

the New Zealand School Certificate. Those who pass the examination are qualified for promotion to the 13th Grade. The ratio of successful applicants is about 30 percent. The examination was introduced in 1988.

- Pacific Senior Secondary Certificate Examination (PSSCE)

This graduation examination for senior secondary school students is used to select applicants for admission to institutions of higher education. Those whose scores in this examination are excellent are qualified to take UPY Course at the National University of Samoa. The ratio of successful candidates is about 10 percent. This examination is considered equivalent to New Zealand's entrance examination for admission to universities and colleges. It was introduced in 1988.

3-2-6 Present State of Tertiary Education

(1) General Condition

In Western Samoa, tertiary education is provided at institutions of higher education which offer bachelor's degree courses, and at vocational training schools. The institutions of higher education in charge are the National University of Samoa and the University of the South Pacific in Samoa (School of Agriculture). The latter is a South Pacific regional university.

On the other hand, the vocational training schools in charge include the Teachers' College and the Nurses' School, which offer very special vocational training courses, as well as Western Samoa Polytechnic, Don Bosco Technical Center and Maritime Training Center, all of which offer more general vocational training courses. Nurses training was conducted under the supervision of the Department of Health until 1992. From 1993

however, this education is provided at the Faculty of Nursing of the National University of Samoa. Training in nursing practice is conducted at facilities of the Department of Health and lectures are given at the National University of Samoa. As a result, the nursing diploma and certificate are to be awarded by the National University of Samoa. It is expected that the Western Samoa Teachers College will be integrated into the National University of Samoa in the near future and will become the Faculty of Education of the University.

Fig.3-6 gives an outline of the above-mentioned tertiary education system. Students who pass the PSSCE are promoted to the University Preparatory Year (UPY) at the National University of Samoa. Those who complete the UPY course enroll at the National University of Samoa or at the University of the South Pacific and other foreign universities according to their academic achievements. Other qualified students are qualified to enroll at vocational training schools. When the Teachers' College is changed into the Faculty of Education of the National University of Samoa, a clear line will be drawn between university education and institutions for technical training, which accept those who have completed secondary education courses.

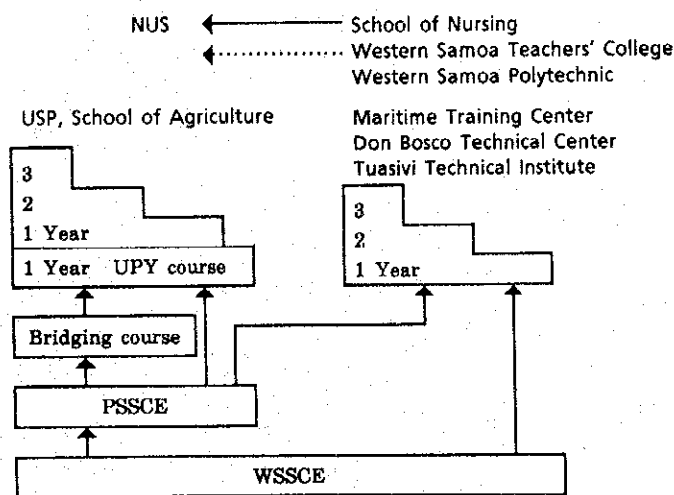


Fig. 3-6 Tertiary Education System

The problem is whether Western Samoa Polytechnic should continue to serve as a technical school or should be upgraded to an institution of higher education in the field of engineering.

(2) Training in Nursing

Training in nursing started at the beginning of the 1900s. The School of Nursing was established on a site facing the National Hospital at Mottotua in Apia. The school of Nursing offered a nurse training program (for those who have completed the Junior secondary school (11th Grade)) under supervision of the Department of Health.

The Government of Western Samoa developed a long-term plan to improve the nurse training program, and in 1993 upgraded the School of Nursing to the Faculty of Nursing of the National University of Samoa. The diploma programs of the Faculty of Nursing including one soon to start are as shown in the following table.

Table 3-7 Diploma Programs at Faculty of Nursing

Program	Enrollment	Period of Education	Qualification
Bachelor of Nursing	—	6 Semesters (3 Years)	
Upper Diploma in Nursing			

The nursing diploma program was developed in 1990 in accordance with the WHO requirements. The program has already been approved by the National University of Samoa and is expected to start soon. The senior diploma program, on the other hand, concerns primary health care. The program, which started in 1993, was also implemented in 1994. It is a program for those who have expertise equivalent of a nursing bachelors degree, but who are not qualified as degree level nurses. In addition to these programs, the Ministry of Health offers Preregistration Diploma Courses (nursing in primary health care) and Hospital Certificate Courses. The Department of Health also offers the following medical professional training courses.

It has been decided, however, that all nurse education programs should be offered at the National University of Samoa.

Table 3-8 Medical Training Program Conducted by DOH

Program	Enrollment	Period of Education	
Health Inspectors	10/year	1 year	
Laboratory Technicians	8/year	1 year	
Dental Therapists	15/year	2 year	

(3) Western Samoa Teachers College

Until January 1991, when the two schools were merged into Western Samoa Teachers College (WSTC), teacher training was conducted at a primary school teacher training school founded in 1940, and at a secondary school teacher training school founded in 1978. The WSTC provides a primary school teacher training course and a secondary school teacher training course.

Western Samoa Teachers College is operating under the control of the Department of Education, and the Director of the Department of Education supervises its operation and management. The following figure shows the organization of the college.

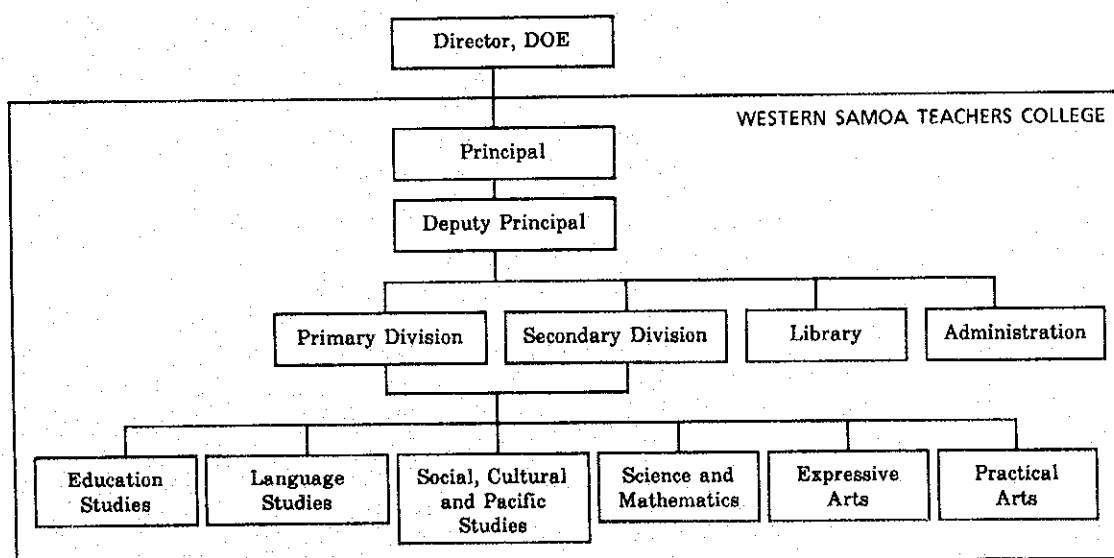


Fig. 3-7 Organization of the WSTC

The WSTC has a staff of 44, of which 33 are instructors and 9 are clerical staff. The college's staff composition is as shown in the following table.

Table 3-9 Staff of Western Samoa Teachers College

	Senior lecture	Lecturer	Others	Total
Education Studies	—	3	—	3
Language Studies	1	8	—	9
Social, Cultural and Pacific Studies	1	5	—	6
Science and Mathematics	1	5	—	6
Expressive Arts	1	3	—	4
Practical Arts	—	5	—	5
Administration and others	4	—	5	9
Total	8	29	5	42

From 1995, present qualifications for admission to the diploma of education program for secondary school teachers will also apply to admission to the program for primary school teachers.

Table 3-10 Qualifications for Admission to Western Samoa Teachers College

Program	Enrollment	Qualification
College Diploma for Primary School Teacher	aged 18 or older	Grade 12 with a maximum of 19 marks including 5 in English in WSSCE
Diploma of Education for Junior Secondary School Teacher	aged 18 or older	Grade 13 with a maximum of 19 marks including 5 in English in PSSCE

Students newly enrolled at the college pay an annual tuition fee of WS\$160, which covers the cost of stationery and part of other college costs. On the other hand, each of the college's students is provided with an annual allowance of WS\$250 (primary school teacher training program) or WS\$788 (secondary school teacher training program).

The college's programs are both 3-year programs. After completing a program, a student is awarded the College Diploma (primary school teacher training program) or the Diploma of Education (secondary school teacher training program). Then, after two years of practice teaching, they are awarded the Western Samoa Training Teacher Certificate.

Table 3-11 Curriculum of Western Samoa Teachers College

Sector	Program	Enrollment	Period of Education	Credit
Teacher Education	College Diploma (for Primary School Teacher)	180	3-year	42
	Diploma of Education (for Junior Secondary School Teacher)	180	3-year	42

The college's facilities occupy a part of the Malifa campus. As shown in the following table, their total floor space is 4,077 square meters, which is insufficient. Almost all classrooms are used every hour, and therefore the rate of use of every classroom is extraordinarily high.

Table 3-12 Floor spaces of Existing Facilities of Western Samoa Teachers College

Room Name	Area (m ²)	Note
Lecturer Rm	1,756.48	
Class-1	98.22	40 students
Class-2	57.24	30 students
Class-3	57.24	30 students
Class-4	57.24	30 students
Class-5	57.24	30 students
Class-6	71.60	30 students
Class-7	71.60	30 students
Class-8	71.60	30 students
Class-9	71.60	30 students
Class-10	117.02	40 students
Class-11	112.50	Demonstration Class Rm
Class-12	112.50	Demonstration Class Rm
Chemistry & Biology Lab.	67.49	Demonstration room for 24 students
Biology Prep. Rm	28.82	
Chemistry Prep. Rm	28.82	
Sewing Rm	88.20	15 students
Cooking Rm	88.20	15 students
Prep. Rm	34.20	
Oven Rm	21.00	
Carpentry · Metalwork Rm	118.80	15 students
Prep. Rm	20.00	
Storage	21.90	
Art Rm	35.60	10 students
Prep. Rm	15.25	
Hall	232.60	

Room Name	Area (m ²)	Note
Library	314.46	
Reading Rm	283.84	
Librarian Rm	15.84	
AV Storage	14.78	
Lecturers' Rm	486.88	
Lecturers' Rm	385.83	
Staff Rm	101.05	
Student Amenities	225.00	
Locker Shower Rm	225.00	each for men & women
Administration	93.87	
Principal Rm	17.50	
Vice Principal Rm	17.50	
Head of Primary Education	11.55	
Head of Secondary Education	11.55	
Office	18.27	2 persons
Storage	17.50	
Others	1,200.35	
Total	4,077.04	

The main existing equipment includes experimental/training equipment, office equipment, library bookshelves, and classroom/office desks and chairs. The experimental/training equipment is heavily damaged, and is insufficient in terms of type and quantity. Additional types and quantities of experimental/training equipment should be procured. Some computer-related equipment installed in 1993 is relatively new. Despite the fact that an air conditioner is installed in the computer room, metal parts at the back are already rusting. The audio-visual equipment includes 2 overhead projectors, a TV/Video set, 2 slide projectors and a home video camera, which is out of order. The audio-visual equipment is outdated, and may not work a few years from now. The classroom/office desks and chairs are old, damaged and need replacement.

(4) Technical Education

Technical education is provided at Western Samoa Polytechnic, Don Bosco Technical Center, which is a mission school, and Tuasivi Technical Center,

which is also a private school. Training of seamen and ship engine drivers is conducted at Maritime Training Center.

① Western Samoa Polytechnic

This school was founded in 1993 as the enlarged version of a technical training school in accordance with the 1992-93 Western Samoa Polytechnic Act. This Act was enacted to promote the growth of manufacturing and service industries, the country's two growth industries. The school is an autonomous institution operated and managed by a board that is required to submit annual reports to the Department of Education. Its facilities, with a total floor space of 4,059 square meters, are located on a site with an area of about 6.5ha, which is adjacent to the project site.

② Don Bosco Technical Center

This is a mission school, and there are similar schools with the same name in many countries. Many of this school's students are junior or senior secondary school dropouts. 60 of them take the 2-year course, and 18 of them take the additional 3rd-year course. Subjects included in the 2-year course are metal engineering, woodwork, auto repair, welding, architecture, furniture production and wood carving. Subjects included in the additional course are guidance techniques, furniture design/production, machine maintenance and retail business management. Other training courses are offered at Don Bosco Technical Center in the Philippines.

(5) Maritime Training Center

This school was founded in 1980 with the financial aid of Germany to train seamen and ship engine drivers. Although it was closed after its

founding, it reopened in 1986 to train only seamen and ship engine drivers for Samoan coastal routes. It is managed by a board that is required to report to the Department of Transportation. This school's programs are as shown in the following table.

The IMO Standards Able Seaman or Waterman is available to those who have completed the one-year program and who have more than two years of practical experience. The tuition fee for the one-year program is WS\$400.

Table 3-13 Programs at Maritime Training Center

Program	Enrollment	Period of Education	Training hours
IMO Standards for Ordinary Seaman or Oiler	Seamen Max. 20 students Oiler Max. 10 students	1-year	30 hours/a week
IMO Standards Able Seaman or Waterman	undecided	18-week	

(6) School of Agriculture of the University of the South Pacific

The University of the South Pacific (USP) was founded as an international university in the Pacific region with the financial assistance of Britain, New Zealand and Australia. It is an autonomous institution operated and managed by its council. The USP Council consists of representatives of the Governments of Australia, Britain, New Zealand, the regional member countries, regional organizations and representatives of the University. The main campus is in Suva, Fiji and there are four Schools: the School of Agriculture (in Western Samoa), the School of Humanities, the School of Pure and Applied Science and the School of Social and Economic Development. The member countries of USP are the Cook Islands, Fiji, Kiribati, the Marshall Islands, Nauru, Niue, the Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu and Western Samoa. It has established Extension Centers in each country and a third campus, specializing in Law studies, is being established in Vanuatu.

In 1993, it had an enrollment of about 7,000, including a wide variety of education courses in the region. The table below shows its internal long-term courses and the number of students taking these courses.

Table 3-14 Number of Full-Time Equivalent Students by Program

Program		1992	1993
Doctoral Courses	Director of Philosophy	4	2
Medical Courses	Bachelor of Medicine Bachelor of surgery	18	0
Master Courses	Master of Arts	18	27
	Master of Philosophy	3	2
	Master of Science	10	16
Bachelor Course	Bachelor of Agriculture	55	49
	Bachelor of Arts	1,014	1,126
	Bachelor of Arts (Business Studies)	44	60
	Bachelor of Arts (Land Management)	11	24
	Bachelor of Arts (Population Studies)	0	1
	Bachelor of Arts (Education)	7	6
	Bachelor of Science (Environment)	357	370
	Bachelor of Science (Environment)	0	18
	Bachelor of Technology	0	0
Other Courses	Unclassified Undergraduate	36	176
	Unclassified Postgraduate	7	3
	Postgraduate Certificate in Education	12	12
	Postgraduate Diploma	75	89
	Foundation Science	57	103
	Foundation Social Science	23	0
	Certificate	34	37
	Diploma	214	157
Total		1,998	2,159

(Source: The Report to the University Council 1994)

The School of Agriculture of USP was established in 1977 on a site consisting of 30.8ha of the former South Pacific Regional College of Tropical Agriculture and an adjoining 10.8ha of land known as Moamoa Estate, as the University's second campus after its Laucala campus, established in Suva, Fiji in 1967. Its initial facilities were completed with financial aid from the Government of New Zealand. Later on, its

facilities were gradually expanded with financial assistance from West Germany, the United States and Australia. In 1980, the Institute for Research, Extension and Training Agriculture (IRETA) was set up. IRETA is conducting research on regional agriculture, short-term training programs, consultant services, extension programs, and development of a regional agriculture information network.

In 1981, the Government of Western Samoa provided the school with a 10ha site for an experimental farm. As a result, the school's present organization of USP at Alafua is as shown in Fig. 3-8. The School of Agriculture is continuing to offer long-term education and training programs which allow its students to obtain proper degrees, diplomas and certificates.

