisual equipment for classes, the video conference system for distance learning programs, and server machines will be included in the plan even when they are not anticipated to directly benefit the students.

3) Equipment Plan

The details of the planned equipment are as follows, and the contrast chart of the requested equipment and the planned equipment list is shown in Appendices 10.

Table 2-20 Planned Equipment List

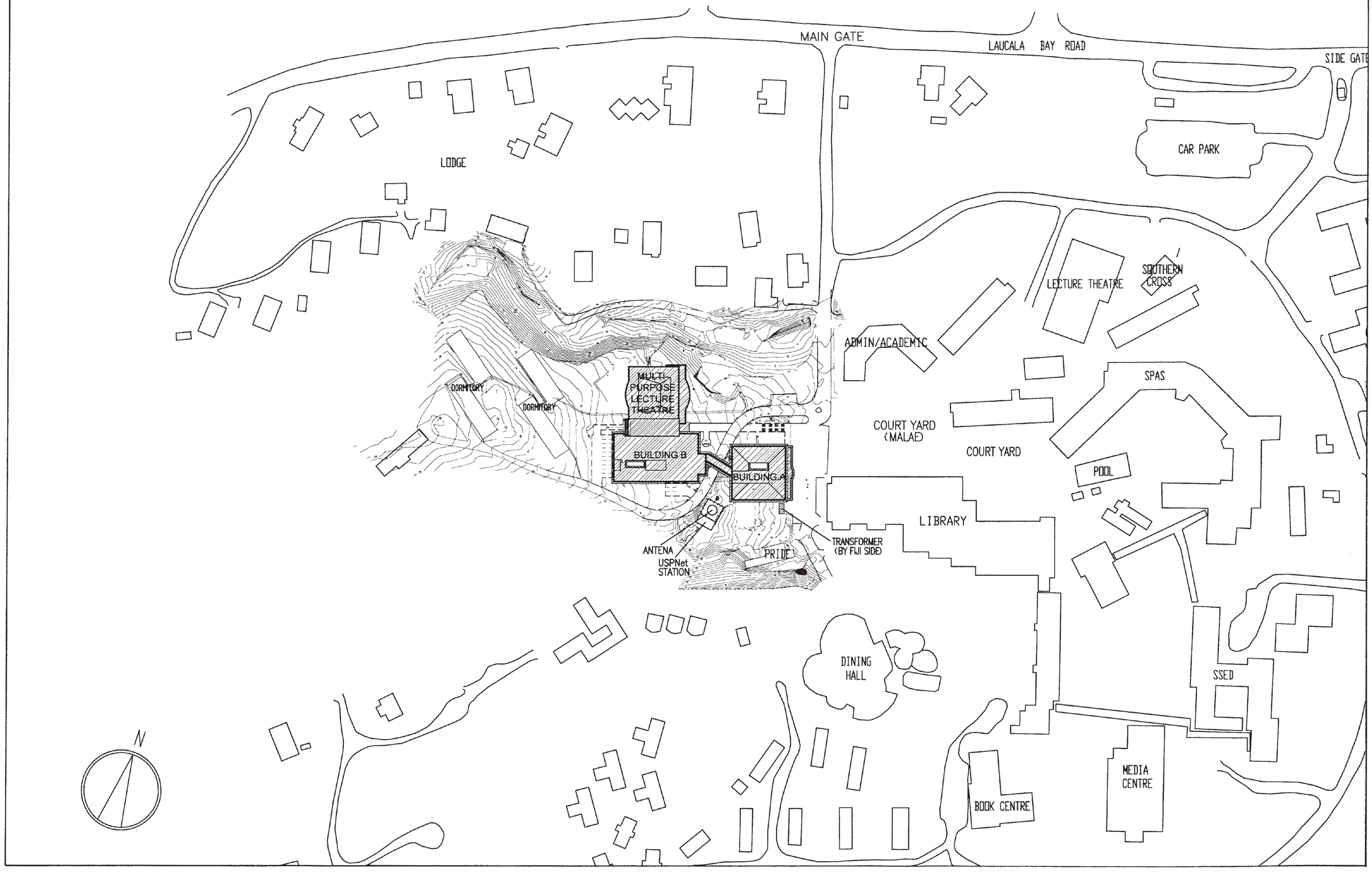
Code No.	Description	Q'ty
COM-1	LCD Projector (L)	1 unit
COM-2	LCD Projector (S) /w Screen	2 units
COM-5-1	PC (Desktop type)	1 unit
COM-5-2	Desk & Chair for PC	1 set
COM-5-3	PC (Laptop type)	3 units
COM-11	OHC	3 units
COM-13	DVD Player	1 unit
COM-14	VCR	2 units

COM-15	White Board	3 units
COM-16	TV	1 unit
COM-20	Remote Camera (w/Control System)	1 set
COM-26	Audio Speaker	2 sets
COM-100	Audio Control System for Multipurpose Lecture Theater	1 set
COM-101	Video Control System for Multipurpose Lecture Theater	1 set
COM-102	A/V Control System for Video Conference Room	1 set
COM-104	A/V Control System for Conference Room	1 set
CSC-1	Server w/Rack	1 set
CSC-4	Switching HUB	1 set
CSC-6	Patch Panel	1 set
CSC-10	Ethernet Card	40 pcs
CSC-15-1	PC (Desktop type)	150 units
CSC-15-2	Desk & Chair for PC	150 sets
CSC-16	Embedded System Board	4 sets
CSC-17	Oscilloscope	2 units
CSC-24	Printer	2 units
ITS-1	Server (High Level)	6 units
ITS-3	Server (General Level)	14 units
ITS-4	Tape Backup Archive	1 unit
ITS-6	Switching HUB	1 set
ITS-7	USP	1 set
ITS-15-1	PC (Desktop type)	120 units
ITS-15-2	Desk & Chair for PC	120 sets
ITS-20	Printer	2 units
ITS-22	LCD Projector (S) /w Screen	2 sets
ITS-30	Equipment Rack	1 set
ITS-32-1	PC (Desktop type for Scheduler)	1 unit
ITS-32-2	Desk & Chair for PC	1 set
ITS-33	Work Bench w/Chair	1 set
ITS-35	VCR/CD-DVD Combo Recorder	2 units
ITS-60	A/V System for USPNet Control Room	1 set
ENG-5	Analog Communications	1 set
ENG-6	Analog Communications Training System	1 set
ENG-7	Fiber Optic Communications	1 set
ENG-8	Antenna Training and Measuring System	1 set
ENG-9	Microwave Technology Training System	1 set
ENG-11	Digital Communications 1	1 set
ENG-12	Digital Communications 2	1 set
ENG-13	Digital Communications Training System	1 set
ENG-17	Oscilloscope	10 units
ENG-18	Power Supply	10 units
ENG-19	Signal Generator	10 units
ENG-20	Multimeter	10 units
ENG-21	Soldering Station	10 sets
ENG-22	Tool kits	10 sets
ENG-29	Bread Board Set	10 sets
ENG-33-1	PC (Desktop type)	15 units
ENG-33-2	Desk & Chair for PC	15 sets
ENG-34	Server w/Rack	1 set
ENG-45	Lab. Table w/Chair	10 sets
ENG-46	LCD Projector (S) /w Screen	2 sets
ADD-1	Microfilm/Microfiche Scanner	1 unit
ADD-2	Flat-bed Scanner	1 unit

2-2-3 Basic Design Drawing

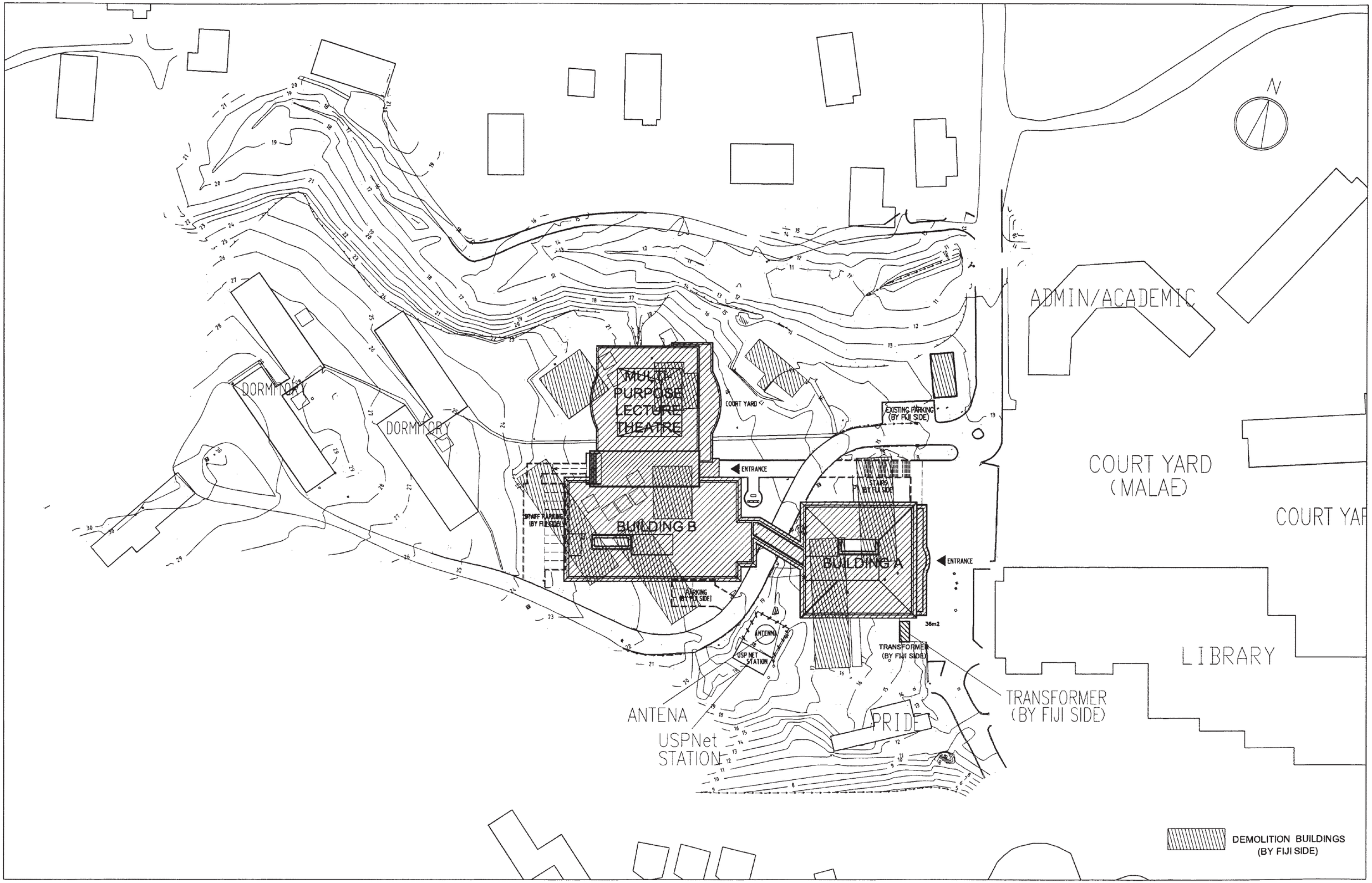
Table 2-21 Basic Design Drawing List

01	General Site Plan	1/2,000
02	Demolition Buildings Plan (by Fiji Side)	1/1,000
03	Site Plan	1/1,000
04	First Floor Plan	1/500
05	Second Floor plan	1/500
06	Second Floor Plan (with Contour)	1/500
07	Third Floor Plan	1/500
08	Fourth Floor Plan	1/500
09	Roof plan	1/500
10	Elevation 1	1/500
11	Elevation 2	1/500
12	Sections	1/500

