Ministry of Education and Training
The Kingdom of Swaziland

PREPARATORY SURVEY REPORT
ON
THE PROJECT FOR
THE CONSTRUCTION OF
SECONDARY SCHOOLS AIMED AT
PROMOTING INCLUSIVE EDUCATION
IN
THE KINGDOM OF SWAZILAND

MARCH 2017

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

MATSUDA CONSULTANTS INTERNATIONAL CO., LTD.
INTEM CONSULTING, INC.

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Preface

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to the Consortium of Matsuda Consultants International Co., Ltd. and INTEM Consulting, Inc.

The survey team held a series of discussions with the officials concerned of the Government of the Kingdom of Swaziland, and conducted field investigations. As a result of further studies in Japan, the present report was finalized.

I hope that this report will contribute to the promotion of the project and to enhancement of friendly relations between our two countries.

Finaly, I wish to express my sinsere appreciation to the officials concerned of the Government of the Kingdom of Swaziland for their close cooperation contributed to the survey team.

March, 2017

Akiko Kumagai

Director General
Human Development Department
Japan International Cooperation Agency

Summary

1 Outline of the Country

Having gained independence from Great Britain in 1968, the Kingdom of Swaziland (hereinafter called "Swaziland") is a landlocked country located on the southeastern tip of the African continent, neighbored by South Africa and Mozambique. Covering an area of 17,000 km^2, it is slightly smaller than the Japanese island of Shikoku and is divided into four administrative regions. Like Lesotho, it is one of the few countries in Africa ruled as an absolute monarchy. It has a population of 1.28 million, with a population growth rate of 1.4% (World Bank, 2015). Although the GNI per capita is US$ 3,230 (World Bank, 2015), it is only ranked 162nd (in 2004) of 214 countries in the world and has a poverty rate of 63% (2009)[1], which means that more than half the country's citizens are living under the poverty line. In particular, poverty in rural areas (poverty rate of 73.1%) stands out in comparison with urban areas (31.1%), showing a large economic disparity. The official languages are Swazi and English, and the great majority of the population adhere to a mix of Christianity and indigenous African religion or Christianity (Roman Catholic). The HIV infection rate is extremely high, and it has become a heavy encumbrance on society. The economic growth rate has continued to decline since 2012, and two-thirds of the national revenue is dependent on the common fund of the Southern African Customs Union (SACU). However, since customs revenue has declined in recent years from the South African region, which is the largest contributor to the fund, revenue for Swaziland has been greatly decreased, forcing tightened administrative and fiscal management.

2 Background and Outline of the Project

In Swaziland's National Development Strategy (Vision 2022) and Poverty Reduction Strategy and Action Plan, human resources are focused upon as an important resource. Investment in human resources development through primary and secondary education is a critical strategy to achieve a sustainable economy, social development, and the eradication of absolute poverty. Vision 2022 plans for a net enrollment rate of 80% by 2022, but in 2013, the net enrollment rate for lower secondary education has stagnated at 27.5%, showing that three-fourths of children of the eligible children have not been enrolled in school. Reasons that have been given for this are the overcrowding of secondary schools in urban areas, and the long commute distances to school in rural areas. The Ministry of Education and Training (hereinafter called "MoET") has set goals in their education and training sector policies for expanding school capacities and optimally placing schools within a five-kilometer commuting distance. Additionally, under the principles of Education for All (EFA) in the aforementioned policy, the ministry states the advancement of Inclusive Education (hereinafter called "IE"), which aims for fair and equitable education through the expansion of school enrollment to all children, including those with disabilities. Since starting to designate IE model primary schools in 2006, efforts have been made to spread the concept of

[1] World Bank website

inclusive education through teacher training and the installation of facilities and equipment. However, as of 2015, the number of IE model primary schools had stopped at nine, with only one secondary school. MoET stipulated the improvement of the quality of secondary education and the improvement of facility conditions in the Ministries' Action Plans for 2018 and 2022, aiming for the creation of base schools to help spread inclusive education through the building of new facilities for IE model schools, which are able to accept students with severe disabilities. However, tight financial conditions have made it difficult for Swaziland to create these facilities on their own.

Due to the above situation, the Government of Swaziland requested Japanese grant aid for the "Project for the Construction of Secondary Schools Aimed at Promoting Inclusive Education," targeted for a total of 12 new and existing sites in four regions to construct secondary schools where Inclusive Education can be implemented.

3 Results of Survey and Project Content

In November to December 2015, JICA dispatched a preparatory survey team to Swaziland. During this time, 17 sites were surveyed, including alternate sites, and it was confirmed that all of the target sites will be new school sites. Based on the results of site surveys, evaluations were conducted on land, infrastructure, construction and other conditions, 12 project candidate sites and their order of priority were confirmed. Through subsequent analyses, outline designs, and project cost estimation done in Japan, total of four sites (the top priority sites of each region) were determined as the targets for the project. The scale of each site will be the minimum necessary, with one classroom for each grade (total of five classrooms), and the necessary ancillary facilities and equipment. The facilities will be physically accessible to learners with disabilities, and furniture and equipment necessary for learners with disabilities will be installed.

Table- Project Target Sites

Code	Site	Region
M1	Boyane	Manzini
S1	Eqinisweni	Shiselweni
H4	Enhlitiyweni	Hhohho
L1	Gamula	Lubombo

Through analyses done in Japan, the survey team compiled outline designs, estimation of project costs, and a project implementing plan. From November 21 to November 28, 2016, the team presented an explanation of the draft preparatory survey report in Swaziland and conducted supplementary surveys. From the results of this, 'the Preparatory Survey Report for the Project for the Construction of Secondary Schools Aimed at Promoting Inclusive Education' was compiled. An outline of the Project compiled based on the outcome of discussions with the Swaziland side is as follows.

1) Components of the Project

The components of the Project will be the minimum necessary facilities (classrooms, science lab, computer lab, home economics lab (cooking and sewing), agriculture lab, administrative offices, feeding kitchen, toilets, teacher's house, and other ancillary equipment such as elevated water tanks) required for implementing Swaziland's standard secondary education curriculum, and furniture indispensable for operating an inclusive school (general education furniture, desks for wheelchairs), and equipment for such (IE-related equipment, general education equipment, school bus, kitchen equipment).

2) Outline of the Facility and Equipment Plans

Outlines of the facility, furniture, and equipment plans are shown below.

Table- Facilities

Block	No. of Block per Site				Composition	Area (m^2)
	M1	S1	H4	L1		
2-classroom Block	1	1	1	1	Classrooms (40 people) x 2	186.98
3-classroom Block	1	1	1	1	Classrooms (40 people) x 3	280.46
Science and ICT Labs Block	1	1	1	1	Science Lab, ICT Lab, Preparation Rooms	311.63
Home Economics Labs Block	1	1	1	1	Cooking Lab, Sewing Lab, Preparation Rooms, Store Rooms	249.30
Agriculture Lab Block	1	1	1	1	Animal House, Store Rooms, Washing Yard	103.18
Administration Block (S)	-	-	1	1	Head Teacher's Office, Deputy Head Teacher's Office, Accountant's Office, Secretary's Room, Teacher's Room, Tea Service, Resource Room, Store Rooms	249.30
Administration Block (L)	1	1	-	-		280.46
Feeding Kitchen Block	1	1	1	1	Feeding Kitchen, Pantry, Firewood Storage, Delivery Porch	124.65
Toilet Block (Male)	1	1	1	1		52.94
Toilet Block (Female)	1	1	1	1		52.94
Toilet Block (Staff)	1	1	1	1		25.02
Teacher's House	2	2	2	2	Semi-detached	127.77
Total/Site	M1／S1					1,923.10
	H4／L1					1,891.94
Block Total (4 sites)						7,630.08
Covered Passage (4 sites)						1,179.97
Total						8,810.05

Table- Furniture

Block	Room	Desks for Students	Desks for Management Staffs	Desks for Teachers	Tables-L	Tables-M	Tables-S	PC Tables	Chairs for Students	Chair for Head Teacher	Chairs for Management Staffs	Chairs for Teachers	Chairs for Visitors	Stools	Stools (adjustable)	Lab Tables-L	Lab Tables-M	Lab Tables-S	Sink-L	Sink-S	Cabinets-L	Cabinets-S	Racks	Desks for Wheelchair	Whiteboards
Classroom Block	Classroom	40		1					40			1													
Science and ICT Labs Block	Science Lab													41											
	Preparation Room											2													
	ICT Lab			1		1		40	40			1													
	Preparation Room											1									1				
Home Economics Labs Block	Cooking Lab														25			7		7					
	Preparation Room			1								1									1				
	Sewing Lab			1								1			24										
	Preparation Room			1								1									1				
Administration Block	Head Teacher's Room		1				1			1			6									2			
	Deputy Head Teacher's Room		1								1		2									3			
	Accountant's Room		1								1		2									3			
	Secretary's Room			1								1									2				
	Teacher's Room（H4, L1）				1	3						20	4								2	2			
	Teacher's Room（M1, S1）				1	3						32	4								2	2			
	Resource Room				1				4																
	Resource Room（S1）				1			1	5																
	Equipment Store																						1	4	3
Feeding Kitchen Block													2			1	2		1						

Table- Equipment

Category	Equipment	Nos. of Items
IE (for each site)	Photocopy machine,Desktop PC with software for visual impairment, Desktop PC, Projector,Screen for projector, Laptop PC, Book binding machine,Voice Recorder, Portable Merlin magnifier, White board, Goal Ball, etc.	11
	School bus	1
IE (S1 site only)	Perkins Brailler, Scanner, Embosser, Slates and stylus set, Braille globe	5
Science	Microscope, Human body model, Power supply device, Aneroid barometer, Hoffman's voltammeter, Dissecting set, Micrometre screw gauge, Optics kit, Circuit board set, Voltmeter, Sliding rheostat resistor, Dynamics trolley, Gas burner, Distillation set, etc.	31
ICT	Desktop PC, Projector with mount, Screen with mount, Printer	**4**
Home Economics	Electric sewing machine, Over locker sewing machine, Dress form, Electric stove, Gas stove,Refrigerator	6
Administration, etc.	Desktop PC, Printer, Pot	3

4 Project Implementation Structure, Construction Period, and Estimation of Project Cost

1) Implementation Structure

After an Exchange of Notes (E/N) regarding project implementation between the Government of Japan and the Government of Swaziland, and a Grant Agreement (G/A) between JICA and the Government of Swaziland are concluded, the Project will be implemented following the scheme

of Japanese Grant Aid, in accordance with Procurement Guidelines for the Japanese Grants (for Japanese consultant and local contractor). After this, a contract will be formed between the Government of Swaziland and a Japanese consultant to conduct the detailed design of the facilities and equipment. After completion of the detailed design drawings and tendering documents, a public tender will be conducted in Swaziland. The selected companies will enter into a contract with the Government of Swaziland for construction work and equipment procurement. Construction of the facility and the procurement of equipment will be conducted in accordance with this contract. Furthermore, in accordance with Japanese grant aid guidelines, tendering for construction work and equipment procurement will be divided and performed separately for the Project.

2) Construction Period and Estimation of Project Cost

The construction period necessary for the Project is estimated to be seven months from the signing of the G/A to the invitation to tender; five months from the invitation to tender to the commencement of the work, and 18 months for construction work, for a total of 29 months. The time necessary for equipment and furniture procurement will be incorporated into the construction work period.

The cost required for the implementation of this Project borne by the Swaziland side will be approximately 65 million yen.

5 Relevance of the Project

1) Relevance

- In the National Development Strategy: Vision 2022 and the Poverty Reduction Strategy and Action Plan, the Government of Swaziland has positioned human resource development, poverty reduction, and socio-economic growth as its top priority strategy. Additionally, the Education and Training Sector Policy (2011) stipulates the promotion of Inclusive Education, which aims for fair and equitable education through the expansion of school enrollment to all children, including those with disabilities.

  Based on these upper level plans and strategies, the Government of Swaziland stated in the Ministry of Education and Training Action Plan (2018-2022) to improve the net enrollment rate for secondary education and promoting school enrollment for socially vulnerable people, including children with disabilities, by expanding school entrant capacity through provision of schools and classrooms, and improving school facilities such as provision of ramps.

  By constructing new facilities and installing equipment to implement inclusive education at the secondary education level, the Project directly supports secondary education in Swaziland and the strategic challenges involved with inclusive education.

- Japan has provided support pertaining to human resources development and the improvement of fundamental lifestyles of socially vulnerable people in Swaziland; therefore, the Project is

consistent with the ODA policies of Japan.

- There are no special skills necessary for operation and maintenance of the facilities and equipment provided by the Project. Implementation of the Project will generate personnel costs for 68 new teachers, which will be borne by MoET. Since this is about 1.3% of the ministry's FY 2014/15 operating expenditure for the secondary education sector, they should be able to adequately cover these costs.

2) Effectiveness

Quantitative Effects

The Project, when implemented, expects the following quantitative effects.

Table- Expected Quantitative Effect

Indicators	Baseline (2016)	Target (2024) 5 years after the completion of project
Number of classrooms provided with essential environment appropriate for students with disabilities	0	20
Number of enrolled students provided with learning environment appropriate for students with disabilities	0	800

Note: Both are calculated based on 40 persons per classroom.

Qualitative Effects

The Project, when implemented, expects to bring about the following qualitative effects.

- More accessible educational environment is provided for students with disabilities, which will enhance the quality of and motivation for their learning.
- The target schools will be reference, visited, and inspected by stakeholders as a model secondary school for promoting inclusive education, which will contribute to the spread of inclusive education in Swaziland.

In light of the above, the Project is highly relevant, and considered effective.

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   - 4-4 TECHNICAL NOTES (Field Survey I)
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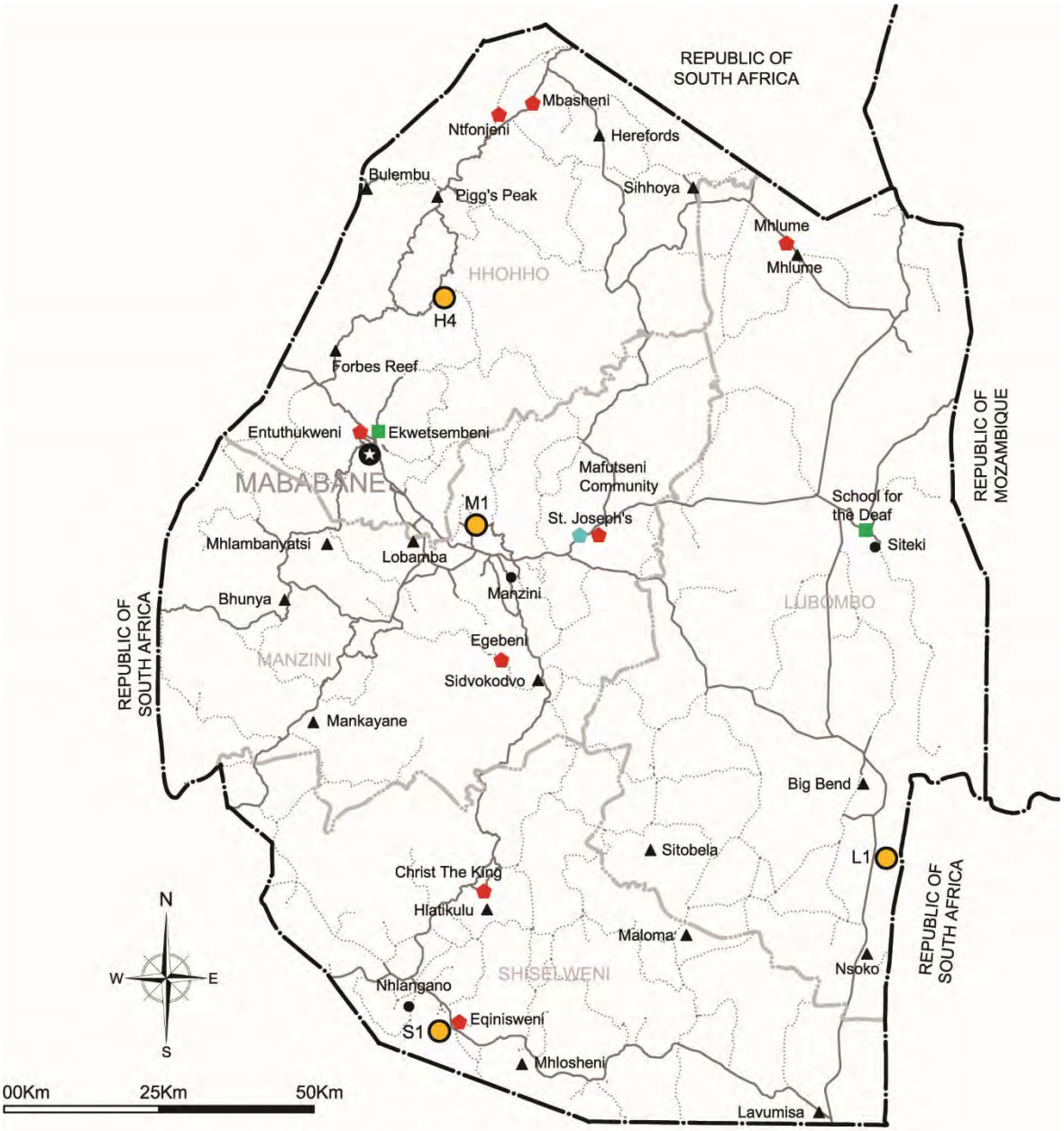
5. References
6. Other Relevant Data
   - 6-1 Topographic Survey Map of the Project Site
   - 6-2 Report of the Geotechnical Investigation on the Site

Location Map



Candidate sites for the project

Region	Code	Site Name
Manzini	M1	Boyane
Shiselweni	S1	Eqinisweni
Hhohho	H4	Enhlitiyweni
Lubombo	L1	Gamula

Legend

- Candidate Site
- IE Model Primary School
- IE Model Secondary School
- Special Needs School
- Capital City
- District Chief Town
- Town
- International Boundary
- District Boundary
- Paved Road
- Unpaved Road

Perspective

Bird’s-eye View (S1 Eqinisweni)

Aspect of Project Facilities (S1 Eqinisweni)

Figures and Tables

Abbreviations

A/P	Authorization to Pay
B/A	Bank Arrangement
BoQ	Bill of Quantities
CIC	Construction Industry Council
CMP	Comprehensive Mitigation Plan
ECC	Environmental Compliance Certificate
EFA	Education For All
EIA	Environmental Impact Assessment
EMA	Environment Management Act
E/N	Exchange of Notes
G/A	Grant Agreement
GNI	Gross National Income
HIV	Human Immunodeficiency Virus
ICT	Information and Communication Technology
IE	Inclusive Education
IEE	Initial Environmental Evaluation
IRIS	Incorporated Research Institutions for Seismology
JICA	Japan International Cooperation Agency
LMB	Land Management Board
M/D	Minutes Discussions
MoET	Ministry of Education and Training
MPP	Micro Project Programme Coordination Unit
NETIP	National Education and Training Improvement Programme
OVC	Orphans and Vulnerable Children
PQ	Prequalification
SACU	Southern African Customs Union
SANS	South African National Standard
SEA	Swaziland Environment Authority
SEN	Special Education Needs
SMC	School Management Committee
SNTC	Swaziland National Trust Commission
SPC	Swaziland Primary Certificate Examination
SPPRA	Swaziland Public Procurement Agency
SRA	Swaziland Revenue Authority
TIN	Taxpayer Identification Number
TSC	Teaching Service Commission

Chapter 1 Background of the Project

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1-1. Background and Outline of the Project

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The objective of the Project is to expand enrollment opportunities and improve equitable access to secondary education through constructing secondary schools at four project sites. The facilities will be physically accessible to learners with disabilities, and furniture and equipment necessary for learners with disabilities will be installed.

1-2. Natural Conditions

(1) Geology and Climatic Condition of the Target Area

In Swaziland, from the highlands of the western region (average elevation 1,500 m) to the lowlands (approximate elevation 150 m) of the eastern region, the land is largely divided into the Highveld, Middleveld, and Lowveld. The target sites of M1, S1, and H4 are located in the Middleveld and have an elevation of 705-1065 m, and are classified as a subtropical hot summer climate to maritime temperate climate, according to the Koppen climate classification. Site L1 is located in the Lowveld, with an elevation of approximately 165 m. It belongs to a steppe climate, but there are no large differences in annual rainfall amounts or temperature between the four sites. The commercial region of Manzini is located in the Middleveld and is considered a maritime temperate climate with an average annual temperature of 19.8°C and an average rainfall of 897 mm. The rainy season is from October to March, with the peak month of January having a monthly rainfall of 250 mm in the western part of the country and about half that amount of 120 mm in the eastern portions. Snow often falls in the Highveld of the southwestern region, but as the elevation drops, the frequency of snowfall also declines.

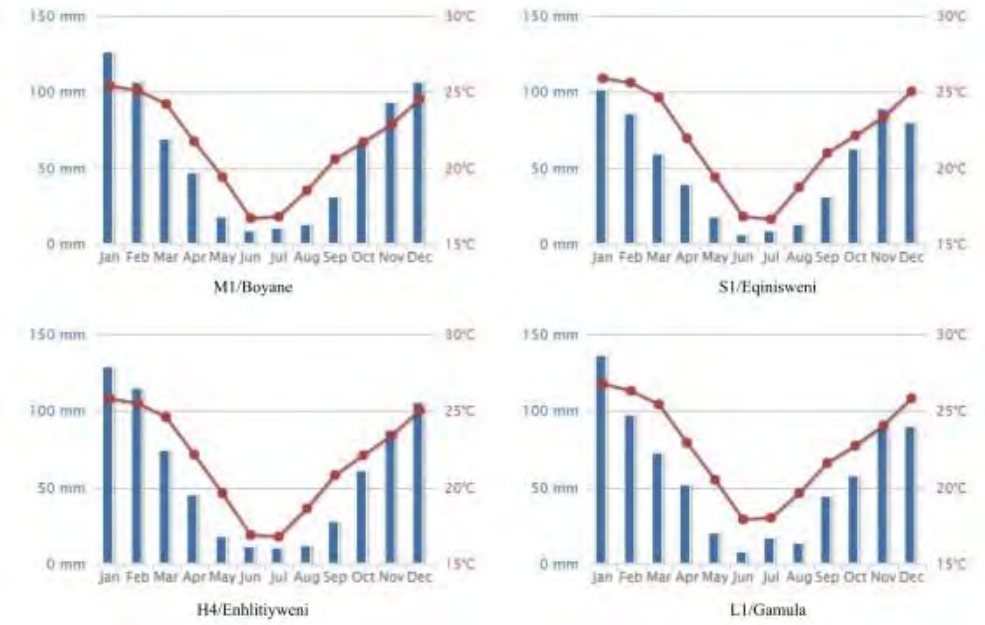


Figure 1-1 Monthly Rainfall and Average Temperatures

(2) Natural Disaster

Through interviews held during site inspections, no history of damage from natural disasters was confirmed. At the H4 site, which lies on top of a hill, there is a possibility of damage due to strong winds, but there have been no actual cases of damage to, for example, the roofs of existing building in the surrounding area. However, in a broad area of Swaziland, the formation of wadi and donga due to erosion from rainfall commonly seen. Therefore, it is necessary to take precautions for the exterior elements of the sites, including the layout of facilities, rainwater drainage processing, slope treatment, and the layout/levels passage on the premises.