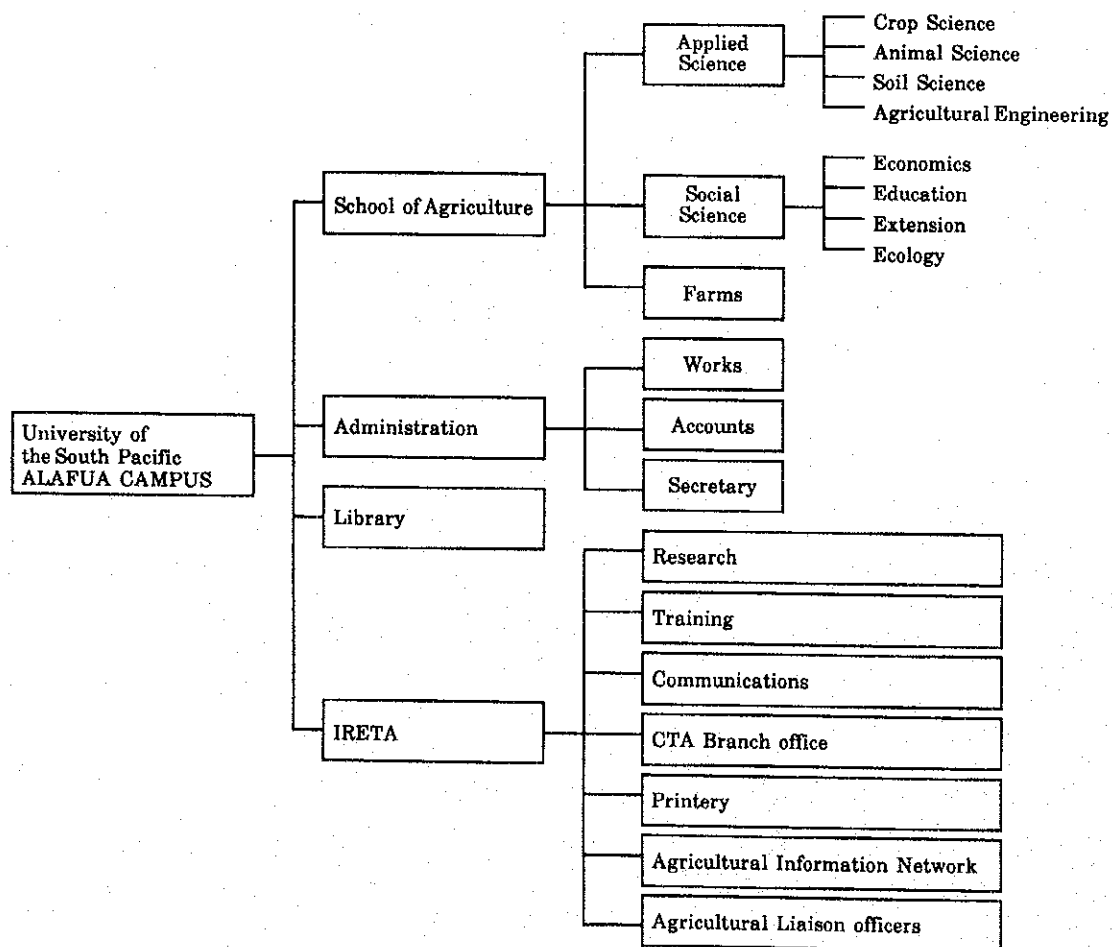


Fig. 3-8 Organization of the University of South Pacific at Alafua Campus in Western Samoa

Table 3-15 The School of Agriculture's Courses and Enrollment

Program	Sector	Period	1988	1989	1990	1991	1992
Master of Agriculture (M. Agric.)	Agric.	over 2 years	3	3	4	7	7
Bachelor of Agriculture (B. Agric.)	Agric.	3 years	53	54	61	66	60
Advanced Certificate Course, Teaching Agriculture (ACTA)	Agric.	1 year	—	15	19	15	6
Diploma Course Tropical Agriculture (DTA)	Agric.	Prep. year 2 years	12 42	13 53	12 56	12 49	— 57
Total in Agriculture			110	143	152	149	130

As is shown in the following table, Western Samoa ranks second after Fiji in terms of the number of students taking bachelor's degree course. This may be partly because of its geographical advantage, but this also reflects a considerably high level of agriculture in Western Samoa.

Table 3-16 The Distribution of Enrollments at SOA by top 5 Countries of Student Origin

	Total Enrollment	Rank				
		1st	2nd	3rd	4th	5th
Bachelor of Agriculture (B. Agric.)	464	Fiji 212	Western Samoa 102	Solomon Islands 49	Tonga 48	Vanuatu 25
Advanced Certificate Course, Teaching Agriculture (ACTA)	89	Fiji 30	Tonga 23	Western Samoa 14	Solomon Islands 13	Cook Islands Vanuatu 4
Diploma Course Tropical Agriculture (DTA)	903	Western Samoa 511	Tonga 107	Vanuatu 89	Niue 38	Cook Islands 31

3-3 Outline of Related Projects

3-3-1 7th National Development Plan

The 7th National Development Plan (1992-94) was worked out by the Government of Western Samoa, which was inaugurated in April 1991. The 7th National Development Plan, scheduled start in the wake of the 6th National Development Plan (1988-90), actually started in March 1992 because the country was hard hit by large-scale cyclones in 1980, 1990 and 1991.

In 1991, the duration for Western Samoan government fiscal year was changed to July 1 through June 30. For this reason, the Government compiled a provisional 6-month budget for the January 1 to June 30, 1991 period. Problems in the areas of education and human resources development and measures to deal with these problems are as itemized below.

① Problems

- There is a serious shortage of skilled labor required by government agencies and private businesses.
- Every year, about 8 percent of the Ministry of Education's staff quits, and most of them move overseas.
- There are no institutions in Western Samoa which develop human resources required by private businesses and government agencies; there is a brain drain.

② Countermeasures

- Improving education and training curricula and teaching techniques
- Improving instructors' compensation and eliminating shortages of educational resources
- Increasing the National University of Samoa's enrollment and improving its scientific capabilities

3-3-2 Development Plan for the National University of Samoa

In July 28, 1988, the Government of Western Samoa formed a committee to examine the National University of Samoa and review its future plans. In 1992 the Council appointed Prof. Ken Back of the Australia National University to prepare A Development Plan in cooperation with Mr. Dick Bishop at the Department of Education of Western Samoa. The report was confirmed and accepted by the Council in December 1993.

The main principle which underpins the academic development of NUS is cooperative inter-university links, particularly a formal link with the University of the South Pacific. On 27 May 1994 a Memorandum of Agreement between the National University of Samoa and the University of the South Pacific was signed by the Vice-Chancellors of the two universities.

The Development Plan is divided into three stages -- the First stage (1994-2000), the Second stage (2001-2005) and the Third stage (2006-2015) -- and stipulates specific goals, contents and scale of courses for each stage. The following table gives an outline of the Development Plan. According to the table, by the end of Stage 2 (2005) the University should have an enrollment of about 1,500 (Faculty of Education: 750; Faculty of Arts/Faculty of Science: 300; UPY Course: 300; Accounting/Business Management Course: 100; Faculty of Nursing: 50) and an academic staff of 210 (full-time: 100; part-time: 50; clerical staff: 6).

Faculty	Stage 1 (1994~2001)	Stage 2 (2001~2005)	Stage 3 (2006~2015)
UPY	• Consolidation of the course	• Further consolidation of the course	• Progressive transfer of the course to senior secondary schools
Faculty of Arts	• Ba degree (courses up to 200-level, cross credits for 300-level courses) • Consolidation of the Diploma in Accounting	• Increase in courses for BA degree (part of 300-level courses) • Degree level courses in accounting, economics and business studies	• Widening of programs for BA degree • Further development of programs in business studies and commerce

Faculty	Stage 1 (1994~2001)	Stage 2 (2001~2005)	Stage 3 (2006~2015)
Faculty of Science	• BSc degree (courses up to 100-level, cross credits for 200 and 300-level courses)		• BSc degree (courses up to 200-level, some 300-level courses in mathematically based subject and computing)
Faculty of Education	• Joint teacher training courses with WSTC (English, mathematics, basic science and Samoan Studies)	• Establishment of the faculty by amalgamating NUS and WSTC • Introducing diploma, post-graduate diploma and degree level courses	• Further consolidation of the faculty with in-service upgrading, refresher and special education courses
Center of Excellence in Samoan Studies	• Development of the Center with subjects for BA, UPY and other programs	• Consolidation of the Center as an internationally recognized center of Samoan Studies	• Introducing post-graduate courses in Samoan Studies
Others	• Preparation for establishing the Diploma in Nursing	• Development of a regional role in nursing and education programs	• Introducing degree-level courses in nursing

The Development Plan cites cases of the Australian National University as examples of teachers colleges being upgraded to the Schools of Education in universities. It notes that primary school teachers are required to have more advanced knowledge and skills than secondary school teachers, and therefore the improvement of primary school teacher training course directly contributes to the improvement in the quality of education in the country. For this reason, the aforementioned three-stage plan for the project implementation was prepared with particular emphasis on the teachers college's integration into the National University of Samoa. In the plan, the prospective Faculty of Education is an element of the University which is as important as the Faculty of Arts and the Center for Samoan Studies.

Furthermore, in the plan, the establishment of a bachelor's degree nursing course at the University is proposed to improve the quality of the country's nursing education. It is suggested in the proposal, on the recommendation of WHO, which investigated the Nurse Training School (NTS) in 1990, that the Department of Health be responsible for course operation and budgetary appropriations and that the University be responsible for granting bachelor's degree.

The following figure compares the present state of the National University of Samoa and the projected university organization and functions, as envisioned in the 20-year Development Plan for the University.

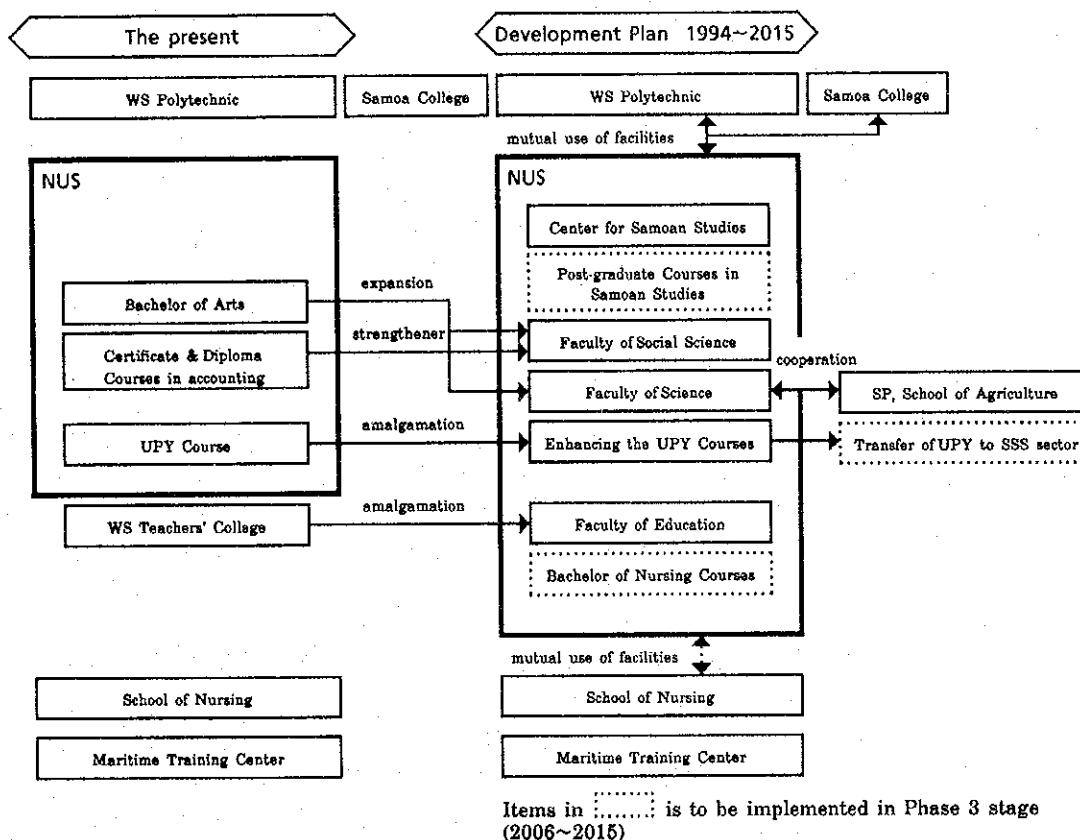


Fig. 3-9 20-Year Development Plan for the National University of Samoa (1994/2015)

Under the 20-year Development Plan, higher education in the country is to be provided at Western Samoa Polytechnic, the Nurse Training School (to be upgraded to the Faculty of Nursing of the National University of Samoa), the Maritime Training Center, the National University of Samoa and the University of the South Pacific in Samoa (School of Agriculture). It is expected that the National University of Samoa will put more energy in practical education, become the most prominent institution of Polynesian studies, and raise standards of general university education.

3-4 General Condition of the National University of Samoa

3-4-1 Details of the Founding of the University

Since Western Samoa became independent in 1962, demands have been voiced for an institution of higher education by and for the Samoan people. In 1968, the University of the South Pacific was founded in Suva, Fiji as an international university in the Pacific region, and one of its branches (School of Agriculture) was set up in Alafua of Western Samoa. Because of this, however, the Government of Western Samoa's plan to establish its own university failed to obtain the understanding of foreign countries and international organizations, and establishing such a university became less likely. Nevertheless, the desire of citizens and the Government of Western Samoa for a national university increased. In April 1983, the Government of Western Samoa incorporated the Samoan cultural tradition and language into the country's curricula after reviewing of the problems and opportunities in education. The cabinet decided to establish a national university which is aimed at reviving and promoting the values and philosophy of Samoan culture, and instructed the Minister of Education to form a special committee to prepare to implement the development project.

In special committee meetings, government consultants maintained that the development project would be a heavy financial burden on the country and that there was little possibility that the planned national university would be recognized internationally, but country opinion leaders, including representatives of churches and chambers of commerce and industry supported the development project.

In 1984, the National University of Samoa Act of 1984 was passed by the national assembly and the National University of Samoa was founded.

The University had an initial enrollment of 48. These students had passed New Zealand's or Western Samoa's university entrance examinations.

3-4-2 National University of Samoa Act of 1984

This law, which governs the founding of the National University of Samoa, stipulates that the National University of Samoa shall be an autonomous institution operated and managed by the Council of the University.

The Council of the University consists of 16 members, and the Council meeting's quorum is 10.

1. the Chancellor
2. the Pro-Chancellor
3. the Vice-Chancellor
4. the Deputy Vice-Chancellor
5. the Pro-Vice-Chancellor
6. 3 members to be appointed in the manner provided by the Statutes to represent the interests of the church education system in Western Samoa
7. 1 member to be appointed by the Government of the Commonwealth of Australia
8. 1 member to be appointed by the Government of New Zealand
9. the Director of Education
10. 1 member to be appointed by the Western Samoa Chamber of Commerce
11. the Vice-Chancellor of the Australian National University
12. the Vice-Chancellor of the University of Auckland
13. the Vice-Chancellor of the University of the South Pacific
14. the President of the University of Hawaii

The Council of the University is required to submit annual reports to the Government of Western Samoa.

3-4-3 Objectives and Roles of the National University of Samoa

(1) Objectives of the University as stipulated in the National University of Samoa Act of 1984 are as follows.

- 1) To conduct university-level education, research, development and recording of Samoan culture and the Samoan language.
- 2) To link Samoan culture and the Samoan language with other Polynesian cultures and languages in the Pacific region.
- 3) To support the Samoan studies program established at universities in New Zealand.
- 4) To cooperate with the centers for Pacific studies at the National University of Australia, the University of Honolulu, the University of Oslo and the University of Norway, where research on Samoan culture and language is conducted.
- 5) To supply government agencies and private businesses with necessary human resources.
- 6) To train teachers and nurses (to accept students to receive training in nursing from such neighboring countries Toela, Tuvalu, Niue, etc., with which Western Samoa has long had close relations).

3-4-4 Organization and Staff Members

(1) Organization

The organization of the National University of Samoa is as shown in the following figure.

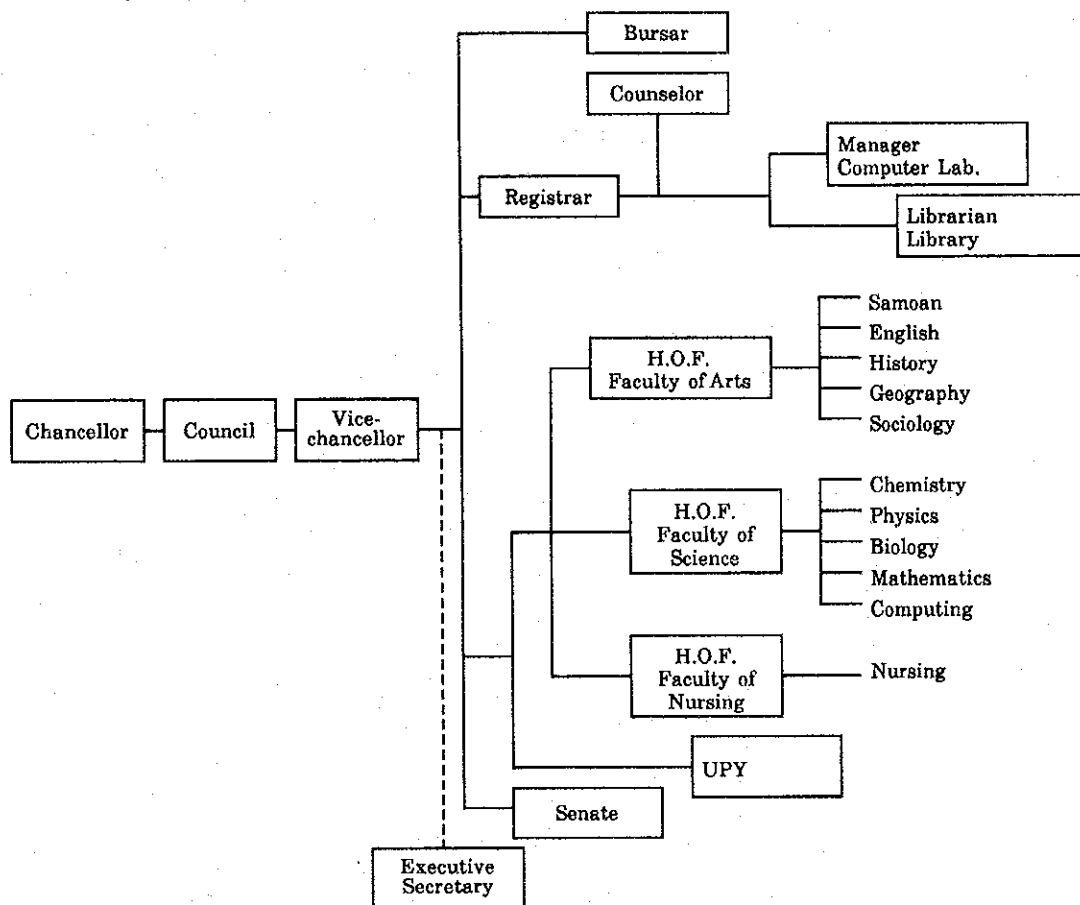


Fig. 3-10 Organization of the National University of Samoa, 1994

(2) Staff Members

At present, the university has an academic staff of 46 (full-time: 30; part-time: 16) and an administration/clerical staff of 20.