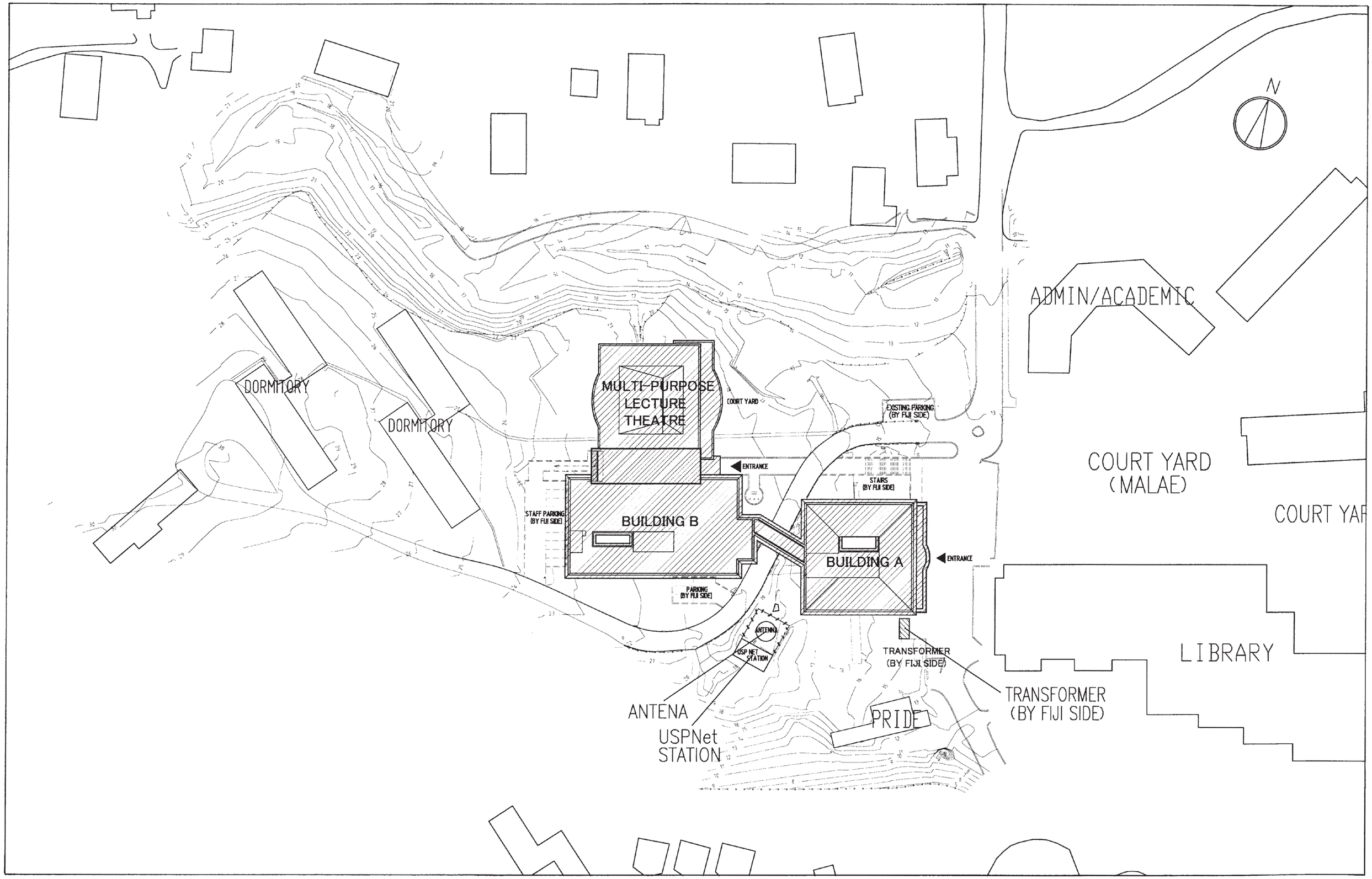


THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE

GENERAL SITE PLAN S=1/2,000 01



THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE
DEMOLITION BUILDINGS PLAN 1/1,000 02



THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE

SITE PLAN S=1/1,000 03

N

ADMIN/ACADEMIC

COURT YARD
(MALAE)

LIBRARY

DORMITRY

STAFF PARKING
(BY FIJI SIDE)

PARKING
(BY FIJI SIDE)

EXISTING PARKING
(BY FIJI SIDE)

STAIRS
(BY FIJI SIDE)

ITS Div.

DRY AREA

HELP DESK

EV

STAIRS

ENTRANCE HALL
(+13.2)

ENTRANCE
(+13.0)

EPS

PS

W/PIT

GUARD STATION

M&E ROOM

BUILDING A

TRANSFORMER
(BY FIJI SIDE)

ANTENNA

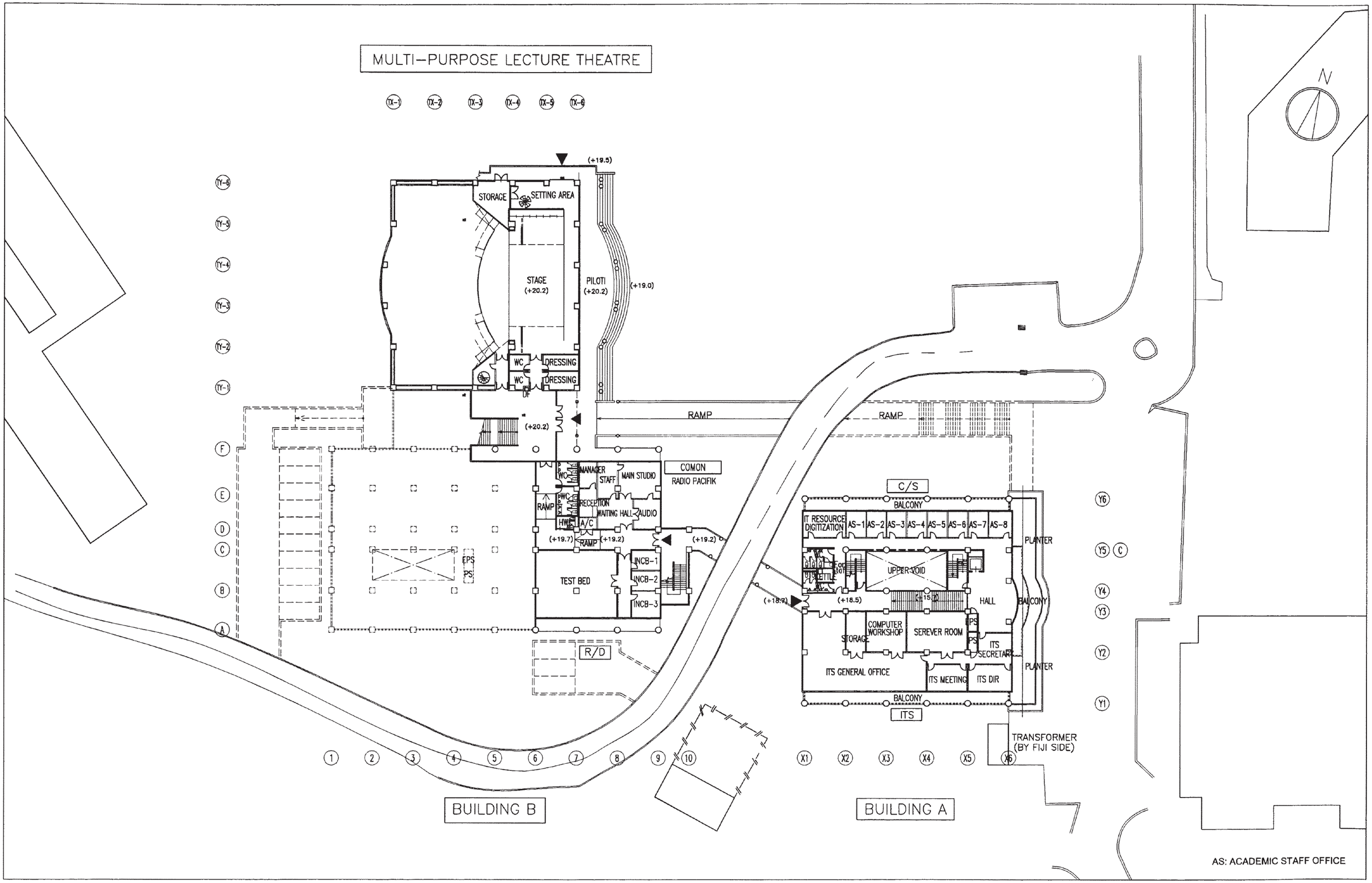
USP NET
STATION

Y6
Y5
C
Y4
Y3
Y2
Y1

X1 X2 X3 X4 X5 X6 X7

THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE
FIRST FLOOR PLAN S=1/500 04