(3) Site Land Survey

Topographical surveying (plane and level surveys) was conducted at all sites by a subcontracted local surveying company. For the level survey, a survey drawing was provided with a grid of 5m and a pitch of 0.5 m, showing latitude, longitude, orientation, existing building, trees, obstructions, and infrastructure. Surveying was conducted within a designated scope based on the site borders, which was confirmed in the presence of a MoET official and a representative of the neighboring residents (Chief of Village). As a result of the survey, it was confirmed that the land at the target sites has a mostly flat to slightly sloping surface, which will not present any problems for facility construction.

(4) Ground Survey

For the optimal foundation design for the buildings, a local engineering firm was contracted to implement a ground survey. The method for the survey was a dynamic cone penetration test on an excavated bed of 2.0 m at nine locations on each site, foreseeing facility construction of a one-story building. Together with this, undisturbed soil samples were taken from three locations at each site, and through laboratory experiments (Atterberg limit, particle size analysis, and triaxial compression test), the physical properties of the soil were confirmed. Additionally, soil permeability tests were conducted at two locations on each site, and the soil permeability performance necessary for formulating an optimal drainage processing plan was confirmed.

Results of the survey showed that the topsoil at the four target sites is 230-540 mm, with mostly sandy clay beneath that. With the exception of site S1, gravel from the weathering of granite and rhyolite can be observed. Results of DCP testing showed that with the exception of the L1 site, the sandy clay layer is softer than the layer of topsoil above it. The subgrade bearing capacity is roughly more than 50 kPa, but some areas with a value of approximately 20 kPa are scattered throughout. At the L1 site, there is much gravel due to weathered stone, and large rock masses may appear at the excavating level. Additionally, although some of the surveyed sites had expansive soil, this was not found at any of the four target sites. Survey results pertaining to topography and ground soil are shown in the table below.

Table 1-1 Outline of Target Sites

Code/Site	M1/Boyane	S1/Eqinisweni	H4/Enhlitiyweni	L1/Gamula
Region	Manzini	Shiselweni	Hhohho	Lubombo
Outline	Part of the Boyane PS athletic field. It is triangular in shape, but has a sufficient area. There are a few trees on the west side of the site.	Nearly rectangular. Consists of the area that was the athletic field of Eqinisweni PS (field was relocated) and the adjacent wooded area. Planned project site is the athletic field area.	Top of a hill and surrounding area. One side is grassy, but has large boulders in some places, which will limit the possible construction area.	Rectangular and quite large. Scattered shrubs in the area.
Area	5.8 ha	2.2 ha	4.5 ha	9.3 ha
Slope	flat ~ mild slope	mild slope	Approx. 1/10 ~ 1/20	mild slope
Geology	sandy clay/gravel-mixed silty clay	gravel-mixed sandy clay/ silty clay	sandy clay/gravel-mixed silty clay	sandy clay/gravel
Permeability	8.3 mm/min	8.3 mm/min	9.5 mm/min	4.6-6.9 mm/min
Electricity	350 m to medium voltage distribution grid	Medium voltage distribution grid on frontal road	Medium voltage distribution grid on frontal road	1 km to medium voltage distribution grid
Water	Well water is used at the adjacent Boyane PS, and the supply is stable. A community water supply pipe (110A) is buried under the frontal road. Construction is planned for completion in September 2016.	There is a well installed at the adjacent Eqinisweni PS. Well water can also be supplied to the site.	A community water supply grid (main pipe =110A) has been laid under the frontal road. However, the water supply is inadequate.	A well (depth of 55 m) and water tank have been installed adjacent to the site. The volume of the water supply is stable.

1-3. Environmental and Social Considerations

(1) Legal Systems Pertaining to Environmental and Social Considerations

In terms of environmental legal systems in Swaziland, the Environment Management Act (EMA) No. 5 of 2002 is set as the basic law. All project activities are categorized from Category 1 to Category 3, in accordance with the forecasted environmental impact.

- Category 1: Projects implemented outside of areas sensitive to environmental impact that are unlikely to cause any significant impact on the environment. These projects may include small-scale residential and commercial buildings, research activities that do not alter the land, technical cooperation projects, institution building projects, prospecting for groundwater or minerals, and small-scale social infrastructure provisions (education and regional health, etc.).
- Category 2: Projects not located in environmentally sensitive areas, but are likely to cause environmental impacts, some of which may be significant, unless mitigation actions are taken. These projects may include medium-scale electrical transmission lines, irrigation and drainage development, and rural road rehabilitation work, etc.

- Category 3: Projects likely to have significant adverse impacts, but whose scale, extent, and significance cannot be determined without in-depth study. Appropriate mitigation measures can only be identified after such study. These projects may include construction of primary infrastructure such as dams and reservoirs, factories, and large-scale afforestation, as well as projects involving resident resettlement, and Category 2 projects which are located in environmentally sensitive areas.

The Swaziland Environment Authority (SEA) reviews the project explanation (including project plan and proposed content) submitted by the proponent following the guidelines described above, and then categorizes each project activity. For projects falling into Category 1, an Environmental Compliance Certificate (ECC) is issued within ten days. For Category 2, submission of an Initial Environmental Evaluation (IEE) and Comprehensive Mitigation Plan (CMP) is required. Once SEA receives the IEE and CMP, they will either approve or reject them within 15 days. If approved, an ECC is issued; if rejected, the IEE will be resubmitted, or an Environmental Impact Assessment (EIA) will be conducted and the CMP revised. For Category 3, after scoping is conducted including stakeholders, an EIA and CMP will be prepared to go through the process of approval or rejection.

Applications for the four target sites of the Project have been submitted by MoET, and SEA has determined that all four target sites are classified as Category 1 projects; the ECC has been issued.

(2) Location Environment of the School Construction Candidate Sites

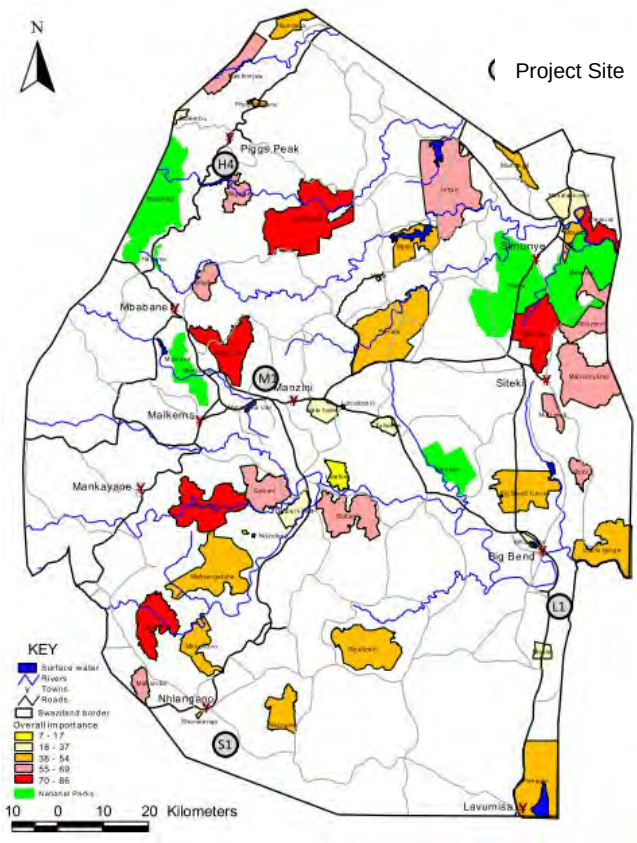
A summary of the sites from an environmental and social aspect are shown in the table below for the four target sites. It has been confirmed that there is no need for resettlement or farmland acquisition, etc. for any of the sites. Additionally, there will be no impact on the surrounding environment. However, depending on the planned location for S1, precautions will be necessary.

Table 1-2 Location Environment of New Facility Candidate Sites and Site Summaries from Environmental and Social Aspects

	Site	Location environment	Site summary (environment and social aspects)
M1	Boyane	No impact on surrounding environment. No resettlement. No acquisition of farmland, etc.	At the wish of the community school board, a portion of the unused PS land will be used (PS wishes this as well.) The candidate site includes sparsely wooded areas, but they are not natural forests. Since the community wishes for the site to be used, and it is a community asset, cutting trees is not a problem. However, it is preferable to reduce the amount of tree-cutting and keep the larger trees intact. (Estimated 20-30 trees at heights of 7-8 meters to be cut.)
L1	Gamula	Bush clearing is necessary. No resettlement. No acquisition of farmland, etc.	Unused land. The candidate site is covered in sparse bush. Since it has a rock bed, there are no dongas, but from the ridgeline down to the dam/reservoir (800 m-2 km down), there are catchment areas. Although it is not a flood plain, caution must be paid to rainwater runoff during concentrated torrential rains that occur during a short period of time.
H4	Enhlitiyweni	Same as above.	Unused vacant lot in a mountainous area. It is mostly flat with a very mild slope. There are unusually shaped rocks in the area, but according to members of the community

			who assisted with the inspection, they have no special cultural meaning.
S1	Eqinisweni	Same as above. (However, since it includes community forest land, considerations must be made regarding the impact on vegetation.)	PS athletic field (and the adjacent community forest land). According to a determination by the community, if the candidate site is assumed to be 10 ha with the PS athletic field, it will include community forest land. The athletic field is a vacant lot, so there are no environmental problems. There are also no problems from a social aspect, since it follows community wishes. At the hearing, it was said that the athletic field is planned to be moved to the other side of the PS. However, if the community forest land is included, it is appropriate to classify this site as Category B.

The figure below shows the locational relationship between the distribution of nature reserves and preservation areas in Swaziland to the target sites. It was confirmed during local surveys that none of the sites are located in nature reserves or preservation areas. This can be reconfirmed through the distribution map of nature reserves and preservation areas.



Source: Swaziland National Trust Commission （SNTC）; Mr. SANDILE GUMEDZE, Senior Ecologist

Figure 1-2 Distribution Map of Swaziland Nature Reserves and Preservation Areas, and the Location Relationship to New School Candidate Sites

(3) Preliminary Evaluation by Site

As shown in Table 1-2, there is no possibility for resettlement or farmland acquisition at any of the target sites, nor are they located in areas requiring protection or preservation. Additionally, due to the nature of the Project, there is no impact on the surrounding environment. (If community forest is included at Site S1, it would be necessary to give consideration to the impact on vegetation, but the plan does not include such an area.)

As with neighboring countries, when building toilets for school construction projects in Swaziland, it is not the standard custom to include septic tanks, etc. Therefore, attention must be given to sanitation and foul odors. Since there are no residences near the Project sites, there will likely be no impact generated from foul odors, etc., but it is preferable to take measures for the disposal of human waste and the prevention of odors.

Based on the above and according to JICA Environmental and Social Considerations Guidelines, all of the Project sites are evaluated as Category C.

Chapter 2 Contents of the Project

Chapter 2. Contents of the Project

2-1. Basic Concept of the Project

(1) Overall Goals and Project Goals

Swaziland's National Development Strategy (Vision 2022) states they will raise the net enrollment rate to 80% by 2022 in order to improve secondary education enrollment rates. Additionally, the Education and Training Sector Policy strives for the promotion of Inclusive Education, which aims for fair and equitable education through the expansion of school enrollment to all children, including those with disabilities, while the National Education and Training Improvement Programme (NETIP) aims to increase the number of IE schools accessible for SEN students. Following these upper level plans of Swaziland, this Project aims to expand enrollment opportunities and improve equitable access to secondary education through constructing secondary schools physically accessible to learners with disabilities.

(2) Basic Concept of the Project

In order to achieve the objectives described above, inclusive secondary schools will be constructed at a total of four sites (one per region) from the 12 sites requested by the Government of Swaziland. The schools will include classrooms, science lab, ICT lab, home economics labs (cooking and sewing), animal houses for practical agricultural study, administrative rooms, feeding kitchen, toilets, teacher's houses, and other ancillary facilities such as elevated water tanks, etc., educational furniture, and equipment. The facilities will be physically accessible to learners with disabilities, and furniture and equipment necessary for learners with disabilities will also be installed.

2-2. Outline Design of the Project

2-2-1 Design Policy

(1) Basic Policy

With a barrier-free premises as a base, a facility plan using inclusive design foreseeing various types of disabilities will be formulated. Plan formulation will be based on local conditions, with specifications for facilities that are both durable and have lower maintenance management requirements.

(2) Setting Project Scope and Overall Scale

1) Evaluation of Requested Sites

Seventeen sites, including alternate sites were surveyed. In addition to surveying site conditions (securing of land, size and shape of site, natural conditions such as land soil and weather), accessibility and infrastructure, 12 requested sites were finalized as requested project sites, based on

a selection criteria agreed upon by both sides. These sites were then given a order of priority. Site selection criteria, methods for studying enrollment demand, the requested 12 sites, and their order of priority are shown below.

a. Site Selection Criteria

- Sufficient enrollment demand
- No steep incline of the land
- Sufficient land space for construction and extension
- No risk of massive natural hazard and public safety
- No hindrance for construction in terms of physical access to the site, working space, etc.
- Verifiable of the land ownership
- No duplication with any construction/improvement projects by other donors or Government

b. Examination of enrollment demand in the catchment area of each site

To determine enrollment demand for each site, the school catchment area was set as a 10 km radius around each site. Then, the current number of students (as of a 2015 survey) from existing primary schools (feeder schools) in the catchment area is multiplied by the transfer rate (SPC passing rate) by region shown in year 2013/14 education statistics. The selection rate (possibility of advancing to the target school) was then set for each feeder school based on distance from the target site and placement of existing secondary schools in the surrounding area for the calculations.

Enrollment demand = estimated number of students advancing from feeders schools = number of G7 enrolled students of feeder school x transfer rate by region x selection rate.

Table 2-1 Selection Rate Settings

Selection Rate	Settings
100%	Schools within 3 km of the candidate site, with no choices (or very few choices) other than the planned school.
50%	Schools within 5 km of the candidate site and that are nearly the same distance as the neighboring secondary school
20%	Schools that have a neighboring secondary school within a 1 km radius, but that are also within 5 km commuting distance of the candidate site.
10%	Schools that are more than 5 km away from the candidate site, but there are no other secondary schools in the surrounding area, and students are more highly motivated to go to the candidate school than those in the 5% category.
5%	Schools that are more than 5 km away from the candidate site, but due to the locational relationship with neighboring secondary schools (within 10 km), only a very small number of students are expected to attend the planned school.

c. Requested sites

Table 2-2 Evaluation Results for 12 Requested Sites

Orde of priority	Code	Site	Region	Topography	No. of streams	Geology	Site area (ha)	Accessbility for construction	Duplication with other donors
1	M1	Boyane	Manzini	A	2	A	5.8	A	A
2	S1	Eqinisweni	Shiselweni	A	2	A	2.2	A	A
3	S2	Mpatheni	Shiselweni	A	2	A	10	A	A
4	M4	Ingwempisana	Manzini	A	2	A	7.5	B	A
5	H4	Enhlitiyweni	Hhohho	A	1	A	4.5	A	A
6	L1	Gamula	Lubombo	A	1	A	9.3	A	A
7	S4	Ka Mbhoke	Shiselweni	A	1	A	4.3	B	A
8	M3	Engwenyameni	Manzini	A	1	A	4.8	A	A
9	M2	Luhlokohla	Manzini	A	1	C	5.3	A	A
10	L2	Sulutane	Lubombo	A	1	C	4.5	A	A
11	L3	New Thulwane	Lubombo	B	2	A	13	A	A
12	H2	Evusweni	Hhohho	B	1	A	1.6	B	A

Legend	A	B	C
Topography	Flat/mild slope	Slope	Steep slope
Geology	Good	Soft	Expansive soil
Accessibility	Good	Possible	Obstructed
Duplication with other donors	No	-	Yes

2) Selection of Project Target Sites

The Swaziland side attached importance to having a fair balance between the four regions and ensuring there was at least one site per region was their priority condition. Based on the estimated project costs and project budget, the top ranked sites for each region were selected to be target sites for the projects, for a total of four sites.

Table 2-3 Project Target Sites

Priority Order	Code	Site	Region
1	M1	Boyane	Manzini
2	S1	Eqinisweni	Shiselweni
3	H4	Enhlitiyweni	Hhohho
4	L1	Gamula	Lubombo

3) Scale of the Schools

Based on the project budget, the scale of the schools at each target site will be one stream (one classroom per grade for a total of five classrooms) with necessary facilities attached.

4) Components of the Project

Facilities

For the requested facility components, the following components will be provided by the Project as the minimum necessary facilities for implementing the standard secondary education curriculum of Swaziland.

a) Classrooms, Science lab, Administration block, Toilets

These will be provided as indispensable components.

b) ICT lab

Information and computer technology (ICT) is planned to be implemented at the target schools. This is an elective subject, but since there are 253 ICT labs at the 273 secondary schools in the country, ICT lab can be considered as standard facility, and will thereby be provided.

c) Home economics lab

Home economics is planned to be implemented at the target schools. This is an elective subject, but since there are 211 home economics labs at the 273 secondary schools in the country, this can be considered as standard facility, and will thereby be provided. Since there is a large difference between the equipment needed for the two subjects of cooking and sewing, each will be prepared accordingly.

d) Agriculture lab

In a previous project, the agriculture lab was provided as a multipurpose room that was also to be used as the home economics lab. However, this was difficult since the equipment and usage was very different between the two subjects. Thus, in the schools built for previous projects, an agriculture lab was built at the expense of the Swaziland side. Additionally, since the agriculture lab has an attached animal house, considerations must be made for the facility layout as well. Ordinary classrooms will be used for agricultural training lectures, and animal house and ancillary store areas will also be provided.

e) Resource room

As an IE model school, teachers with IE skills will be allocated, and securing space to implement integrated learning for students with disabilities will be required. The space will highly be necessary not only for physical therapy for those with physical disabilities and a cool down area for students with emotional disabilities etc., but also for a space where students with disabilities can interact with teachers and other studentsat at times. This room

will be included as a facility necessary for effectively implementing inclusive education at the target schools.

f) Feeding kitchen

As of 2013, a school lunch programme has been implemented at 228 of the 273 secondary schools in the country. Since this is also planned for implementation at the target schools, a kitchen for preparing food will be provided.

g) Teacher's house

Teacher's houses are necessary to secure teachers. It is especially important to secure a minimum number of teachers for when schools are opened at new sites. Additionally, from the viewpoint of daily monitoring of the premises, having on-site teacher's houses is standard, and will thus be provided for the Project.

Furniture

General furniture for education, IE furniture (desks for wheelchairs), and other furniture will be supplied as the minimum necessary components for the target facility. Furniture for the teacher's houses will be the responsibility of the residents, and not covered by the project. Furniture specifications will follow MoET standard specifications.

Equipment

The requested equipment is IE-related equipment, general education equipment, school buses, and facility-related equipment (kitchen equipment, etc.). Based on the following selection standard agreed upon with the Swaziland, the equipment essential for operating the target inclusive schools will be installed.

Selection criteria

- Necessary for inclusive learning
- Necessary to implement the curriculum
- Indispensable for facility operation and maintenance
- Skill level of the user is adequate
- Relatively simple maintenance management (special skills or consumables that are expensive/difficult to procure are not necessary)
- Appropriate level of cost-effectiveness
- Space necessary for installing equipment and space for various room in the facility has been secured
- Procurement through local companies is possible
- Appropriate as Japanese grant aid

a) IE-related equipment

Swaziland's concept of IE is a full-inclusion environment that includes students with severe disabilities at all secondary schools. Since the target schools will be positioned as IE model schools, it is highly likely that students with severe visual and hearing impairment will be attending. However, at this point in time, since it is difficult to estimate the number of students with severe disabilities and the types of disabilities, as well as when they will begin school, equipment necessary for students with mild disabilities will be installed. MoET will then install equipment necessary for students with severe disabilities as the need arises. However, Site S1 is adjacent to an IE model primary school, where there are two students with severe visual impairment enrolled. Since it is highly likely that these students will continue their education at the target school, equipment for students with severe visual impairment will be installed.

b) General education equipment

With the exception of consumables and equipment that is not difficult for MoET to procure, all equipment essential to implementing the curriculum for each subject will be supplied.

c) School bus

One compact school bus (mini-van) will be supplied to each target school to help students with disabilities commute to school. In Swaziland, with the exception of special education schools, commuting from home is the norm, and dormitory living is unusual. It is estimated that students with disabilities currently attending general primary and secondary schools walk to school, ride public buses, or are driven by family members. However, since there are only 273 secondary schools in the entire country, compared to the 619 primary schools, the distance to secondary schools for many students becomes longer. Since long commutes to schools becomes a heavy daily burden for children with disabilities, this may lead to losing motivation for study and dropping out of school, which may cause them to give up on moving up to higher levels of education altogether. From the viewpoint of improving access to secondary education for students with disabilities, the necessity of school buses is high. MoET will be responsible for fuel costs, driver salaries and insurance, and regular vehicle maintenance costs, while daily operational management will be conducted by each target school. MoET has only one school bus in the capital city of Mbabane, but they have experience with the operation of such, since other school buses under their control are being driven for students with disabilities at primary schools, special education schools, and secondary schools.

d) Facility-related equipment

Pots for use with firewood (three per site), as are commonly used in Swaziland, and will be supplied for the feeding kitchen. (Stoves will be provided by building work.)

(3) Policy for Natural Environment Conditions

1) Measures for Weather Conditions

At the target sites, the monthly average high temperature is 26°C, and the low 16°C, making it a warm climate year-round. The monthly average rainfall during the rainy season is approximately 100mm-130mm, but is higher if there are torrential rains. Thunder and lightning also often appear on the west side of the country. The facility plan for the Project will follow the following policies.

- Natural ventilation using natural drafts will be used as a base for the rooms. Insulation material will be installed underneath the roof as a locally standard item.
- Using natural lighting as base, sufficient indoor lighting will be secured in consideration of students with visual impairment (low vision). In order to avoid direct sunlight in mornings and evenings, placement will follow an east-west axis, but for sloped sites, placement will be set in accordance with the tilt of the land to reduce construction costs. In this case, indoor curtains will be used as a measure for direct sunlight.
- In consideration of students with hearing impairment, roofbed board will be installed to reduce noise generated from rainfall.
- Access will be possible to all facilities on the premises via covered outdoor passage.
- Lightning conductors will be installed on buildings where computers are used: the ICT lab, science lab, and administration block.

2) Measures for Natural Disasters

Through interviews held during site surveys, no history of damage from natural disasters was confirmed. The H4 site, which lies on the top of a hill, is in a location easily exposed to strong winds, but there have been no actual cases of damage to the roofs of existing buildings in the surrounding area. However, all of the four target sites are on slightly sloped land; therefore, an appropriate exterior facility plan will be formulated for facility layout, rainwater drainage processing, slope treatment, and the layout/level of passage on the premises.