1) Academic Staff

The University's academic staff consists of 1 professor, 1 senior lecturer and 40 lecturers. A breakdown by faculty of the University's academic staff is as shown in Table 3-17.

Table 3-17 Breakdown of the Academic Staff (by Faculty)

		Professor	Reader	Senior Lecturer	Lecturer	Total
Faculty of Arts	F.T.	1	—	1	12	14
	P.T.	0	—	0	9	9
Faculty of Science	F.T.	0	—	1	8	9
	P.T.	0	—	0	0	0
Faculty of Nursing	F.T.	0	—	0	5	5
	P.T.	0	—	0	6	6
Total	F.T.	1	—	2	25	28
	P.T.	0	—	0	15	15

A breakdown by subject of the University's academic staff is as shown in the following table.

Table 3-18 Breakdown of the Academic Staff (by Subject)

Faculty of Arts	Nos. of Staff	Faculty of Science	Nos. of Staff	Faculty of Nursing	Nos. of Staff
Samoan	5	Mathematics	4	Nursing	11
English	4	Physics	1		
History	1	Chemistry	1		
Geography	1	Biology	1		
Commerce	10	Computer	2		
Sociology	2				
Total	23	Total	9	Total	11

2) Administrative/Clerical Staff

The University has an administrative/clerical staff of 20: 17 are managers or clerical workers; a cleaner; a caretaker; and a night watchman.

Table 3-19 Breakdown of the Administrative/Clerical Staff

Administration	Nos.	Technical Staff	Nos.	Secretarial Staff	Nos.	Library Staff	Nos.
Vice-Chancellor	1	Computer Manager	1	Executive Secretary	1	Librarian	1
Registrar	1	Computer Technician	1	Typist	2	Assistants	3
Bursar	1	Systems Engineer	1	Assistants	4		
Total	3	Total	3	Total	7	Total	4

3-4-5 Operating Budget

The National University of Samoa's incomes consist of the government's current subsidies, equivalent to the amount of the University's current expenses, and other subsidies, tuition fees, and other incomes. Over the past five years, the University has had no development appropriations. Trends in the University's incomes and expenditures are as shown in Table 3-20 and Table 3-21. Expenditures are equal to incomes.

Table 3-20 Incomes of the National University of Samoa 1990~1994/95

(Unit: WS\$)

	1990/91	1991/92	1992/93	1993/94	1994/95
Recurrent Budget	709,999	836,000	886,600	886,600	1,184,409
Aid Grant	375,380	102,600	100,000	100,000	87,000
Fee	22,982	60,006	68,000	87,750	290,000
Others	9,504	27,158	13,400	13,400	8,000
Total Revenue	1,117,865	1,025,764	1,068,000	1,155,750	1,570,009

(Source: NUS)

Table 3-21 Expenditures of the National University of Samoa 1990~1994/95

(Unit: WS\$)

	1990/91	1991/92	1992/93	1993/94	1994/95
Salaries	609,634	629,526	869,254	924,796	1,189,409
Supplies & Equipment	370,843	189,493	97,350	102,210	143,600
Facility Operation	75,661	141,290	18,805	36,544	94,000
Facility Maintenance	31,838	28,000	32,615	49,400	52,000
Equipment Maintenance	29,889	34,455	49,976	42,800	91,000
Total Expenditure	1,117,865	1,025,764	1,068,000	1,155,750	1,570,009

(Source: NUS)

The rate of increase in the University's expenditures and income was -8.2 percent in 1991/92, 4.1 percent in 1992-93 and 8.1 percent in 1993-94. In 1994-95, it is 35.8 percent. While the rate of increase in the University's payroll for the same fiscal year is 28.6 percent, the rate of increase for equipment maintenance expenses is about 260 percent, and the rate of increase for facility maintenance expenses is about 210 percent. This is because such items of equipment as computers, which require frequent maintenance, were obtained during the fiscal year. The equipment

and material expenses include allowances for the students and payments to the University of the South Pacific, Alafua for the use of its facilities and purchases of office supplies and equipment.

3-4-6 Track Record

Since its founding in 1984, the University has graduated a total of 1,262 students (UPY course: 1,162; bachelor's degree course: 21; diploma/certificate courses: 79). In the years immediately after its founding, students who passed the UPY examination at a sufficient standard received scholarships to attend universities in Australia, New Zealand and USP. Subsequently more students attended NUS and after ten years, in 1993, the University had graduated 10 Bachelors of Arts.

In 1993, the Nurse Training School, which had been operating under the control of the Department of Health, was integrated into the National University of Samoa and became the Faculty of Nursing of the University. In 1994, a Nursing Diploma Course was introduced in the University. As a result, the University now has three Faculties -- Faculty of Arts, Faculty of Science and Faculty of Nursing.

Table 3-22 National University of Samoa's Track Record 1984~1994

(Unit: WS\$)

Cont. WSP

	UPY Program			Degree Program		Diploma/Certificate			Total Enrollment
	Nos. of candidates for an examination	Nos. of students entered	Nos. of students completed	Enrollment	Nos. of graduates	Enrollment	Nos. of students completed		
							Diploma	Certificate	
1984	262	48	33	—	—	—	—	—	48
1985	253	63	45	—	—	—	—	—	63
1986	260	74	48	—	—	—	—	—	74
1987	284	68	47	—	—	—	—	—	68
1988	305	70	50	28	—	169	—	—	267
1989	346	95	56	42	—	131	—	9	268
1990	369	150	82	22	7	163	1	13	340
1991	411	126	70	107	2	186	1	9	419
1992	668	144	74	232	2	232	5	17	608
1993	531	167	91	144	10	277	3	21	588
1994		157	—		—		—	—	

(Source: NUS)

① Faculty of Arts

The Faculty of Arts is the National University of Samoa's only Faculty that awards bachelor's degree (bachelor of arts majoring in Samoan studies). As shown in the following table, the Faculty of Arts has four majors -- Samoan studies, English literature, sociology and history.

Table 3-23 Faculty Arts' Majors

Courses	100 level		200 level		300 level	
	1st Semester	2nd Semester	1st Semester	2nd Semester	1st Semester	2nd Semester
Samoan study	3	3	3	5	4	3
English	2	2	—	1	—	4
Sociology	1	1	2	2	—	—
History	2	1	2	2	1	2

To be awarded a bachelor's degree students of the Faculty are required to take a total of 20 courses -- 8 to 12 major courses (100 level: 2; 200 level: 3; 300 level: 3) and 8 to 12 other courses. At present, only students majoring in Samoan studies are qualified for a bachelor's degree. At present, preparations are being made to award bachelor's degree to students majoring in English literature by offering them a special curriculum/syllabus (100 level: 2; 200 level: 7; 300 level: 7). The Faculty intends to introduce this bachelor's degree course as soon as it secures a necessary number of lecturers. The Faculty is also offering night business management/accounting diploma/certificate course for people who work days. Every year about 100 people attend this course.

② Faculty of Science

At present, the Faculty of Science offers two certificate programs -- mathematics/statistics and computer science. Three types of course -- 100 level courses (1st semester: 8; 2nd semester: 5), 200 level

courses (1st semester: 3; 2nd semester: 3) and 300 level courses (2) -- are planned for the future.

③ Faculty of Nursing

Only such general courses as English, Samoan studies and mathematics are provided.

④ UPY

This is a preparatory course for students who plan to take courses at USP, universities in New Zealand and Australia as well as at NUS. At present, this course is divided into three categories -- science, humanities and commerce -- and are subdivided into 16 subjects. Students are required to study 10 of these subjects. There are no full-time lecturers to teach these subjects. Lecturers at the Faculty of Arts and the Faculty of Science are in charge of this course. Since the university has no laboratories, chemical and biological experiments are conducted at the laboratories of the School of Agriculture of the University of the South Pacific, and physical experiments at the laboratories of Samoa College.

About 30 percent of the students who have completed the UPY course study at universities in Australia and New Zealand. Others enroll at the National University of Samoa. The rest find employment.

The following table outlines the programs of the National University of Samoa.

Table 3-24 Curriculum of the National University of Samoa 1994

Program	Education Sector	Inauguration year	Terms of the Program	Required Course	Enrollment/ 1994
UPY Program	Science	1984	1 Year	10	41
	Commerce / Accounting	1984	1 Year	10	51
	Social Science	1984	1 Year	10	57
Degree Program	Samoan	1993	3 Year	20	40
	English		3 Year	20	32
	History		3 Year	20	33
	Mathematics	plan	3 Year	20	
Diploma Program	Accounting	1989	1 Year	8	51
	Nursing	1994	2 Year	15	20
	Mathematics	1995	2 Year	8	
Certificate Program	Commerce	1988	1 Year	6	106
	Mathematics	1994	2 Year	6	
	Computing	1994	1.5 Year	6	

Table 3-25 shows the National University of Samoa's enrollments in 1993 and 1994. In 1993, the number of students who have completed their respective courses was 125. In 1994, 371 students were admitted to the University.

Table 3-25 Track Record of the National University of Samoa

		subject	Term of the Program	1993		1994	
				Enrollment	Graduate	Students entered	
A.	UPY Program	Bachelor of Arts	1 Year	167	91	157	
B.	Faculty of Arts	Degree Program	Bachelor of Arts	3 Year	132	10	29
		Bachelor of Education	3 Year	12	0	0	
		Diploma	Account	1 Year	35	3	51
		Certificate	Commerce	1 Year	241	21	106
C.	Faculty of Science	Degree Program		3 Year			
		Diploma		2 Year			
		Certificate	Mathematics	2 Year	1	0	8
			Computing	1.5 Year			
D.	Faculty of Nursing	Degree Program		3 Year			
		Diploma	Nursing	2 Year			20
E.	Total	Degree Programs		144	10	29	
		Diplomas		35	3	71	
		Certificates		242	21	114	
Grand Total (A + E)				588	125	371	

3-4-7 Present State of the National University of Samoa's Existing Facilities and Equipment

(1) Premises

The University has no campus of its own. It rents part of the facilities on the Malifa campus in the Malifa District in the center of Apia. There are a national primary school and a junior secondary school on the campus. The combined total number of pupils and students of the two schools is about 4,500. These schools' facilities are very congested. There are many classes of more than 80. In addition, the campus has facilities of the University of the South Pacific and the Department of Education. In the eastern part of the campus are the premises of the Western Samoa Teachers College.

(2) Present State of the Existing Facilities

The buildings that the University uses are obsolete and far from suitable for research and education at the University in terms of function and space. Since the University has no laboratories, experiments are conducted at the laboratories of Samoa College and the School of Agriculture of the University of the South Pacific. It shares a library with the Western Samoa Teachers College. One of its rooms which used to be a library is now used as a meeting room and as a Samoan studies room.

Table 3-26 Floor Spaces of the National University of Samoa's Existing Facilities

Room Name	Area (m ²)	Note
Lecture Rm	892.75	
Room - 1	74.21	40 students
Room - 2	74.21	40 students
Room - 3	74.21	40 students
Computer Lab.	74.21	20 students
Computer Prep. Rm	37.10	
Falé	558.81	
Library	92.18	
Reading Rm	85.58	moved to WSTC
Librarian Rm	6.60	
Lecturers' Rm	225.93	
Arts HOF Rm	32.36	
English PCI Rm	9.40	
History IC Rm	9.40	
Science PIC Rm	23.86	
English Staff Rm	9.40	
History Staff Rm	18.55	2 persons
Samoan Study Rm	18.55	2 persons
Biology Study Rm	18.55	2 persons
Math. & Science Staff Rm	18.55	2 persons
Accounting & Management Staff	18.55	2 persons
UPY	18.55	
Staff Rm	30.21	
Student Amenities	19.08	
Shop	19.08	
Administration	78.75	
Vice Chancellor's Rm	16.40	
Bursar's Rm	16.40	
Chief Accounting Rm	16.40	
Accountant Office Rm	16.40	
General Office Rm	13.15	
Resource Center	16.40	
Others	517.25	
Total Area	1,825.94	

(3) Present State of the Existing Items of Equipment

The University's main existing equipment includes computer-related equipment, physical experimental equipment, office equipment, and lecture room/office desks and chairs. Except for the 11 personal computers which were introduced in July 1994 under the Government of Japan's Equipment Grant Aid, almost all the existing items of equipment are close to the end

of the service lives. It seems that these items will have to be replaced in a few years. It also seems that except for the computer-related equipment, almost all the existing items of equipment are managed poorly. The University has not concluded maintenance contracts with the suppliers of computers and computer-related equipment for repair service when equipment breaks down. The University has no laboratories and uses the laboratories of the School of Agriculture of the University of the South Pacific, Samoa College and Western Samoa Polytechnic. Thus, the number of pieces of experimental equipment at the University is small given the scope of its education and training and the number of students using it. Furthermore, the University's pieces of experimental equipment are all for use in physical experiments, and inadequate in terms of quantity and performance. The computer-related equipment is used more than 40 hours a week on average in the Faculty of Science's computer courses and UPY Course. It is expected that these pieces of equipment will be used more than 80 hours a week in the future.

CHAPTER 4 CONTENTS OF THE PROJECT



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4-1 Objectives of the Project

The economic structure of Western Samoa is shifting from primary industry to higher value-added industries. In the 7th National Development Plan, secondary and tertiary industries are regarded as the main force for further growth of Western Samoa. At present, the number of white-collar employees operating and managing these industries is not large enough. It is therefore urgent for the country to improve university education qualitatively and quantitatively.

However, the National University of Samoa (NUS), which is the sole university of Western Samoa, is not in a position to meet the expectations of the Government due to lack of academic and physical plans for growth and development, as well as a shortage of lecture rooms, laboratories and equipment for educational and research use.

In 1993, the Council of NUS approved A Development Plan for the National University of Samoa, prepared by Emeritus Professor Kenneth J. Back with assistance from the Government of Australia and the Government of New Zealand. The Development Plan outlines progressive academic improvement and physical development of NUS over the next twenty years.

The objectives of this Project are physical development mainly covering the First Stage of the Development Plan. This entails constructing and providing facilities and equipment which are urgently required, and contributing to economic development of Western Samoa.

4-2 Examination of the Contents of the Request

4-2-1 Appropriateness and Necessity of the Project

The three main roles which NUS should play to realize the aforementioned objectives are:

- Development of human resources contributing to economic and social development.
- Improvement of teacher training programs by establishing the Faculty of Education.
- Preservation, maintenance and advancement of Samoan language and culture.

The necessity and relevance of each of these three roles are examined as follows:

(1) Development of Human Resources

In 1984, when NUS was founded, there were only 262 Pacific Senior School Certificate (PSSC) candidates who wanted to get a university education, but this number of candidates nearly doubled to 530 by 1993. It is expected that the annual number of students who wish to enroll for university education will remain constant at about 600, or about 10 percent of the population of 18-year olds, until the year 2000.

However, opportunities for university education are very limited: only 40 students can enroll in undergraduate programs at NUS presently; many UPY graduates who failed to obtain overseas scholarships abandon plans for further study and gain employment.

Social need for tertiary education is changing. Changes in the economic structures of Western Samoa generate growing demand for practical education in business English, business management, accounting and

computer studies. The Government also needs to develop competent staff able to participate in policymaking and formulate development plans.

Hence, NUS is expected to play an increasingly important role in the tertiary education system of Western Samoa.

(2) Improvement of Teacher Training Programs

There are 158 primary schools (public: 141, private: 17) in Western Samoa. The total number of primary schoolchildren is 35,739 and that of primary school teachers is 1,478. Since the overall Teacher: Learner ratio of 1:24 is not so large compared with a ratio of 1:20.5 in Japan, the quantity of primary school teachers is fulfilled.

The most urgent problem relates to quality of these teachers. According to a survey conducted by the Department of Education, about 15 percent of primary school teachers and about 30 percent of secondary school teachers do not have relevant qualifications; few school teachers are proficient in teaching English, mathematics and general science. A survey of learning skills of primary schoolchildren in the South Pacific region (the PILL study), which was sponsored by UNESCO, shows that Western Samoan pupils' examination scores in English, Samoan and mathematics were 44 percent, 26 percent and 29 percent, respectively, lowest among all participating countries.