MULTI–PURPOSE LECTURE THEATRE



THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE

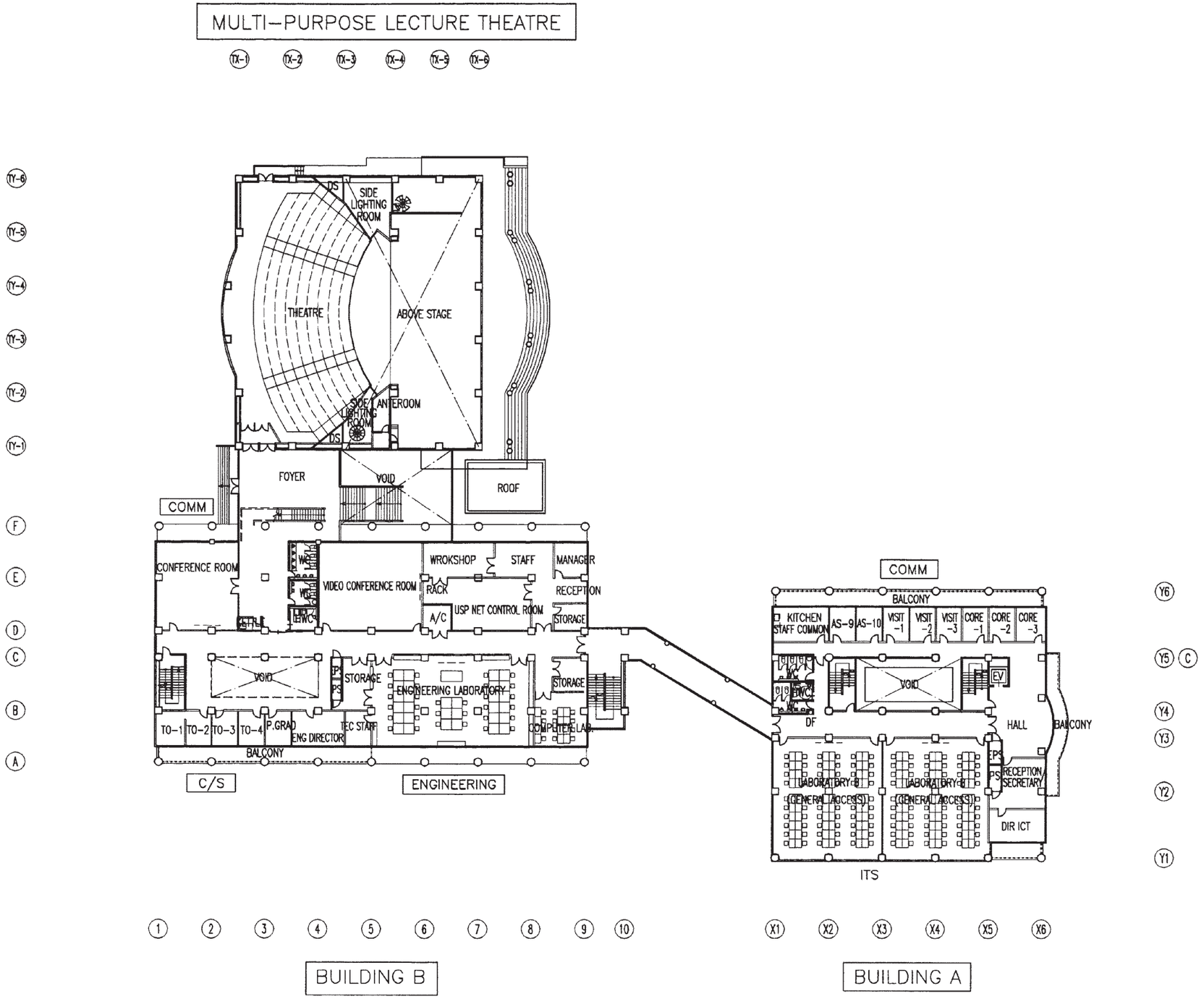
2nd FLOOR PLAN S=1/500 05

MULTI-PURPOSE LECTURE THEATRE

STORAGE
SETTING AREA
STAGE (+20.2)
PILOTI (+20.2)
(+19.5)
(+19.0)
WC
DRESSING
WC
DRESSING
DF
(+20.2)
RAMP
COURT YARD
BOUNDARY
EXISTING PARKING (BY FIJI SIDE)
RAMP
STAIRS (BY FIJI SIDE)
MANAGER
STAFF
MAIN STUDIO
COMON
RADIO PACIFIK
WC
RECEPTION
WAITING HALL
AUDIO
RAMP
A/C
(+19.7)
(+19.2)
RAMP
(+19.2)
INCB-1
INCB-2
INCB-3
EPS
PS
TEST BED
R/D
C/S
BALCONY
IT RESOURCE DIGITIZATION
AS-1 AS-2 AS-3 AS-4 AS-5 AS-6 AS-7 AS-8
PLANTER
WC
KITCHENETTE
UPPER VOID
(+18.5)
(+15.0)
(+18.7)
WALL
BALCONY
COMPUTER WORKSHOP
SERVER ROOM
PS
ITS SECRETARY
STORAGE
ITS GENERAL OFFICE
ITS MEETING
ITS DIR
PLANTER
BALCONY
ITS
TRANSFORMER (BY FIJI SIDE)
ANTENNA
USP MET STATION
BUILDING B
BUILDING A
ADMIN/ACADEMIC
COURT YARD (MALAE)
LIBRARY
N

THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE
2nd FLOOR PLAN (WITH CONTOURS) S=1/500 06

MULTI–PURPOSE LECTURE THEATRE

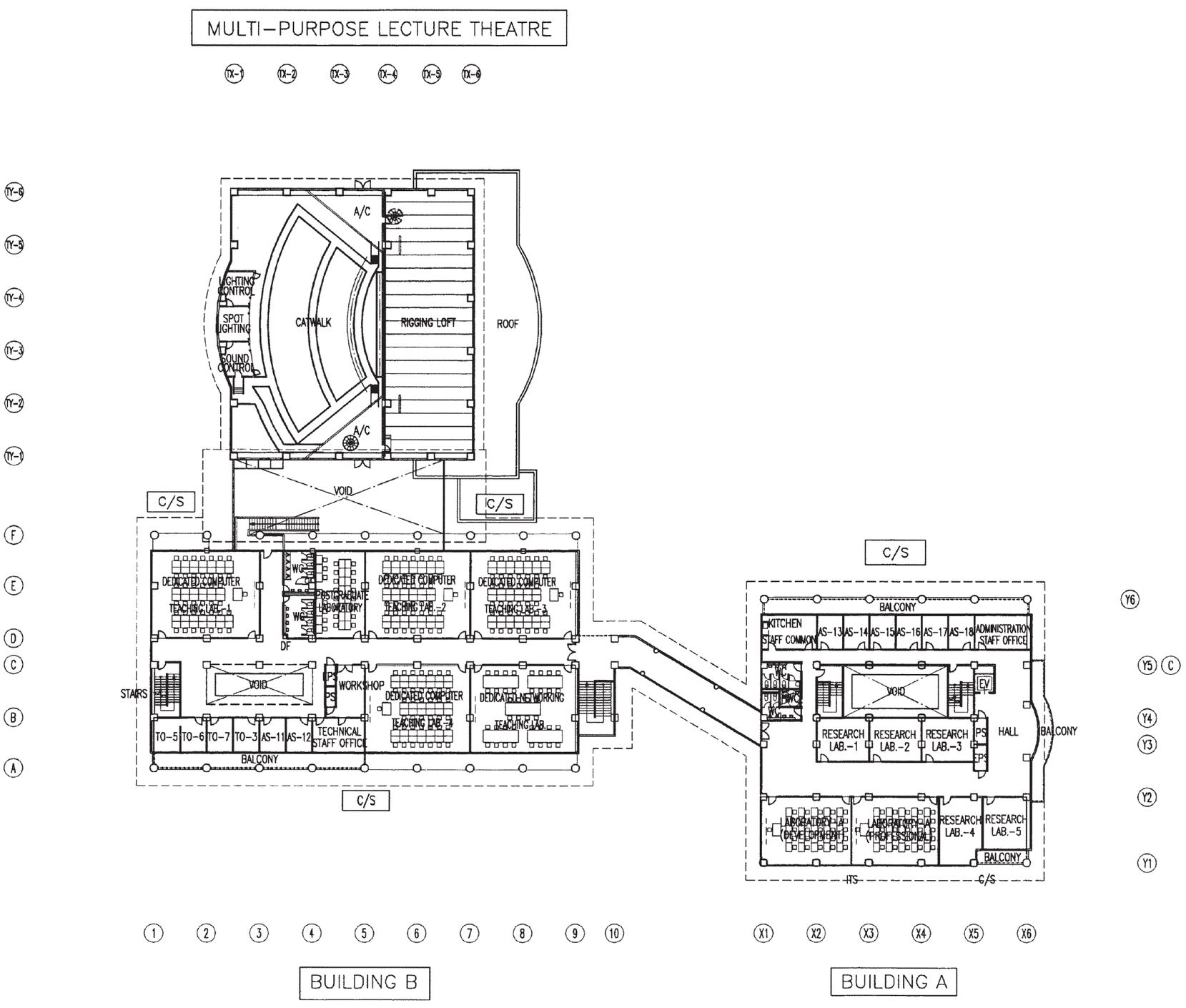


AS: ACADEMIC STARR OFFICE
VISIT: VISITING STAFF OFFICE
CORE: CORE STAFF OFFICE
TO: TUTOR OFFICE
P.GRAD: POSTGRADUATE LABRATORY

THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE

3rd FLOOR PLAN S=1/500 07

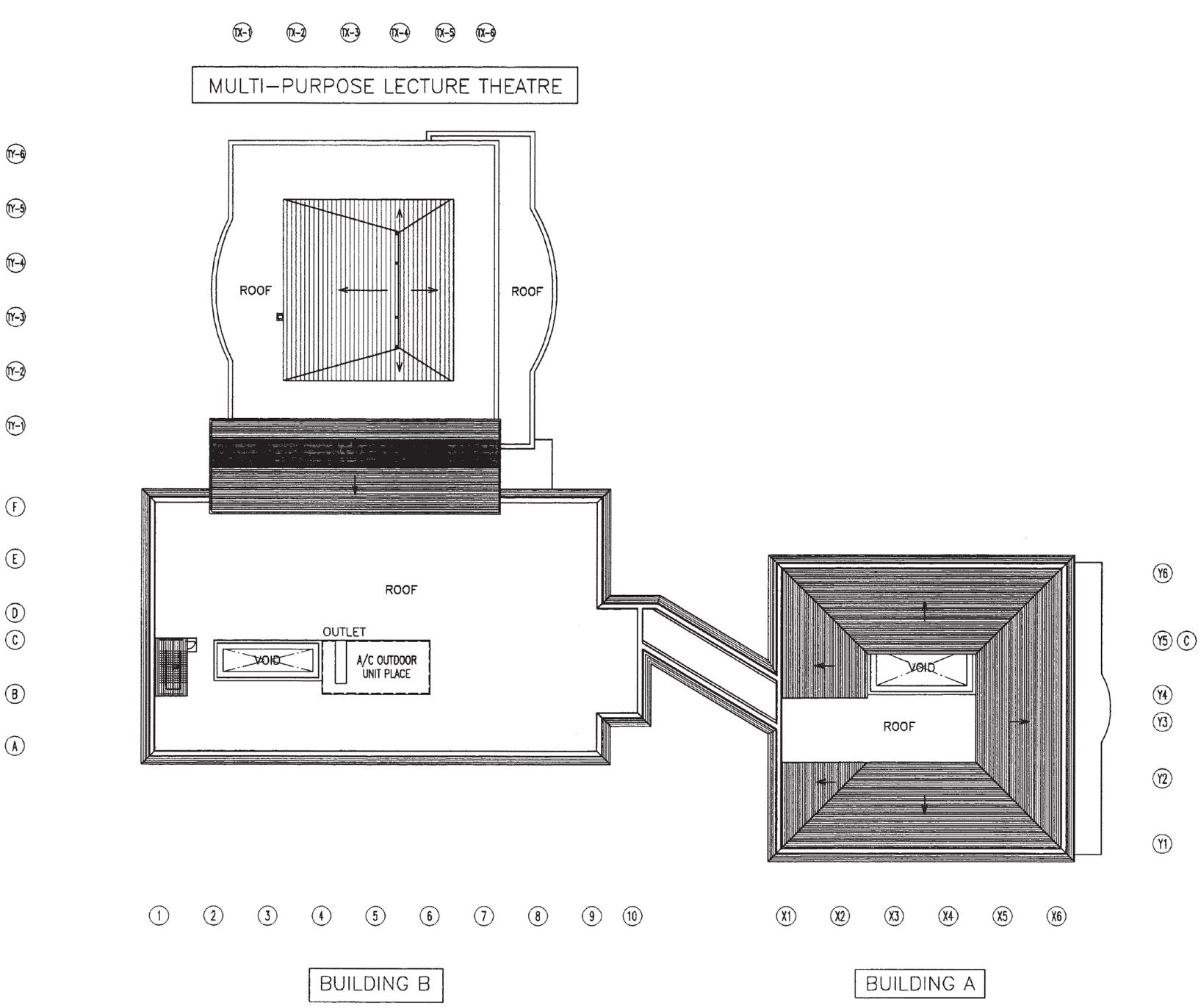
MULTI–PURPOSE LECTURE THEATRE



C/S: COMPUTING SCIENCE
AS: ACADEMIC STAFF OFFICE
TO: TUTOR OFFICE

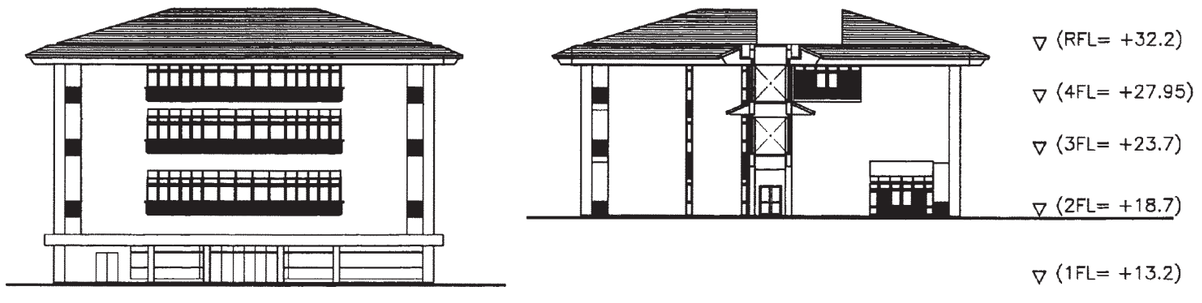
THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE

4th FLOOR PLAN S=1/500 08

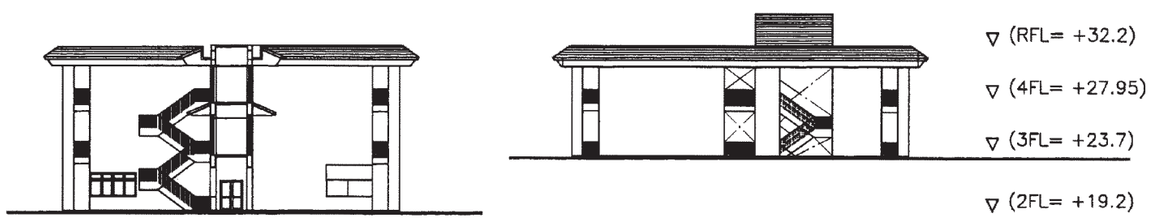


THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE
ROOF PLAN S=1/500 09

BLD–A NORTH



BLD–B NORTH



BLD–A EAST

BLD–A WEST

BLD–B EAST

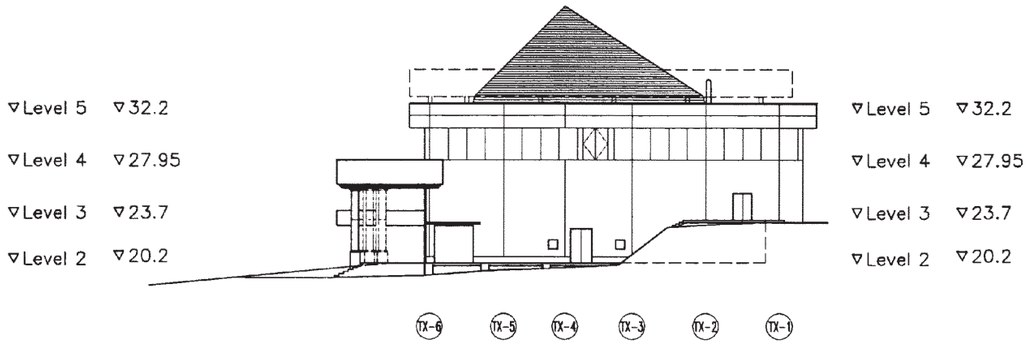
BLD–B WEST

BLD–B SOUTH

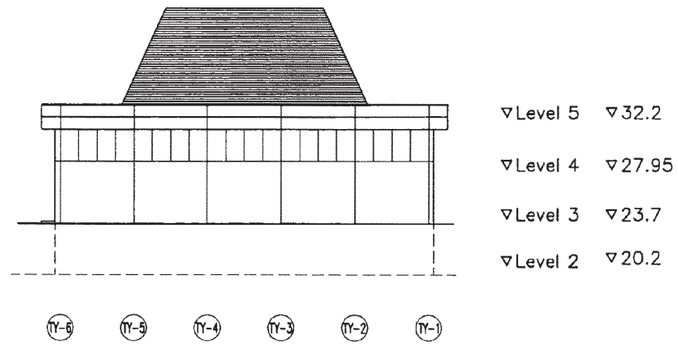
BLD–A SOUTH

ELEVATION

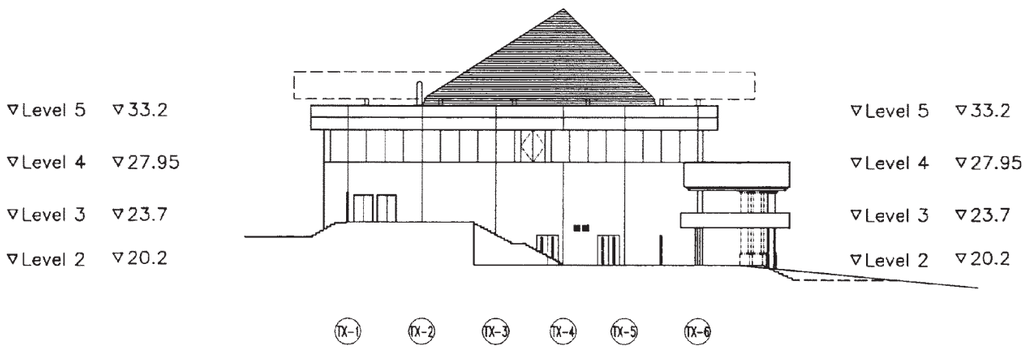
THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE
ELEVATION S=1/500 10