Through interviews held during site surveys, it was confirmed that there is no history of damage from earthquakes; however, according to IRIS[2], very small earthquakes have been recorded in the past. According to the seismic zone map of the South African National Standard (SANS), the western portion of Swaziland falls into Zone 1, where it is necessary to consider the seismic force. Therefore, based on SANS, a structural design will be carried out considering seismic lateral force. Earthquakes that may occur are natural earthquakes, as opposed to the mining induced common in South Africa.

3) Measures for Topographical and Soil Conditions

All of the target sites consist of sloped ground. Additionally, since some of the sites have exposed rock, a layout plan that conforms to the shape of the land will be followed. Results of geotechnical

[2] Incorporated Research Institutions for Seismology

surveys confirmed a soil bearing capacity of approximately 50 kPa. Although this is sufficient for the planned one-floor building facilities, there are scattered areas that show values of 20 kPa.

- The levels of each building will be set in accordance with the tilt of the land, but from the viewpoint of inclusive education, excessive gaps in levels will be avoided, and kept to a minimum as needed.
- Rainwater drainage will be installed around the facility and connected to provided seepage pits and/or led to site boundaries appropriately considering land conditions of the sites.
- Load bearing tests will be performed before the start of construction, and the necessary bearing capacity of the soil will be confirmed.

4) Policy for Social and Economic Conditions

Since there are many computers concentrated in the ICT lab, some existing schools have installed private security systems. As a general theft prevention measure for the Project, burglar grills will be installed in rooms where there is a risk of theft including the ICT lab, administration building, and science lab building. Additionally, similar to existing schools, it is preferable for outside perimeter fences to be constructed at the expense of the Swaziland.

(4) Policy for Construction/Procurement Conditions

1) Approval and Permits

Site Approval for the Project

When using land for new development plans or projects, it is necessary to obtain project approval from the Land Management Board (LMB). This approval has been acquired for all four target sites.

Building Permits

For both urban and rural areas, building permits are required for all of the sites. Applications are submitted to the Urban Government of the Ministry of Housing and Urban Development, which is also the assessing agency. Applications will be made by the Policy and Budget Planning Unit of MoET. The necessary drawings include the site location map, layout drawing, general drawings (floor plans, elevations, cross sections) and site drawing. Five copies of each must be submitted for each site. Within this, one set must be color drawings, with the designated areas shown in the designated colors (wall=red, concrete=green, wooden parts=yellow). It normally takes six weeks from the time of application to the acquisition of the permits, but since the Project is a public works project, this time is expected to be shortened to approximately two weeks.

2) Building Code and Standard

Building code

In Swaziland, a guideline for the design of barrier-free facility construction has been prescribed (SZNS ISO 20154:2011, Accessibility and Usability of the Built Environment), in which descriptions are given for passage and staircase widths, slopes, handrails, doorway widths, and

toilets, etc.. Apart from the above, no regulations for building nor structural design exist. In general, the South African National Standard (SANS) is applied. The facility design for the Project will be prepared considering those guidelines and standards.

School facility standards

School Guide Regulations Procedures stipulate a capacity of 40 persons per classroom, but that's all indicated on designing of school facility. For the facility design, the conditions and standards of existing schools were examined, and an appropriate design for implementing inclusive education considering local conditions and circumstances will be formulated.

3) Construction and Procurement Conditions

According to interviews with local construction contractors and consultants, current construction market conditions are largely prosperous, with public works projects mainly driving business. In addition to road construction and government office buildings, the construction of an international conference hall (42,000 m^2) is underway as a large-scale project funded half and half by the Government of Swaziland and the Government of Taiwan. Tendering for the adjacent hotel (51, 000 m^2) is also scheduled to begin in the near future. For the Project, many construction companies have expressed a strong interest. These companies include top class construction companies who have worked on large-scale projects in the past, companies with experience in general grant assistance projects (water supply project), as well as those who have worked in community development (secondary schools).

Most of the equipment and materials necessary for construction, including imported items, can be procured within the country. Of these materials, primary materials manufactured domestically include cement, aggregate, burnt brick, natural stone, and timber, etc. Secondary products such as concrete blocks (hereinafter referred to as "CB") are also produced. Most of the other primary materials (reinforcing bar, plywood, construction finishing materials, device/electrical equipment and materials, etc.) are imported products from South Africa. However, due to geographical conditions with South Africa, and because the Southern African Customs Union (SACU) allows imported products to be transported without incurring customs duties, the import of materials and equipment from South Africa is done on a regular basis. Therefore, there will be no problems in terms of procurement.

Additionally, the maintenance conditions of major trunk roads in the country is very good. Although access to the sites requires passing over unpaved roads, the sites are all located within 2 km of a paved road. Therefore, there are no special problems regarding the transport of equipment and materials.

(5) Policy Pertaining to the Use of Local Contractors

1) Local Construction Contractors

Local construction contractors are registered with the Construction Industry Council (CIC), which is a lower organization of the Ministry of Public Works and Transportation. There are many construction companies, mainly local contractors belonging to the highest category of CIC registration and foreign-capital companies that have the technical and financial capabilities sufficient for performing construction work on the same scale as the Project. For executing work on the Project, construction contractors will be selected using appropriate and relevant criteria.

2) Local Suppliers

Construction material suppliers are concentrated in the capital area of Mbabane and the industrial park area of Matsapha, where there are several large and medium-sized companies. Construction materials for school construction can be procured from domestic suppliers. Conversely, large suppliers of equipment are limited, but it is both inexpensive and common for construction contractors to directly procure equipment themselves from South Africa. Suppliers of fabricated concrete articles such as concrete blocks, bricks, and steel have large factories in Swaziland, making it possible to procure materials with a consistent degree of quality ensured.

For furniture suppliers, a list of 31 companies has been compiled from MoET's past experience. However, most of these companies are agents for South African manufacturing companies and mainly suppliers who procure ready-made products. Due to Swaziland's economic scale, the number of companies that manufacture their own furniture based on orders is extremely limited. For the Project, a furniture company will be selected from companies that may include agents who procure furniture through South African factories; this will done from the viewpoint of ensuring competiveness in tendering as well.

For the equipment supplier, there are many manufacturing company agents in Swaziland with past MoET experience. However, for some of the target equipment such as IE-related equipment, there are no manufacturing company agents, or they are limited in number. For equipment where appropriate competitive tendering cannot be done, or if there is risk that fair tendering cannot be ensured, the requirement for requesting procurement from a third country will be applied and procurement will be made from South Africa or other neighboring countries.

3) Local Consultant

Local consultants are registered with the CIC according to their field of specialty. These firms include 15 architectural design firms, 19 structural design firms, 9 electrical equipment firms, 8 machine equipment firms, 11 QS firms, 2 interior design firms, 3 urban planning firms, and 12 project management firms. However, these firms are not categorized according to their size or past experience. Through interviews regarding consultants, it was found that among structural consultants specializing in engineering, there are some companies that own laboratories for quality control, as well as some that are technically reliable, having been in charge of national projects such

as international conference halls. To implement the Project, these local consultants will be effectively used for construction supervision.

(6) Policy on Operations and Maintenance Measures

In general, facility maintenance will be made simple, with no special skills required for operation and maintenance of equipment. Equipment and materials for which maintenance and obtaining consumables is difficult will not be used. Additionally, in order to lower operation and maintenance costs, the facility plan will ensure natural light and natural ventilation, keeping the use of machinery to a minimum and thereby lowering electricity costs.

(7) Policy Pertaining to Setting the Grade of Facilities and Equipment

The grade of the facility will be sufficient enough to ensure building durability and inclusive design, while using locally standard materials. Furniture will be specified based on the local standards with a viewpoint of low maintenance cost. Equipment for experiments and practical learning will meet local specifications. Equipment for students with disabilities will meet specifications that allow for local maintenance.

(8) Policy on Construction, Procurement Methods, Construction Period

1) Construction and Procurement Methods

School buildings of local standard are designed as masonry structure, without giving consideration to seismic force. However, Swaziland is categorized as an seismic zone in the South African building code. Additionally, in the newest version of this code, using a masonry structure for educational facilities is fundamentally prohibited. Aiming to secure large openings to let in natural lighting as IE design, combines the use of a reinforced concrete (RC) frame and the burnt brick curtain walls normally used in Swaziland will be applied in principle.

2) Construction Period

Analyzing the work results of previous projects, and based upon survey results including interviews conducted with local consultants, construction companies, consultant staff, and procurement agents during the field survey, it was determined that approximately 18 months is the appropriate period of construction for the four sites.

2-2-2 Basic Plan

(1) Facility Plan

1) Layout Plan

The layout of the facilities on the site will basically follow the policy described below. The conditions unique to each site (size, land shape, slope, adjacent road conditions, existing on-site trees, etc.) will be considered to form an appropriate plan.

- Sites with a sloped topography will generally have a layout that follows the contour line; a layout that limits land forming will be given first priority.
- In order to avoid direct morning and evening sunlight, building layouts will be parallel to the east-west axis.
- The layout will consist of two rows following the contour line with a central courtyard in between and facing outdoor passage. This will limit the distance for moving between the facilities for students with disabilities.
- The toilets will be located near the school buildings to limit the burden for students with disabilities. Booths for wheelchair will be installed at both end of the row.
- The resource room will be placed adjacent to the teacher's room where it can be easily seen and access by teachers and other students.
- The agriculture lab (animal house) will be placed near the farm for practical learning.
- All buildings will be interconnected with covered open passage.
- A minimum number of parking spaces will be secured for the school bus, maintenance personnel, and visiting guests. Enough space to allow vehicles to turn around will be ensured.
- The plan will be formulated to allow future facility expansion.
- Existing trees will be left standing to the greatest extent possible.

2) Floor Plan

While referring to the standard design, an appropriate plan will be followed based on the function of the various rooms and inclusive design. The details and sizes of the various rooms in each building will follow the policy described below and be set while taking into consideration the activity to be conducted in each room and layout of the furniture. The floor area of the facilities and various rooms are calculated using center lines of columns and walls.

- Securing natural light and drafts, the plan composition will use side passage.
- With a RC column/beam and burnt brick curtain wall structure as a base, the span placement will be based on the allocation of bricks.
- Each classroom and lab will be planned estimating usage by 1-2 students with wheelchairs.
- From an IE point of view, entrances to classrooms and labs will be installed in two locations (front and back). Doors will open inward and have an effective opening of 900 mm.
- Burglar grills will be installed in labs and administration buildings where equipment is stored.

a) Classroom block

- A total of five classrooms, with one per grade will be planned. Each will have a capacity of 40 persons, as per Swaziland standards. Based on the system of three grades for lower secondary education and two grades for upper secondary, the two classroom blocks will consist of a 3-classroom block and a 2-classroom block.

b) Science and ICT labs block

- The science lab will be used by four science-related subjects. These are Combined Science

(lower secondary education curriculum F1-F3), Physics, Chemistry, and Biology (upper secondary education curriculum F4-F5). With a total of 28 periods/streams, since the total number of periods is less than 40 per week, one science lab can be shared by the four subjects.

- Since ICT consists of 13 periods/streams, one room with a 40-person capacity will be sufficient.
- The science lab and ICT lab will be connected to form one building block. In the central area, preparation rooms for each lab will be installed.
- Lab tables and PC desks will be placed at a right angle to the teacher's desk to allow the teacher's demonstrations to be seen easily by students. Propane gas tanks to be used for experiments will be placed outside.

c) Home economics lab block

- Home economics consists of cooking and sewing, with 14 periods/streams each for a total of 28 periods. Considering the nature of each subject, the practice labs for each will be provided separately.
- Since most of the students who select home economics as a subject are girls, the selection rate is about half of each class. Thus, each room will be planned as a 24 person capacity room.
- One building block will be planned for the two labs, with preparation rooms and storage areas between them.

d) Agriculture lab block

- Local standard design stipulates an integrated facility consisting of a lab, preparation room, storage area, and animal house. However, since the lab will mostly be used for lectures, a classroom will be used for that purpose. The animal house, feed storage, store rooms for agricultural tools and chemicals, and a practical learning sink will be placed together in one block.
- Since the type and number of livestock will differ depending on the school, the animal house will be built following standard design. Since the practical learning sink will be used outside for mixing agricultural chemicals, etc., it will be built adjacent to the area for washing agricultural machinery and tools.

e) Administration block

- One building block will be planned to hold the head teacher's office, deputy head teacher's office, accountant's room, secretary's room, teacher's room, store room, tea service, as well as the resource room and IE equipment store room.
- The head teacher's office will be placed along an open passage for easy viewing of the school blocks. Additionally, a dedicated store room will be provided to store important documents such as test papers, etc.

- Since the secretary's office will also serve as the printing/copy room, sufficient space will be secured. Additionally, since the administration block will also be the reception area for the school, a small window for communication with visitors will be installed.
- Based on the confirmed enrollment demand of one stream at Sites H4 and L1, the teacher's room will be large enough for a capacity of 18 people, based on the minimum number of teachers necessary, calculated at 17 people. This will secure a room large enough for future growth in personnel. At Sites M1 and S1, an enrollment demand of two streams or more has been confirmed, thus making it highly probable that the facilities will be expanded in the future. To prevent obstacles to the integral function as a teacher's room, the room will be expanded by one span so that it is possible to increase personnel in the future. Teacher's desks will be installed according to local standard specifications. Partitions will be placed between the fixed desks with the upper portion of the partition walls to be used as shelves for books and documents.
- Educational statistics (2013) show that approximately 2% of all students currently enrolled in secondary education are students with disabilities, but with the growth of inclusive education in primary education, the number of students with disabilities is trending upward. The target schools for the Project will be IE model schools and some students with disabilities are expected to commute to school from private boarding houses. Based on this, the number of students with disabilities expected to attend the target schools is estimated as eight students (200 students x 4% = 8 students with disabilities). Therefore, a floor area for the resource room sufficient to accommodate this number will be secured. Additionally, enough space will also be ensured for permanently storing IE furniture and equipment such as desks for wheelchairs, etc.
- In addition to building the resource room adjacent to the teacher's room, it will also have direct access from outside. A permanent 4-person table will be installed, and it can be moved appropriately when students with physical disabilities use the room for physical therapy. S1/Equinisweni will have PC desks for students with visually impairment.

f) Feeding Kitchen

- As per the request of Swaziland, the heat source for cooking will be firewood. Based on local facilities of the same type, the equipment in the feeding kitchen will include four fixed cooking stoves, sink, food preparation counter, and serving counter. A pantry and backyard will also be included. The backyard will have access from the parking lot and will also have a firewood storage space.
- The front of the kitchen will have space to distribute meals, with a service counter and a place for students to wash their hands. Following local standards, students will provide their own container for meal.

g) Toilet block

- The local standard toilets are called VIP (Ventilated Improved Pit) toilets. A hole (pit) is dug,

over which a shelter is constructed. Even with the installation of an overhead ventilation pipe, foul odors cannot be avoided, and thus, the toilets must be placed a sufficient distance away from the school buildings. The toilets are considered disposable, as once the pit is full, it is discarded along with the shelter. For the Project, instead of pit toilets, a prefabricated toilet unit system (Enviro-Loo) manufactured in South Africa will be used. With this system, since all liquids are evaporated, soil is not contaminated. Solid matter is decomposed using bacteria and turned into sludge, compacting it to approximately 5% of its original state. It has the additional merit of having an extremely low level of foul odors, as the process is accelerated by a strong natural ventilation function. These toilets were used in the "Project for Construction of Primary and Junior Secondary Schools in Limpopo Province" implemented in South Africa in 2004 and thus have proven effectiveness.

- Through the use of the Enviro-Loo, the toilet blocks can be placed adjacent to the school building. From an IE point of view, this will lessen the burden of getting to the toilets for students with disabilities.
- A total of three toilet blocks will be planned, one for female, male, and teachers. Each block will have a booth for wheelchair. Since each toilet unit system can accommodate up to 20 people, the number of toilets to be installed will be based on the planned number of boys and girls (100 each) and number of teachers (17), as shown below.

Table 2-4 Planned Number of Toilets

	Male	Female	Teacher/Staff
Toilet stools	3	5	2
Urinals	Affixed	-	-
Hand-washing faucets	4	4	2
Handicapped booth	1	1	1

- An incinerator will be placed adjacent to both the female's and teacher's toilet block to dispose of feminine hygiene products.

h) Teacher's houses

- Two semi-detached house blocks will be planned following the local standard, and as the minimum necessary scale. Design specifications will follow local standards.

Table 2-5 Planned Facility Overview

Code	Block	No. of Block per Site				Composition	Area (m^2)
		M1	S1	H4	L1		
2CR	2-classroom Block	1	1	1	1	Classrooms (40 people) x 2	186.98
3CR	3-classroom Block	1	1	1	1	Classrooms (40 people) x 3	280.46
SL+ICT	Science and ICT Labs Block	1	1	1	1	Science Lab, ICT Lab, Preparation Rooms	311.63
HL	Home Economics Labs Block	1	1	1	1	Cooking Lab, Sewing Lab, Preparation Rooms, Store Rooms	249.30

AL	Agriculture Lab Block	1	1	1	1	Animal House, Store Rooms, Washing Yard	103.18
ADMS	Administration Block	-	-	1	1	Head Teacher's Office, Deputy Head Teacher's Office, Accountant's Office, Secretary's Room, Teacher's Room, Tea Service, Resource Room, Store Rooms	249.30
ADML		1	1	-	-		280.46
K	Feeding Kitchen Block	1	1	1	1	Feeding Kitchen, Pantry, Firewood Storage, Delivery Porch	124.65
TM	Toilet Block (Male)	1	1	1	1		52.94
TF	Toilet Block (Female)	1	1	1	1		52.94
TS-a/TS-b	Toilet Block (Staff)	1	1	1	1		25.02
SH	Teacher's House	2	2	2	2	Semi-detached	127.77
Total/Site		M1／S1					1,923.10
		H4／L1					1,891.94
Grand total	Block total (4 sites)						7,630.08
	Covered Passage (4 sites)						1,179.97
	Total						8,810.05

3) Cross Section Planning

- From the aspect of the site conditions and the implementation of a barrier free design, all buildings will be one-story structures.
- By giving the school building shed roofs and large openings in the walls, indoor illuminance is provided in the form of natural lighting, giving consideration to students with visual impairment. Additionally, by extending the eaves of the shed roof toward the open passageide, a wider covered passageway can be provided, without disturbing natural light into the rooms.
- Depending on site conditions, the school buildings and open passage will consist of a single-piece platform with no level differences, or a platform with two different levels. Each level will be connected with a slope of 1/15 inclination.
- The difference between the levels of room and the open passage is 20 mm, but will be tapered. Additionally, the floor drainage slope for the open passage will be 1/100 as the standard, but no more than 1/50.

4) Structural planning

a) Structural type

- Typical type: Reinforced concrete column/beam frame + independent footings, shed roof by steel beam, brick curtain wall
- Animal house: Reinforced concrete column/beam frame + independent footings, wooden truss gable roof, concrete block curtain wall

- Teacher's house: Brick masonry structure + continuous footing, wooden truss gable roof (local standard design)

b) Structural standards

In Swaziland, there are no building standards that apply to structure, but in general, the South African National Standard (SANS) is applied. For the Project, based on SANS loading conditions (seismic load, wind load), the Standard for Structural Calculation of Reinforced Concrete Structures (Architectural Institute of Japan) will be applied. SANS will be applied for materials specifications.

- Soil bearing capacity: Based on locally subcontracted geotechnical survey results, a soil bearing capacity of 50 kPA (M1, S1, H4), 200kPA (L1) at an excavation level of 1 m depth is applied for planning.
- Wind load: Calculated based on SANS with a standard wind speed of 28 m/s and ground surface roughness category (Zg) = 250.
- Seismic force: The southwest region of Swaziland is falls into Zone I of the SANS seismic hazard map. For the Project, structural analysis of seismic lateral force will be conducted with a shear coefficient of Co=0.1g.

c) Structural materials

Structural materials will follow local specifications and are planned as follows.

- Concrete: The design strength will be 21 MPa.
- Reinforcing bar: Since the commodity items circulating in the local area generally follow South African specifications (SANS), these will be used for the Project as well.

  - Deformed bar 450 MPa

- Steel material: SANS specification products in circulation will be used.

  - Shaped steel Grade S355 (355 MPa）

  - Bolts Grade 88 (800 MPa)

- Bricks: NFX category (compressive strength of 30 MPa)

5) Electrical installation

a) Power Receiving and transforming

- Draw-in and transforming: New electricity power lines must be brought in for all target sites. Since the existing distribution grid is medium-voltage 11 kV, a transformer will be installed and electricity will be transformed to 380/220V and drawn into the site. Since the electric power necessary for the site is estimated at 100 kVA, electricity transforming will be conducted through a pole-mounted transformer (if under 125 kVA). In this case, Swaziland side will install poles, pole-mounted transformers, and low-voltage circuit breakers through

the work of Swaziland Electricity Company (SEC). Work beyond that will be covered by the Project.

- Power receiving: After electricity is transformed, it will be received by independent feeder pillars (kiosk). Kiosks will be installed in two locations, dividing between student facility use and teacher's houses use. An electricity meter for each of the teacher's houses will be installed inside the kiosk.

b) Motive power trunk line

- Electricity is distributed from the receiving boards in Kiosk to each distribution panel (electric lighting distribution panel, motive power control panel) as shown below. Electrical conduits will be laid for trunk lines and motive power distribution lines. Hand holes will be placed at necessary locations and cables will be installed within conduits.

Electric lighting trunk line:	3-phase, 4 lines 400/230V
Outlets for lights:	single-phase, 3 lines 230V
Motive power for drainage and sanitation:	3-phase, 4 lines 400V

c) Lighting facilities

- A level of 250 lx will be the aim as the average illumination above standard desks for students. Taking students with visual impairment into consideration, the front row of desks in the classroom will be 500 lx average. Passage and toilets, etc. will be 150 lx. In order to avoid unnecessary lighting, lights will be placed on appropriately separate switching systems within rooms. Outdoor lighting will be turned on through automatically lighting flashers. Lighting fixtures in each room will be fluorescent lights, which are economical and can be obtained locally. Outlets will follow South African specifications commonly followed in Swaziland.
- Since unfamiliar people may use the science and ICT labs, home economics lab, and administration block, exit lights will be installed.

d) Electrical outlets

- Electrical outlets will follow the South African specifications commonly used in Swaziland. They will be installed on walls in four location in classroom and administration rooms. Dedicated outlets will be installed for areas where computers, projectors, air conditioners, and practical learning equipment, etc. will be used. Furthermore, a trench will be placed under the floors of the science lab, ICT lab, and the home economics cooking lab, where multiple conduits and electrical lines are necessary. To facilitate maintenance management, these will be installed in a flexible manner, allowing for any future changes in layout.

e) Communications equipment

- Telephone (land line) equipment: None of the sites or nearby areas have telephones lines.