Insufficient primary education adversely affects higher education; many students who enter universities and colleges in Australia and New Zealand drop out because of poor academic ability. According to reports of the World Bank Project: Pacific Regional Post Secondary Education Study, from 1980 to 1983, as much as 66 percent of Western Samoan students studying at universities and colleges in New Zealand dropped out. The reports pointed out the insufficient level of education provided in the UPY Course at NUS

and raised the possibility that foreign universities and colleges may cease to accept the UPY Course as qualification for admission.

Teacher inefficiency in teaching English, mathematics and basic science at all levels has resulted in poor student skills for the above subjects at all levels. Students with poor mathematics and literacy skills enter and graduate from the Teachers College (WSTC) and eventually become school teachers; overall quality of school teachers is likely to decline further for lack of basic academic skills. A vicious circle whereby "Poor skills in basic subjects" and "Inefficiency in teaching basic subjects" perpetuate each other is the greatest problem the educational system of Western Samoa faces. It is therefore important to improve teacher training programs through this Project.

(3) Preservation, Maintenance and Advancement of Samoan Language and Culture

The National University Act defines the most important mission of NUS as "to retrieve, analyze, maintain, advance and disseminate knowledge of Samoa, the Samoan language and Samoan culture". Although other institutions (the Center for Pacific Studies of the University of Auckland, the Department of Polynesian Language of the University of the South Pacific and the Center for Polynesian Studies of the Hawaii University) research Samoan culture, only NUS is located in Western Samoa and is organized and managed by Samoans.

The research and educational activities at other foreign universities are very limited; the main objectives are to teach Samoan language and culture to foreign students, but not to carry out full-scale research projects on Samoan cultures. Even the Center for Pacific Studies at Auckland University, which is supposed to be the most active foreign institution,

offers only some 100-level Samoan language courses and does not award a BA major in Samoan Studies.

It is therefore reasonable and sound for NUS to establish the Institute of Samoan Studies within the scope of this Project to research language, customs, traditional economy, politics, religion, legal systems, music and fine arts of Samoa.

A Development Plan for the National University of Samoa is divided into three stages: the First Stage (1994-2000), the Second Stage (2001-2005) and the Third Stage (2006-2015). It is designed to identify goals at each stage by setting broad limits on student numbers, academic developments and physical requirements for the twenty-year period.

Table 4-1 Details of Development Plan for NUS

Faculty	Stage 1 (1994~2000)	Stage 2 (2001~2005)	Stage 3 (2006~2015)
UPY	<ul style="list-style-type: none"> • Consolidation of the course 	<ul style="list-style-type: none"> • Further consolidation of the course 	<ul style="list-style-type: none"> • Progressive transfer of the course to senior secondary schools
Faculty of Arts	<ul style="list-style-type: none"> • BA degree (courses up to 200-level, cross credits for 300-level courses) • Consolidation of the Diploma in Accounting 	<ul style="list-style-type: none"> • Increase in courses for BA degree (part of 300-level courses) • Degree level courses in accounting, economics and business 	<ul style="list-style-type: none"> • Widening of programs for BA degree • Further development of programs in business and commerce
Faculty of Science	<ul style="list-style-type: none"> • BSc degree (courses up to 100-level, cross credits for 200 and 300-level courses) 		<ul style="list-style-type: none"> • BSc degree (courses up to 200-level, some 300-level courses in mathematically based subject and computing)
Faculty of Education	<ul style="list-style-type: none"> • Joint teacher training courses with WSTC (English, mathematics, basic science and Samoan Studies) 	<ul style="list-style-type: none"> • Establishment of the faculty by amalgamating NUS and WSTC • Introducing diploma, post-graduate diploma and degree level courses 	<ul style="list-style-type: none"> • Further consolidation of the faculty with in-service upgrading, refresher and special education courses
Center of Excellence in Samoan Studies	<ul style="list-style-type: none"> • Development of the Center with subjects for BA, UPY and other programs 	<ul style="list-style-type: none"> • Consolidation of the Center as an internationally recognized center of Samoan Studies 	<ul style="list-style-type: none"> • Introducing post-graduate courses in Samoan Studies
Others	<ul style="list-style-type: none"> • Preparation for establishing the Diploma in Nursing 	<ul style="list-style-type: none"> • Development of a regional role in nursing and education programs 	<ul style="list-style-type: none"> • Introducing degree-level courses in nursing

The contents requested by the Government of Western Samoa cover mainly the First Stage of the Development Plan, which is scheduled to end in 2000.

To finalize the scope of this Project, academic activities of each faculty are examined:

1) Faculty of Arts / Faculty of Commerce / Faculty of Science

At present, about 7 percent of the Education department's annual budget (about WS\$1,184,400) is allocated for operation and management of NUS. However, the educational and research activities at the Faculty of Arts, Commerce and Science are not worth the amount invested in them. It is therefore advisable that this Project should encourage three faculties to substantially raise academic returns to make them worth the size of the budget, rather than stick to the Development Plan.

a) Faculty of Arts

The Faculty of Arts intends to offer subjects for Bachelor of Arts (majors in English literature/business English) and Diploma in English, in addition to the present Bachelor of Arts (major in Samoan studies) and Diploma in Samoan studies. English is used widely in government agencies and private businesses in Western Samoa, and there is a strong demand for the programs. It is therefore appropriate that this Project improve the quality of the English programs.

b) Faculty of Commerce

Every year, more than 100 students, mostly mature-aged full-time employees, enroll in the Commerce/Accounting Diploma/Certificate programs; there is a strong demand for practical business programs

at NUS. To cope with increasing demand, NUS plans to improve the Commerce/Accounting programs by separating the Faculty of Commerce from the Faculty of Arts. The Council of NUS approved the plan in October, 1994. The Faculty of Commerce will be established in February, 1995. It will provide degree-level courses in the future, while continuing current programs for some time after its establishment.

Since Western Samoa has no higher institutions which are equivalent to "vocational college" in Japan, offering practical business programs is one of NUS's important functions. It is also advisable that NUS open practical Diploma/Certificate programs similar to the Technical And Further Education (TAFE) Program in Australia. The following practical programs will be important in Western Samoa.

- Diploma/Certificate in Business Management/Marketing
- Diploma/Certificate in Secretarial Studies
- Diploma/Certificate in Foreign Trade
- Diploma/Certificate in Travel and Tourism

c) Faculty of Science

According to the Development Plan, subjects other than basic science, mathematics and computer studies are to be studied under cross-credit programs and/or distance education programs with the University of the South Pacific (USP) and other universities. However, studying laboratory-based subjects through distance education programs has limitations; physics, chemistry and biology courses at bachelor degree level (300-level) should be provided at NUS. NUS also plans to establish the Certificate of Proficiency

(COP) in mathematics, general science and computer studies for interesting students studying for Diploma in Education program and for practicing teachers.

2) Faculty of Education

The Development Plan calls for WSTC to amalgamate with NUS to form the Faculty of Education during the second half of its Second Stage, around the year 2005. However, the Government of Western Samoa intends to form the faculty earlier than this schedule to expedite consolidation of teacher training programs. In carrying out the amalgamation, issues such as lecturer salary gaps between the two institutions (NUS's lectures: WS\$16,500 per annum; WSTC's lecturers: average, WS\$11,650 per annum) and collection of tuition fees, are to be resolved. It is proposed that a Working Party be set up so that the necessary steps in preparation for the amalgamation can be identified. NUS and WSTC should be amalgamated by 1997, when the new campus is scheduled to be completed under this Project.

The Faculty of Education is to train about 120 students every year through Diploma in Education, Primary Teachers and Diploma in Education, Junior Secondary Teachers for some time following the amalgamation. In Western Samoa, the number of teachers retiring each year is consistently about 70; long-term emphasis of teacher training should be on quality, rather than quantity. The Faculty intends to provide a Bachelor of Education program and in-service upgrading, refresher and special education programs for practicing teachers in the future.

3) UPY Course

The UPY Course opened in 1984, when NUS was founded, in order to provide college graduates with bridge courses to prepare for university studies. At first, the UPY Course followed closely the Foundation Year Courses of the University of the South Pacific and used materials provided by USP. By arrangement with USP, course assessors visited NUS on a regular basis to review programs and provide advice. However, the use of course assessors from USP ceased in 1987; there has been no external academic assessment for the UPY Course since then. Course topics have been developed with some elements specially designed for Western Samoan students, but UPY Course standards have been declining gradually. An arrangement with foreign universities would help to maintain UPY Course standards.

Since NUS provides the UPY Course as "an emergency step", which the senior secondary schools should essentially provide, responsibility for the UPY Course should be transferred to these schools. The Project will also encourage NUS's cooperation with Samoa College to develop curriculum and in-service teacher training courses for this purpose.

4-2-2 Examination of the Project Implementation and Management System

(1) Management System

At present, NUS has 43 academic staff members (28 full-time lecturers and 15 part-time lecturers) and 20 administrative and clerical staff members. WSTC has 41 lecturers and 5 administrative and clerical staff members. NUS is planning to increase the number of lecturers by 19, mainly to improve the Faculty of Commerce and Faculty of Science, and increase administrative staff by 16 by the year 2000.

NUS intends to separate the Samoan Studies Center and the Faculty of Commerce from the Faculty of Arts, and the Faculty of Mathematics/Computer Science from the Faculty of Science. However, it is appropriate that NUS consists of five faculties (Faculty of Arts, Faculty of Commerce, Faculty of Science, Faculty of Education and Faculty of Nursing) and one research institute (Samoan Studies Center) until activities at the new campus are consolidated.

(2) Budget Plan

Budget to install electricity, telephones and supply water, to be borne in part by the Government of Western Samoa, was discussed and basically confirmed during the Basic Design Study period. The Minister of Education identified that the Government will make budgetary appropriations for the aforementioned work and some other operations in June 1995.

The operation cost of the proposed facilities is estimated at WS\$3,201,810 (at 1994 prices), which is equivalent to only 134% of the total recurrent costs of NUS and WSTC in 1994.

4-2-3 Examination of the Project's Relationships/Overlap with Other Assistance Projects

(1) Respective Roles of Tertiary Institutions

In Western Samoa, there are other tertiary institutions: the Western Samoa Polytechnic (WSPOLY), the Nurses Training School (NTS) and the Maritime Training School (MTS). The following institutions having close relations with NUS should assume their respective roles.

1) Nursing Training School (NTS)

In 1994, the Nurses Training School was amalgamated with NUS to form the Faculty of Nursing. Its existing facilities at Motootua, adjacent to the National Hospital, became the Motootua Campus of NUS. The Government of Australia has been providing assistance to the Motootua Campus through AIDAB and preparing A Development Master Plan for the faculty, which includes refurbishment of the existing facilities at Motootua. According to the Master Plan, students and lecturers of the faculty usually stay in the Motootua Campus, where most sessions for the faculty are held. Students attend sessions only in basic science and computer studies at NUS.

Since the necessary facilities and equipment for the faculty are to be procured when the Motootua Campus is repaired in the aforementioned AIDAB project, there will be no need to construct special facilities for the faculty at NUS. The AIDAB project will also provide equipment for computer training and a library; it will be necessary to adjust the computer system through which the Vaivase Campus and the Motootua Campus can be linked.

2) Western Samoa Polytechnic (WSPoly)

The Western Samoa Polytechnic finalized A Development Master Plan for the period from 1995 to 2004 with New Zealand government assistance, which covers a plan to strengthen educational activity as well as a plan to improve facilities and equipment. According to the Plan, a Diploma in Business is to be introduced in addition to the ongoing Certificate in Secretarial Studies. Since these programs overlap with courses provided at NUS, namely business English, accounting, business mathematics and computer studies, it will be necessary to adjust the

overlap. In the future, mutual arrangements in which NUS provides humanities and science programs and WSPOLY provides engineering programs should be necessary.

(2) The Project's Relationships with Other Assistance Programs

In 1994, the Government of New Zealand provided NUS with financial aid, amounting to WS\$230,000 for preparation of the curriculum, scholarships for the UPY Course and books for the library, and provided WSTC with additional financial aid, amounting to WS\$460,000 for the overseas training of lecturers. The Government of Australia also provides an education course for practicing teachers.

Since both governments have clearly stated that they would not financially assist physical development of NUS, there will be no overlap between this Project and other assistance programs. However, the both government's assistance to consolidate academic activities of NUS after the implementation of this Project will be required.

4-2-4 Examination of the Facilities and Equipment Requested

The results of the examination of details of the facilities and equipment requested by the Government of Western Samoa are as described below:

(1) Facilities

Since most of the facilities requested are necessary for ongoing academic activities at NUS and WSTC, the contents are generally reasonable and sound. Table 4-2 compares existing facilities (including WSTC) and requested facilities.

The number of rooms and their areas will be examined based on the activity plan and the staff plan in Chapter 5.

Table 4-2 Examination of the Facilities Requested

Facilities	Existing Area (m ²)	Requested Area (m ²)	Contents of Request
Library	407	1,050	Books (20,000 vol.), Reading Table (15), Carrels (150)
Faculty Facilities (Center for Samoan Studies, Faculty of Arts, Science and Education)	824	2,500	Laboratories, Computer Labs., Language Lab., Academic Staff Rooms and Display Room
Lecture Rooms	2,538	2,300	Lecture Theaters, Lecture Rooms, laboratories, Falé
Administration	173	550	Senior Staff/Admin. Staff Office
Staff Housing	—	500	Housing for Expatriates
Student Residence/Student Amenities	244	1,200	Dormitory, Canteen, Shops
Maintenance Center	—	300	Building/Equipment Maintenance
Sporting Facilities	—	—	Gymnasium

1) Library

At present, NUS and WSTC have a combined collection of 12,000 books, and will increase to 20,000 with assistance from the Government of New Zealand. It is therefore necessary to secure a space to store these books.

Since most NUS students have little room at home, it is necessary to add a student study area with library, where students will be able to study after school.

2) Laboratories

At present, NUS has no laboratories, and rents laboratories of Samoa College and the University of the South Pacific, Alafua Campus to conduct experiments. These arrangements are, in many respects, functionally inconsistent with intended activities, for example, it is difficult to manage the equipment and transport students between both institutions.

Although the Faculty of Science has already completed preparations for lectures to award the Bachelor of Science (preparation of the

curriculums and syllabus), it remains unable to open the program due to lack of necessary laboratory facilities.

3) Lecture Theaters

NUS provides 5 to 6 sessions which are attended by about 100 students every day. NUS currently uses a fale (traditional building with no wall) for these sessions. The sessions are often interrupted by the outside noises and primary schoolchildren who enter the fale after school. WSTC has a lecture theater (approximate 300 seats), used for student assembly, music courses and lectures. However, the lecture theater is physically beyond use and repair. It is therefore necessary to provide one or two lecture theaters accommodating 100 to 200 students.

4) Amenities

There are no restaurants or shops around the Toomatagi District, where the new campus is located; a dining hall of minimum size is necessary within the campus.

Since the Government of Western Samoa is expected to secure staff and student housing on its own, these facilities are not included in this Project.

(2) Equipment

NUS has little of the requested equipment indispensable for proposed academic activities. Therefore the requests are basically sound and appropriate. Details of the requests were examined, taking account of contents of the activities, condition of existing equipment and quantity and grade consistent with the activities.

However, due to budgetary limitations, some indispensable items which will not be installed in the proposed facilities were eliminated from the Project. These items are listed in Annex-9. It is strongly advisable that NUS and the Government of Western Samoa procure the aforementioned equipment by March, 1997, when NUS starts to use the proposed facilities.

1) Experimental Equipment

The requested experimental equipment is classified into two groups: that for physical, chemical and biological courses of the Faculty of Science and that for basic scientific courses of the Faculty of Education. Most of this is basic equipment.

2) Language Laboratory Equipment

A language laboratory system is necessary for students to learn English effectively in a short time by using audio teaching materials.

3) Computer

In Western Samoa, ability to use computers increasingly gives candidates better job opportunities. Thus, computer courses are becoming more important in university education. NUS is improving the quality of its computer courses, and increasing their session hours. The Computer Center of NUS intends to provide 38.5 lecture hours per week and 55 tutorial hours per week in 1995.

The administration section of NUS also needs to improve its computer system to cope with an increase in enrollment (from the present 731 to 980 by 2000) and staff. A Local Area Network (LAN) within the university, through which common data can be accessed by several terminals in the proposed facilities, will be required for effective operation and management. The grade and quantity of personal

computers will be determined through examination of the maintenance and management system and maintenance budget for personal computers.

4) Audio-Visual Equipment

The requested audio-visual equipment is commonly used: video and TV sets, video cameras, cameras, overhead projectors, slide projectors and video dubbing equipment. Quantity of equipment is determined after scrutinizing the condition of existing audio-visual equipment, the grade is determined based on existing standards.

A video projection system and PA system in the 100-seat and 200-seat lecture theaters are indispensable to sessions with large number of students.

The requests also include a printing system and an audio-visual teaching material production system for the Resource Center. The Project must include a small printing system to produce large quantities of textbooks and documents at low cost, a small-scale video teaching material production system, a slide teaching material production system and TP material production system.