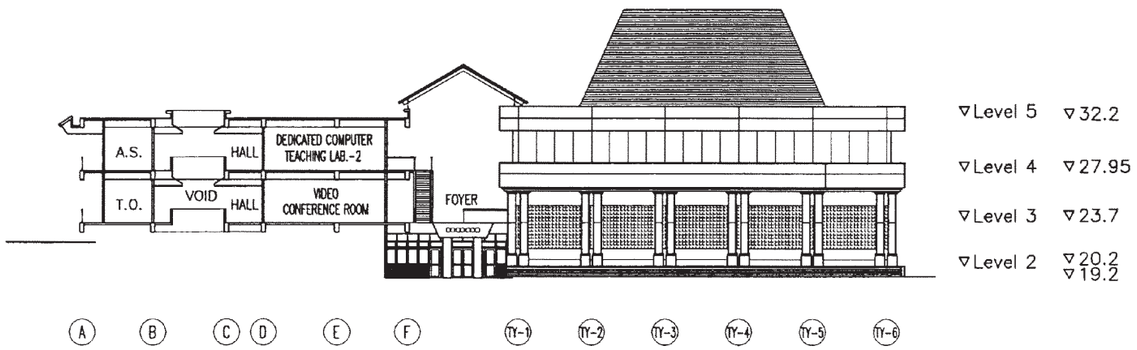
THEATRE NORTH



THEATRE WEST



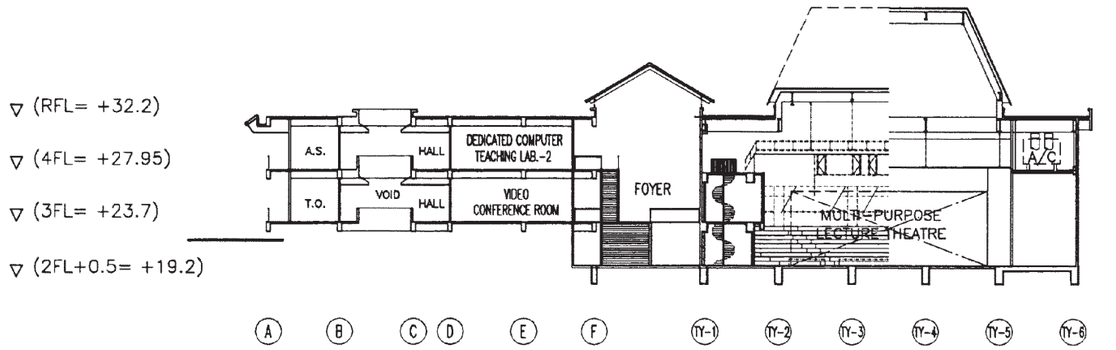
THEATRE SOUTH



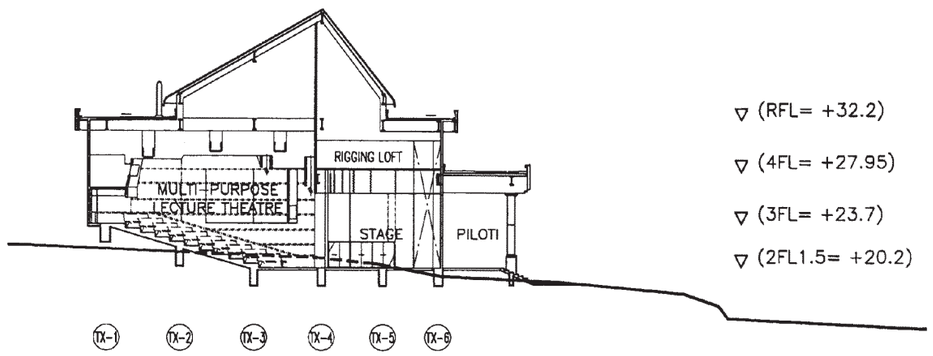
THEATRE EAST

THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE

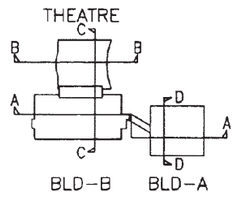
ELEVATION 2 S=1/500 11

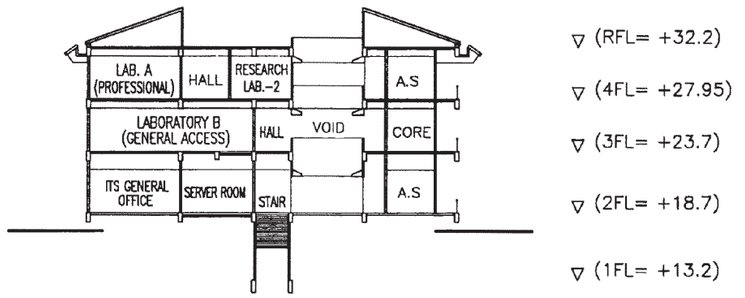


SECTION C–C

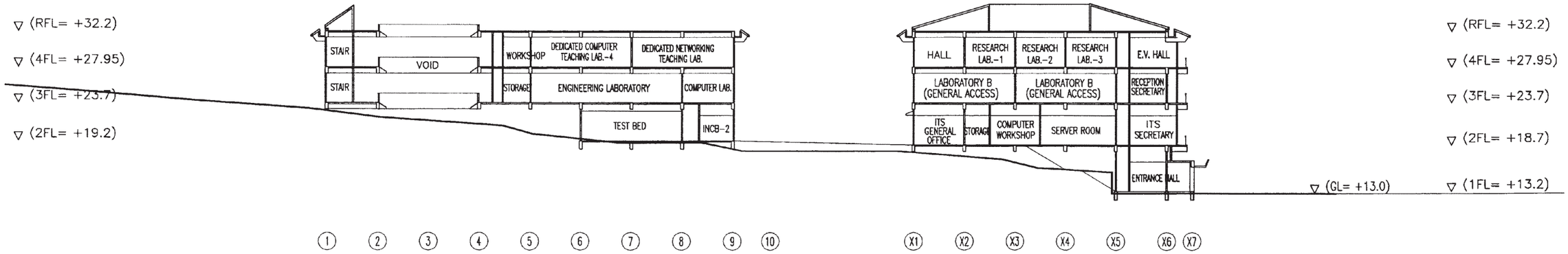


SECTION B–B





SECTION D–D



SECTION A–A

THE UNIVERSITY OF THE SOUTH PACIFIC ICT CENTRE
SECTIONS=1/500 12

2-2-4 Implementation Plan

(1) Implementation Policy

The elements of this project include facility construction work and the procurement and installation of equipment. The scope of cooperation regarding the project undertaken by the Japanese side will be implemented according to the framework of Japanese grant aid. Implementation of this plan shall be initiated officially only after it is approved by the Governments of both countries and the exchange of notes (E/N) is signed. Immediately after the signing of the E/N, the Japanese consultant, the responsible organization on the Fiji side, and USP, the implementing organization, shall enter a contract and initiate the detailed design work for the project. When the design is completed, the Japanese construction companies and equipment supply and installation companies will participate in the tender for their works. The successful tenderers for construction of facilities and supply and installation of the equipment will proceed to their work. The basic principles and items to be proposed for implementation of this project are described below.

1) Responsible organization and implementation organization

The responsible entity is the Ministry of Education of Fiji and the implementing organization in the project is USP. USP will be responsible for operation and maintenance of the facilities and the equipment provided by Japan.

2) Consultant

After the signing of the E/N, the Japanese consultant firm and the Government of Fiji will enter a consultant contract according to the formal procedure for the Grant Aid System of the Government of Japan. This consultant firm will execute the following activities under this Contract.

① Detailed design of the project:	To prepare the design documents (specifications and technical reference materials on the facilities and equipment included in the project).
② Tender:	To cooperate in the selection of the construction firm(s) and equipment supply and installation firm(s) through the tender, and to cooperate in transactions for procedures required under the contract.
③ Construction supervision:	To supervise operations in order to ensure that proper instructions are conveyed for the construction of the facilities, delivery and installation of the equipment, and operation and maintenance.

In the detail design stage, the consultant determines the construction plan and the equipment supply plan in detail based on the basic design study of the project, reviews the equipment, and prepares tender documents consisting of specifications of the project plan, tender terms and conditions, and drafts of the contracts required for the construction work and procurement of equipment.

Cooperation in the tender procedure involves three activities: observing the selection of the construction firm(s) and the equipment supply and installation firm(s) through the tender, helping the parties execute the formal procedures required for execution of their contracts, and preparing the reports to be submitted to the Government of Japan.

Construction supervision involves two activities: checking whether the tasks performed by the construction firms and equipment supply and installation firms are performed as specified in each contract, and confirming that the contents of their contracts are executed appropriately. To promote the smooth implementation of the project, the consultant shall also provide the related parties with advice and guidance and serve as a coordinator among them from a neutral position..

Major items in the scope of the construction supervision work are listed below.

①Procedures required for verification and approval of the work implementation plan, working drawings, equipment specifications, and other documents submitted by the construction firm(s) and equipment supply and installation firm(s).

②Inspection and approval prior to shipment of the construction materials, supply, installation and handling of the equipment.

③Confirmation of instructions for the construction machines and materials, supply, installation and handling of the equipment.

④Checking and reporting the progress of the construction.

⑤Observation of the handover of the completed facilities and equipment.

The consultant shall execute the above items and report to the related authorities of the Government of Japan on the progress of this project, the payment procedure, and the handover of the completed facilities.

3) Construction firm(s) and equipment supply and installation firm(s)

The construction firm(s) and equipment procurement firm(s) shall be selected through an open tender for Japanese corporations which meet the specific requirements. In principal, in cases where the amount of the bid tendered is within the estimated price for the contract, the tenderer who bids the lowest price will be determined to be the successful tenderer and will negotiate the construction and the procurement contract with the Ministry of Education.

The construction firm(s) and the equipment supply and installation firm(s) shall construct the facilities; procure, deliver and install necessary construction materials and equipment according to the terms and conditions of contracts; and provide technical guidance for the operation, maintenance and management of the procured equipment to the Fiji side. In addition to providing guidance for securing a system of supply by the suppliers, manufacturers and agencies of spare parts and consumables needed for the different equipment for continuous use of it after it is procured, these

firm(s) shall provide support to make it possible to receive services such as gratis repair during the period of guarantee, paid repair after the period of guarantee, technical guidance, etc.

4) Japan International Cooperation Agency

The Grant Aid Management Department of Japan International Cooperation Agency (JICA) shall give due advice to the consultant, construction firm(s), and equipment supply and installation firm(s) to ensure that the project is implemented in conformity with the Grant Aid System. This department shall also hold consultations with the executing organizations of this project insofar as necessary for the smooth, trouble-free implementation of the project.

5) Preparation for implementation plan

The representatives of the executing organization on the USP side and the consultant shall review the implementation plan during the implementation design period. They shall clarify the scopes of the construction work for which the Japan and USP sides are responsible, confirm through consultations the starting time and the method of each work, and discuss relevant details to ensure that of the works are carried out smoothly according to the implementation schedule in this report. In particular, the USP side must be sure to carry out, at its own expense before commencement of the facility construction work, the demolishment of buildings, the procurement and preparation of the land, the shifting of the existing electrical room and water tank, and other necessary preparations.

(2) Implementation Conditions

The items to be noted for implementation of the project are described below. They should be fully taken into consideration when formulating the implementation plan.

1) Schedule Management

The foundation work will be started before the rainy season, if at all possible. The work scheduling should also be based on the recognition that the work will be of improved quality if the finishing is not performed during the rainy season.

2) Dispatch of Technicians for Equipment Installation

It is extremely important to impart knowledge and skills regarding appropriate operation and maintenance of the equipment so as to sufficiently contribute to the IT-related education services. That being the case, technicians who are thoroughly familiar with the operation of the different equipment will be selected as the equipment installation technicians, and sufficient time will be allotted for them to explain the operation thereof (operation techniques, simple repair techniques, inspection methods, etc.) and to make sure that those concerned on the receiving side acquire sufficient understanding concerning its operation and maintenance.

3) Safety Control

Temporary fences will be established around the construction site. Persons will be stationed on the site perimeter to direct traffic and give directions on site entry. Other measures will be provided to ensure sufficient safety control, as the USP will remain in operation to some extent during the construction under this project.

(3) Scope of Works/ Procurement, Installation Categories

The success of this project hinges on the mutual cooperation between the Japan and Fiji sides. When this project is implemented under Japan's Grand Aid, it will be advisable that the Governments of Japan and Fiji undertake the scopes of work as described below, respectively.

1) Undertakings borne by the Government of Japan

The Government of Japan undertakes consultation of this project and the works related to construction of the facilities, procurement, and installation of equipment as described below.

① Consultation

i. To prepare implementation design documents for the facilities and equipment subject for this project and their tender terms documents.
ii. To cooperate in selecting the construction firm(s) and equipment supply and installation firm(s) and executing contracts for the project.
iii. To supervise the construction of the facilities and the instructions for the delivery, installation, operation and maintenance of the equipment.

② Construction of facilities, supply and installation of equipment

i. To construct facilities subject to this project.
ii. To procure construction materials and equipment subject to this plan, and transport and deliver them to the site.
iii. To instruct installation of the equipment subject to this project, conduct a trial run, and make adjustments.
iv. To explain and instruct operation and maintenance methods for the equipment subject to this project.

2) Undertakings borne by the Government of FIJI and USP

The Government of FIJI and USP are to bear the cost of, and implement, the following work concerning, among other things, preparation of the facility construction site.

① Preparation of the construction site

i. To secure and prepare the land for the construction and the temporary work.
ii. To clear the existing facilities (5 dormitory buildings, structures such as containers, etc.) and trees and plants in the project site.
iii. To replace the electrical room

iv. To replace the water tank.
v. To reclaim the project site.
vi. To connect electricity line in the project site, install connecting poles, and take necessary related procedures.
vii. To secure water supply and take necessary related procedures.
viii. To install the computer and audiovisual wiring system.

② Outdoor work
i. Landscape planting, etc.
ii. Parking lot

③ To purchase IT equipment and the furniture and equipment to be procured by the USP side, and to transfer the existing machines, furniture, and equipment.

④ To make measures so that the Japanese firms will be exempted from tax, local tax, and various financial burdens imposed by the Government of Fiji on the purchase of goods and the provision of services executed according to the formally approved contracts.

⑤ To provide measures to facilitate speedy customs clearance and surface transportation procedures for the equipment and materials to be exported from Japan and other foreign countries according to the approved contracts.

⑥ To provide measures to facilitate procedures for those Japanese who enter Fiji and stay there to carry out their roles in the project.

⑦ To issue approvals and permissions required for implementation of this project.