This equipment is not covered by the Project.

- Internet facilities: This will be in the scope of the Swaziland side, not covered by the Project.

f) TV equipment

- Empty conduits will be installed in the teacher's houses for televisions. The ends will be capped, and the actual installation of antennae and televisions will be the scope of the Swaziland side.

g) School bell

- A chime will be used to signal the beginning and end of classes. The bell will be operated from the administration block, and speakers will be installed in two locations on outside walls at each site.

6) Air conditioning and Ventilation systems

a) Air conditioning system

- For the Project, only the ICT lab will have a wall-mounted, split-type air conditioner. Since air conditioners may be installed in rooms within the administration building at the expense of the target school, conduit sleeves and electrical outlets will be installed.

b) Ventilation facilities

- The science lab will be equipped with a fume hood and wall-mounted ventilation fan. The feeding kitchen and teacher's houses will also have wall-mounted ventilation fans. Other areas will generally use natural ventilation provided through the architecture.

7) Water Supply, Drainage, and Sanitation systems

a) Water supply system

- The method for supplying water will be a gravity water supply system using water reservoir tank and elevated water tank.
- The water supply up to the new water reservoir tank will fall within the scope of the Swaziland side. From the provision of new water reservoir tank onward will fall within the scope of the Project. The water source will be expected from existing community or adjacent primary school borehole or new borehole, from the neighboring community water grid.
- As commonly seen in Swaziland, rainwater collection tanks (JOJO Tank) will be placed outside of each building to effectively use rainwater.

b) Hot water supply system

- Electric hot water heaters will be installed in the kitchen of the home economics lab and in teacher's houses.

c) Sanitation system

- All toilets will be western-type stools. Urinals for students will be affixed stainless models, and hand washing basins for students will be constructed from concrete. Ready-made ceramic models will be installed for teacher use. From an inclusive education aspect, all faucets will be lever type faucets.

d) Drainage system

- Wastewater: Since the toilet unit system treats waste through evaporation and solidifying processes, wastewater drainage treatment will not arise
- Rainwater/non-fecal wastewater: This will generally be processed on-site by passing through a drainage ditch on the premises into seepage pits. The overflow will be appropriately discharged off site. A chemical dilution tank will be installed for the sinks of the science lab and agricultural lab. Grease traps will be installed in the home economics lab and the feeding kitchen.

8) Gas supply system

- Natural gas lines will be installed in the science lab and home economics lab. Propane gas tanks will be placed in the outdoor tank storage area, and pipe wrenches will be prepared indoors.

9) Fire Alarm and Fire Extinguishing system

There are no standards in Swaziland regarding the installation of fire alarm systems or fire extinguishing equipment. While following the example of similar facilities, fire protection system for the Project is as follows.

- Two indoor fire hydrants with an alert radius of 30 m will be installed at each site. However, a fire extinguishing pump will not be included, as they will be connected directly to the elevated water tank.
- Dry-chemical fire extinguishers (9 kg) will be appropriately installed. Additionally, a CO2 extinguisher (5 kg) will be placed in the ICT lab.
- A smoke detector will be placed in the science lab and home economics lab, where fire will be used. A heat detector and fire blanket will be placed in the feeding kitchen, where cooking stoves will be a source of heat. These automatic fire alarms will be battery operated and free-standing, not managed by a fire alarm control panel.
- A push-button alarm bell and alarm lamps will be installed adjacent to the indoor fire extinguishers.

10) Lightning Protection system

- Lightning protection will be installed in the science and ICT lab block, and administration block, where computer equipment is expected to be used.

11) Construction material planning

For the selection of construction materials, ease of maintenance management, and workability will be taken into consideration, and materials that can be procured locally will be used as a base. Specifications, as compared to similar projects and existing buildings, are shown in the table below.

Table 2-6 Comparison of Major Building Specifications

Item		Previous project (community development)	Specification for the Project	Design rationale
Exterior specifications				
Roof		Colored steel roofsheet (IBR) t=0.58mm	Same	Widespread use as a local construction material and has suitable specifications in terms of workability and maintenance. Sheathing will reduce noise from rain.
Exterior walls		Concrete block + mortar + paint	Brick face masonry, partially painted	Locally standard materials and construction methods. Little price difference with CB + painted mortar, but with brick face masonry, lower maintenance costs and shortened construction time can be expected.
Windows		Steel-frame awning window	Aluminum frame louver window, wooden frame with fixed fittings	Effective from an IE standpoint in that they do not jut out from wall and are better for ventilation. Since it gets cold in winter, they will be appropriately airtight.
Doors		Steel frame + wood door frame	Steel frame + steel flush door, security grill door	Suitable in terms of preventing damage from wheelchairs, etc. and ensuring security.
Open passage floors		Direct-press concrete	Same	From an IE standpoint (wheelchairs, etc.), this finish will reduce the chance of gaps provided due to age deterioration.
Interior specifications				
Floors		Trowel-finished mortar	Trowel-finished concrete	Durable than mortar finish. No problem in terms of local skill levels.
Walls	Standard	Mortar + paint	Same	Standard specification
	Toilets	Mortar + paint, some tiling	Same	Maintenance burden reduced by using materials that are easy to clean.
Ceilings	General	Plasterboard+ paint	Rock wool sound absorbing board + plasterboard backing	From an IE standpoint (hearing impairment)

(2) Furniture planning

Following local standards, the minimum necessary education furniture for school operations will be provided. Also, height-adjustable student desks for wheelchair users will be provided as furniture for students with disabilities. Furniture specifications will follow MoET standard specifications; the content and quantity will be provided for each room as described in the table below. Wheelchair users are estimated as two per school.

Table 2-7 Furniture components

Block	Room	Desks for Students	Desks for Management Staffs	Desks for Teachers	Tables-L	Tables-M	Tables-S	PC Tables	Chairs for Students	Chair for Head Teacher	Chairs for Management Staffs	Chairs for Teachers	Chairs for Visitors	Stools	Stools (adjustable)	Lab Tables-L	Lab Tables-M	Lab Tables-S	Sink-L	Sink-S	Cabinets-L	Cabinets-S	Racks	Desks for Wheelchair	Whiteboards
Classroom Block	Classroom	40		1					40			1													
Science and ICT Labs Block	Science Lab													41											
	Preparation Room											2													
	ICT Lab			1		1		40	40			1													
	Preparation Room											1									1				
Home Economics Labs Block	Cooking Lab														25			7		7					
	Preparation Room			1								1									1				
	Sewing Lab			1								1			24										
	Preparation Room			1								1									1				
Administration Block	Head Teacher's Room		1				1			1			6									2			
	Deputy Head Teacher's Room		1								1		2									3			
	Accountant's Room		1								1		2									3			
	Secretary's Room			1								1									2				
	Teacher's Room（H4, L1）				1	3						20	4								2	2			
	Teacher's Room（M1, S1）				1	3						32	4								2	2			
	Resource Room				1				4																
	Resource Room（S1）				1			1	5																
	Equipment Store																						1	4	3
Feeding Kitchen Block													2			1	2		1						

(3) Equipment planning

IE-related equipment and general education equipment necessary for science experiments, ICT, and home economics will be provided. Additional necessary equipment will also be installed in the feeding kitchen and teacher’s room. Since the frequency that equipment for students with severe visual impairment will be used is unclear, this will be an item to be covered by the Swaziland side, with the exception of S1/Eqinisweni site, which is adjacent to an IE model primary school where students with severe visual impairment are enrolled. School buses will be 15-person mini-vans, which are commonly used as such in Swaziland. The rear seats (four seats) can be folded down for use as wheelchair storage space. Excluding the driver, passenger capacity will be 10 people. This will allow for an estimated eight students with disabilities and caretakers to ride in the school bus.

Table 2-8 List of Equipment

No.	Code	Description	Q'ty	unit
1	SN-1	Photocopy machine	4	no.
2	SN-2	Desktop PC with software for visual impairment	4	no.
3	SN-3	Desktop PC	4	no.
4	SN-4	Projector	8	no.
5	SN-5	Screen for projector	8	no.
6	SN-6	Laptop PC	8	no.
7	SN-8	Book binding machine	4	no.
8	SN-9	Voice Recorder	8	no.
9	SN-10	Portable Merlin magnifier	8	no.
10	SN-12	White board	4	no.
11	SN-13	Goal Ball	4	no.
12	SN-14	Perkins Brailler	2	no.
13	SN-16	Scanner	1	no.
14	SN-17	Embosser	1	no.
15	SN-18	Slates and stylus set	2	no.
16	SN-20	Braille globe	1	no.
17	SN-21	School bus	4	no.
18	CL-1	Desktop PC	164	no.
19	CL-2	Projector with mount	4	no.
20	CL-3	Screen with mount	4	no.
21	CL-4	Printer	4	no.
22	HL-1	Electric sewing machine	48	no.
23	HL-2	Over locker sewing machine	8	no.
24	HL-3	Dress form	4	no.
25	HL-6	Electric stove	16	no.
26	HL-7	Gas stove	12	no.
27	HL-8	Refrigerator	4	no.
28	AO-1	Desktop PC	16	no.
29	AO-2	Printer	16	no.
30	SL-1	Microscope	40	no.

No.	Code	Description	Q'ty	unit
31	SL-3	Human body model	4	set
32	SL-4	Human head model	4	no.
33	SL-5	Human eye model	4	no.
34	SL-6	Human heart model	4	no.
35	SL-7	Power supply device	4	no.
36	SL-8	Motor/generator unit	4	no.
37	SL-9	Steam engine unit	4	set
38	SL-10	Aneroid barometer	4	no.
39	SL-12	High tension power supply	4	no.
40	SL-13	Cathode ray deflection tube	4	no.
41	SL-14	Hoffman's volt ammeter	4	set
42	SL-17	Dissecting set	80	no.
43	SL-18	Micrometre screw gauge	80	no.
44	SL-19	Vernier calliper	80	no.
45	SL-20	Displacement vessel	80	no.
46	SL-21	Stop clock	80	no.
47	SL-22	Optics kit	40	set
48	SL-23	Lens set	40	no.
49	SL-24	Circuit board set	40	no.
50	SL-25	Galvanometer	40	no.
51	SL-26	Voltmeter	40	no.
52	SL-27	Ammeter	40	no.
53	SL-28	Sliding rheostat resistor	40	set
54	SL-29	Mass hanger set	40	set
55	SL-30	Dynamics trolley	40	set
56	SL-42	Balance	20	no.
57	SL-47	Gas burner	80	no.
58	SL-48	Stand retort	80	set
59	SL-49	Distillation set	4	no.
60	FK-1	Pot	12	no.

Legend

: S1 Site only

SN : IE Equipment
CL : ICT Equipment
HL : Home Economics Equipment
SL : Science Lab Equipment
AO : Administration Equipment
FK : Feeding Kitchen Equipment

2-2-3 Outline Design Drawings

(1) Site plans

M1 Boyane

S1 Eqinisweni

H4 Enhlitiyweni

L1 Gamula

(2) Floor plans, elevations, sections

2-classroom Block

3-classroom Block

Science and ICT lab Block

Home Economics Lab Block

Agriculture Lab Block

Administration Block-S

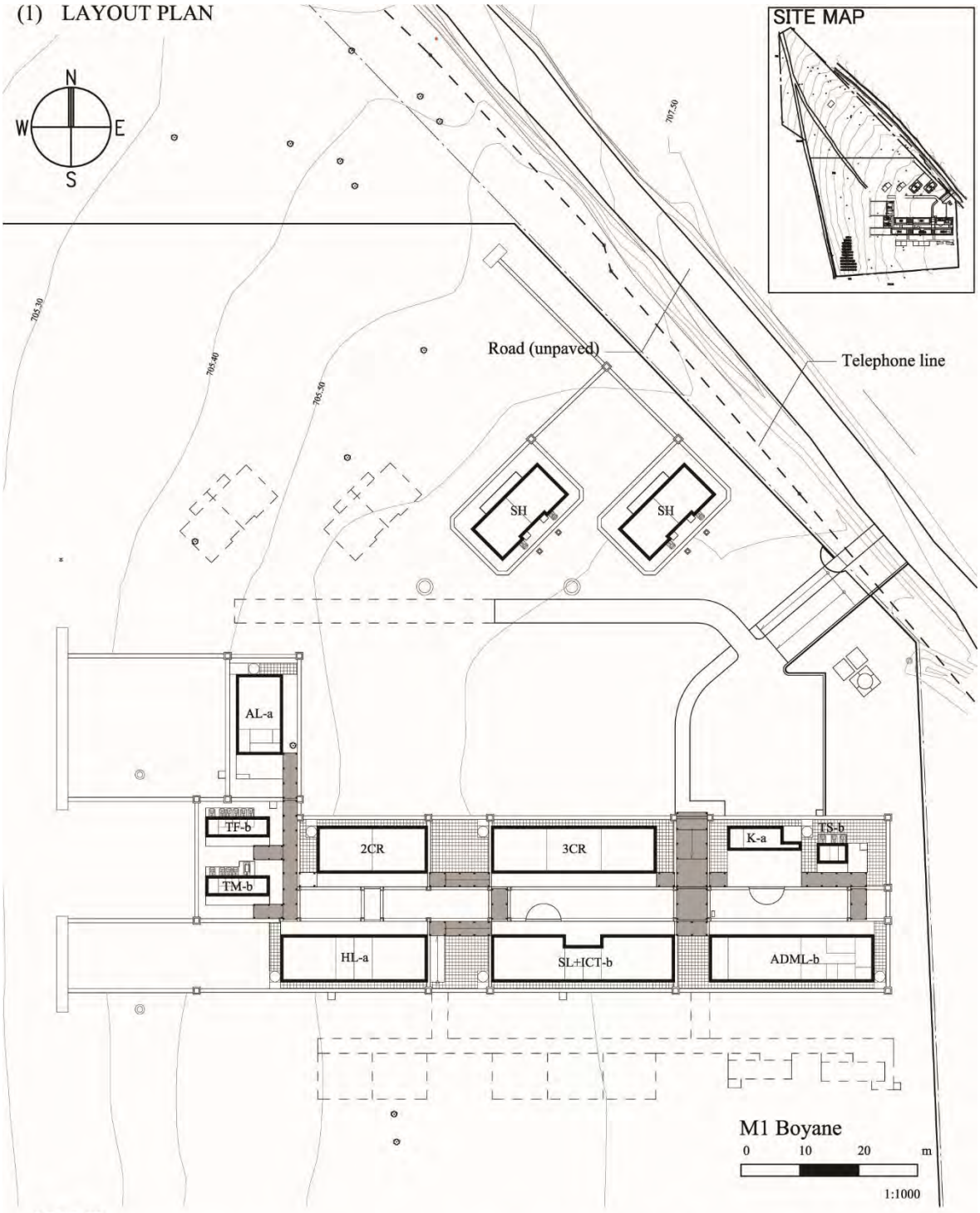
Administration Block-L

Feeding Kitchen

Toilet Blocks (for female, male, and staffs)

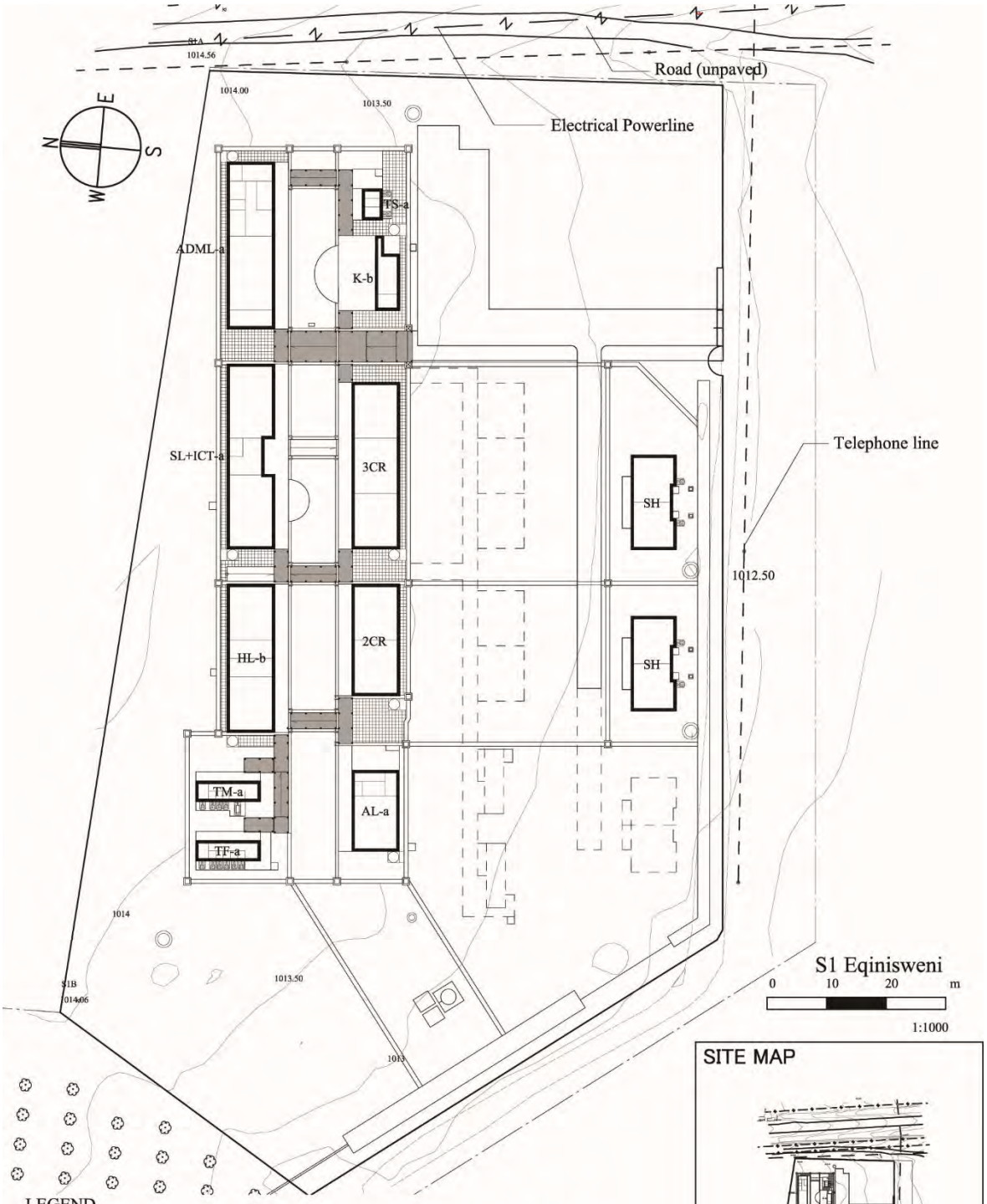
Teacher’s house

(1) LAYOUT PLAN



LEGEND

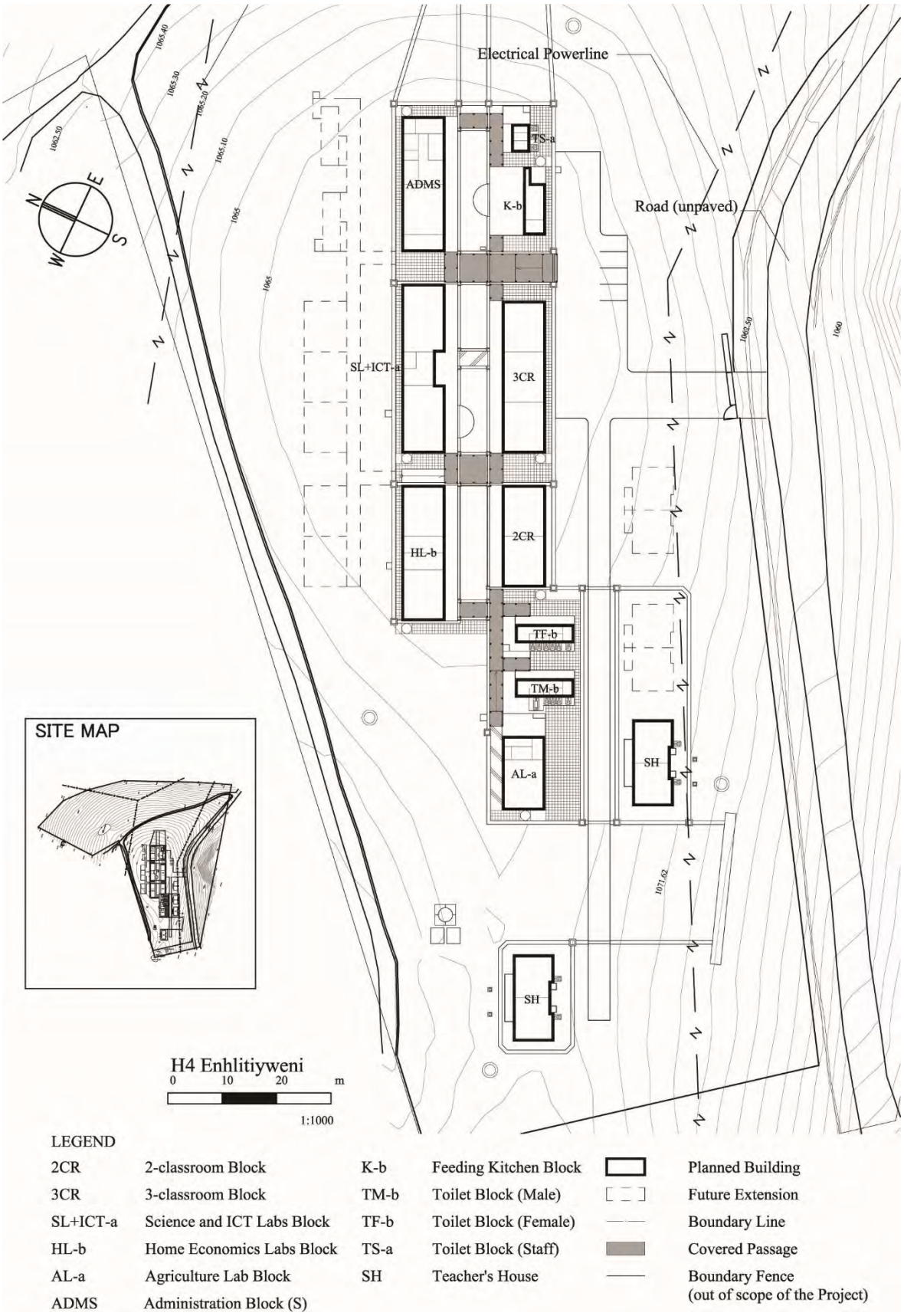
2CR	2-classroom Block	K-a	Feeding Kitchen Block		Planned Building
3CR	3-classroom Block	TM-b	Toilet Block (Male)		Future Extension
SL+ICT-b	Science and ICT Labs Block	TF-b	Toilet Block (Female)		Boundary Line
HL-a	Home Economics Labs Block	TS-b	Toilet Block (Staff)		Covered Passage
AL-a	Agriculture Lab Block	SH	Teacher's House		Boundary Fence (out of scope of the Project)
ADML-b	Administration Block (L)				