5) Lecture Theater/Laboratory Tables and Chairs

The necessary number of tables and chairs in each lecture room and laboratory will be provided. Maintenance equipment to be used for maintenance and repair of facilities and equipment will also be necessary.

Table 4-3 Examination of the Equipment Requested

Field	Item	Requested	Proposed	Reason
Laboratory Equipment (Faculty of Science)	(Physics) Digital tester, Strobe scope, Ammeter, Micro Ammeter, Signal generator, Dual trace, Oscilloscope, Balances, Galvano meter etc.	1 set	Procured by Western Samoan Side	Items requested consist of basic experimental equipment, hence they are sound and reasonable. However, they are excluded from the Project.
	(Biology) Corn Monohybrid Genetics Biokit, Charts for Genetics, Charts for Botany, Water bath, Electric balance, laboratory thermometer, Bunsen Burners, etc.	1 set	Procured by Western Samoan Side	
	(Chemistry) Fume hood, Emergency eyeshower	1 set	1 set	Equipment which should be installed in the facilities are included.
	pH meter, Electric balance, Laboratory implement, Chromatography Absorbent, laboratory fringe and freezer, etc.	1 set	Procured by Western Samoan Side	Items requested consist of basic experimental equipment, hence they are sound and reasonable. However they are excluded from the Project.
	Chemicals:	160	Eliminated	
Laboratory Equipment (Faculty of Education)	(Science Lab.) Fume hood, Emergency eyeshower	1 set	1 set	Equipment which should be installed in the facilities are included.
	Conductivity rings, Dissecting kits, pH meter, Fume chamber, laboratory microscope, Calorimeter, Standard condenser set, Multitester, Bunsen burner	1 set	Procured by Western Samoan Side	Items requested consist of basic experimental equipment, hence they are sound and reasonable. However, they are excluded from the Project.
	(Carpentry) Belt sander, Air compressor, Heavy duty grinder, Buffer, Lathe machine	1 set	1 set	Most of the existing equipment requires replacement or repair. They should be replaced.
	(Metalwork) Lathe machine, Air compressor, Metal cutter, Grinder	1 set	1 set	ditto
	(Home Economic) Refrigerator, Freezer, Gas range, Electric range, Microwave oven	1 set	1 set	ditto
	(Sewing) Dress model, dress mirror, Electric sewing machine, irons.	1 set	1 set	ditto
	(Art, Drawing) Implement for technical drawing	1 set	1 set	Currently, there is little equipment.
	(Art, Painting) Painting instruments	1 set	Procured by Western Samoan Side	Items requested consist of basic experimental equipment, hence they are sound and reasonable. However, they are excluded from the Project.
	(Music Instruments) Drums, Cymbals, Glockenspiels, Electric piano, Violin, Bass guitar, Flute, Trumpet, Keyboard and others	1 set	Procured by Western Samoan Side	Items requested consist of basic experimental equipment, hence they are sound and reasonable. However, they are excluded from the Project.

Field	Item	Requested	Proposed	Reason
	(Physical Education) Instruments for tennis, rugby, softball, soccer and others	1 set	Procured by Western Samoan Side	Items requested consist of basic experimental equipment, hence they are sound and reasonable. However, they are excluded from the Project.
Language Laboratory	LL system for 20 students	1 set	1 set	The basic LL system should be planned.
Computer	Campus LAN system	1 set	1 set	The system should have a capacity to deal with data of 1000 students and staff members.
	Personal computer	62 sets	42 sets	20 students × 2 rooms
	Laser printer	4	4	Computer softwares for a LAN system and applications should be provided.
	Monitor	1	2	
	Software	1 set	2 sets	Existing PCs will be transferred.
	Administration/library Computer	35	(10)	Software dealing with 20,000 books.
	Computerized catalogue Software for library	1 set	1 set	Existing PCs (8086) will be transferred for student's individual learning.
	Reinstall work of the existing PCs	--	(10)	
Audio visual Equipment (Library)	Video both and TV sets	—	Procured by Western Samoan Side	This item is excluded from the Project.
Audio visual Equipment (Lecture Rooms)	Video and TV set	13 sets	Procured by Western Samoan Side	Items are excluded from the Project.
	OHP and screen	27 sets		
	Slide projector and screen	1 set		
	Portable PA player	1 set		
Audio visual Equipment	Video projection system	—	2 sets	Video projection system and PA system are provided in 200 and 100- seat lecture theaters
	PA system	—	2 sets	
Audio visual Equipment (Resource Center)	Printing (stencil type)	1 set	2 sets	Printing machines are necessary in order to print large quantities of text books.
	Video production system	1 set	1 set	VHS video production and dubbing system will be provided.
	Video dubbing system	1 set	1 set	
	TP materials	1 set	1 set	
	Photocopy machine	1	3	
	Desk-top publishing system (DTP)	1 set	Eliminated	
	Slide production system	1 set	Procured by Western Samoan Side	
	Audio dubbing system	1 set		
Maintenance	Maintenance equipment	1 set	1 set	Equipment for Maintenance Workshop
Tables and Chairs	Lecture tables and chairs	1 set	1 set	Quantity will be determined based on the academic activities and staff plan
	Office tables and chairs	1 set	1 set	
	Laboratory tables and chairs	1 set	1 set	
	Library shelves	1 set	1 set	
	Library furniture	1 set	1 set	

4-2-5 Necessity of Technical Cooperation

There are currently four American Peace Corps volunteers, who mainly teach the UPY Courses, and one Japanese JOCV, who is working as a system engineer at the Computer Center. In 1993, 11 personal computers were provided under the Japanese assistance program.

Although NUS will have enough academic staff members to provide the proposed courses, technical cooperation will be very important especially to the Faculty of Science, which should prepare new curricula and consolidate teaching methods for new courses in physics, chemistry and biology. It is, therefore, advisable to continue close relationships with aid organizations and institutions in Japan, New Zealand and Australia after implementation of this Project.

4-2-6 Basic Policy for the Implementation of the Project

The feasibility and anticipated effects of the Project, as well as the ability of the Western Samoan organization to take charge of its implementation have been proven. It has also been confirmed that the anticipated effects of the Project are consistent with the objectives of the Government of Japan's grant aid cooperation system. Therefore, the outline of this Project will be reviewed from the next Chapter, and the basic design for it will be drawn up on the assumption that this Project will be implemented under the Japanese grant aid cooperation. However, it should be noted that change parts of the content of the Western Samoan requests are considered as appropriate.

4-3 Outline of the Project

4-3-1 Implementing Organization and Management System

(1) Implementing Organization

The government agencies responsible for this Project are the Department of Education and the National University of Samoa. The National University of Samoa, an independent institution of tertiary education, is managed by a Council appointed by the Government, which is responsible to the Ministry of Education. The head of State is the Chancellor of the University, and the Minister of Education is concurrently the Pro-Chancellor of the University.

(2) Management System

The management system in the year 2000 is as shown below:

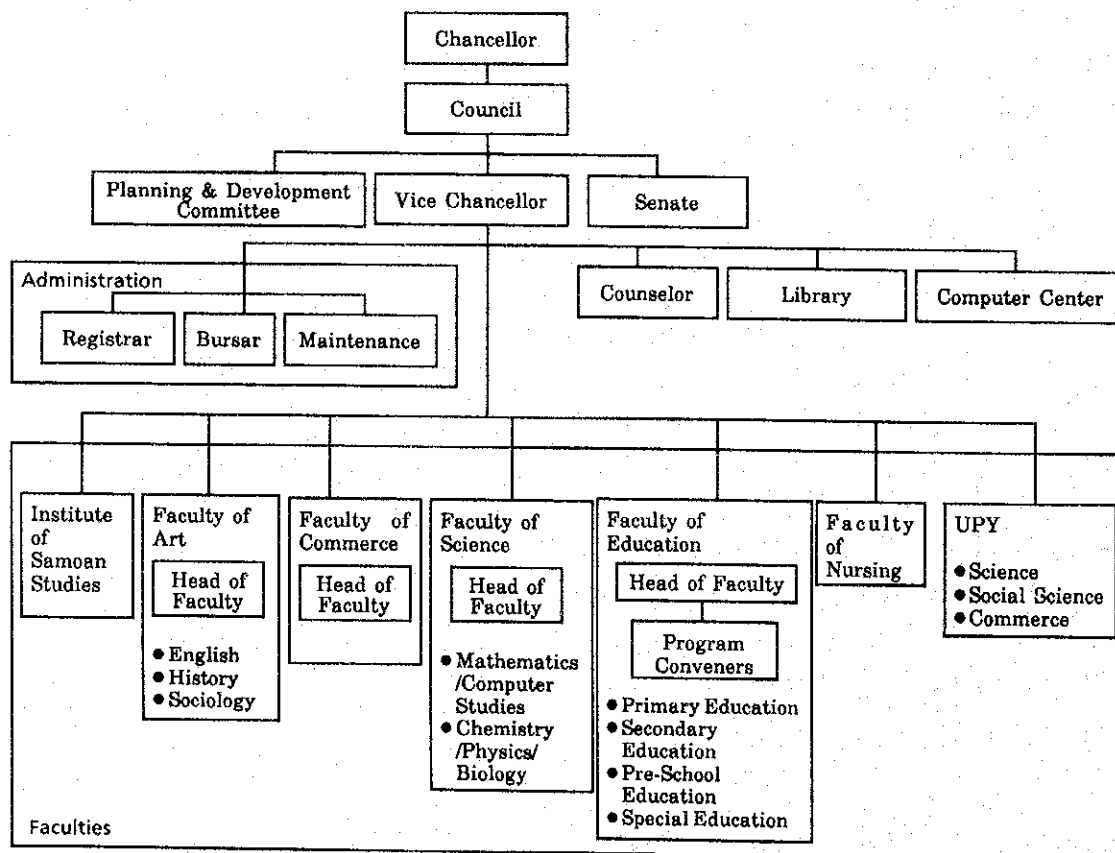


Fig. 4-1 The Planned Organization of the NUS

(3) Staff Plan

The number of lecturers and professors at NUS after implementation of the Project is shown in the following table. There will be no facilities for the Faculty of Nursing since the faculty has facilities at the Motootua Campus.

Table 4-4 Examined Staff Plan

Faculty \ Year		1994		1997		2000	
		Professor, Senior Lecturer	Lecturer	Professor, Senior Lecturer	Lecturer	Professor, Senior Lecturer	Lecturer
Faculty of Arts	Full-time	2	12	1	15	5	19
	Part-time	—	9	—	—	—	—
Faculty of Commerce	Full-time			2	1	2	3
	Part-time			—	7	—	5
Faculty of Science	Full-time	1	8	1	10	2	13
	Part-time	—	—	—	—	—	2
Faculty of Education	Full-time	—	(41)	2	39	6	35
	Part-time	—	—	—	—	—	—
Faculty of Nursing	Full-time	—	5	—	5	1	4
	Part-time	—	6	—	6	—	6
Academic Staff Sub-Total	Full-time	3	66	6	70	16	74
	Part-time	—	15	—	13	—	13
Administration		10 + (1)		15		18	
Library, Resource Center		4		5		8	
Maintenance		3		8		8	
Computer Center		3		3		3	
Administration Sub-Total		20 + (1)		31		37	
Total		63 + (42)		120		140	

(): the number of WSTC staff

The administration staff is to increase from 21 to 37 (offices: 18, library/resource center: 8, computer center: 3, others: 8).

4-3-2 Activity Plan

(1) Faculty/Program

The programs to be carried out under this Project are outlined in Table. 4-5.

Table 4-5 Details of the Academic Activities

Faculty	Program	No. of Enrollments	Duration (semesters)	Requisite Courses (courses)
Faculty of Arts	Bachelor of Arts (Samoan Studies)	20	6	20
	Bachelor of Arts (English)	20	6	20
	Diploma in Samoan Studies	35	3	8
	Diploma in English	35	3	8
Faculty of Commerce	Diploma in Accounting	30	3	8
	Certificate in Accounting	40	2	6
Faculty of commerce	Bachelor of Science (General Science)	20	6	20
	Certificate of Proficiency (General Science)	10	2	6
	Certificate of Proficiency (Mathematics)	10	4	6
	Certificate of Proficiency (Microcomputer)	10	2	2
	Certificate in Mathematics & Statistics	15	4	6
	Certificate in Computing	15	4	6
Faculty of Education	Diploma in Education (Primary Teachers)	180	6	42
	Diploma in Education (Jr. Secondary Teachers)	180	6	42
	Other Programs	110		
Faculty of Nursing	Diploma in Nursing	40	2	15
UPY Course	Science	180	2	10
	Social Science		2	10
	Commerce		2	10
Total		950		

(2) Courses/Curriculums

NUS is to provide 107 courses at the 100 level, 93 courses at the 200 level and 77 courses at the 300 level within its 5 faculties. Students are required to complete the requisite number of courses within the specified period of time to be awarded the Bachelor degree, the Diploma and the Certificate respectively. Courses to be provided after the implementation of this Project are outlined in Table 4-6.

Table 4-6 The Number of Courses at Each Level

Faculty	Program	100		200		300	
		1st Semester	2nd Semester	1st Semester	2nd Semester	1st Semester	2nd Semester
Faculty of Arts	Samoan Studies	3	3	3	5	4	3
	English	2	4	—	7	—	7
	Sociology	1	1	2	2	—	—
	History	2	1	2	2	1	2
Faculty of Commerce	Commerce/Accounting	9	8	2	2	—	—
Faculty of Science	Mathematics/Computing	8	5	3	3	1	1
	Physics/Chemistry/Biology	9	9	5	4	4	4
Faculty of Education	Primary Teacher	11	6	11	6	10	7
	Junior Secondary Teacher	14	11	18	16	18	15
Total		59	48	46	47	38	39

In addition to the above courses, 33 courses for the UPY Program (First Semester: 16 courses; Second Semester: 17 courses) will be provided. A list of the courses to be provided after the implementation of this Project is attached in Annex-7.

4-3-3 Location and Present Condition of the Project Site

(1) Location of the Project Site

The site for the new campus is located at the Toomatagi District in the eastern part of Apia, the Capital of Western Samoa. The project site faces Kolisi Road (4 meters wide) on the west and south, Western Samoa Polytechnic and Samoa College on the north, and a cliff which is about 10 meters deep on the east side. Vaivase Road, which is located on the other side of the premises of Samoa College, is a trunk road with a width of 8 meters. The project site is connected to the center of the city by buses running frequently on Vaivase Road. The project site is about 2km from the Malifa District, an existing campus, about 2km from the Motootua

Campus (Faculty of Nursing) and about 7km from the Alafua Campus of the University of the South Pacific.

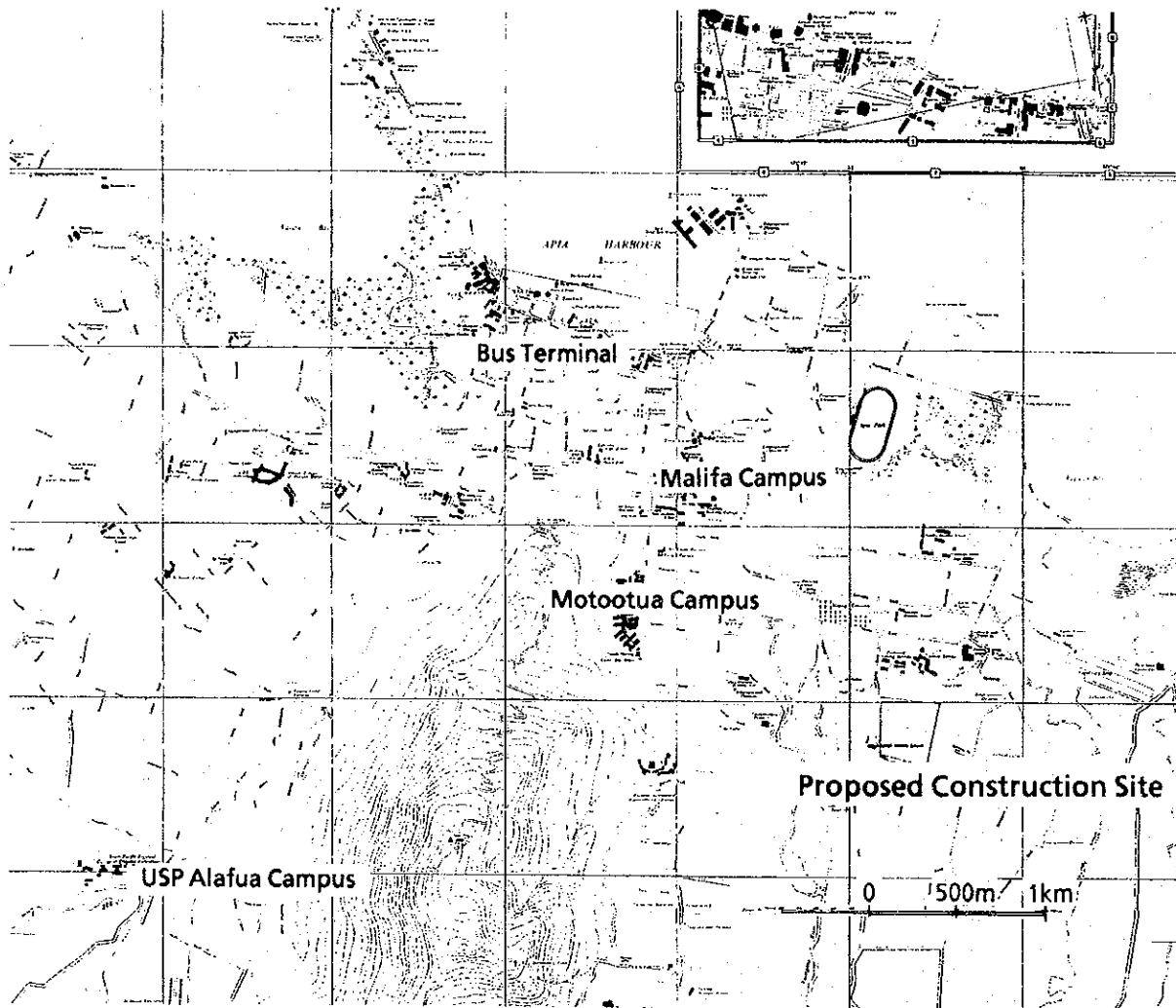


Fig. 4-2 Location of the Project Site

(2) Present Condition of the Project Site

The project site is rectangular, 290m from north to south and 280m from east to west, and has a total land area of about 76,700m². It is inclined from north to south at a slope of about 7 percent (4 degrees) with a steep cliff on the east side. Its ground consists of igneous rock (basalt) and

0.3 to 2.0 meter-thick silty surface soil. It is well drained, and dotted with tall trees such as coconut plum trees and rain trees.