⑧ To pay all the necessary expenses other than those borne by the Government of Japan.

(4) Consultant Supervision

1) Implementation supervision policy

Under the policy of the Grant Aid System of the Government of Japan, the consultant shall form, based on the concept of the basic design, a team responsible for executing the project, including the preparation of the implementation design, to achieve smooth and successful implementation. The implementation supervision policy for this project is outlined below.

① To keep close contact with those in charge of the project representing related organizations of both countries so that the construction of the facilities and installation of equipment will be completed without delay.

② To provide quick and appropriate advice and suggestions from a neutral standpoint to the construction firm(s), equipment supply and installation firm(s), and others concerned.

③ To provide appropriate guidance and suggestions regarding suitable equipment layout and adjustment of tie-in with facilities, as well as operation and management after the handover. And to confirm that implementation has been completed and the terms of each contract are fulfilled, to observe the handover of the facilities and equipment and obtain an approval of receipt from the Fiji and USP sides.

2) Construction supervision plan

As the types of construction works involved in this project are versatile, a resident supervisor (in charge of construction) is appointed and the following engineers are dispatched from time to time in step with the progress of the construction works.

- Manager of general affairs (Overall coordination, process control)
- Engineer in charge of construction (Confirmation of construction methods, design concept, construction drawings, specifications of materials, etc.)
- Engineer in charge of structure (Confirmation of the ground conditions, foundation work. framework)
- Engineer in charge of electrical installation (Power supply & distribution system, electric service and substation, etc.)
- Engineer in charge of mechanical installation (Utility supply and processing system, air conditioning, water supply, drainage and plumbing system, etc.)
- Engineer in charge of equipment (Instruction for equipment installation, adjustment with the facility, confirmation of operation instructions, etc.)

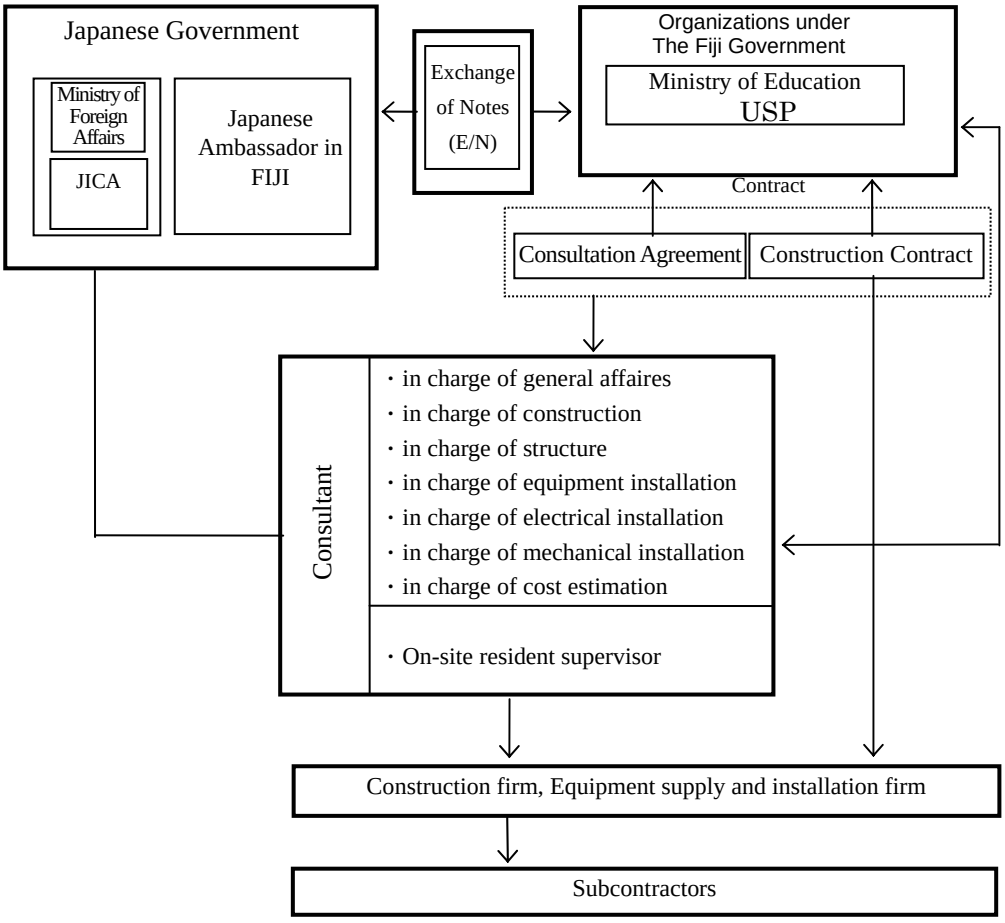


Figure 2-19 Supervision System

(5) Quality Control Plan

1) Quality Control of the Facility

The Construction firm(s) will submit the documents of construction plans in advance to the consultant according to the construction contract (drawings, specifications, etc.). The consultant will verify the adequacy prior to the commencement of construction, listing the specific inspection items and indicating the frequency of inspection necessary to secure a high level of quality control.

Major controlling items are listed below.

① Material

On-site resident supervisor will inspect the construction materials received.

i. Mill sheets of steel bars, results of tension strength tests, and manufacturer names

ii. Analysis tables of cement material identification, tables of test results and manufacturer names

iii. Analysis of salt components in aggregate, size distributions, densities, and percentages of absorption

iv. Reinforced concrete

iv-1 Mixing Plans

Confirmation and determination of the aggregate quantity, slump, cement-water ratio, air quantity, and salt components through test mixings

iv-2 Compression Tests

Determination of the standard control values from analysis of result tables

iv-3 Control of material quantity measures and complete control of material storage

iv-4 Prior submittals of concrete casting plans

② Standards of Control

The consultant will supervise the construction in accordance with certain standards of control based on the approved construction schedule plans. The standards of control will basically be governed by the standards of Japan.

③ Soil-Bearing Capacity

The soil-bearing capacity will be confirmed at the site in the presence of an on-site resident supervisor by implementing plate loading tests.

2) Quality Control of Equipment

Ready-made equipment to be procured for this project will be selected from among equipment in full compliance with JIS, UL, IEC, ISO, and other international standards. The consistencies between the equipment to be procured and the contents of the contract will be confirmed at the inspections carried out before shipment, in parallel with the inspections carried out by third-party agencies for the containers and other components for shipment.

(6) Procurement Plan

1) Construction materials

Construction materials that can be procured within Fiji are limited to sand/gravel, lumber, concrete blocks, and the like. Although there is one plant for cement in Fiji, cement will be procured from Japan or from a third country (such as Australia or New Zealand) for reasons of quantity and quality. The same will apply to steel bars, finishing material, and facility equipment as well.

In terms of labor, a construction rush started from late 2003, powered by the booming economy in Australia and New Zealand. A resulting shortage in the general labor force compounded the problems already posed by a pre-existing shortage of skilled workers, leading to strikes by construction workers. Under these circumstances, it will be necessary to select materials and adopt construction methods with an eye on shortening the construction period, and to dispatch Japanese engineers or supervisors from a third country to the construction site.

Table 2-22 Procurement Categories of Construction and Equipment Materials

Material	Procured from			Remarks
	Fiji	Japan	Third countries	
(Construction material)				
1. Solidification material for concrete (gravel, sand)	○			
2. Cement	○			
3. Reinforcing rods		○		
4. Steel-frame structure		○	○	Structure steel frame will be procured from Japan. Purling materials will be procured from AU or NZ.
5. Concrete blocks	○			
6. Metallic heat insulation material		○		
7. Wood, plywood	○			
8. Tiles for floors and walls			○	
9. Light-gauge steel furring strip			○	
10. Interior boards			○	
11. Wooden fittings	○			
12. Metal fittings		○	○	Japan, Malaysia
13. Fixtures for fittings		○		
14. Paint (general material)	○			
15. Paint for protection against rust		○		
16. Glass	○			
17. Concrete products	○			
(Materials for equipment work)	○			
1. PVC cable tubes	○			
2. Wires, cables	○	○	○	
3. Control panels	○			
4. Transformer			○	
5. Special control panels		○		
6. Lightning equipment		○		
7. Generator equipment		○		
8. Telephone system equipment	○			
9. Special light electrical equipment		○		
10. Sanitary earthenware	○	○		
11. Pumps		○		
12. Air-conditioning system		○		
13. Fans		○		
14. Refrigerator		○		
15. FRP water storage tank		○		
16. Electric water heater	○			
17. Piping	○	○		
18. Filters		○		
19. Hose reel (for fire hose)	○			

2） Equipment

Of the planned equipment, estimated procurement categories are as shown below.

Table 2-23 Procurement category of Equipment

Code No.	Equipment	Procured from
COM-1	Liquid crystal projector（large）	Japan
COM-2	Liquid crystal projector（small）/screen set	Japan
COM-5-1	Personal computer（desktop）	Fiji
COM-5-2	Desk/chair set for computer	Fiji
COM-5-3	Personal computer（note）	Fiji
COM-11	Presenter	Japan
COM-13	DVD player	Japan
COM-14	VTR	Japan
COM-15	Whiteboard	Japan
COM-16	TV	Japan
COM-20	Remote-control TV camera	Japan
COM-26	Speaker	Japan
COM-100	Sound system for Multi-purpose Lecture Theatre	Japan
COM-101	Video system Multi-purpose Lecture Theatre	Japan
COM-102	Audiovisual system for Video Conference Room	Japan
COM-104	Audiovisual system for conference rooms	Japan
CSC-1	Server/rack set	Fiji
CSC-4	Switching hub	Fiji
CSC-6	Patch panel	Fiji
CSC-10	Ethernet card	Fiji
CSC-15-1	Personal computer（desktop）	Fiji
CSC-15-2	Desk/chair set for computer	Fiji
CSC-16	Embedded Computer	Japan
CSC-17	Oscilloscope	Japan
CSC-24	Printer	Fiji
ITS-1	Server（multifunctional type）	Fiji
ITS-3	Server（general function type）	Fiji
ITS-4	Tape backup system	Fiji
ITS-6	Switching hub	Fiji
ITS-7	Uninterruptible power source	Fiji
ITS-15-1	Personal computer（desktop）	Fiji
ITS-15-2	Desk/chair set for computer	Fiji
ITS-20	Printer	Fiji
ITS-22	Liquid crystal projector（small）/screen set	Japan
ITS-30	Equipment rack	Fiji
ITS-32-1	Personal computer（desktop/for schedule management）	Fiji
ITS-32-2	Desk/chair set for computer	Fiji
ITS-33	Workbench/chair set	Japan
ITS-35	VTR/CD/DVD recorder	Japan
ITS-60	System for USPNet control room	Japan
ENG-5	Analog communication experimental device	Canada
ENG-6	Analog communication practice system	Canada
ENG-7	Optical fiber communication experimental device	Canada
ENG-8	Antenna technology practice system	Canada
ENG-9	Microwave technology practice system	Canada
ENG-11	Digital communication experimental device 1	Canada
ENG-12	Digital communication experimental device 2	Canada
ENG-13	Digital communication practice system	Canada
ENG-17	Oscilloscope	Japan
ENG-18	Automatic voltage regulator	Japan
ENG-19	Signal generator	Japan
ENG-20	Multimeter	Japan
ENG-21	Soldering system	Japan
ENG-22	Tool set	Japan
ENG-29	Breadboard set	Canada

3) Transportation method and place of delivery

Regarding transportation of the equipment and materials, basically the construction materials are to be shipped by maritime transportation in containers. A liner service runs a route from Japan to Fiji's main cargo receiving port, Suva (a voyage of 2-3 weeks). Overland transportation is necessary from the port of Suva to the site, but this will pose no problems as the road conditions are favorable. The procurement plans also allow an extra week for unloading, customs clearance, and other formalities. This will ensure plenty of leeway in the schedule.