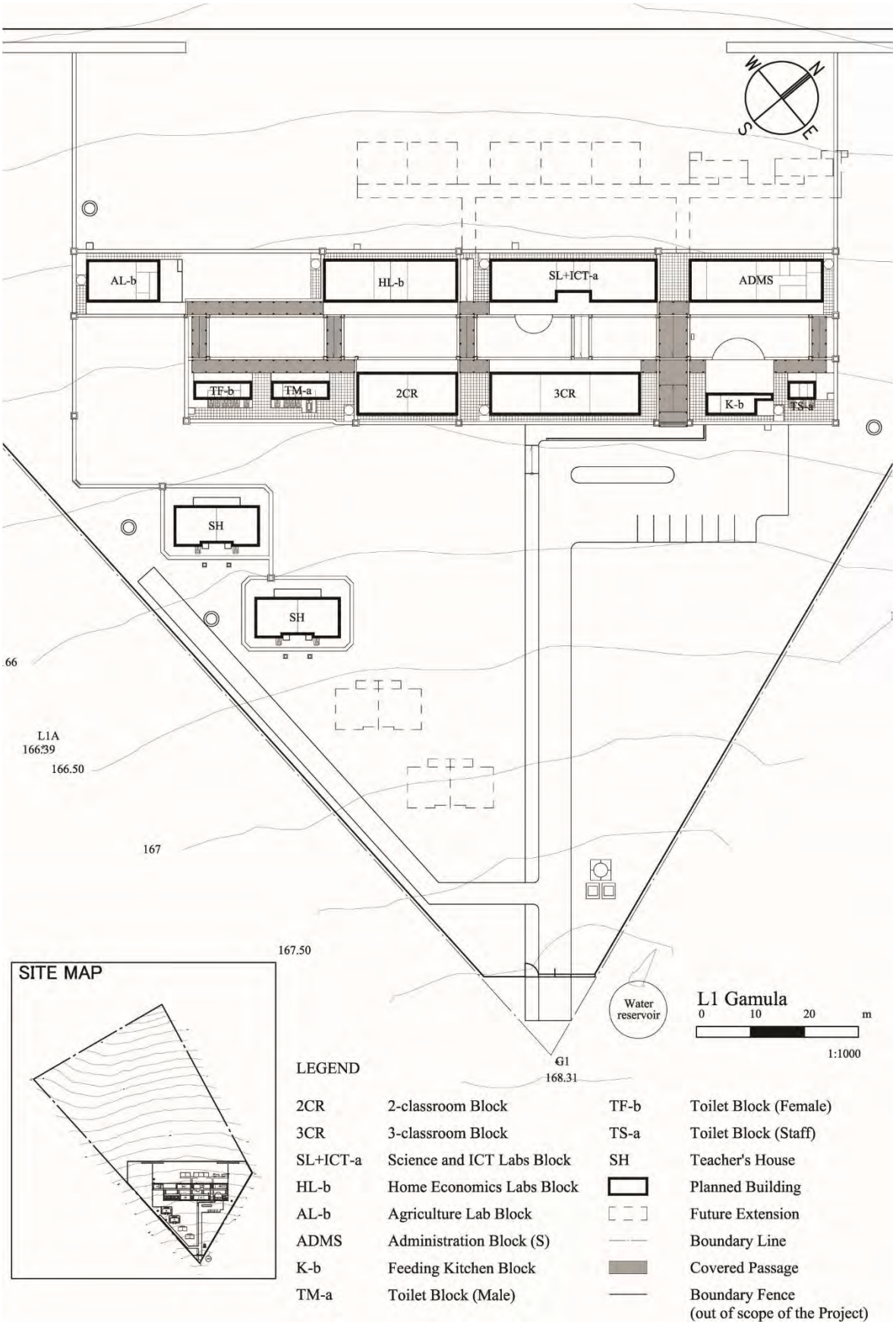


SITE MAP

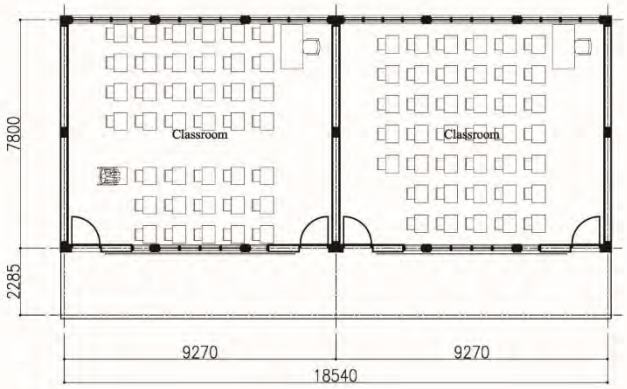
LEGEND

2CR	2-classroom Block	TF-a	Toilet Block (Female)
3CR	3-classroom Block	TS-a	Toilet Block (Staff)
SL+ICT-a	Science and ICT Labs Block	SH	Teacher's House
HL-b	Home Economics Labs Block		Planned Building
AL-a	Agriculture Lab Block		Future Extension
ADML-a	Administration Block (L)		Boundary Line
K-b	Feeding Kitchen Block		Covered Passage
TM-a	Toilet Block (Male)		Boundary Fence (out of scope of the Project)

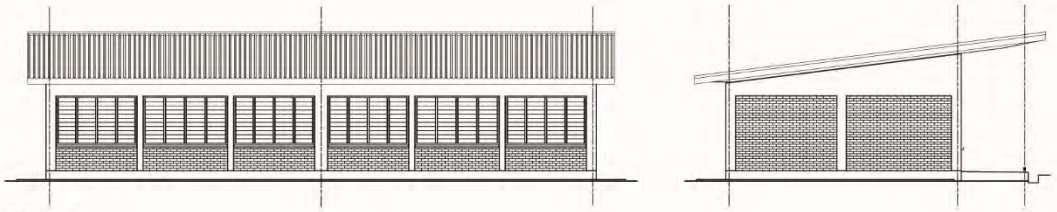

Electrical Powerline
Road (unpaved)
ADMS
TS-a
K-b
SL+ICT-a
3CR
HL-b
2CR
TF-b
TM-b
AL-a
SH
SH
SITE MAP
H4 Enhlitiyweni
0 10 20 m
1:1000
LEGEND
2CR 2-classroom Block
3CR 3-classroom Block
SL+ICT-a Science and ICT Labs Block
HL-b Home Economics Labs Block
AL-a Agriculture Lab Block
ADMS Administration Block (S)
K-b Feeding Kitchen Block
TM-b Toilet Block (Male)
TF-b Toilet Block (Female)
TS-a Toilet Block (Staff)
SH Teacher's House
Planned Building
Future Extension
Boundary Line
Covered Passage
Boundary Fence
(out of scope of the Project)


AL-b
HL-b
SL+ICT-a
ADMS
TF-b
TM-a
2CR
3CR
K-b
TS-a
SH
SH
66
L1A
166.39
166.50
167
167.50
G1
168.31
Water reservoir
L1 Gamula
0 10 20 m
1:1000
SITE MAP
LEGEND
2CR 2-classroom Block
3CR 3-classroom Block
SL+ICT-a Science and ICT Labs Block
HL-b Home Economics Labs Block
AL-b Agriculture Lab Block
ADMS Administration Block (S)
K-b Feeding Kitchen Block
TM-a Toilet Block (Male)
TF-b Toilet Block (Female)
TS-a Toilet Block (Staff)
SH Teacher's House
Planned Building
Future Extension
Boundary Line
Covered Passage
Boundary Fence
(out of scope of the Project)

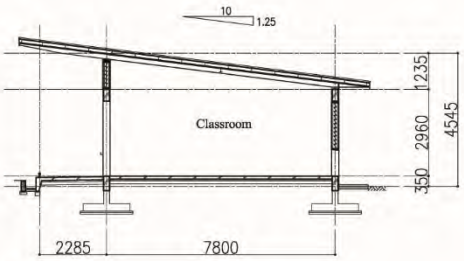
(2) Plan, Elevation, Section



Plan



Elevation

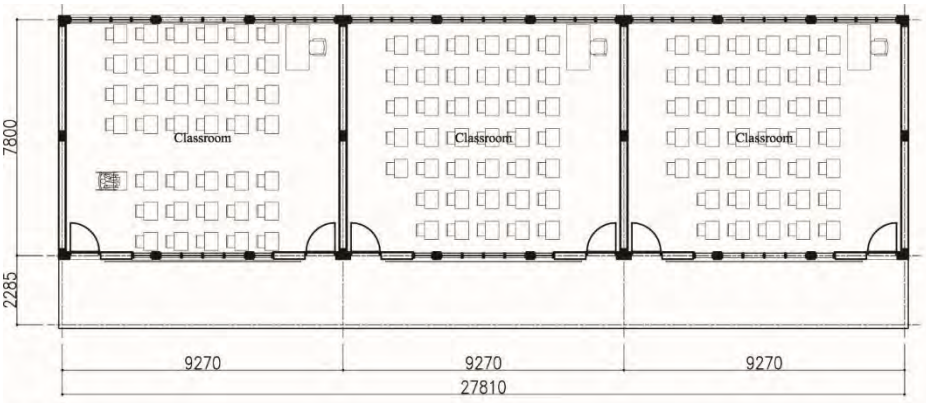


Section

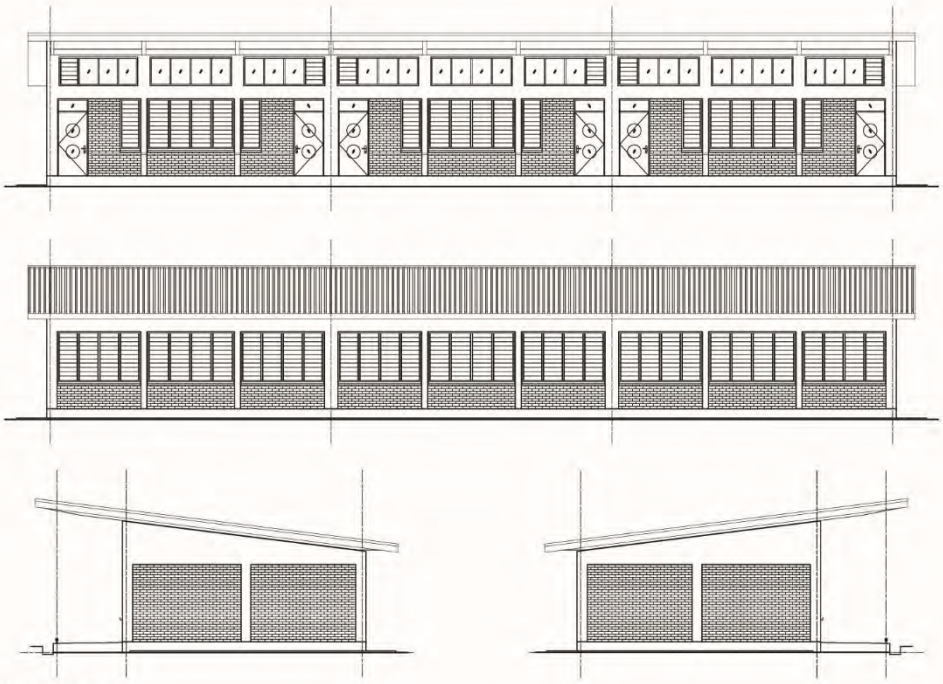
2- classroom Block

0 1 3 5 10

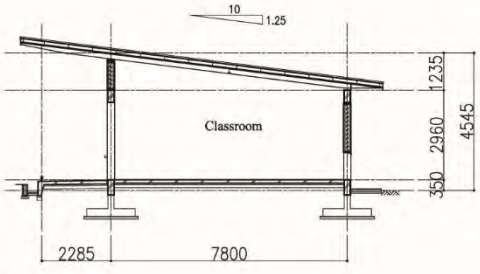
1:250



Plan



Elevation

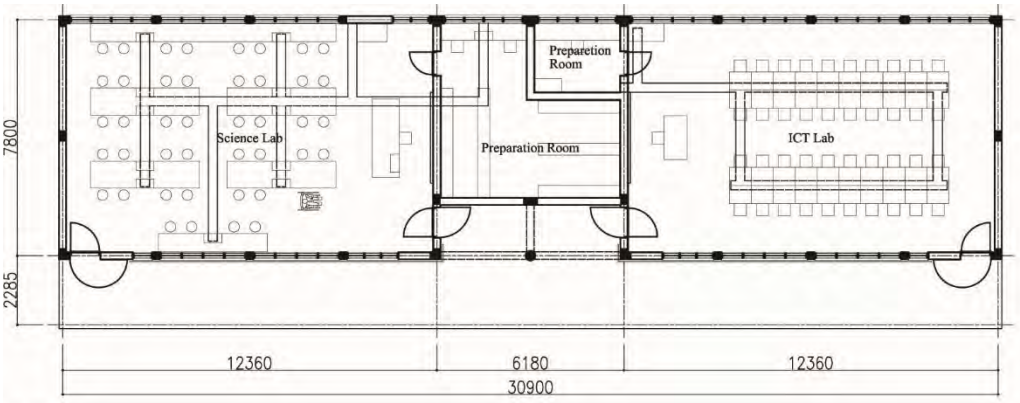


Section

3-classroom Block

0 1 3 5 10

1:250



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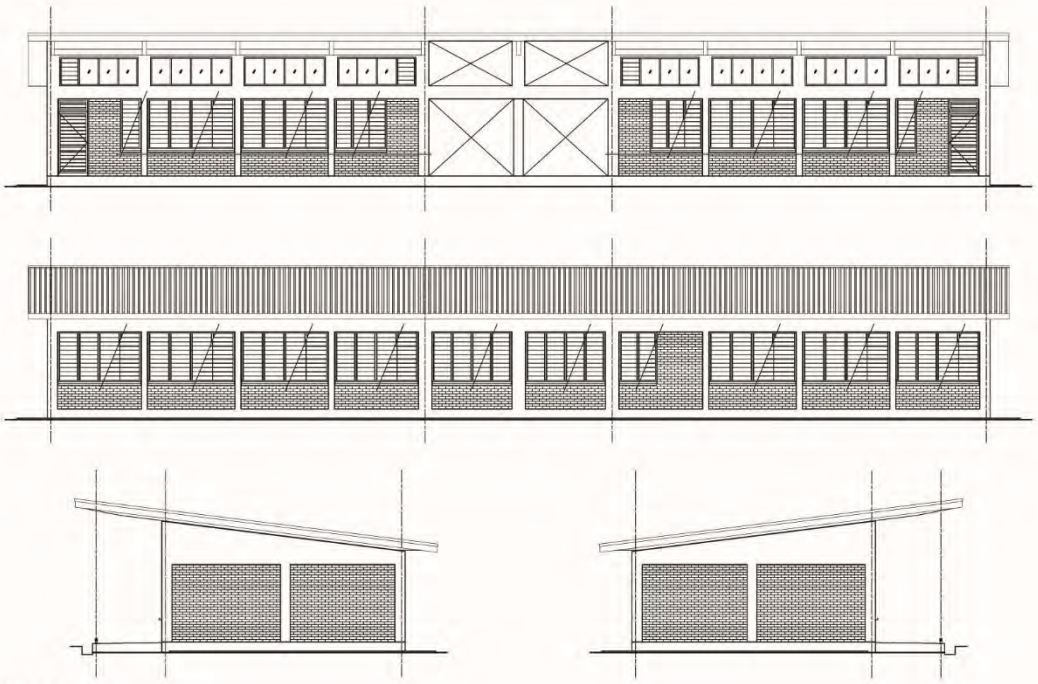

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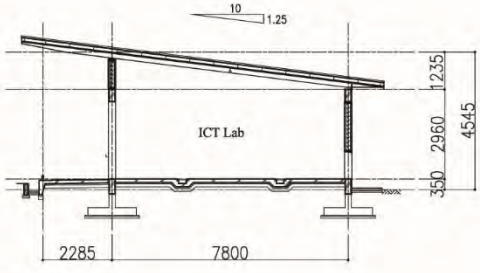

Section

Science and ICT Labs Block

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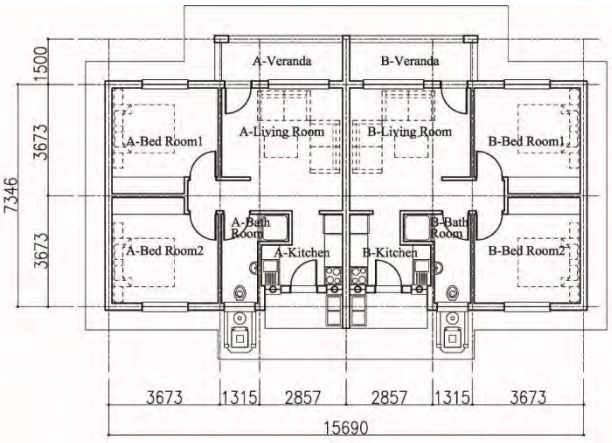
1:250



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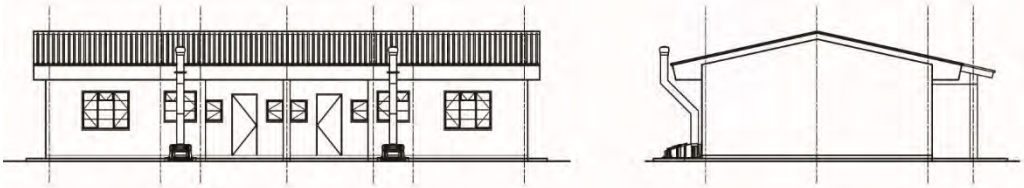

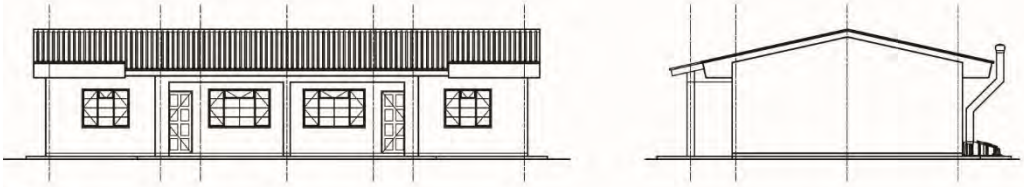

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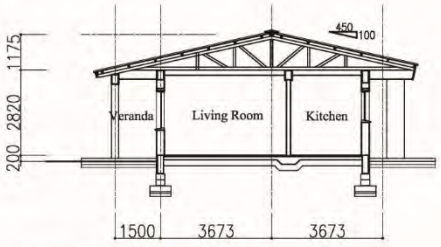

Section

Teacher's House

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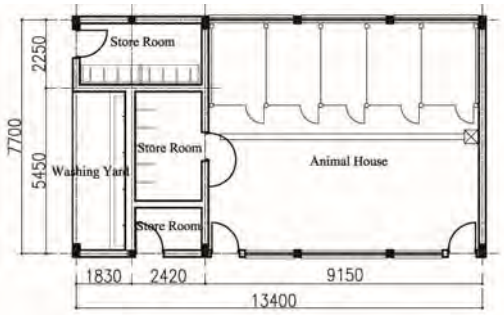
1:250



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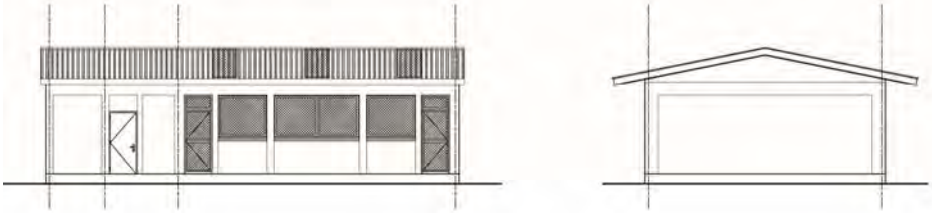

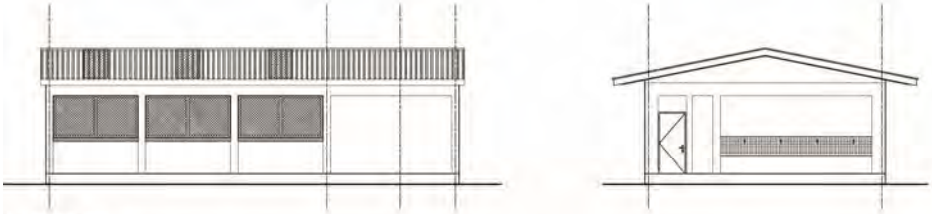

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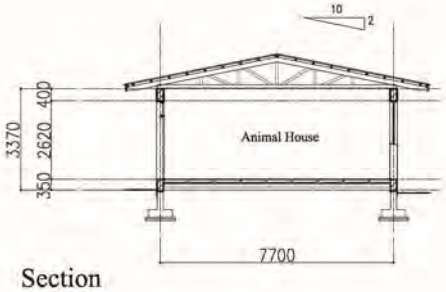

Section

Aagriculture Lab Block

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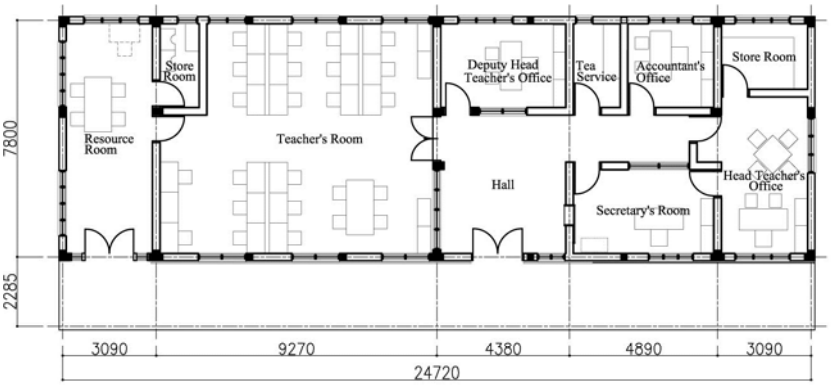

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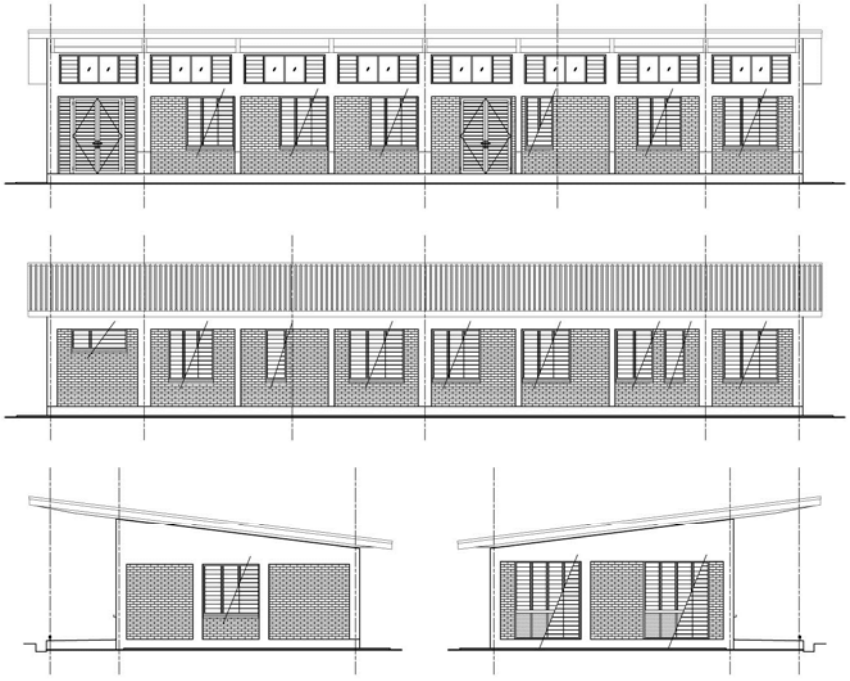