The surface is covered with shrubs and other matter. It is necessary to remove part of this prior to the start of construction work. There are four residences for Australian SMEC project staff on the west side of the project site, and an unused water tank (Magiagi Reservoir, diameter: about 24 meters) at the southwest corner of the project site.

(3) Present Condition of the Infrastructure around the Site

1) Electric Power

A 22kV overhead power line is installed along Kolisi Road, which the project site faces on the west and south sides, and a 33kV overhead power line is installed along the south side of the project site. It is advisable to lead a cable into the site from the former line.

2) Telephone

An overhead telephone line is installed along Kolisi Road and it is possible to lead a cable into the site from this line.

3) Water Supply

A water main with a diameter of 4 inches (100mm) is laid underground along Kolisi Road. It is advisable to connect a 3-inch-diameter (75mm) pipe to this water main. Since there are shortages of water supply and declines in water pressure during dry season, the water tank should have a volume large enough to meet the daily consumption needs of the proposed facilities. It is also necessary to store and use rainwater for toilets in dry season.

4) Sewage

There are no sewer pipes installed in and around the project site. It

is therefore necessary to treat waste water within the project site. In recent years, government facilities have been required to have waste water treatment systems rather than septic tanks. After consultations with the Department of Public Works, it was decided to install waste water treatment systems in stead of septic tanks within the project site. Treated water will penetrate the soil.

5) Gas

There are no gas mains installed in and around the project site. Gas is provided in cylinders. The Western Samoa Gas Supply Corporation, which is the sole gas supplier in Western Samoa, is supplying butane gas in cylinders.

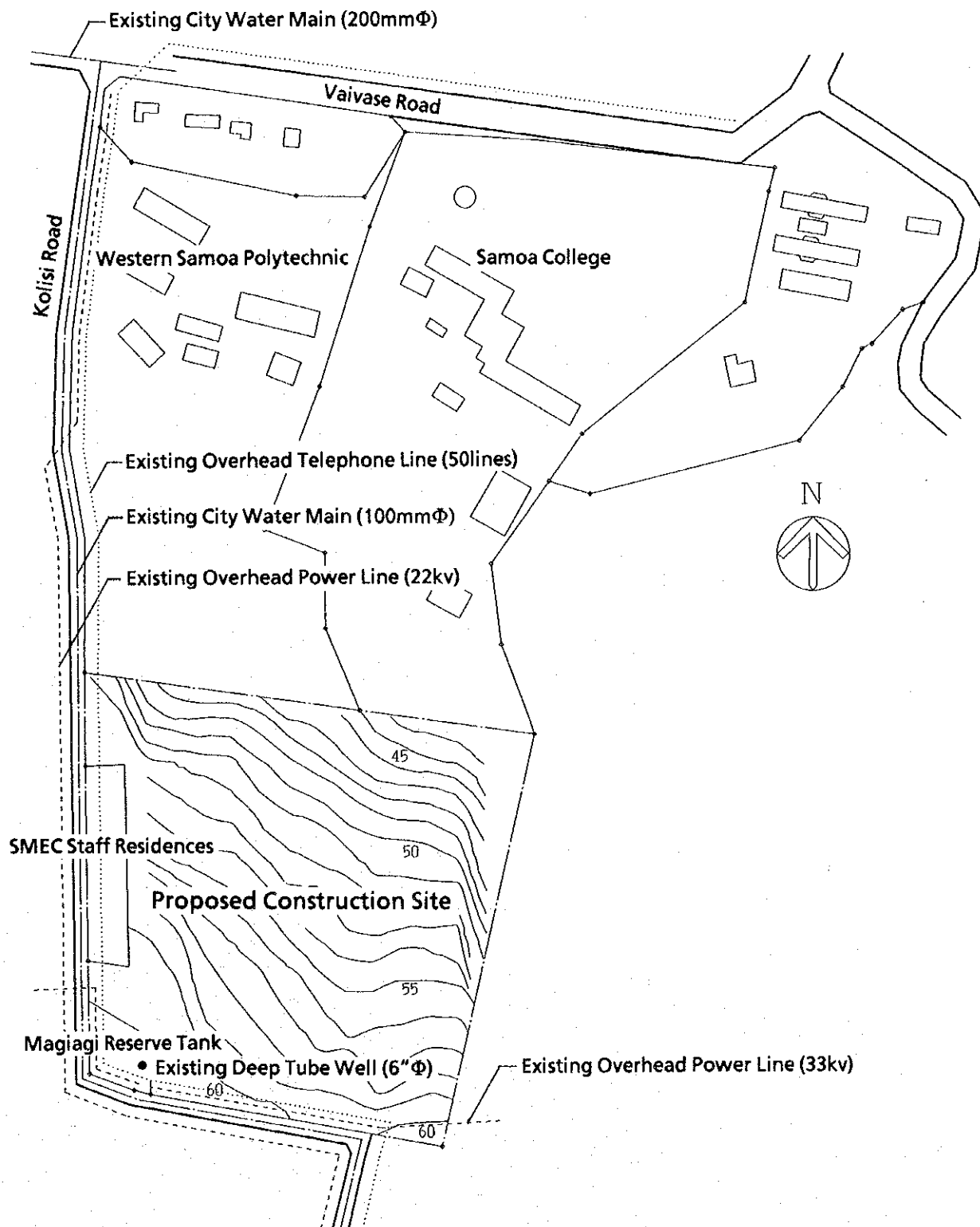


Fig. 4-3 Present Condition of the Project

4-3-4 Maintenance and Management Plan

(1) Staffing and Budget

As stated earlier, there is a considerable salary gap between NUS and WSTC (the Faculty of Education of NUS) lecturers. The average annual salary for WSTC lecturers is WS\$11,500, but the salary for NUS senior lecturers is WS\$36,000 and that for other lecturers is WS\$16,500. In addition, the salaries at WSTC vary widely depending on the designation of the lecturers: from WS\$20,200 (the annual salary for the principal) to WS\$5,100, almost a quarter of the principal's salary.

The salary scale for the Faculty of Education after the anticipated amalgamation has not been finalized. It is not reasonable to set all lecturer salaries at the highest level of WS\$16,500, which is the same amount of annual salary for a manager of the Department of Education, regardless of qualifications and experience. It is desirable, therefore, that a unified salary scale based on individual qualification and teaching experience should be established by 1997, when the amalgamation is scheduled to be implemented.

At present, WSTC pays allowances to each student. Annual total allowance for a primary-course student is WS\$250 and that for a secondary-course student is WS\$788. The total amount of allowances was WS\$230,000 in 1994. NUS and WSTC must conclude whether these allowances are necessary or not after both institutions amalgamate, and current differences in tuition fees of two institutions are adjusted.

(2) Maintenance and Management of the Facilities

Maintenance and management of the facilities are divided into: 1) operation of the facilities, 2) maintenance of the facilities and 3)

repair of the facilities. The following points should be noted so that more efficient maintenance and management may be carried out within the framework of limited budgetary appropriations.

1) Operation of the Facilities

Only rooms in which air-conditioning is indispensable will be air-conditioned. Moreover, a partial on/off control system will be adopted so that each room's air-conditioning may be controlled according to load. Other measures such as natural lighting and use of stored rainwater, will also be used to minimize energy costs.

2) Maintenance of the Facilities

Maintenance activities such as cleaning, routine inspection and safety measures will maximize the facilities' functions, safety and service lives. For this reason, it is necessary to establish an efficient maintenance system and create proper and effective inspection/maintenance standards. It is desirable that operation of the air-conditioners should be supervised by a full-time engineer.

3) Repair of the Facilities

Repair can be divided into repair of damaged or defective portions of the facilities, and remodeling of facilities. It will be possible to commission the Public Works Department to design and supervise the repair/remodeling work after the completion of this Project.

(3) Maintenance and Management of the Equipment

Maintenance of the equipment is divided into: 1) cleaning of the equipment, 2) inspection/tuning of the equipment, 3) replacement of consumables and 4) repair. The proposed equipment is basic for educational use, and therefore can be maintained and managed by users.

(4) Tentative Calculations of Operation Costs

Tentative costs incurred by the proposed facilities were calculated:

1) Personnel Expenses

① Basic Salaries

The staff plan by salary scale is as shown in the following table.

(All prices are 1994 prices. It is assumed that the average annual salary for lecturers at the Faculty of Education and for newly recruited lecturers would be WS\$15,000)

Table 4-7 Total of Salaries

Designation	Annual Salary (WS\$)	1997		2000	
		No. of Persons	Total (WS\$/year)	No. of Persons	Total (WS\$/year)
Professor	57,000	2	114,000	6	342,000
Senior Lecturer	36,000	4	144,000	10	360,000
Lecturer	16,500	31	511,500	39	643,500
Lecturer (Faculty of Education)	15,000	39	585,000	35	525,000
Part-time Lecturer	5,000	13	65,000	13	65,000
Vice Chancellor	67,000	1	67,000	1	67,000
Registrar	45,000	1	45,000	1	45,000
Bursar	34,000	1	34,000	1	34,000
Executive Secretary	16,000	1	16,000	1	16,000
Librarian	22,000	2	44,000	2	44,000
Manager	25,000	1	25,000	2	50,000
Technician	11,000	1	11,000	3	33,000
Assistant Officer	10,000	3	30,000	6	60,000
Clark	7,000	8	56,000	8	56,000
Typist	7,000	2	14,000	2	14,000
Cleaner, Others	4,000	10	40,000	10	40,000
Total		120	1,801,500	140	2,394,500

② Other Expenses

Teacher education students have Teaching Practice twice a year, usually held at model primary schools for a period of three to four weeks.

The average annual expenses for Teaching Practice will be:

- Travel expenses for students : WS\$8,000 /year
- Travel expenses for lecturers : WS\$10,000 /year

Annual Personnel Expenses (①, ②)

Year 1997 : WS\$1,819,500

Year 2000 : WS\$2,412,500

2) Operating Cost

① Electricity Charge

a. Load capacity

- Lighting $30W/m^2 \times 9,000m^2$ (Total Area) = 270kW
 - Air-conditioning (Air-conditioned are: 9,000m²)
 $(9,000m^2 \times 0.25 \times 200kcal/m^2) \div (860kcal/h \times 2.5) = 209kW$
 - Ventilation $3W/m^2 \times 9,000 = 27kW$
 - Sanitary $3W/m^2 \times 9,000 = 45kW$
 - Equipment = 30kW
 - Others = 22kW
-
- 603kW

b. Consumption

- Average occupied days a month 20days/month
- Average occupied hours a day 12h/day
- Demand ratio 0.3
- Unit charge WS\$0.43/kWh
- Annual electricity charges
 $603kW \times 20days/month \times 12h/day \times 12month/year \times 0.3 \times WS\$0.43/kWh$
 $= WS\$224,027/year$
 $= 224,027 \times 1.1(10\%VAGST) = WS\$246,400/year$

② Telephone Charge

Calculation was carried out on the following assumption:

- Domestic call 40times/day

 - International call 40times/day (2minutes/time)

 - Average occupied days a month 20days/month

 - Unit charge ● Domestic call WS\$0.12/time
 - International call WS\$30/time

 - Annual telephone charge
- (40times/day×20days/month×12months/year×WS\$0.12/time)
+ (1time/day×2minutes/time×20days/month
×12month/year×WS\$30/time)= 1,152+14,400= WS\$15,552/year
WS\$15,552/year×1.1(10%VAGST)= WS\$17,100/year

③ Supply Water Charges

a. Consumption

- Consumption per student 60ℓ/person·day
- Consumption per teacher 100ℓ/person·day
- Capacity

student:	700students
teacher:	100students
- Average occupied days a month 20days/month
- Unit charge WS\$0.15/m³
- Annual consumption
 $(60\ell/\text{person}\cdot\text{day} \times 700\text{students} + 100\ell/\text{person}\cdot\text{day} \times 100\text{teachers})$
 $\times 12\text{days/month} = 12,480\text{m}^3/\text{year}$
- Annual Water charge
 $12,400\text{m}^3/\text{year} \times \text{WS}\$0.15/\text{m}^3 = \text{WS}\$1,872/\text{year}$
 $\text{WS}\$1,872/\text{m}^3 \times 1.1(10\%\text{VAGST}) = \text{WS}\$2,100/\text{year}$

④ LP Gas Charges

- Average occupied days a month 20days/months
- Consumption per meal (Kitchen) 800kcal/meal

- Number of meals a day 400meals/day
- Annual gas consumption
 $20\text{days/month} \times 800\text{kcal/meal} \times 400\text{meals/day} \times 12\text{months/year} =$
76,800,000kcal/year ... a
- Consumption for laboratory
Burner 800kcal/h·burner, 45 burners in each laboratory
- Consumption
 $800\text{kcal/h} \cdot \text{burner} \times 45\text{burners} \times 2\text{h/day} \times 0.2(\text{demand rate}) =$
14,400kcal/day
- Annual consumption
 $20\text{days/month} \times 14,400\text{kcal/day} \times 12\text{month/year} \times 0.8(\text{annual demand}) =$
2,764,800kcal/year ... b
- Unit price of butane gas (11,340kcal/kg) WS\$3.72/kg
- Annual gas charge

a+b= 79,564,580 kcal/year
 $(79,564,800\text{kcal/year} + 11,340\text{kcal/kg}) \times \text{WS\$}3.72/\text{kg} = \text{WS\$}25,194/\text{year}$
 $\text{WS\$}26,100/\text{year} \times 1.1(10\%\text{VAGST}) = \text{WS\$}27,700/\text{year}$

Annual Operation Cost (①~④): WS\$294,310

3) Maintenance Expenses

① Facility Maintenance Expenses

Calculation of facility maintenance expenses is set at WS\$50,000 a year.

② Equipment Maintenance Expenses

● Spare parts	WS\$10,000
● Consumable supplies	WS\$90,000
● Maintenance contract fees	WS\$5,000
	WS\$195,000

③ Purchasing Expenses

• Chemicals and reagents	WS\$10,000
• Materials	WS\$50,000
• Consumables for computers	WS\$25,000
• Consumables for AV equipment	WS\$10,000
• Others	WS\$50,000

WS\$145,000

④ Office Supplies and Others

• Office supplies	WS\$30,000
• Printing expenses	WS\$25,000
• Vehicle maintenance expenses	WS\$30,000
• Others	WS\$20,000

WS\$105,000

Annual Maintenance Expenses (①~④):	WS\$495,000
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Thus, the total costs are:

Total costs in 1997	:	WS\$2,608,810
Total costs in 2000	:	WS\$3,201,810

CHAPTER 5 BASIC DESIGN



CHAPTER 5 BASIC DESIGN

5-1 Basic Design Policies

The facilities to be constructed and the equipment to be procured under this Project is designed based on the following policies:

(1) Facility Configuration and Equipment Selection to Minimize Operating Cost

The existing facilities are, in many respects, functionally inconsistent with the activities to be carried out at NUS. For example, there are no laboratories or lecture theaters, and rooms which should be air-conditioned are not. It is imperative, therefore, that operation costs of the proposed facilities and equipment will be relatively higher than current costs. However, it will be possible to reduce operation costs of the proposed facilities by maximizing use of natural ventilation and insulating materials and by minimizing air-conditioned areas. Also, maintenance costs of the proposed equipment can be minimized by selecting durable, maintenance-free equipment.

(2) Facilities to Cope with Future Plan

Although the proposed facilities and equipment are designed based on the academic activities in the year 2000, the facilities must be architecturally configured to allow for alteration in the future. The configuration must also be flexible enough to which allow for future changes of academic activity.

(3) Natural and Climatic Conditions

Although the project site is situated in an environment of high temperature and high humidity, it will be possible to make the proposed

facilities comfortable, and to minimize facility maintenance and management costs by designing the facilities in accordance with natural conditions in and around the site. In designing the facilities, special attention should be paid to the following points:

1) Temperatures and Humidity

The project site is located in the city of Apia, at lat. 13°50'S and long. 171°45'E. The country belongs to the tropical oceanic climate zone of high temperature and high humidity: average annual temperature in Apia is 27.7°C; average annual humidity is 80 percent. Thus, it will be necessary to air-condition the library shelving areas, plus computer and other laboratories to protect the equipment against high humidity. Lecture rooms, which are not to be air-conditioned, must have large windows and high ceilings to maximize natural ventilation.