(7) Implementation Schedule

1) Project Implementation Schedule

To implement this project under Grant Aid from the Government of Japan, the schedule will proceed in the following steps. After an initial E/N is made and entered by and between the both countries, the concerned parties will perform the tender for selecting construction firm(s) and equipment supply and installation firm(s) and Contracts, construction, equipment supply, and installation within a single fiscal year. The periods for detail design, tender, construction/procurement and installation stages are as follows.

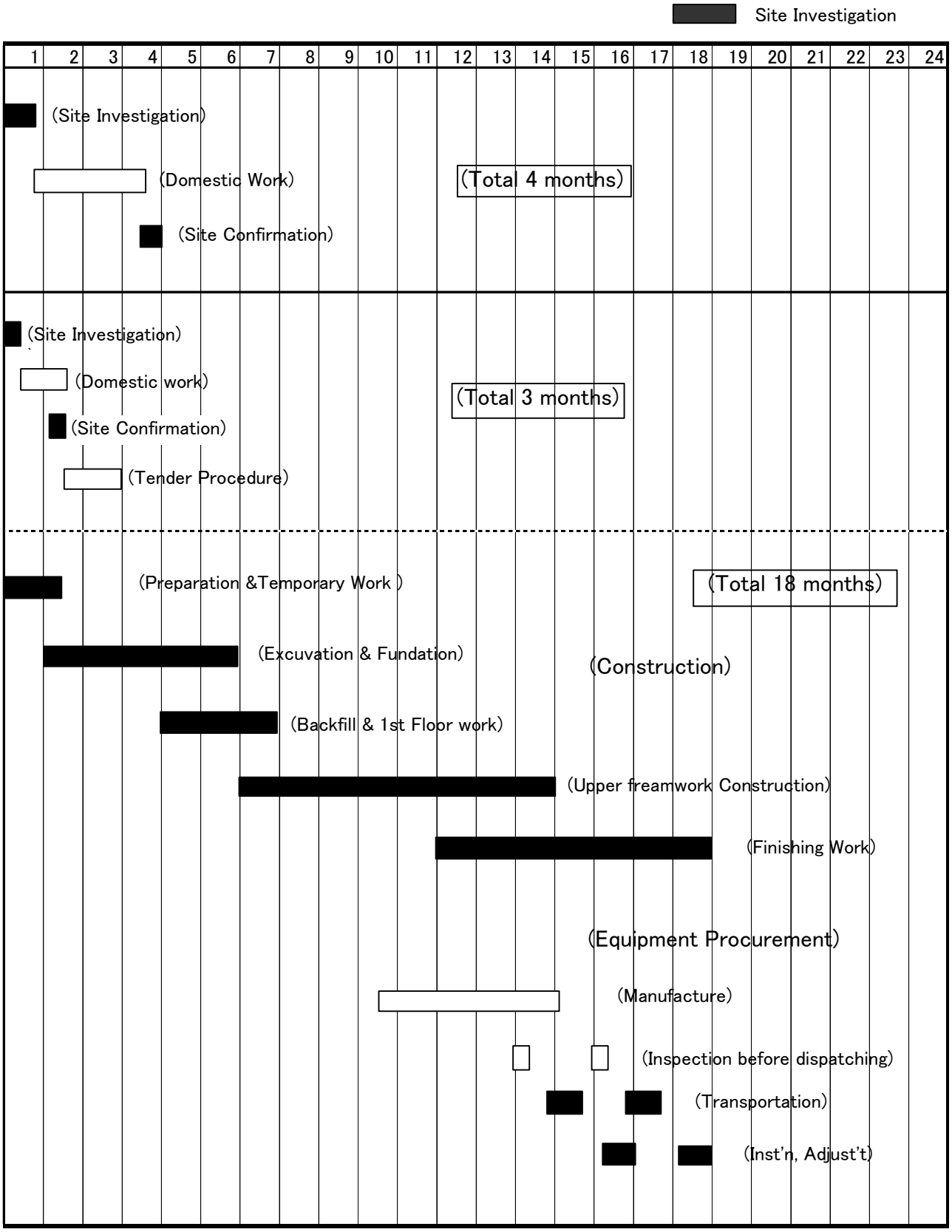
Table 2-24 Project Implementation Schedule

	Detail Design Stage	Main Stage
Detailed Design Stage (Including the field survey)	4.0 months	
Tender Stage		3.0 months
Construction / Procurement & Installation Stage		18 months
Total	4.0months	21.0 months

2) Implementation Schedule

The following table shows the implementation schedule of this Project.

Table 2-25 Implementation Schedule



2-3 Obligation of the Recipient Country

The scope of works regarding this project is described in "Article 2-2-4(3) Scope of Works / Procurement/Installation Categories." The scope of works on the Fiji side is outlined below.

(1) Procedures

1) Acquisition of the site

The building site, located within the USP campus, is leased from the Fiji Government on a contract for 99 years from 1977.

2) Exemption from tax

When Japanese companies and building constructors working on this project procure construction materials and equipment within the country for this project during the period of execution of construction, or import the same into Fiji from abroad, exemptions from customs duties, consumption tax, other inclusive tax, surcharges, etc. will be required. In addition, measures will have to be taken for the prompt landing procedures required for custom clearances.

3) Accommodations allowed for imported materials and equipment from Japan or third countries

The Ministry of Education will provide required accommodations for prompt custom clearances and inland transportation procedures concerning the imported materials and equipment from Japan or third countries.

4) Acquisition of Building Permission

The application and acquisition of building permissions regarding this project must be completed without delay prior to the commencement of the construction. The same condition shall also apply to other applications and acquisitions required for the commencement of construction.

5) Issuance of Banking Arrangement and Authorization to Pay

The Ministry of Education will be the contact person on this project, and will promptly issue the Banking Arrangement and Authorization to Pay based on the agreement of the consultant and the contract of the executing agency.

(2) Tasks undertaken by the Fiji Government and the USP

The Fiji Government and the USP will share responsibility for executing the following tasks, all of which are indispensable for the smooth implementation this project:

1) Removal of obstacles and site-preparation work at the construction site

Five dormitory buildings, a number of power-receiving facilities and in-house power-generation facilities, a water receiving tank, trees, and other structures and objects will have to be either

removed from the construction site or relocated within the site. The construction site is sloped downward from the west side to the east side and leads to the Laucala Bay. The USP needs to remove the above buildings, structures, trees, and complete rough land reclamation in accordance with the design ground of the construction site before the construction starts.

The above works are all inexpensive and do not require any special techniques. The contents of the works are capable of being shared sufficiently by the Fiji Government and the USP.

2) Infrastructure development

① Relocation of power-receiving facilities

The existing power-receiving facilities provided by FEA need to be relocated to ensure that they do not interfere with this project.

② Relocation of in-house generator

The existing in-house power generator needs to be relocated to ensure that it does not interfere with this project. The in-house power generator required for this project will be procured in this project separately.

③ Relocation of water-receiver tank

The existing water-receiver tank needs to be relocated to ensure that it does not interfere with this project.

④ Wiring for computers, videos, and the network system within the building

The pathways in the building required for those equipment will be laid out by the Japanese side with the wiring works implemented by the USP.

3) Outdoor work

① Parking lot

A parking lot to accommodate visitors on occasions such as lectures and conferences in the Multi-purpose Lecture Theater will be provided by the USP in the back of the ICT Centre.

② Landscape planting

The Landscape planting works will be executed by the USP in accordance with the outdoor work of this project.

4) Relocation of existing equipment and furniture

The relocation of existing equipment, furniture, etc. in the existing facilities and purchase of required equipment will be included in the scope of the project undertaken by the USP. The relocation of the existing ICT equipment can be executed by the IT Service, while the furniture, etc., can be relocated individually by the staff without asking for assistance of vendors (thus ensuring that no cost sharing will be incurred).

The relocation will be executed from places partially completed, one after another.

2-4 Project Operation Plan

2-4-1 Administration Plan

(1) Operation System and Organization

The USP will be in charge of the operation and maintenance of the facilities after completion as the implementation agency under the supervision of the Ministry of Education of Fiji. This project aims to mitigate the digital divide in Fiji and the South Pacific countries and to promote the development of the social economy by completely developing the possibility of ICT utilization and by establishing a central educational/research institution for information and communication technology which enables the South Pacific region to participate in the global information society on a full scale.

Since commencing its audio remote education using satellites in 1973, the USP has fostered engineers and expanded its IT service department on its own in order to fulfill its leading role in the ICT field in Fiji. This project does not intend to establish a new department, but to expand and strengthen the existing department. With the human resources and equipment having been beefed up in recent years in response to the high demand for the Computer Science Course, upgrades in the existing administrative organization will allow the organization to remain operating on a continuous basis.

(2) Manpower planning

Faculty teaching ICT-related courses accounted for 153 of the 1,297 USP staff as of 2004, and their numbers are still increasing. Given that the purpose of this project is to upgrade the existing ICT-related courses, and given that faculty recruitment implemented each year by the USP on a continuous basis in accordance with the curricula, the USP is considered to be capable enough to operate the ICT Centre after completion.

As a “Technical Cooperation Project” in fiscal 2006, the USP is considering dispatching the three professionals in charge of the operation and maintenance of the centre, Internet protocol technology, and information security technology, respectively, to a professional institute in Japan with the objective of acquiring technologies and knowledge required for the startup, operation, and maintenance of the Information Communication Technology Centre to be newly constructed in association with this project.

2-4-2 Maintenance System

(1) Maintenance System of the USP

With regard to the maintenance of the USP, in light of the fact that ICT-related maintenance has been executed by the ICT Service Department and maintenance of facilities has been executed by the Building and Repair Department, the USP will have sufficient operating and maintenance capabilities when the ICT Centre is opened.

The 54 persons working in the ICT Service Department are engaged in the maintenance of the satellite communication across the whole campus, as well as the registration, operation monitoring, and

security control of the ICT equipment. There are expected to be 60 such personnel by the time the ICT Centre opens.