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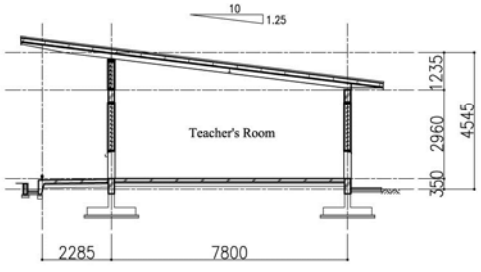
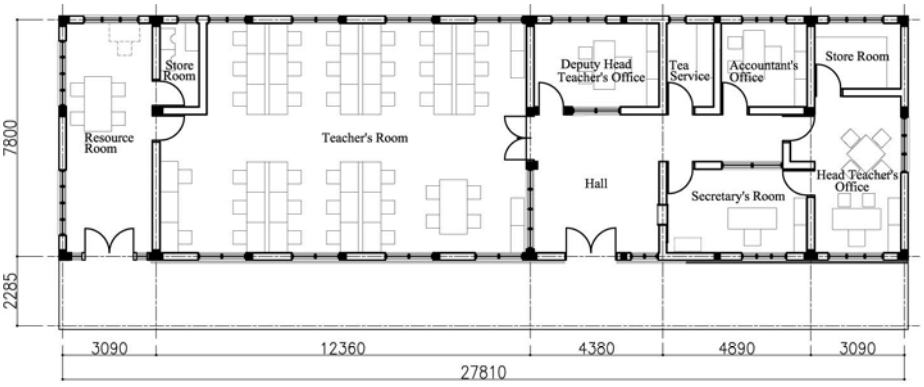


Section

Administration Block (S)

0 1 3 5 10

1:250



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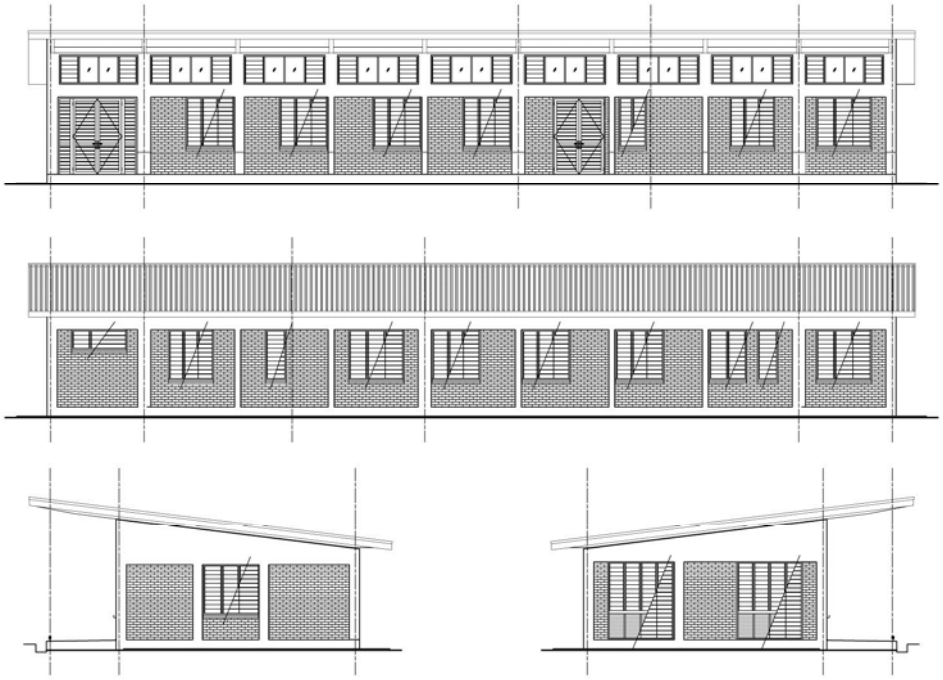

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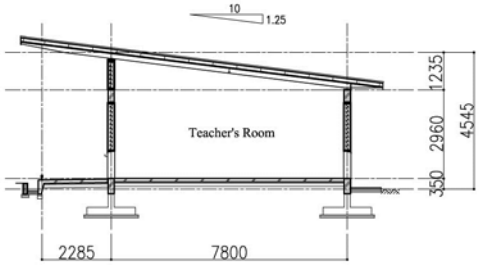

Section

Administation Block (L)

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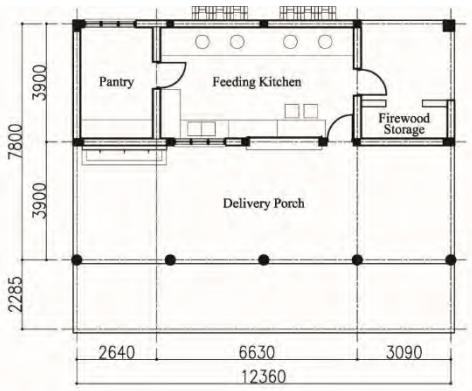
1:250



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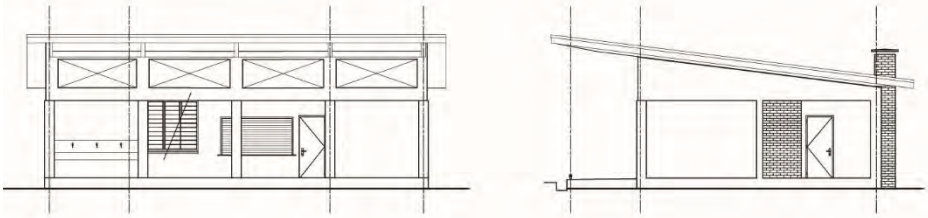
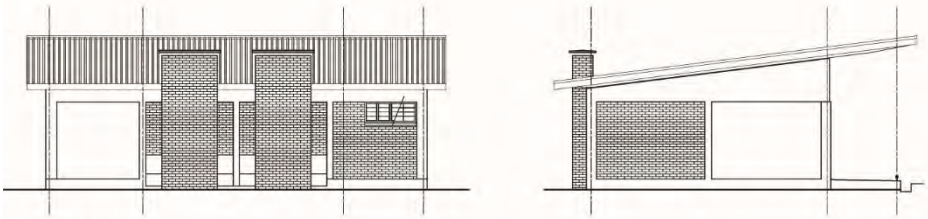
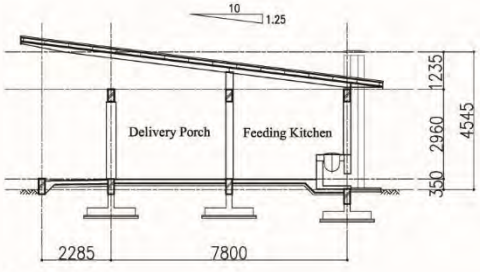




Elevation

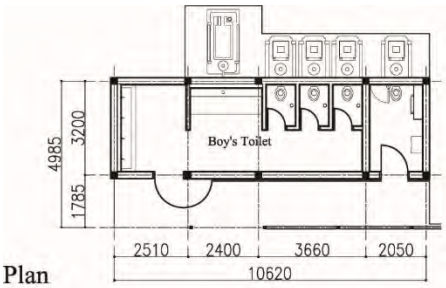


Section

Feeding Kitchen Block

0 1 3 5 10

1:250



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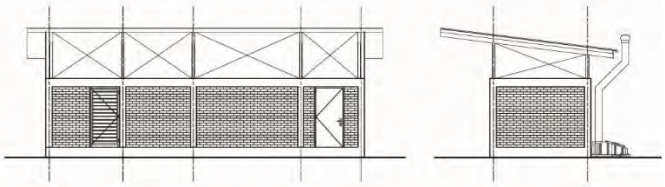

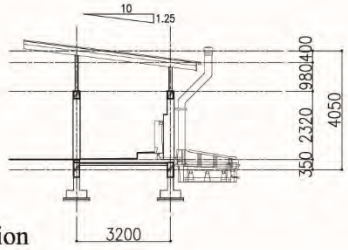

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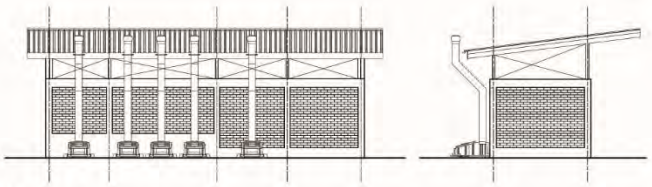
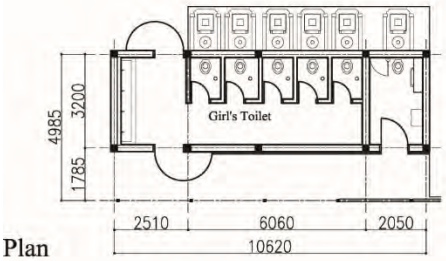


Elevation

Toilet Block (Male)



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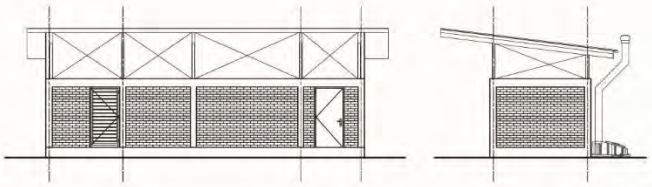

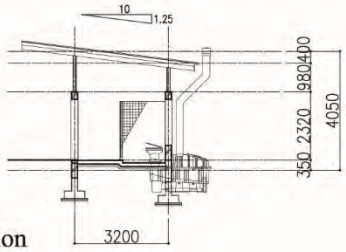

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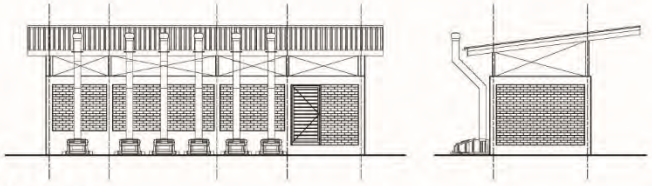
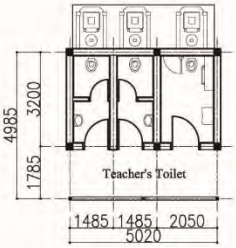
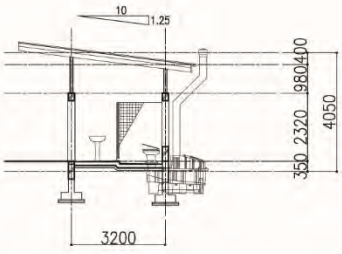


Elevation

Toilet Block (Female)



Plan



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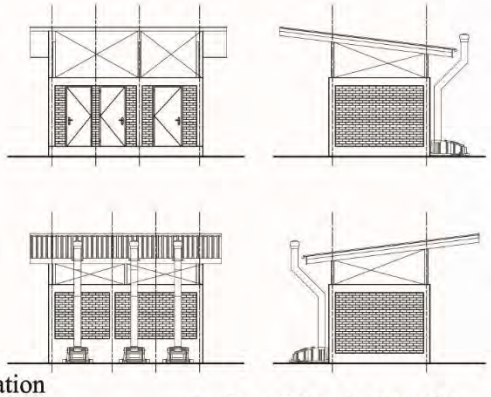
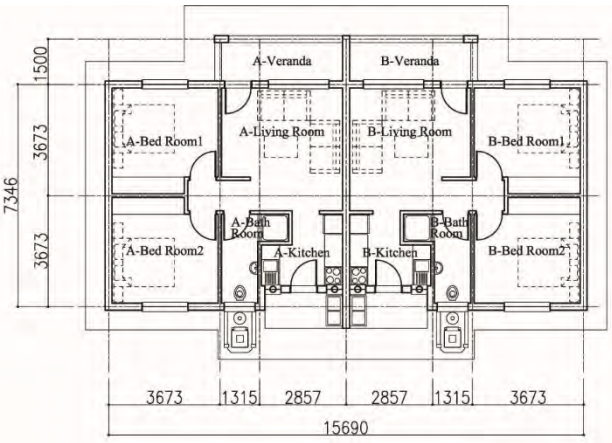


Elevation

Toilet Block (Staff)



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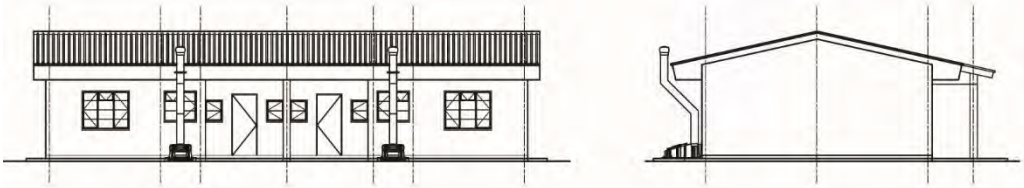

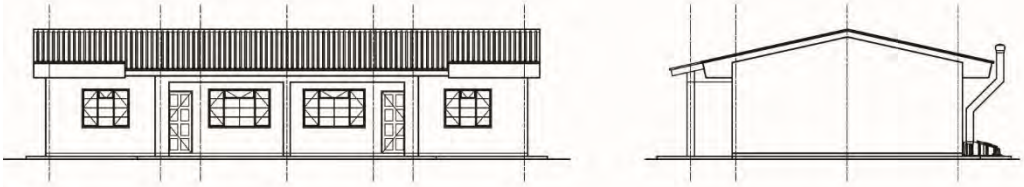

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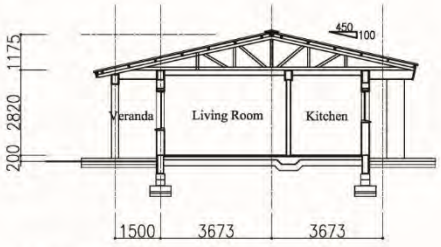

Section

Teacher's House

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1:250

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

(1) Basis for Project Implementation

Upon a cabinet approval of the Government of Japan, an Exchange of Notes (E/N) regarding project implementation will be concluded by the governments of both countries. Additionally, a Grant Agreement (G/A) will be concluded by the Government of Swaziland and JICA, based on the E/N; after this, the Project will be implemented following the scheme of Japanese Grant Aid. Subsequently, a contract will be formed between the Government of Swaziland and a Japanese consultant company to conduct the detail design of the facilities and equipment. After completion of the detail design drawings and tendering documents, a public tender will be conducted in Swaziland. The selected companies will enter into a contract with the Government of Swaziland for construction work and equipment procurement. Construction of the facility and procurement of equipment will be conducted in accordance with this contract. In accordance with Japanese grant aid guidelines, tendering for construction work and equipment procurement will be divided and performed separately for the Project.

(2) Project Implementation Structure

1) Implementation Structure of Swaziland

For implementation of the Project, the responsible agency on the Swaziland side is the Ministry of Education and Training (MoET). The implementing agency is the Department of Research and Planning within the ministry, and will coordinate and operate the overall project, including taking necessary budget measures. Additionally, the Micro Project Programme Coordination Unit (MPP) of the Ministry of Economic Planning and Development will be in charge of facility and equipment procurement, as well as provide technical support for construction supervision. MoET will be the contracting body for the design and supervision contract with the consultant, construction work contracts with construction contractors, and the equipment procurement/installation work contract with equipment procurement companies. MoET will also implement the items borne by the Swaziland side, as well as acquire the necessary permits and agreement from relevant agencies. They will additionally request that JICA pay invoices submitted by local contractors, with assistance from the consultant.

2) Japan International Cooperation Agency (JICA)

Japan International Cooperation Agency (JICA) will enter into a G/A agreement with Swaziland-side agency, and appropriately supervise implementation of the Project to ensure that it follows the scheme of Japanese Grant Aid. JICA will additionally approve execution of the grant upon receiving the request for payment from the Swaziland implementing agency, and request payment from the Bank of Japan.

3) Consultant

Following the design and supervision contract concluded with the Swaziland implementing agency, the consultant will prepare the detail design for the facilities and equipment based on the content of this report, as well as supervise construction work and procurement. The consultant will also prepare tendering documents, assist in work execution/procurement company selection, and in concluding contracts for construction work and equipment procurement. In order to implement this work efficiently, the consultant will build a close and cooperative relationship with both MoET and MPP, ensure work progress, and dispatch any necessary supervising engineers to Swaziland during the work execution and procurement period.

4) Contractors and Suppliers

In accordance with work execution and procurement contracts concluded with MoET, construction contractors and equipment suppliers will perform construction work and equipment procurement according to contractual documents, and within the deadline for implementation.

5) Project Implementation Structure

The relationship between each organization and structure of the project's progression during the project implementation stage are shown in the figure below.

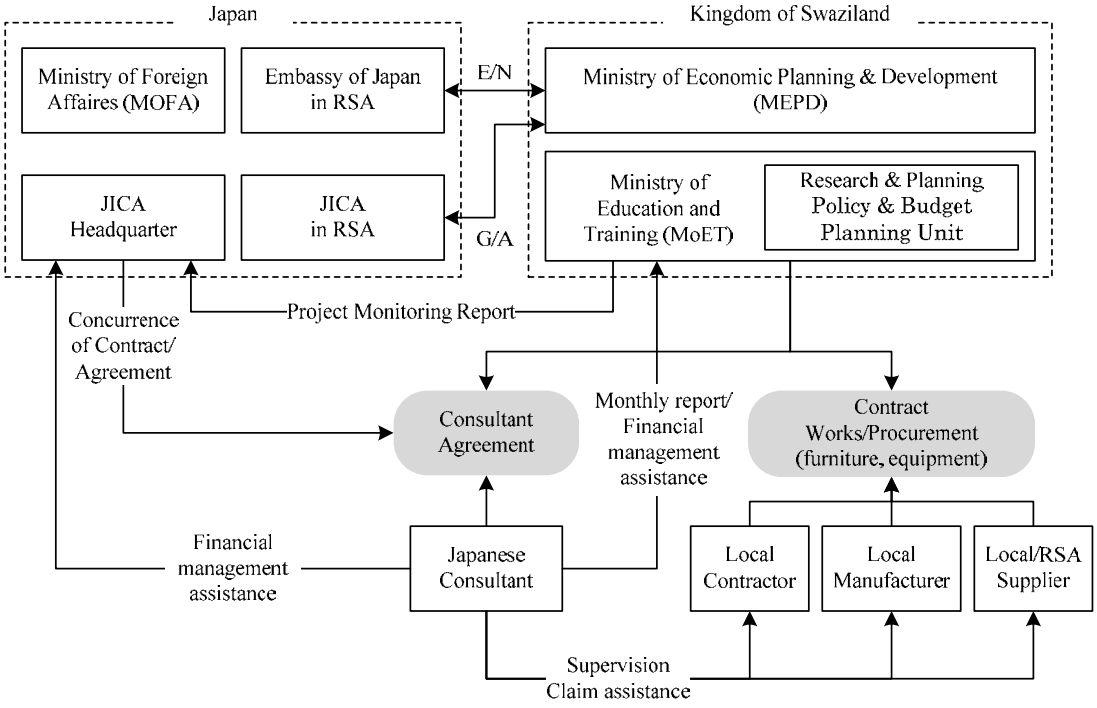

Figure 2-1 Project Implementation Structure

2-2-4-2 Implementation Conditions

(1) Tax Exemption Procedures

Upon discussions with the Ministry of Finance and the Swaziland Revenue Authority (SRA), it is confirmed that various tax such as customs duties and value added tax (VAT) would be exempted based on the descriptions of the E/N and G/A of the Project. However, since there have been no grant aid projects since implementation of a tax reform which introduced VAT instead of former sales tax in 2012, details for specific procedures will be examined upon verifying the content of the E/N, G/A and contract documents. The outline of tax exemption which confirmed at present are as follows.

Table 2-9 Outline of Tax Exemption

Outline	To be confirmed
Refunding system will be applied in principle.	- MoET will secure the counterpart budget for refunding.
For low value items such as daily consumables bought locally (e.g. stationary) , zero rated VAT will be applied.	- Which organization (SRA or MoET) will be authorized to apply. - Detail of application (items, maximum price, etc.)
No personal effects are exempted from taxes (e.g. payments for salaries and consultancy). Even the foreign national consultants are subjected VAT from their salaries is withheld and paid to SRA	- Japanese consultant is to be applied exemption of tax.

(2) Construction Contractors

Local construction contractors are registered with the Construction Industry Council (CIC), which is a lower organization of the Ministry of Public Works and Transportation. Construction sectors are divided into six category levels, as shown below.

Table 2-10 Construction Contractors Registered in Swaziland (2015/16)

Category	Cost limit of public works contract per project	No. of registered companies
B1	25,000,000~120,000,000 SZL (215million~1.03 billion JPY)	17
B2	10,000,000~25,000,000 SZL (86~215 million JPY)	25
B3	5,000,000~10,000,000 SZL (43~86 million JPY)	42
B4	2,000,000~5,000,000 SZL (17~43 million JPY)	41
B5	500,000~2,000,000 SZL (4~17 million JPY)	55
B6	~500,000 SZL (up to 4 million JPY)	126

*Calculated at 1 Lilangeni = 8.52 JPY. (Average rate for three months starting on the last day of the month prior to date of estimation.)

Other than those listed above, foreign-capital construction contractors fall under Category BF, in which there are 10 registered companies. These companies are qualified to participate in Swaziland

domestic public works projects, and do not have an upper cost limit for contracts. Additionally, the construction contractors listed above specialize in building construction; there is a separate registration system for companies specializing in equipment/facility work. Electrical facility contractors fall into four categories between E1 and E4, with 102 registered companies. Conversely, there are only two registered companies specializing in water supply and drainage equipment work. This is because ordinarily, electrical equipment work is subcontracted to specialized companies, but water supply and drainage facility work is performed by the construction companies themselves.

For previous projects (community development grant aid), B1 and B2 construction companies as noted above were considered eligible, and separate work orders for 12 sites were made in five lots (2-3 sites per lot). However, large differences in the capacity of these construction contractors were observed, with work delays of six months past the initial plan occurred for some lots. For executing work on the Project, construction contractors will be selected using appropriate and relevant criteria.

(3) Equipment Procurement

Since all of the procured equipment will be installed in new buildings, procurement will be planned to coincide with the time of construction work completion. For installation locations and utility-related items such as the amount of electrical power needed as well, arrangements should be made with the facility-side in advance, and the content reflected in the equipment specifications sheet as needed.