2) Rainfall

In the city of Apia, the rainy season lasts from November to March, during which it rains heavily for short period. The highest daily rainfall in the history of the city is 486mm. Therefore, it will be necessary to take into account generally high rainfall when designing roofs, elevation of first floors and the openings in walls. For example, the proposed facilities must have pitched roofs and deep eaves as protection against heavy rainfall. During the dry season, on the other hand, the average monthly rainfall is as little as 100mm. The pressure of city water supply in hill areas drops; houses on hill sides usually have rainwater tanks for emergency use during dry season. Since the project site is located in such an area, rainwater should be utilized as much as possible.

3) Ventilation and the Damage from the Wind

In the city of Apia, winds usually blow from the southeast. Generally speaking, the wind is mild, with the average annual wind velocity at about 3.2 meters/second. It will be possible, therefore, to maximize natural ventilation by making each room face southeast. Although strong winds are rare, Apia is hit by a large-scale cyclone with window velocity of over 30meters/second and rainfall of more than 200mm/hour about every ten years. Thus, it is necessary to consider preventive measures against strong cyclone winds.

4) Sunlight

As the city of Apia is situated at lat. 13°50'S, sunlight is strong when the sun is high. It will be necessary, therefore, to attach heat insulating materials to the roofs and protect the openings in the wall from sunlight (through the design of eaves, balconies and louvers etc.).

5) Earthquakes

Western Samoa is a volcanic island situated at the end of the Pacific Rim Earthquake Belt, and is therefore characterized by active crustal movements. Thus, the proposed facilities must be made quake-proof.

(4) Local Building Laws and Regulations

In Western Samoa, the Public Works Department (PWD) requires builders, including government agencies, to apply for official approval of proposed construction work. NUS must also apply to construct the proposed facilities. The National Building Code for Western Samoa, worked out by the PWD, is equivalent to the Building Standards Act and the Fire Service Act of Japan. It stipulates sites of buildings, fire escapes, structures,

resistance to fire, equipment and so on. Although this code is not yet verified by the Assembly, the proposed facilities should conform to the law, since local public buildings conform to it.

(5) Utilization of Local Contractors and Locally Available Materials

The Western Samoan construction market is relatively small. There are few large-scale construction projects. There are no large local contractors comparable to general contractors in Japan. Since the technological level of construction and ability to manage construction work differ from one local contractor to another, it is necessary to scrutinize each candidate's capability when selecting sub-contractors.

Only aggregate, sand and concrete blocks are locally available, while all other building materials are imported from abroad. In past similar grant aid projects, most of the building materials were imported from Japan or New Zealand. As prices of New Zealand-made materials have fallen because of the recent appreciation of the yen against the New Zealand dollar, construction costs should decrease as more materials are imported from New Zealand.

The proposed equipment is to be procured from Japan and New Zealand. As is the case with building materials, equipment should be procured from New Zealand as much as possible. Equipment manufacturers which have local agencies in Western Samoa and equipment models which can be maintained locally should be selected.

5-2 Examination of the Design Conditions

5-2-1 Configuration of Facilities

Rooms required are transformed into buildings based on the following points:

- Lecturer's rooms and administrative offices, which are similar in size and function, are combined in the same building so that these rooms may be interchanged in the future.
- Facilities of each faculty should be located on the same floor so that these faculties can share offices and seminar rooms.
- The laboratories of the Faculty of Science should be located near main faculty facilities, and the language laboratory should be located near the main facilities of the Faculty of Arts to allow for close functional relationships.
- Large lecture theaters (200 and 100 seats) which require higher ceilings should be detached from the other lecture rooms to minimize construction costs.

The facility layout for each building is as shown in the following diagram.

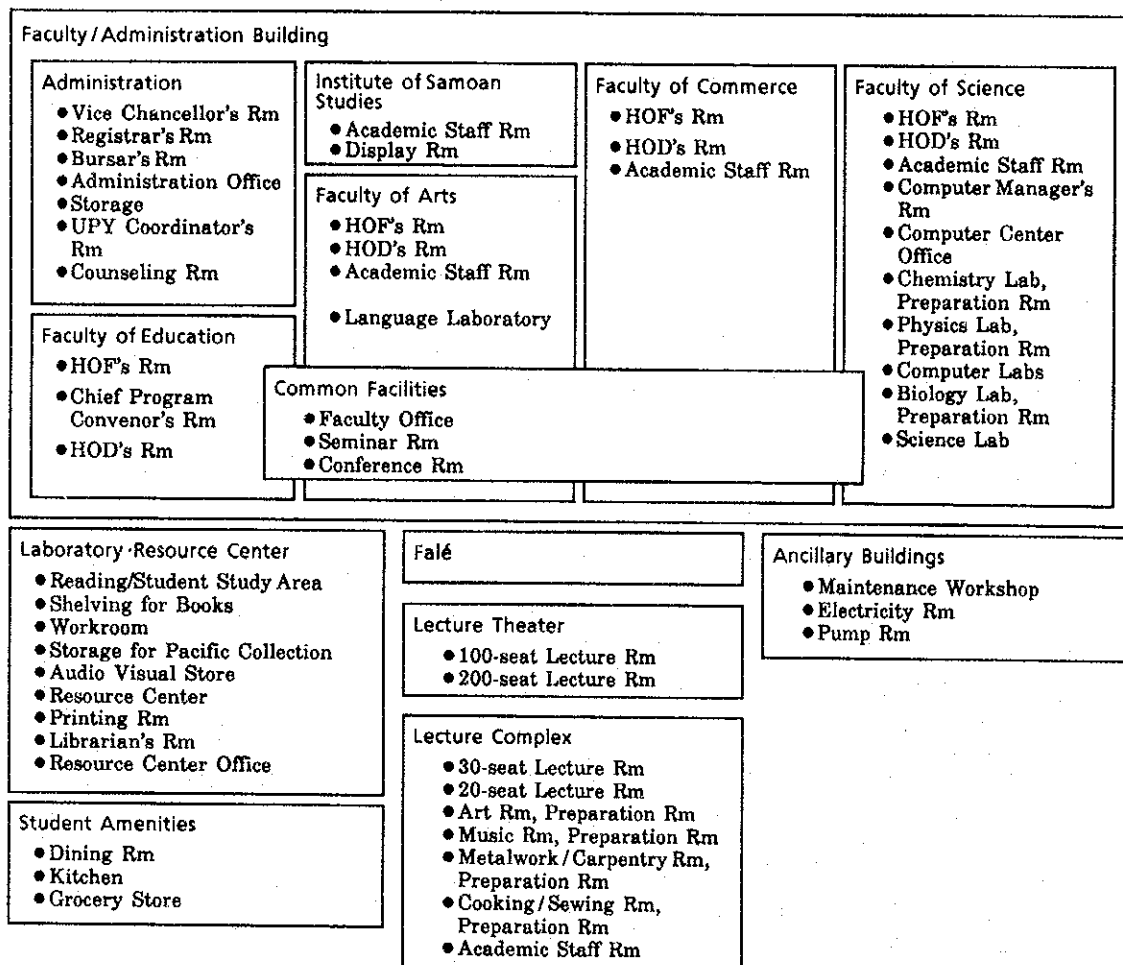


Fig. 5-1 Configuration of the Facilities

5-2-2 Size and Area of the Proposed Facilities

Size and area of each room will be determined by proposed academic activities. For example, the number of lecture rooms will be calculated based on the number of courses planned in the year 2000, and the size of academic staff rooms will be determined based on the number of each faculty's academic staff.

(1) Unit Area

Unit area of the proposed facilities is determined base by unit area of the existing facilities of NUS and WSTC, and the unit area of similar facilities at the University of the South Pacific and other institutions.

Table 5-1 Examination of Unit Area

	Proposed Facilities	NUS Existing Building	USP, Alafua	Australian Standard	Standard of MOE, Japan
Lecture Room	2.0 m ² /person	1.8~2.8 m ² /person	5.0 m ² /person	1.5 m ² /person	2.0 m ² /person
Lecture Theater	1.5 m ² /person		1.2~1.6 m ² /person	1.0 m ² /person	
Laboratory	4.0 m ² /person	2.8 m ² /person	4.1 m ² /person	3.0 m ² /person	6.6 m ² /person
Language Lab.	4.5 m ² /person			2.5 m ² /person	
Computer Lab.	4.0 m ² /person	3.7 m ² /person		2.5 m ² /person	
Carpentry/Metalwork	6.0 m ² /person	7.4 m ² /person			
Academic Staff (HOD)	20.0 m ² /person	16.2 m ² /person	18.9 m ² /person	20.0 m ² /person	
Academic Staff (Senior Academic)	15.0 m ² /person	9.3~11.6 m ² /person	11.3 m ² /person	15.0 m ² /person	
Academic Staff (Junior Academic)	10.0 m ² /person			6.0~12.0 m ² /person	
Reading room	2.0 m ² /person			2.3 m ² /person	
Office (V-Chancellor)	20.0 m ² /person	16.4 m ² /person		25.0 m ² /person	
Office (Senior Admi.)	15.0 m ² /person	16.4 m ² /person		16.0 m ² /person	
Office	6.0 m ² /person	6.6~9.1 m ² /person		5.0~10.0 m ² /person	

(2) Lecture Rooms/Theaters

Sessions to be held after the implementation of this Project will be roughly divided into four groups: small lectures and tutorial sessions with about 15 students, lectures with 20 students (class quota of the Faculty of Education), lectures with 100 students and lectures with 200 students. Table 5-2 shows the necessary number of rooms for each size session, calculated by dividing the total lecture hours a week by the maximum hours a week. The maximum hours a week are 35 hours (7hours/day×5days). At the Faculty of Education, the same sessions are held twice a week, dividing 60 students into two classes, while other sessions at other faculties are held once a week.

Table 5-2 Examination of Required Number of Lecture Rooms/Theaters

Room Name	Session House per Week (first Semester)	Session House per Week (Second Semester)	Necessary Number of Lecture Rooms	Occupancy Ratio
Lecture Room (20 seats)	337 hours	307 hours	12 rooms	80%/73%
Lecture Room (30 seats)	288 hours	220 hours	12 rooms	69%/52%
Lecture Theater (100 seats)	28 hours	28 hours	1 room	80%/80%
Lecture Theater (200 seats)	10 hours	5 hours	1 room	29%/14%

An adequate number of 30-seat lecture rooms for the Faculty of Education is 10 when the occupancy ratio of the rooms is set at 80%. However, it is advisable that the faculty should have 12 lecture rooms, corresponding with the number of classes, in order to use these rooms for class assembly, changing and dining. The falé will be used for lectures attended by more than 200 students.

(3) Laboratories

The total hours of experimental sessions to be held after the implementation of this Project will be 88 hours per week in the First Semester and 93 hours in the Second Semester. Generally speaking, experimental sessions need a few hours of preparation before and after each session, and the occupancy ratio for laboratories should be lower than the occupancy ratio for lecture rooms. Therefore, it is recommended that the proposed facilities have four laboratories: chemistry laboratory, physics laboratory, biology laboratory and science laboratory. The occupancy ratio for the aforementioned laboratories will be about 60%.

Besides laboratories, the proposed facilities must include an art room, music room, sewing room, cooking room, metal workshop, carpentry workshop, language laboratory and two computer laboratories to cope with academic activities peculiar to each subject. Metal and carpentry workshops, which will generate vibration and noise, should be detached from the main lecture building.

(4) Staff Rooms

Only full-time academic staff will have their own rooms, while part-time staff will have carrels, lockers and document posts in staff resting rooms. The standard area for each designation was determined based on the

comparison shown in Table 5-1, namely, 20m² for the Head of Department, 15m² for senior lecturers and 10m² for lecturers.

(5) Dining Hall

Dining hall will have 150 seats, which will allow half the full-time students to take lunch in each of three shifts.

Table 5-3 Area Table

Library/Resource Center Building

Room Name	Proposed Area (m ²)	No. of Persons (person)	Area Determining Factor
Reading/Student Study Area	156	60 seats	60 seats × 2.0m ² /person = 120m ²
Shelving for Books	207	20,000 vol.	8.5m ² /1,000 vols × 20 = 170m ²
Circulation and Issue Desks			
Computer Area			
Locker for Students	13		Layout of Equipment
Workroom (Acquisition+Catalogue)	35		Layout of Equipment
Storage for Pacific Collection	26		Layout of Equipment
Audio Visual Store	26		Layout of Equipment
Resource Center	26		Layout of Equipment
Printing Room	52		Layout of Equipment
Librarian's room	19	1	10m ² /person
Deputy Librarian		1	10m ² /person
Library Office	19	3	3 person × 6.0m ² /person = 18m ²
Resource Center Manager's Office	19	1	10m ² /person
Resource Center Office		2	2 person × 6.0m ² /person = 12m ² (Shared with Manager)
Others	82		
Sub-Total	680		

Research/Administration Building

Faculty	Room Name	Proposed Area (m ²)	No. of Persons (person)	Area Determining Factor
Institute of Samoan Studies	Director's Room	19	1	1 person × 20.0m ² /person = 20m ²
	Academic Staff Rm	52	4	5 persons × 10.0m ² /person = 40m ²
	Display Room	52		
Faculty of Arts	Language Lab.	104	20	20 persons × 4.5m ² /person = 90m ²
	HOF's Room	19	1	1 person × 20.0m ² /person = 20m ²
	HOD's Rooms (3 rooms)	58	3	3 persons × 15.0m ² /person = 45m ²
	Academic Staff Room	156	15	15 persons × 10.0m ² /person = 150m ²
	Seminar Room	26	15	15 persons × 2.0m ² /person = 30m ²
	Faculty Reception	19	1	Layout of Equipment(Shared with FOS)

Research / Administration Building

Faculty	Room Name	Proposed Area (m ²)	No. of Persons (person)	Area Determining Factor
Faculty of Commerce	HOF's Room	19	1	1 person \times 20.0m ² /person = 20m ²
	HOD's Room	19	1	1 person \times 15.0m ² /person = 15m ²
	Academic Staff Room	26	3	3 persons \times 10.0m ² /person = 30m ²
	Staff Resting Room	26	5	Layout of Equipment
	Seminar Room	26	15	15 persons \times 2.0m ² /person = 30m ²
Faculty of Science	Chemistry Lab.	78	16	16 persons \times 4.0m ² /person = 64m ²
	Preparation Room (Chemistry)	52		Layout of Equipment
	Physics Lab.	104	30	30 persons \times 4.0m ² /person = 120m ²
	Preparation Room (Physics)	52		Layout of Equipment
	Biology Lab.	78	16	16 persons \times 4.0m ² /person = 64m ²
	Preparation Room (Biology)	52		Layout of Equipment
	Computer Lab-1	78	20	20 persons \times 4.0m ² /person = 80m ²
	Computer Lab-2	78	20	20 persons \times 4.0m ² /person = 80m ²
	Preparation Room (Computer)	52		Layout of Equipment
	Computer Center Manager's Room	19	1	1 person \times 20.0m ² /person = 20m ²
	Computer Center Office	19	1	1 person \times 10.0m ² /person = 10m ²
	HOF's Room	19	1	1 person \times 20.0m ² /person = 20m ²
	HOD's Rooms (2 Rooms)	39	2	2 persons \times 15.0m ² /person = 30m ²
	Academic Staff Room	130	13	13 persons \times 10.0m ² /person = 130m ²
	Seminar Room	26	15	15 persons \times 2.0m ² /person = 30m ²
	Faculty Reception	(19)		Layout of Equipment (Shared with FOA)
Faculty of Education	Science Lab.	104	30	30 persons \times 4.0m ² /person = 120m ²
	HOF's Room	19	1	1 person \times 20.0m ² /person = 20m ²
	HOD's Room (3 Rooms)	58	3	3 persons \times 15.0m ² /person = 45m ²
	Chief Program Convenior's Rooms (2 Rooms)	39	2	2 persons \times 15.0m ² /person = 30m ²
Administration	Vice Chancellor's Room	39	1	1 person \times 20.0m ² /person = 20m ² (including Reception Room)
	Registrar's Room	39	1	1 person \times 15.0m ² /person = 15m ²
	Bursar's Room	26	1	1 person \times 15.0m ² /person = 15m ²
	Counseling Room	19	1	1 person \times 15.0m ² /person = 15m ²
	UPY Coordinator's Room	19	1	1 person \times 15.0m ² /person = 15m ²
	Administration Office	78	12	12 persons \times 6.0m ² /person = 72m ² (including PABX)
	Conference Room	104	30	30 persons \times 2.0m ² /person = 60m ²
	Maintenance Workshop	52		Layout of Equipment
	First-aid Room	19		Layout of Equipment
	Others	1,448		
Sub-total		3,560		

Falé

Room Name	Proposed Area (m ²)	No. of Persons (person)	Area Determining Factor
Falé	604	400	400 persons \times 1.5m ² /persons = 600m ²

Lecture Building-I

Room Name	Proposed Area (m ²)	No. of Persons (person)	Area Determining Factor
Lecture Theater (200 seats)	259	200	200 persons \times 1.5m ² /person = 300m ²
Lecture Theater (100 seats)	156	100	100 persons \times 1.5m ² /person = 150m ²
Lecture Rooms (30 seats, 12 rooms)	778	30	30 persons \times 2.0m ² /person \times 12 Rooms = 720m ²
Lecture Rooms (20 seats, 12 rooms)	467	20	20 persons \times 2.0m ² /person \times 12 Rooms = 480m ²
Art Room	78	30	30 persons \times 3.0m ² /person = 90m ²
Preparation Room (Art)	52		Layout of Equipment
Music Room	78	30	30 persons \times 3.0m ² /person = 90m ²
Preparation Room (Music)	52		Layout of Equipment
Cooking Room	78	16	16 persons \times 6.0m ² /person = 96m ²
Preparation Room (Cooking)	52		Layout of Equipment
Sewing Room	78	16	16 persons \times 6.0m ² /person = 96m ²
Preparation Room (Sewing)	52		Layout of Equipment
Academic Staff Room	318	35	35 persons \times 10.0m ² /person = 350m ²
Equipment Storage	97		Layout of Equipment
Others	1,146		
Sub-total	3,741		

Lecture Building-II

Room Name	Proposed Area (m ²)	No. of Persons (person)	Area Determining Factor
Metalwork Room	104	16	16 persons \times 6.0m ² /person = 96m ²
Carpentry Room	104	16	16 persons \times 6.0m ² /person = 96m ²
Preparation Room	52		Layout of Equipment
Sub-total	260		

Student Amenities

Room Name	Proposed Area (m ²)	No. of Persons (person)	Area Determining Factor
Dining Room	156	150	150 persons \times 1.0m ² /person = 150m ²
Kitchen	52		Layout of Equipment
Grocery Store	52		Layout of Equipment
Sub-total	260		

Ancillary Buildings

Room Name	Proposed Area (m ²)	Area Determining Factor
Guard House	9	Layout of Equipment
Power Distribution Room	72	Layout of Equipment
Pump Room (Supply water)	24	Layout of Equipment
Pump Room (Neutralization Tank)	12	Layout of Equipment
Sub-total	117	

5-3 Basic Design

5-3-1 Site Plan

(1) Access to the Project Site

Kolisi Road, which provides the only access to the project site, is too narrow (4 metres) to have regular bus routing for a large quantity of passengers (about 900 students and staff members). Four residences, located between Kolisi Road and the project site, will hide most of the proposed facilities; it will be difficult to identify the proposed facilities from the road. Thus, this road is not suitable as a main access road to the University.