The Facilities and Properties Department consists of approximately 70 personnel, including interior cleaning staff, outdoor maintenance staff, storemen, assistants, repair staff (carpenters), plumbers, painters, electricians, and mechanics.

2-4-3 Financial plan

(1) Budget and financial status of USP

Government subsidies from the 12 founder member countries and tuitions received from the students account for 85% of the revenues of the USP. The rest consists of foreign aid and revenues from other businesses.

The annual financial balance of the USP has been continuously in surplus. The surplus in 2003 amounted to approximately 2.76 million Fiji dollars.

Table 2-26 Financial Status of USP from 1999 to 2003 (Profit-And-Loss Statement) (UNIT: FJ$)

Revenues	1999	2000	2001	2002	2003
Government subsidy	33,492,000	35,145,000	36,240,000	38,376,000	41,925,000
Tuition from students. etc.	7,824,561	7,981,508	8,865,205	9,799,786	12,378,687
Foreign aid	3,800,000	3,981,924	4,565,186	4,777,082	4,490,660
Revenues from other businesses	1,785,360	2,363,585	2,422,517	2,818,930	4,503,721
Total revenues	46,901,921	49,472,017	52,092,908	55,771,798	63,300,071
Expenditures					
Compensation to the faculty	21,448,863	21,956,507	22,648,750	23,747,355	27,185,448
Service fees for supporting the faculty	8,964,730	8,763,627	8,761,231	9,581,453	10,915,972
Management support	6,875,697	7,800,587	8,404,280	9,472,197	10,036,437
Utilities, land related expenses and maintenance expenses	3,126,479	2,660,232	3,538,734	3,530,886	3,177,482
Communications cost	1,201,626	1,330,372	1,441,786	1,563,035	1,671,464
General education expenses	1,563,279	1,820,932	2,846,893	3,054,533	2,482,695
Other expenses	2,862,897	3,019,813	2,423,278	2,920,562	4,345,940
Building and repairing expenses	676,000	683,000	683,000	678,000	678,000
Reserve fund	95,000	78,382	40,000	40,000	40,000
Total expenditures	46,814,571	48,113,452	50,787,952	54,588,021	60,533,438
Annual surplus	87,350	1,358,565	1,304,956	1,183,777	2,766,633

Source: USP

(2) Past and present budgets of USP

While growth rates for three years from 2000 to 2002 were 5% to 7% for both revenue and expenditures, growth rates in 2003 exceeded 12% for revenues and expenditures. With the annual surpluses from 2000 to 2003 as shown in the previous table, the financial status of this university has remained sound state without falling into the red. While a specific reason for the high growth rates in revenue and expenditure in 2003 has not been fully given, the increase in the number of students in the popular IT-related courses certainly contributed.

Table 2-27 Revenues and Expenditures from 2000 to 2003 (Year-On-Year Growth Rate)

	2000	2001	2002	2003 (Unit: %)
Growth rate of the total revenue	5.5	5.3	7.1	13.5
Growth rate of the total expenditure	2.8	5.6	7.5	12.5

(3) Analysis of past expenditures and perspective of future expenditures after completion of facilities

The operation cost of the ICT Centre consists of the compensation to faculty; communications cost; lighting, heating and similar costs; facility maintenance expenditures; and equipment maintenance expenditures.

Compensation to faculty accounts for approximately 45% of the total expenditure of the USP, while the utilities, land-related expenses, maintenance expenses, and communications costs account for only 8% to 10%.

This section will discuss the individual items of the estimated expenditure of the ICT Centre and calculate the income and expenditure over the next five years from the estimated point of project completion (2008) based on the information obtained from the USP. For the purpose of calculation, the rate of rise in prices will be assumed to be 1.99%, the average rate for Fiji in the past three years (Source: Fiji Statistics Bureau).

1) Labor cost

The data for the period from 1999 to 2003 show that the labor cost continuously accounted for approximately 45% of the total expenditure. With approximately 40 personnel expected to be hired, the total number of the faculty to be involved in the ICT Centre after the completion of the facilities is expected to climb to 89. The income and expenditure will be calculated on the assumption that the ICT Centre will receive budget allocation commensurate with the increase in the labor cost from the USP.

2) Communications cost

The communications cost, which chiefly consists of the telephone/fax rates and Internet connection fees, accounts for 3% or less of the total USP expenditure. That being the case, this ratio will be applied to individual income and expenditure.

3) Lighting, heating and similar costs

Electricity charges and water supply charges will be calculated based on the sizes and the contents of the facilities and equipment in this project.

4) Facility maintenance expenditures

The facility maintenance expenditures account for approximately 6% of the total expenditure. Because the air-conditioned floor area of the facilities to be constructed in this project exceeds 50%

of the total floor area, the ratio of the facility maintenance is expected to increase. In light of the above factor, the ratio of the future facility maintenance expenditures against the total expenditure is estimated to be approximately 10%.

5) Equipment maintenance expenditures

The expenditure required in association with the application of the equipment procured in this project is mostly electricity charges. However, because most equipment expected to be procured in this project is intended for replacement of decrepit equipment, the additionally increase in the electricity charge is estimated to be approximately 79,000FJ$, which will account for approximately 14.5% of the lighting, heating and similar costs of the USP. Thus, the increase in electricity charges is evaluated as less problematic in terms of operation.

2-4-4 Operating and maintenance expenditures

The income and expenditure after the completion of the facilities are estimated as follows:

Table 2-28 Income and Expenditure after Opening of the ICT Centre (Unit: FJ$)

		Year 1	Year 2	Year 3	Year 4	Year 5	Total
Operating expenditure							
Labor cost		947,600	1,049,300	1,236,100	1,433,200	1,726,300	6,392,500
Building maintenance; lighting, heating and similar costs		825,000	850,000	876,000	902,000	929,000	4,382,000
Equipment	Depreciation	820,000	820,000	820,000	820,000	820,000	4,100,000
	Maintenance	160,000	165,000	170,000	175,000	180,000	850,000
	Consumables	20,000	21,000	22,000	23,000	24,000	110,000
Total expenditures		2,772,600	2,905,300	3,124,100	3,353,200	3,679,300	15,834,500
Source of revenues							
USP revenues		200,000	206,000	212,000	218,000	225,000	1,061,000
Revenue balance	Computer Science	290,000	316,000	344,000	375,000	409,000	1,734,000
Departmental budget allocation	Computer Science	150,000	155,000	160,000	165,000	170,000	800,000
	ITS	100,000	103,000	106,000	109,000	112,000	530,000
Revenues from extra-curricular activities	Trading income	87,600	216,100	361,400	484,000	543,000	1,692,100
	Development Project - donors	356,000	401,000	497,000	612,000	783,000	2,649,000
	Literature & Language	25,000	28,000	32,000	36,000	41,000	162,000
	ITU/Cisco/USP Academy	1,396,000	1,438,000	1,481,000	1,526,000	1,571,000	7,412,000
Total revenues		2,604,600	2,863,100	3,193,400	3,525,000	3,854,000	16,040,100
Surplus (deficit)		(168,000)	(42,200)	69,300	171,800	174,700	205,600
Cumulative surplus		(168,000)	(210,200)	(140,900)	30,900	205,600	205,600

(1) Running cost of facilities

Electricity charges and water supply charges are calculated as follows:

1） Electricity charges

Electric energy (ICT Centre): {700Kw (estimated contract demand) ×0.4 (daytime demand factor) C 14hr (service hours) + 700Kw ×0.2 (nighttime demand factor)×8hr (service hours)}×365 days=1,839,600Kwh /year

Electric charge (ICT Centre): 1,839,600Kwh /year × 0.296FJ$/Kw

=544,521 FJ$

2） Water supply charges

57.6t(demand per day) × 240days × 0.529 FJ$=7,312 FJ$

(2) Running cost of equipment

The maintenance expenditures for the equipment provided in this Grant Aid Project are basically limited to the electricity charges during the operation of the equipment. The following table lists equipment requiring special attention to control maintenance expenditures due to large-quantity electricity consumption and other factors.

Table 2-29 Running cost of equipment

Equipment	Qty	Required daily electric energy per unit (kW/h)	Total required daily electric energy（kW/h）	Annual required electric energy（kW/h）	Annual required expenditure
Server	22 units	17kW/h*1	374 k W/h*2	136,510kW/h	40,407 FJ$
Personal computer	217 units	3kW/h*3	651kW/h*4	130,200kW/h	38,539 FJ$

*1：Calculated on the assumption of 24 hours of daily service.

*2：Calculated on the assumption of 200 days of service each year.

*3： Calculated on the assumption of 8 hours of daily service.

*4：Calculated on the assumption of 200 days of service each year.

Calculated on the assumption that the electricity charge is 0.296 FJ$ per 1kW/h.

2-5 Project Cost Estimation

The total project amount in case this project will be implemented through grant aid cooperation from Japan is estimated to be 2,046 million yen and the breakdown of the cost to be borne by Japan and Fiji is estimated as follows, according to the condition in the article(3)below. This cost estimate is provisional and would be further examined by the Governments of Japan for the approval of Grant.

(1) Cost Estimation to be borne by the Japan side

Cost Estimation App.1871.5 million Japanese Yen
3 buildings and total floor area 6,659 ㎡

Table 2-30 Cost Estimation to be borne by the Japan side

Item	Cost Estimation（million Japanese Yen）		
（1）building		1,484.6	1,707.0
Building A（ITS, Computer Labs）	524.1		
Building B（Computer Labs, Conference, etc and Connection bridge）	538.9		
Building T（Multi-purpose Lecture Theatre）	371.2		
Landscaping & Others	50.4		
（2）Equipment	222.4		
（3）Detail Design, Supervising			164.5

(2) Cost Estimation to be borne by Fiji side

Table 2-31 Cost Estimation to be borne by Fiji side

		（FJ $）	（million Japanese Yen）
Total		2,687,000	174.2
1）	Demolition of Existing Building	401,000	26.0
2)	Leveling of Construction Site	26,000	1.7
3)	Move of Power Receiving Station	40,000	2.6
4)	Move of Water Tank	40,000	2.6
5)	Landscaping	261,000	16.9
6)	Parking	200,000	13.0
7)	Planting	32,000	2.1
8)	Equipment	472,000	30.6
9)	Furniture	180,000	11.7
10)	Theatre Equipment	734,000	47.5
11)	Power Receiving Equipment	301,000	19.5

* Networking, Telephone calling, Moving Expenses are not included in the cost estimation above.

(3) Condition of Cost Estimation

1) Time of Cost Estimation

From February 2004 to September 2005 (half year average rate)

2) Exchange rate

- US $ 1= 106,07 Japanese Yen
- FJ $ 1= 0.6100US $
- FJ $ 1= 64.70 Japanese Yen

3) Construction term

The period of detailed design, construction and procurement of equipment is identified in the implementation schedule.

4) Other

This Project will be implemented though the system of the Grant Aid cooperation by the Government of Japan.