2-2-4-3 Scope of Works

With implementation of the Project through Japanese grant aid, the scope of works to be borne by the Japanese side and the Swaziland side are listed as follows. Note that major obligations for the Swaziland side in Japanese grant aid projects are shown in Table 3-1.

(1) Works to be undertaken by Japanese Side

a) Facility construction

- Construction of facilities described in this report
- Installation of electrical, air conditioning, water supply/drainage, and sanitation equipment ancillary to the above facilities
- The minimum necessary exterior facilities (land forming, on-site vehicle paths and parking areas, open passage, rainwater drainage and pits) ancillary to the above facilities

b) Furniture procurement

- Procurement of general furniture for facilities
- Procurement of furniture for wheelchair use
- Furniture for kitchen (cooking counters, etc.)

c) Equipment procurement

- Procurement/installation of general education equipment
- Procurement/installation of IE equipment
- Procurement of school buses

(2) Works to be undertaken by the Swaziland Side

- Securing of land for facility construction
- Cutting existing trees and roots that hinder facility construction
- Securing means of water supply (borehole, community water supply, etc.) and drawing in water to new water resevoir tanks
- Drawing in electricity to the project sites
- Gas supply (installation of propane gas tanks)
- Preparation of furniture, fixtures, fittings, and consumables, etc. not included in the scope of the Japanese side
- Provision of perimeter fence, gate, trees and plants not included in the scope of the Japanese side
- Acquisition of necessary permits for implementation of construction work
- School bus vehicle registration

2-2-4-4 Tendering Management Plan

(1) Lot Composition

For lot composition, geographical conditions of the target sites and the capacity of local companies will be taken into consideration to set the scale of the work order as a precondition, and then determined according to the following basic policy.

1) Facility Construction

Most of the facility construction implemented by MoET involves small-scale projects such as adding classrooms to existing schools or repairing existing facilities. In contrast, the Project is large scale, with approximately 2,200 m^2 of floor area per site for a total floor area of 8,800 m^2. For reliable project implementation and to reduce risk, the selection of superior contractors is an important point. Considering the scale of the Project, with the necessity of ensuring consistent work quality and efficient work supervision, the size of each lot inevitability becomes larger. Thus, construction contractors registered in Category B will be eligible for selection. According to a survey of these construction contractors, all of the companies hope to receive a consolidated order for all four sites. However, since these companies have varying annual revenues of 200 million yen to more than one billion yen, there is a difference between their financial capabilities, their equipment, and their technical capacities. Therefore, eligibility requirements for target contractors must be carefully studied.

To increase motivation among the leading companies falling into the B1 Category of construction contractors to participate in the Project, the work order size will be consolidated into two lots (two sites per lot). By dividing the project into multiple lots, risk can be reduced. Furthermore, tendering for these two lots will done as one batch, implemented simultaneously.

Table 2-11 Construction Work Lot Composition

Batch	Lot	Site	Site Floor Area	Lot Floor Area	Batch Floor Area
1	1	M1 Boayne	2,213.82 m^2	4,383.44 m^2	8,810.05 m^2
		H4 Enhlitiweni	2,169.62 m^2		
	2	S1 Eqinisweni	2,200.78 m^2	4,426.61 m^2	
		L1 Gamula	2,225.83 m^2		

2) Furniture Procurement

Taking the capacity of furniture companies into consideration for furniture procurement, four sites will be handled as one lot in order to preserve uniformity of quality at each site and for price competitiveness due to scale merit. Furthermore, since the number of companies in Swaziland with their own plants for fabricating furniture is limited, and from the standpoint of ensuring competitiveness, agents who procure furniture from South African factories will also be included.

3) Equipment Procurement

It has been confirmed that there are no general trading company-like contractors in Swaziland who are able to bid for equipment procurement work for the Project. Therefore, tendering will be conducted by dividing equipment into groups, separated by type of equipment (IE-related equipment, computer-related equipment, etc.) to create five lots, which will ensure competitiveness.

(2) Tendering in Swaziland

In Swaziland, tendering for public works must conform with the Swaziland Draft Public Procurement Regulations (2014) based on the Public Procurement Act (2011). If items defined in the regulations are changed, based on the Public Procurement Act, approval must be obtained from the Swaziland Public Procurement Agency (SPPRA), which was established as an organization under the umbrella the MoF in 2014. However, donor projects are conducted based on the guidelines of each donor.

MoET does not directly manage tendering for education facility projects. For the Project, tendering will be managed by the Micro Project Programme Coordination Unit (MPP) of the Ministry of Economic Planning and Development. However, facility procurement is mainly done for small-scale projects such as the construction of classroom buildings or residences, or repairing existing facilities. Public tendering is usually conducted for these many small-scale projects in Swaziland. Construction contractors eligible for bidding are designated from relatively lower categories, depending on the size of the work order. After the local briefing, bidders place their bidding documents in a box prepared for such within the designated time frame. Questions will be

taken verbally at the local briefing only. Prequalification (hereinafter referred to as “PQ”) is not implemented for small-scale projects. Instead, a general evaluation system that assesses the tenders by giving points for technical evaluation and price evaluation is used. Looking at an example of tendering evaluation, if the total number of points is set at 100, with 70 points for technical merit and 30 points for price merit, the contractor with the highest number of total points will capture the top spot for negotiating rights. Contractors will be disqualified if they have less than 45 technical points.

Table 2-12 Example of Small-Scale Project Tendering Evaluation

Type	Content	Points
Technical evaluation	Equipment owned	15
	Capacity of personnel	20
	Past experience with similar work	20
	Financial details	10
	Construction schedule	5
		Technical evaluation total: 70 points
Price evaluation	Bidder’s price points = Lowest bid price/ bid price x 30	Price evaluation total: 30 points
Total		100 points

In contrast, prequalification (PQ) is implemented for large-scale projects. The standard PQ tendering schedule carried out by MPP is as shown below.

Table 2-13 Time Required for MPP’s Standard PQ Tendering

	Public announcement ~ PQ application deadline	PQ evaluation	Handover of drawings ~ opening of bids	Tendering evaluation	Total
No. of days	14	31	21	31	97

MPP’s Tender Evaluation Committee will conduct PQ and tender evaluations. Normal members of the board include two architectural engineers, one structural engineer, and one QS; however, appropriate specialized engineers for equipment, etc. are added, depending on the content of the project. Evaluations will also be conducted after a local screening is implemented for multiple contractors, previously narrowed down through documentation screening. Evaluation results are sent to the MPP Tender Board for approval. Composition of the Tender Board is shown below. Excluding the chairperson and the secretary, the members are personnel outsourced by MPP.

Table 2-14 Tender Board Members

Chairperson	Secretary	Members
C.S. Dlamini - Civil Engineer	B. Bhembe – Water Engineer	N. Vilakati – Legal Advisor K. Mavimbela – Contracts and Grants M. Mthundzi – Human Resource Specialist S. Malambe – Planner M. Dlamini – Economist

Furthermore, unit price contracts are generally used, based on the bill of quantities (BoQ).

(3) Tendering Plan for the Project

Tendering for the Project will be implemented in accordance with JICA Procurement Guidelines for Japanese Grants (facility/equipment procurement system for Japanese consultant and local contractor), while taking MPP's standard procedures and requirements into consideration.

1) Facility Construction

Specifically, open tendering with participation restriction for qualified bidders will be used, limited to eligible contractors registered as Category B1 in the CIC, and following tendering methods commonly used in Swaziland. As this is a large-scale project, PQ will be implemented. Additionally, construction contractors who pass the screening will be handed drawings, and price competition will be implemented. PQ evaluation criteria will include , in addition to the technical evaluation normally implemented in Swaziland, sales revenue from the past five years, as well as bid capacity (highest revenue minus quantity of currently held construction work at the time of bidding) will be evaluated. Details of this evaluation criteria will be decided while working together closely with MPP throughout the period of creating the detail design. Furthermore, for construction contractors narrowed down through document screening, a local screening regarding their implementation conditions for similar projects will be conducted to select superior companies who are able to implement the project reliably. The consultant will also become a member of the Tender Evaluation Committee, and will engage in tendering evaluation together with MPP.

Taking into consideration the scale of the work to be conducted for the Project, the following time period is thought necessary for tendering, from the public announcement to contracting with companies.

Table 2-15 Time Required for Project Tendering

Content	Required period	Remarks
PQ public announcement ~ application deadline	2 weeks	Following local standards
PQ documents screening	1 week	
Local screening	2 weeks	
Preparation of PQ evaluation report	1 week	
Approval by Tender Board	1 week	
PQ results notification, period of appeal	1 week	
Handover of drawings to PQ qualifiers ~ opening of bids	6 weeks	Period necessary for accurate pricing depending on facility scale and BoQ content
Preparation of tendering evaluation report	2 weeks	
Approval by Tender Board	1 week	
Notification of result, appeals	1 week	
Submission of required documents such as work contract and guarantee of performance	2 weeks	
Total	20 weeks	

2) Furniture Procurement

Based on MoET's past procurement of educational furniture, domestic open tendering with participation restriction for qualified bidders will be implemented. Since the furniture for all sites will be procured together, eligibility requirements shall be set after careful screening for fabrication/procurement capacity, as well as technical capacity, placing additional importance on the content and size of past furniture procurement experience for similar projects. Based on the possibility that quantities for the furniture order may decrease depending on bidding results for facility construction, tendering for the order will begin in two batches after the facility construction bidding results are determined.

3) Equipment Procurement

Following MoET's past experience in procuring equipment, open tendering will be implemented. However, since there are no manufacturer agents in Swaziland for a portion of the target equipment such as IE-related equipment, or else the number of agents is limited, there is risk that fair tendering may not be ensured. Tendering requirements, such as including participants from South Africa or other SACU member countries, will be studied. This will be separated from facility and furniture procurement, and implemented in three batches.

2-2-4-5 Work / Procurement Supervision Plan

(1) Basic Policy for Supervision of Work and Procurement

Keeping the intent of the Japanese grant aid scheme and the outline design firmly in mind, the consultant will maintain consistency in implementing operations from the detail design to tendering, work/procurement supervision, and handover. For work/procurement supervision, close contact will be kept and reports made to the government agencies of both countries. Supervision will be conducted by offering swift and appropriate recommendations to work/procurement companies and personnel so that facilities and equipment procurement are completed without delay, and are of the specified quality based on contract documents.

(2) Tendering Support

The consultant will provide support for tendering, which will be conducted with the Swaziland implementing agency as the main actor. Since procurement for the Project will follow JICA guidelines, it may differ from the procurement content and procedures normally implemented in Swaziland. Therefore, relevant agencies must increase their understanding of these guidelines and make adjustments as necessary for the smooth implementation of tendering. Additionally, for tendering evaluation, the consultant will become a member of the Tender Evaluation Committee, and will implement evaluation operations together with MPP.

(3) Work Supervision Structure and Operational Content

In order to appropriately implement overall progress management and work supervision for the Project, as well as provide financial management support for the Swaziland implementing agency, the consultant will dispatch two Japanese architectural engineers to Swaziland as resident supervisors for the duration of the work execution and procurement period. Local engineering staff will also be allocated as necessary, and the following operations will be conducted.

- Preparation of construction supervision criteria documents: In order to secure work supervision quality among different sites and local supervising engineers, and to made operations uniform, a checklist of work supervision points, and a standardized form for reporting testing/inspection results, as well as periodic reporting will be provided.
- Approval of work plan, etc.: Work plans, schedules, and samples, etc. submitted by construction contractors will be approved without delay. Additionally, if questions regarding contracts arise, a prompt explanation will be given to the construction contractor.
- Site construction supervision: A site supervisor engineer will reside at each site to ensure quality of the work, following the work supervision forms noted above, as well as perform inspections to maintain the work schedule and ensure safety. Additionally, a managing supervisor will regularly inspect all sites to implement construction supervision conditions (two people for construction quality assurance, maintaining construction schedules, ensuring safety, and inspections, etc.) Additionally, if there are problems or delays, appropriate measures will be taken, such as providing the contractor with direction and guidance for improvement.
- Routine management patrol: The Japanese engineers will have an office in a hub city, from which they will regularly visit all sites. In addition to managing overall progress of the Project, they will also strive to ensure work execution quality that is consistent throughout each site.
- Spot work management: For specialized fields such as structure or equipment, while watching construction progress at each site, Japanese specialized engineers will be spot dispatched to give recommendations to the site’s resident supervisor and observe the implementation of inspections and trial runs, etc.
- Quality control testing: Testing will be performed to confirm the quality of materials used that may greatly affect the quality of construction.
- Holding meetings: Regular meeting will be held with construction contractors to confirm the progress and schedule of construction. Regular meetings will also be held with the Swaziland implementing agency, including relevant agencies, to report on the status of the construction. Additionally, a construction progress and quality control meeting may also be held as necessary between the Swaziland implementing agency, JICA, construction contractors, and

the consultant. At this meeting, problems that may have arisen during the work period are shared and resolutions are studied.

- Payment support: The content of invoices from construction contractors will be examined and certificates issued. Support will also be provided to the Swaziland implementing agency regarding procedures for requesting payments from JICA.
- Report creation, etc.: In addition to monthly reports regarding work progress, other necessary reports will be provided and submitted to the Swaziland implementing agency and JICA.
- Final inspection: A final inspection will be implemented upon completion of the construction work; the results will be reported to the relevant agencies.
- Inspection for defects: When the period of guarantee against defects is over, an inspection for defects, supervision of defects correction work, and a verification inspection will be implemented; results will be reported to the relevant agencies.

In order to implement the construction supervision described above, the consultant will build the following system.

- Construction supervision base: Taking into consideration access to each site, a construction supervision office will be placed in Mbabane, which is convenient for communicating and coordinating with the Swaziland implementing agency. This will be the activity base for directly hired local engineers.
- Site supervision team: In addition to the allocation of one supervisor to each site, specialized equipment engineers (one electrical, one mechanical) will visit each site regularly to implement supervision activities, confirm work progress, and ensure work execution quality. Additionally, one QS will be allocated to perform monthly progress assessments.
- Headquarters support system: Corporate consultants will eliminate project managers for each specialized field, and establish a system for an operations manager to support the resident supervisors. Additionally, at the start of construction work, the midpoint, and the completion of work, engineers in appropriate fields will be spot dispatched, in accordance with construction work progress. These engineers will observe major inspections, etc.

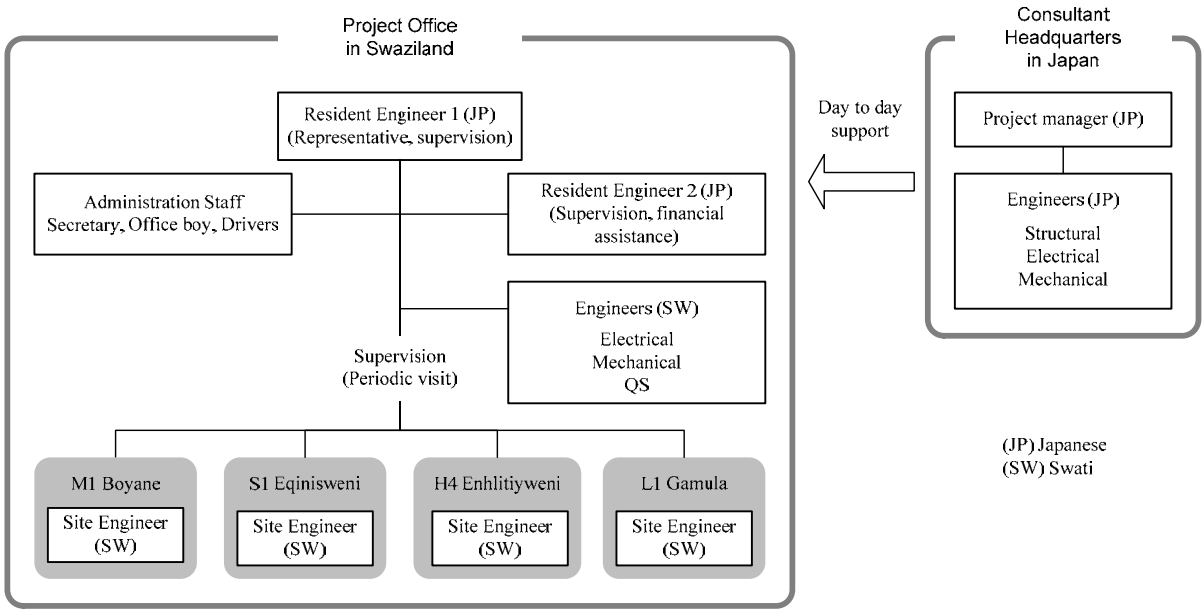

Figure 2-2 Diagram of Construction Supervision Structure

(4) Procurement Supervision Structure and Operational Content

After the completion of installation work, initial operation instruction, and provision of operational guidance, the consultant will be in attendance and observe the receiving and inspection of equipment by the procurement contractor, and the handover to Swaziland. For receiving and inspection of the equipment, the content and model name shown on the contract, country (region) of origin, manufacturer name, presence of ODA sticker, and external appearance, etc. should be verified.

From the period of time between installation work and receiving/inspection/handover, equipment procurement supervision will be conducted with a system of two dispatched procurement supervision engineers.

2-2-4-6 Quality Control Plan

The primary facilities for the Project are one-story buildings with reinforced concrete as the main structure with steel roof beam. In regard to quality control, focus will be placed on the structural frame (reinforcing bar, steel beam, concrete construction work), which has a large impact on basic performance items such as durability, as well as on the building equipment, which is essential for the building to function. Supervision will be conducted as described in the table below. Materials specifications and testing methods will refer to SANS.

Table 2-16 Quality Control Items

Item	Method
Ground	・ After excavating the foundation, the subgrade will be visually inspected and test results confirmed. ・ Confirmation will be made through load tests at all four sites.

Building locations	・ Benchmarks will be set using surveying instruments, and the building locations will be roped off. This will be confirmed in the presence of relevant officials.
Reinforcing bar	・ Material quality will be confirmed using a mill sheet for reinforcing bars of each type and delivery source. One time tensile tests per rebar diameter will be performed at an official testing center.
Steel beam	・ From a QA standpoint, the steel beam processing plant will be carefully chosen. Fabrication drawing checks, fabrication/processing, rustproofing, and product inspection will be conducted systematically. ・ Inspections at the plant will be conducted twice: once for inspection for the full size drawing and once for product inspection.
Bar arrangement inspection	・ Bar arrangement inspection will be conducted prior to concrete placement. Items to be checked are: quantity/position/precision, embedment length with joints, and installation of spacers.
Cement	・ The report of testing results will be obtained from the manufacturer to check material quality. ・ If stored on-site, guidance will be provided on appropriate storage environment and number of stacking bags in order to avoid hardening due to humidity.
Aggregate	・ Testing will be implemented once on mass, particle size distribution, and water absorption rate, etc. at an official testing center. ・ Maximum particle size, presence and amount of silt, water content, etc. will be checked through visual inspection for each delivery.
Concrete	・ Water quality inspection of mixing water will be conducted to confirm there are no problems with quality. ・ Mix proportion by volume using the standard formulation will be the base. 28-day prescribed strength will be confirmed through test mixing. ・ Moisture content will be determined through slump testing, and kept below maximum values as stipulated in the specification sheet. ・ Compressive strength testing will be conducted approximately four times per building. It will be confirmed that the 28-day strength average for three samples exceeds the quality control strength. ・ Following Japanese standards, measures for hot weather will be taken so that the temperature of fresh concrete does not exceed 35°C.
Bricks	・ Desired strength will be confirmed through compressive strength testing. ・ Highest stacking height will be 1.2 m, and they will be covered with a sheet for storage.

2-2-4-7 Construction Materials and Equipment Procurement Plan

(1) Facilities

The construction equipment and materials used in facility construction for the Project will follow local specifications. However, most of the materials are commonly used for local facility construction, etc. Materials produced in Swaziland are cement, aggregate, and fired bricks, in addition to the secondary product of concrete blocks. Other materials (steel, lumber, construction finishing materials, equipment, electrical materials and machinery) are largely imported products from South Africa. However, since Swaziland is close to South Africa in terms of physical distance and time needed to travel, and it is also in the same customs union, it is possible to procure South African products as easily as domestically procured items. In reality, there are many cases of construction contractors procuring materials from South Africa, and one of the largest suppliers in

Swaziland is a South African funded company. The countries of origin for major construction materials are shown in the summary below.

Table 2-17 Source Countries for Major Construction Materials Supply

Item		Source of supply country			Summary
		Swaziland (Domestic))	Swaziland (Imported)	3rd country	
Construction Material	scaffolding		○	○	Various construction contractors own scaffolding material made in South Africa.
	sand	○			River sand can be procured from the outskirts of each site.
	aggregate	○			Can be procured mainly from the Matsapha region quarry.
	cement	○			Normal Portland cement (CEM-II 32.5, 42.5) can be procured.
	ready-mixed concrete	○			There are multiple plants in the industrial park area on the outskirts of Matsapha. There are also large construction contractors with their own plants. Selection will be made after studying the time required for transport to the site and completion of installation, as well comparison with SANS criteria.
	fired bricks	○			Can be procured from a large-scale plant in Swaziland.
	lumber		○	○	Since the number of companies handling lumber in Swaziland is limited, it is advantageous to import directly from South Africa for large-scale construction work.
	form plywood		○	○	Procurement of imported products in Swaziland is possible, but it is advantageous to import directly from South Africa for large-scale construction work.
	reinforcing bar		○		Deformed bar (SANS-compliant product) can be procured.
	steel frame		○		This will be an imported item from South Africa, but there are multiple large-scale factories.
	iron sheet roofing material		○		Many imported products from South Africa in circulation.
	steel fittings		○		Steel and aluminum import products are in circulation, and all are commonly seen. However, there are no large plants for steel fittings, with large construction contractors fabricating their own. Quality must thereby be confirmed when approving samples.
	wooden fittings		○	○	There are many South African products in circulation, but there are no factories

					specializing in wooden fittings. These will be imported from a South African fittings plant.
	cement products	○			Secondary concrete products such as concrete blocks, curbstones, and flat tiles of a high quality can be procured locally.
	porcelain tile		○		Imported products from South Africa are in circulation in Swaziland.
	paint		○		There are agents for paint manufacturers from South Africa and other countries who sell and mix paint.
	hardware		○		For hardware, imported products made in Europe and South Africa are widely circulated in Swaziland.
	boards		○		Imported plasterboard and rock wool sound absorbing boards made in South Africa and other countries are in circulation.
	furniture, fixtures		○		Ready-made products made in South Africa are wide circulation. Depending on the ordered quantity, this can also be imported directly from South Africa.
Facility and equipment materials	sanitary ware, faucets		○	○	Imported products made in South Africa and other countries are in circulation in Swaziland. Since there are no large suppliers specializing in equipment materials, for large-scale construction work, construction contractors often procure items directly from South Africa.
	piping material, pumps		○	○	
	electrical wires, cables		○	○	
	light fixtures, outlets, switches		○	○	
	panels			○	Fabrication in South Africa is assumed.