During the Basic Design Study, the possibility of laying a direct access road from Vaivase Road to the project site was discussed. As a result, both sides agreed that it would be desirable to construct a 4-meter-wide pedestrian access along the boundary of Samoan College and Western Samoa Polytechnic.

(2) Site Plan

As stated in 4-3-3 "Location and Present Situation of the Project Site", the project site is located on the north side of a hill, and has a slight slope of about 7 percent from south to north. The lowest elevation at the site is 40 meters above sea level and the highest elevation is 60 meters.

Each building of the proposed facilities will be laid parallel to the contour lines, along the slope of the land, to minimize the costs of excavation and shoring. Thus, the axis of the buildings will be east-west, and this layout will be able to reduce a heat accumulation from solar radiation as well.

A court surrounded by the Faculty/Administration Building and the Lecture Building will be "An Academic Core" of the campus, where students and academic staff will gather informally between classes and at lunch time. The Library/Resource Center and the Falé is to face the court. The difference in elevation (about 6 meters) between the Faculty/Administration Building and the Lecture Building will make the court more attractive by taking advantage of sloping terrace design, flower garden, etc.

(3) Future Plan

It is necessary to secure spaces for future expansion adjacent to the Lecture Building and the Faculty/Administration Building.

5-3-2 Architectural Plan

(1) Plan

Since the project site is located on a hill facing sea side, it is possible to make the proposed facilities comfortable without air-conditioning by controlling sunlight and maximizing natural ventilation. In this sense, the falé (traditional Samoan building consisting of only roof and pillars) is an ideal building type in Western Samoa. However, it is not functionally and economically feasible to make all the proposed facilities falé-style. Thus the design of the proposed facilities should rearrange and modernize the functional advantages of a falé. Each building is to be designed based on the following points:

1) Lecture Building

A corridor connecting lecture rooms should be located to the north of the rooms to maximize natural ventilation and control direct sunlight. 20-seat and 30-seat lecture rooms should be located in the same building for future flexibility.

2) Faculty/Administration Building

The administration office and the Center for Samoan Studies should be located near the entrance.

3) Library/Resource Center Building

The reading room/student study area should be detached from the shelving area so that students will be able to study after class. The shelving area, the audio-visual storage and the Pacific Collection storage should be air-conditioned.

4) Falé

This facility will be used for lectures attended by a large number of students (up to 400 students), assemblies and lectures organized by the Samoan Studies Center (related to traditional Samoan performing arts, etc.).

(2) Sections

Ceiling heights and shapes of each room vary according to function. 200-seat and 100-seat lecture theaters should be detached from the main building to minimize construction costs. Laboratories which have supply water and sewer lines should be located on the ground, while lecture rooms which require high ceilings to maximize natural ventilation should be located on the upper floor. Table 5-4 shows story height and ceiling height of the main rooms.

Table 5-4 Heights of Story and Ceiling

room Name	Story Height	Ceiling Height
Lecture Theater (200)	6.0m	4.0m
Lecture Theater (100)	5.4m	4.0m
Lecture Rooms	4.5m	4.3m (up to the bottom of ceiling)
Laboratories	3.8m	2.8m
Academic Staff Rooms, Office	3.8m	2.8m

5-3-3 Structural Plan

(1) Outline of the Buildings

The proposed facilities are for an institution of higher education, including lecture rooms/theaters, laboratories, a library, etc. The base span shall be 7.2m×7.2m and the floor heights shall be 3.8 meters for the ground floor and 3.6 meters for the second floor. The project site is inclined at an angle of 7 percent from north to south. The proposed buildings are to be grouped in accordance with site inclination to account for natural site condition as much as possible. Each group of buildings is connected by exterior stairway or sloped walkway.

(2) Foundation System

According to the geotechnical investigation of the project site, conducted in September 1994, about 1.0 to 2.0m below the ground surface, the top basalt layer with N-values of more than 50, and thickness of 5 meters exists. Beds of sand, gravels and boulders with N-values of 13 to 30 are present to a depth of 15 meters. Below this depth is clay with sandy layers with N-values of 7 to 9. Since the proposed buildings are all low (2-story buildings), either strip or pad footing could be utilized for foundation system, using top basalt layer as the supporting layer. A sufficient design allowable bearing capacity, 15.0t/m² to 20.0t/m² can be secured.

(3) Superstructure System

In light of the scale (2 stories above ground), the degree of ease of execution and the cost of the proposed buildings, as well as local natural conditions (earthquakes and so on), the most appropriate structural system for superstructure is reinforced concrete with rigid framed structure. The ground floor slabs should be designed as a suspended slab and should

avoid slab-on-grade system to prevent cracks which may occur in the future as a result of settlement of filling soil underneath.

(4) Applicable Standards

Codes and standards necessary for the calculation of building stress (live load, seismic force coefficient, wind force coefficient, etc.) shall be in accordance with the National Building Code for Western Samoa. Reinforced Concrete Structural Calculation Standards of Japan shall be applied in calculations of regarding such elements section as beams, girders, columns and slabs.

(5) Load and External Force

1) Live Load

The basic live load for each room is as shown in the following table.

Table 5-5 Live Load for Each Occupancy

(Unit: kPa)

Occupancy	Live load
Lecture Room	3.0
Laboratory	3.0 *
Reading Room	3.0
Shelving for Books (up to 1.8m)	4.0
At Each 0.2-Height of Shelves	0.5
Office	2.5
Toilet	2.0

* To be determined based on calculation

2) Seismic Force

The earthquake force will be calculated based on the following equations.

Earthquake force (V) = C · Wt

C : seismic force coefficient

Wt : earthquake load

$$C = Ch(T1, 1) Sp \cdot R \cdot Z \cdot Ls \\ = 0.113 (\text{Max.})$$

Ch(T1,1): coefficient specific to the ground

Sp : structural factor (0.67)

R : safety factor (1.2)

Z : district factor (1.05)

Ls : calculation method factor (1/6)

5-3-4 Utility Plan

(1) Electrical Facility Plan

1) Electricity Receiving and Voltage Reducing Equipment

A service line will be connected to the 22kV elevated power line installed along Kolisi Road, running along the western side of the project site. The voltage will be lowered to 415V/240V with a pad mount transformer to be installed near an electric light pole at the project site and electricity will be supplied to a low-tension panel board installed in the panel board room by means of an underground cable.

The Government of Western Samoa should be responsible for the installation of a service line and the supply and installation of a pad mount transformer and wattmeters.

- Electricity reception : 3Ø3W 22kV
- Low tension electricity : 3Ø4W 415-240V
- Transformer capacity : 500kVA

An emergency generator (150kVA) and an induction type voltage regulator (IVR) should be installed as a measure against power failures and voltage fluctuations. The generator should be actuated when the electric current is cut off and when the voltage fluctuates

beyond the IVR's regulating range. The main loads on the generators should be a switchboard, emergency lighting, fire pumps and water pumps. A static-type automatic voltage regulator with high response speed should be mounted on each of those items of equipment which require a stable and precise power source.

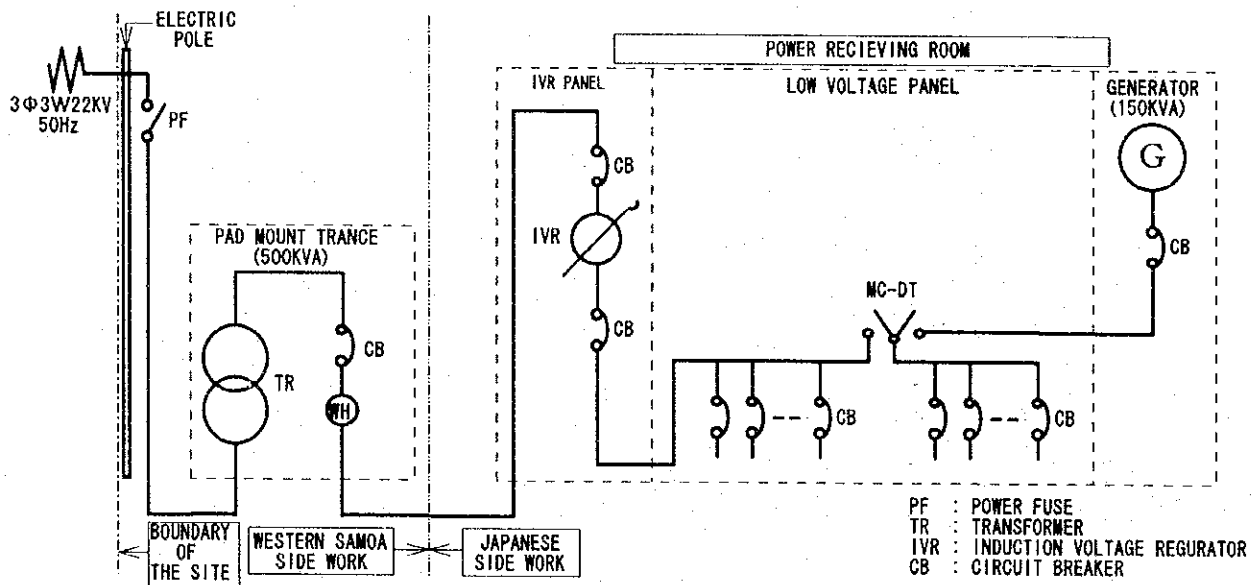


Fig. 5-2 Diagram of Electrical Power Supply

2) Main Line Feeder Power Equipment

Electricity will be supplied to the power distributor and the power equipment control board installed in each building from the low tension panel board installed in the panel board room. The main line feeders between the buildings should be laid underground.

The main line feeder voltage is as follows:

- Power equipment : 3Ø3W 415V
- Electric lights, sockets : 3Ø4W 415/240V

An alarm board for monitoring main line feeder power equipment should be installed in the office room of the research/administration building.

3) Electric Lights and Wall Sockets

a) Lighting equipment

The main light sources for lighting equipment should be fluorescent lights. Incandescent lights can be used depending on the architectural design or the use. Energy-saving type switches suited for the uses of the rooms should be installed.

The target luminous intensity for each room is as shown in Table 5-6.

Table 5-6 Target Illumination Level

Room Name	Illumination Level (lx)
Lecture Room, Seminar Room	350
Laboratory	500
Computer Laboratory	500
Reading Room	500
Academic Staff Room	350
Office	350
Storage	200

b) Wall Sockets

General-purpose and special wall sockets should be installed. A socket board should be installed in each room where many items of equipment are to be installed. The standards on wall sockets should be based on AS3100, A3112 and NZ198.

4) Telephone

A lead-in wire from the MDF room on the ground floor of the research/administration building can be connected to the elevated telephone line installed along Kolisi Road running along the western side of the project site. Telephone wires within the project site should be laid

underground. In principal, extension telephone circuits should be installed in pipes and should be connected to extension telephones in each room through intermediate terminal boards installed in each building. The switchboard's capacity should be 8 main circuits and about 64 extension circuits. A telephone should be installed in each preparatory room, each lecture theater, each laboratory, each room of the library and each office room.

5) Public Address System

The main public address system unit should be installed in the administration office, from where announcements will be made to specific or all staff members and students.

6) Fire Alarm System

A fire alarm system should be installed for detecting fires as early as possible and giving instructions on evacuation. The fire alarm receiver should be installed in the administration office, and red indicator lamp, alarm bell and fire alarm transmitter should be installed in the upper part of each fire hydrant case.

7) Lightning Arresting System

A lightning arresting system should be installed to protect the buildings against lightning.

8) Outdoor Lights

Outdoor lights should be installed near the buildings and the access road.

(2) Air Conditioning and Ventilating Plan

A separate air conditioning system (consisting of air-cooled air conditioners) should be employed because it is advantageous in terms of maintenance and management costs. The spaces to be air-conditioned should be minimized to save on construction and running costs. Table 5-7 shows the space to be air-conditioned.

1) Design Temperature/Humidity Condition

a. Design outdoor temperature/humidity conditions

Dry-bulb temperature : 30.3°CDB

Relative Humidity : 80%RH

b. Design indoor temperature/humidity conditions

Dry-bulb temperature : 26°CDB

Relative Humidity : not specified

2) Air Conditioners

Separate-type air-cooled air conditioners should be used. The spaces to be air-conditioned are as shown in Table 5-7.

Table 5 - 7 Air-Conditioned Rooms

Building Name	Room Name
Faculty/ Administration Building	Chemistry Lab, Chemistry Preparation Room, Physics Lab, Physics Preparation Room, Biology Lab, Biology Preparation Room, Language Lab, Computer Labs, Computer Preparation Room, Printing Room, Vice Chancellor's Rooms, Registrars Room, Bursar's Room, UPY Coordinator's Room, Counseling Room, Administration Office, Display Room, HOF's Rooms, HOD's Rooms, Chief Program Convenor's Room
Lecture Complex	Lecture Theater (100, 200 seats), Music Room and Preparation Room
Library	Shelving Space, Resource Center, Workroom, Storage for Pacific Collection, Audio Visual Store, Librarian's Room, Library Office, Resource Center Office

3) Ventilators

In principle, natural ventilation should be utilized. But some of the rooms and all the toilets should be equipped with ventilators. The lecture rooms and theaters should be equipped with ceiling fans.

(3) Water Supply and Sanitary Plan

1) Water Supply Equipment

A Western Samoa Water Authority water main with 100mm diameter is installed along Kolisi Road, which runs along the northern side of the project site. City water will be taken into a water tank through a service pipe connected to the water main, pumped up into a elevated water tank, then supplied to the facilities. During the dry season when there is a shortage of water supply, rainwater should be utilized as much as possible. Rainwater from the roofs should be stored for emergencies for supply using pumping equipment and elevated water tank. Since it is likely that scum will be mixed with water, a simple sand separator and filter should be installed.

2) Hot Water Supply Equipment

Water heaters should be installed in the kitchen and the water heater room. A solar water heating system should be installed in the kitchen, where hot water will be used mainly for cleaning tableware. An electric water heater should be installed in the water heater room.

3) Drainage and Ventilating Equipment

As the project site is not connected with the water main yet, waste water from the buildings should be treated within the project site. Consultations with the Department of Public Works of Western Samoa led

to a decision to install septic tanks in the project site. Regarding quality of treated water, the BOD should be less than 60ppm, so as not to require an extremely complex system. Since there are no drain pipes installed in and around the project site, treated water will be made to penetrate soil. Both waste water and sewage are to be treated in the septic tanks. Pipe for the septic tanks should be laid in accordance with standards set by the Department of Public Works.

4) Sanitary System

Laboratories, urinals and washstands of the type widely used in the country should be installed. Urinals for the use of students should be stainless steel continuous ones.

5) Kitchen Equipment

Gas cookers, sinks and refrigerators for use in preparing meals for students and instructors should be installed.

6) Fire Extinguishers

Indoor and outdoor fire hydrants regulated by the Department of Public Works and the New Zealand Standards will be installed.

7) Gas Equipment

A cylinder gas supply system should be installed in the canteen kitchen.