(2) Equipment

Most of the equipment can be procured in Swaziland. However, a portion of the IE-related equipment, etc. will likely be procured from South Africa.

For all of the equipment procured for the Project, the consultant will confirm and offer guidance upon handover to MoET officials in charge of managing the various equipment on operation methods and maintenance management methods (daily inspections, cleaning/adjustments, responses for slight malfunctions, etc.) After teachers and staff are allocated to each target school, MoET will ensure that instruction regarding these operations and maintenance management is thoroughly conducted.

2-2-4-8 Implementation Schedule

If implemented as a Japanese Grant Aid Project, after an Exchange of Notes (E/N) is conducted between the two countries and a Grant Agreement (G/A) is signed, the Project will be implemented through the following stages.

- Detail design, preparation of tendering documents, approval (approximately six months)

The consultant will conclude a design and supervision contract with the Swaziland implementing agency and provide detail design drawings and tendering documents based on the content of the outline design. Additionally, based on the content of the detail design, a detailed estimationof the works will be conducted and confirmed by JICA. Meetings will be held with the Swaziland implementing agency at the time of the consultant agreement, beginning of estimations, and the completion of design work, then the detail design work will be completed. The time necessary for detail design work is approximately 5.5 months.

- Tendering (approximately five months)

  After the Swaziland implementing agency approves tendering documents, MPP will implement tendering as an agent of the implementing agency. The consultant will provide support for this. The time required from the public announcement of P/Q to concluding contracts is approximately four months.

- Work execution and procurement (approximately 18 months)

  After signing the work contracts and obtaining verification from JICA, contractors will begin construction work and equipment procurement. Depending on the Project's facility scale and local labor conditions, the time necessary for construction work and equipment procurement/installation has been determined as approximately 18 months. This assumes the smooth procurement of materials and equipment, prompt procedures and screenings by Swaziland relevant agencies, and the smooth implementation of construction borne by the Swaziland side.

An outline of the project implementation schedule combining the information above is shown in the following table. The project implementation period from the conclusion of the G/A to the completion of construction work is estimated to be 29 months.

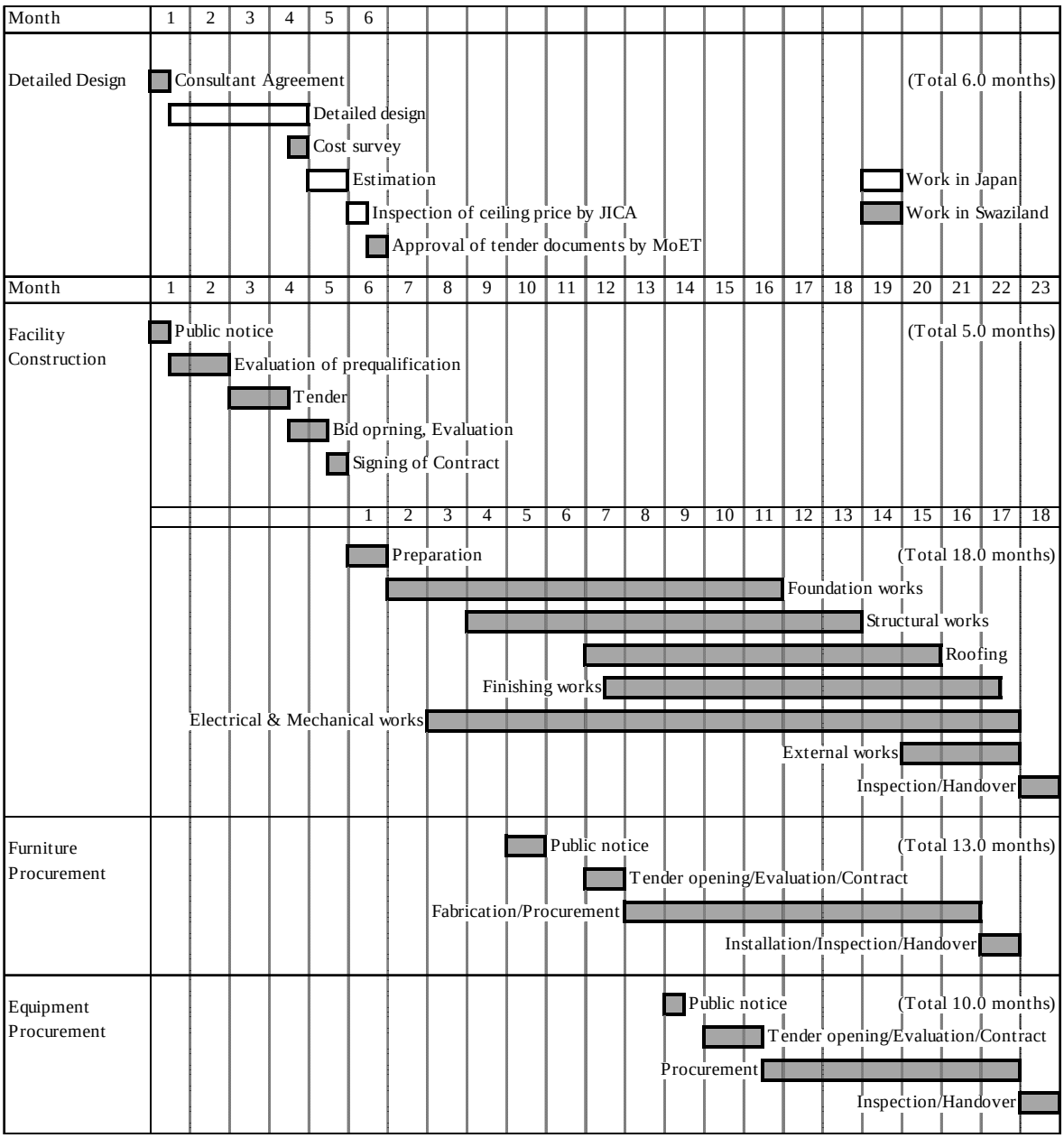

Figure 2-3 Project Implementation Schedule

2-3. Summary of Responsibilities of Recipient Country

The items borne by the Swaziland side for implementation of the Project are shown below.

Table 2-18 Items Borne by the Swaziland Side

	Content	Timing or Deadline
1	Application for counter project budget for FY 2017	2016
Detail design, tendering		
1	Consultant agreement	Soon after concluding the G/A (April 2017)
2	Bank arrangement (B/A)	
3	Issuance of authorization to pay (A/P) for Consultant agreement	Two weeks after Consultant agreement
4	Payment of bank transfer fees	For each payment invoice
5	Approval of tendering documents	October 2017
6	Application for counter project budget for FY 2018	October 2017
7	Approval of prequalification results for Project tendering	December 2017
8	Acquisition of construction permits	Until the start of construction (February 2018)
9	Removal of existing trees and roots within the site (L1 site), existing fence (M1, S1 site)	Until the start of construction (February 2018)
10	Tendering observation and construction/procurement contracts	March 2018
During work execution period		
1	Issuance of authorization to pay (A/P) for construction/procurement contracts	Two week period after construction contract (March 2018)
2	Payment of bank transfer fees	For each payment invoice
3	Support for obtaining entry visas and permissions to stay in the country for Japanese and 3rd country nationals to work on the Project	Soon after concluding the construction/procurement contracts (March 2018)
4	Customs procedures for products imported from 3rd countries for the Project; exemption of custom duties	Upon each request from the contractor
5	Exemption of value added tax for services and product procured in Swaziland for the Project	Upon each request from the contractor
6	Securing a means of water supply and connection of supply, up to the water receiving tank	Until final inspection (August 2019)
7	Drawing in and contracting electrical power	Until final inspection (August 2019)
8	Procurement and connection of propane gas tanks	Until final inspection (August 2019)
After handover		
1	Procurement of furniture, office supplies, and furnishings, etc. not included in the Project	Soon after facility handover
2	Installation of outer perimeter fence and tree planting on the site	

For the implementation of items borne by the Swaziland side, MoET will administer overall management as the implementing agency of the Project. MoET will also be the contact point for procedures for tax exemptions and permits, etc., and will be in charge of the items for which the Swaziland side is responsible, while working together with relevant agencies such as the SRA and Ministry of Housing and Urban Development's Department of Urban Government.

2-4. Project Operation and Maintenance Plan

(1) Operation and Maintenance Structure

Secondary education level operational management falls under the jurisdiction of the MoET Secondary Education Department. It is coordinated by ministry school inspectors and secondary education regional inspectors assigned by region education offices to each secondary school, including the target schools, as well as Special Education Needs (SEN) regional inspectors. For individual school operations, teaching staff are assigned under the school head teachers, and operations are conducted with a certain level of independence. Important matters concerning school operations and maintenance management are decided by a School Management Committee (SMC) consisting of the school head teacher, regional representatives, parent representatives, and teachers, etc.

(2) Operation and Maintenance Budget

With the exception of costs for facility/equipment maintenance and teachers' salaries, other expenses are primarily covered by each schools' tuition revenue (standard amount is 4,900 SZL per year per student, but differs by school). Therefore, schools with more students have a larger budget to put toward operation and maintenance. The target schools will have one stream for 200 people, but of the 273 secondary schools in the country, approximately half (124 schools) are operated with under one stream. Therefore, it can be determined that this will not be a problem for the operation and maintenance of the target schools. Since the target schools will implement a school lunch programme, the food ingredients, etc. for the lunches will be provided in kind by MoET, but labor costs for kitchen staff are the responsibility of the school. The following table shows the budget breakdown of an existing secondary school (St. Marks High School: 682 students in 2013). Tuition is 6,500 SZL per person, and 6% of the budget can be allocated for maintenance costs.

Table 2-19 Budget Breakdown of Existing School (Reference Example)

Revenue		Expenditure		
Item	Amount (SZL)	Item	Amount (SZL)	
Tuition	4,490,850	Administrative costs	497,660	9%
Facility rental revenue	130,000	Staff labor costs	366,000	7%
Shop revenue	50,000	Textbook costs	1,212,200	23%
PTA fees, donations	100,000	Books and newspapers	135,000	3%
Testing fees	693,229	Sports and culture costs	94,000	2%
Other	104,000	Office supplies for students	281,600	5%
		Other expenses	953,020	18%
		Repair and maintenance costs	335,000	6%
		Facility maintenance	510,000	10%

		costs		
		Utilities	280,000	5%
		Testing fees	621,350	12%
Total	5,568,079	Total	5,285,830	100%

Source: St. Marks High School budget sheet (2013/2014). Excludes dormitory-related costs.

(3) Teacher Allocation Plan

It is standard in the operation of Swaziland secondary schools to have 40 periods of classes per week, with one period of class time as 40 minutes. However, this is not uniform since it is decided at the discretion of each school. Elective subjects are similar, with the subjects to be offered decided by each school. Therefore, at this time, it is difficult to accurately estimate the number of teachers necessary at the secondary schools built for the Project. However, MoET uses the following simplified formula according to the number of students to make such calculations.

Required number of teachers = number of students / 0.17 / 100 + number of teachers for elective subjects

Since the Project assumes a one-stream school, according to the formula, the number of students will be 200 (40 students x 5 grades). In terms of elective subjects, based on the labs to be built for the Project, at the least, agriculture, life sciences (home economics), and information technology will be implemented, and four teachers for agriculture, cooking, sewing, and ICT will be allocated. Therefore, the number of teachers necessary for the target schools are calculated as follows.

Required number of teachers = 200 students / 0.17 / 100 + 4 = 16

Additionally, MoET has set the combination of subject composition and class period numbers for the secondary schools to be built for the Project, as shown in the table below. Subjects other than agriculture, life sciences, and ICT will be offered as elective subjects, but since the total number of class periods for each grade exceeds 40, it can be seen that not all of these elective subjects will be implemented. Instead, the combination of elective subjects will be determined by each school, depending on facility conditions and teacher allocation. Therefore, if the target schools implement other elective subjects in addition to agriculture, life sciences, and ICT, the required number of teachers would increase beyond 16. Thus, it can be said the calculation result based on the simplified formula is the minimum necessary number of teachers.

Table 2-20 Subject Composition and Class Periods per Week (1 Stream) for the Target Schools (Example)

Subject type	Subject/field name	Number of school hours per grade (No. of periods)				
		Form 1	Form 2	Form 3	Form 4	Form 5
Required subject	Siswati language	5	5	5	5	5
	English language	5	5	5	5	5
	Literature	4	4	4	4	4
	Mathematics	6	6	8	6	6
	Combined science	6	6	6	0	0

	Physical science	0	0	0	6	6
	Biology	0	0	0	6	6
	Total no. of required subjects	26	26	28	32	32
Elective subject	Agriculture field	6	6	6	6	6
	Business field	6	6	6	6	6
	Accounting field	—	—	—	6	6
	Life sciences	6	6	6	6	6
	Geography	5	5	5	5	5
	Religious studies	4	4	4	4	4
	History	5	5	5	5	5
	Foreign language (French)	5	5	5	5	5
	Design and technology	6	6	6	6	6
	ICT	3	3	3	5	5
	Total no. of elective subjects	46	46	46	54	54
Total		72	72	74	86	86

When the Project is implemented and facilities for the target schools have been built, it will be necessary to allocate a minimum of 64 new teachers in total to the four target schools. The hiring and placement of teachers is done by the Teaching Service Commission (TSC), a MoET-affiliated organization. MoET newly hired 262 secondary school teachers in 2016 who graduated or completed teacher training school, university, or graduate school in 2015. This number is deemed adequate to place new teachers at the target schools. Aside from general teachers, personnel in administrative positions (head teacher, deputy head teacher) and other employees will also be allocated. Four employees per 200 students is the standard allocation.

(4) Maintenance Management Plan

Under the direction of the school head teacher, teachers and students participate in the daily maintenance of school facilities. No special skills are required for the maintenance of facilities for the Project, but in order to keep the building in good condition over a long period of time, it is necessary to implement daily cleaning and inspections, as well as appropriately repair items that are worn, damaged, or deteriorated due to age. Therefore, a minimum necessary budget for maintenance must be secured.

- Regular cleaning: Student will regularly clean the school buildings under the guidance of the teachers. Cleaning staff will clean administrative areas.
- Routine repairs: If periodic inspections and appropriate daily management are conducted, there will be no need for repairs for several years after the completion of construction. After this time, period repairs such as repainting (once per 10 years), and inspection and adjustment of fittings (once per year), etc. will be necessary.
- Maintenance management of building services: A system for conducting daily management including regular inspections, simple repairs, and part replacements, etc. will be provided.

- Maintenance management of outdoor facilities and landscaping: Periodic inspection and cleaning of drainage ditches and drainage basins is necessary. Additionally, in order to prevent ground erosion due to rainwater and to keep the environment of the premises in order, appropriate tree trimming and maintenance on the site is desirable.
- Maintenance management of equipment: Maintenance and inspections should be performed in accordance with the manual accompanying theequipment. Consumables and spare parts should also be supplemented as necessary. Personnel from the subject or department managing each piece of equipment will provide an inventory list and maintenance record for systematic maintenance management. MoET will be responsible for school bus vehicle registration, fuel costs, driver salaries and insurance, and regular vehicle maintenance costs, while daily operational management will be conducted by each target school.

2-5. Estimated Project Cost

2-5-1 Estimated Project Cost

(1) Expenses Borne by the Japanese Side

Not to be made public until contracts with contractors and suppliers are verified.

(2) Expenses Borne by the Swaziland Side

Table 2-21 Swaziland Side Expenses

Item	Estimated costs (1,000 SZL)	(1,000 JPY)
Fees on B/A, payment transfer	56	481
Public notice for tender	90	772
Land preparation, removal of existing trees, roots and obstacles	1,443	12,381
Securing a means of water supply and connection of supply up to the water reservoir tank	470	4,033
Drawing in of electricity power supply	401	3,441
Procurement and connection of propane gas tanks	5	43
Installation of outer perimeter fence	5,088	43,655
Total	7,553	64,806

(3) Calculation Conditions

- Estimated as of: August 2016
- Currency exchange rate: 1 US$ = 107.12 JPY, 1 SZL = 8.58 JPY, 1 ZAR = 8.58 JPY
  (SZL = Swazi Lilangeni)
- Construction period: As shown in the construction schedule.
- Other: The Project will be implemented following the scheme for Japanese Grant Aid.

2-5-2 Operation and Maintenance Costs

The estimation of costs necessary for the operation and maintenance of Project facilities is shown below.

(1) Operation Costs

1) Personnel expenses

With implementation of the Project, the personnel expenses associated with new personnel necessary at the four target schools is estimated as follows. The added personnel costs to be borne

by MoET are calculated as 9.259 million SZL, but since this amount is 1.2% of MoET's FY 2014/15 ordinary expenditures in the secondary education sector (742.636 million SZL), the added costs can be adequately covered.

Table 2-22 Yearly Added Personnel Costs (SZL)

	Estimated position	No. of personel	Total
Teachers	C3	16	1,848,320
Head teacher	D5	1	249,442
Deputy head teacher	D4	1	216,905
Total/school			2,314,667
Total costs (4 schools)			9,258,668

Note: Calculated based on MoET's 2015 base salaries by occupation.

Additionally, personnel expenses for each target school will be 240,000 SZL, which accounts for 24.5% of the government standard tuition revenue of 980,000 SZL (4,900 x 200 students).

Table 2-23 Annual Personnel Costs for Target Schools (SZL)

	No. of people	Total
Accountant	1	90,000
Secretary	1	42,000
Kitchen staff	2	60,000
Security, other	2	48,000
Total per school		240,000

Note: Estimated amounts based on St. Mark's High School budget sheet (2013/14)

2) Operating Costs for Facilities

The expenses necessary for operating the facilities are estimated based on the following conditions.

Water charges

Since water will be supplied from boreholes provided by the Swaziland, or from the community water supply, which is free of charge, there will be no payments of water charges as part of school operations.

Electricity charges

Electrical power consumption is calculated in accordance with the estimated operational state of each room. However, since electricity charges for teacher's houses are the responsibility of the residents, they are not included in these calculations. Calculations are as shown below. The annual number of operational days is set at 39 weeks, based on the actual operation from 2016/2017. Additionally, school operations for one week will be the MoET standard of 40 class periods per

week, with one class as 40 minutes. The operational state of each room is estimated as follows, based on the class timetable proposed by MoET for the target schools.

Classrooms	Set at 40 periods/week, assuming full time use and including elective subjects.
Science lab	According to the timetable proposed by MoET, the total number of periods for science subjects is 42periods/week. This exceeds the MoET standard of 40 periods, but considering classes with lectures that will use ordinary classrooms, this will be set at a maximum of 40 periods/week.
ICT lab	Set at 19 periods/week, in accordance with the proposed MoET timetable.
Home economics lab	Set at 15 periods/week for both cooking lab and sewing lab, in accordance with the propose MoET timetable.
Agriculture lab	Set at 30 periods/week, in accordance with the proposed MoET timetable.
Administration rooms	Set at 40 periods/week, assuming full time use.
Feeding kitchen	Set at four hours of operational time per day.
Other	Electricity used by air conditioners will be considered for only the ICT lab prepared by the Project. Air conditioners installed by the Swaziland for administration buildings are not included in calculations.

Based on the calculation conditions above, and individually assuming the usage time of electrical equipment installed in each room such as lights and outlets, the amount of electricity usage per school is calculated as follows.

Table 2-24 Calculation of Annual Electricity Charges

	Amount of power used per hour (KWh)	Annual operational time (time)	Annual amount of power used (KWh)
Classrooms (5 rooms)	4.26	1040	4,430.40
Science lab	4.53	1040	4,711.20
ICT lab	10.25	494	5,063.50
Home economics labs	29.98	390	11,692.20
Agriculture lab	0.46	780	358.80
Administration block	6.45	1040	6,708.00
Feeding kitchen	1.20	780	936.00
Total amount of power used			33,900.10
Estimated electricity charges	Basic charge: 1,902.87 (SZL) x 12 months = 22,834.44 Usage charge: 0.7768 (SZL) x 33,900.10 = 26,333.60 Total: 49,168.04 (SZL)		

The annual amount of power necessary after implementation of the Project is calculated at 33,900.10 KWh per school, with a charge of 49,169 SZL.

Fuel costs

Estimating the consumption of liquid propane gas used in the science lab and home economics lab, charges are calculated as follows.

Table 2-25 Annual Liquid Propane Gas Usage Estimate (per School)

Device	Device output (Kcal)	No. of devices	Demand factor	Annual operational time	Annual consumption amount	No. of necessary LPG tanks (48 kg tanks)
	[a]	[b]	[c]	[d]	[e]=[a]*[b]*[c]*[d]	[e]/(48*0.458)
Electrical cooking equipment	4,300	4	50%	390	3,354,000 Kcal (139.75 m3)	
Burners for experiments	1,000	13	10%	1040	1,352,000 Kcal (56.33 m3)	
Total amount used					196.08 m3	8.9 tanks
Gas fees	332 (SZL) x 9 tanks = 2,988(SZL)					

The firewood used for cooking school lunches is handled in the same manner as the consumables, chemical reagents, and food ingredients supplied by the government, and are thus not included in these calculations.

Communications costs

Since the infrastructure conditions differ at each site, landline telephones and internet connections, etc. are not included in the scope of the Project. Therefore, the Swaziland will be responsible for the installation of such as necessary, and this item will not be calculated.

(2) Maintenance Costs

If appropriate maintenance is conducted regularly on the facilities built by the Project, there will be no need for large-scale repairs for approximately 30 years after completion of construction. Regular maintenance is required in the form of furniture/fittings repairs, painting, replacement of equipment parts, machinery repairs, and daily inspections and cleaning. Based on similar facilities of the same scale, average repair and maintenance costs for each area have been set as shown below. The annual maintenance costs calculated per school are as shown in the following table.

Table 2-26 Annual Maintenance Costs (per School)

	Facilities (construction costs x 0.3%)	Equipment (equipment costs x 1.0%)	Furniture (furniture costs x 2.0%)	Machinery (machinery costs x 1.0%)	Total (SZL)
Maintenance costs	52,969	18,315	14,920	19,835	106,039

(3) Tabulation of Operation and Maintenance Costs

The estimated budget and necessary expenditures for school operations (excluding consumables) for each target school have been calculated, with results shown below. Operation and maintenance costs (excluding consumables) are 41% of the school budget, and will thus not be a problem for conducting continued operation and maintenance.

Table 2-27 Proportion of Estimated Maintenance Costs (per school, in SZL)

Budget	Expenditure					Expenditure/ Revenue
Tuition revenue	Personnel expenses	Electricity charges	Gas charges	Maintenance costs	Total expenditure	
980,000	240,000	49,169	2,988	106,039	398,196	41%

Chapter 3 Project Evaluation

Chapter 3. Project Evaluation

3-1. Preconditions for Project Implementation

As preconditions for Project Implementation, the items to be undertaken by the Swaziland side are as follows.

(1) Implementation of Items Borne by the Swaziland Side

For implementation of the Project, the items borne by the Swaziland side such as removal of existing trees and roots blocking facility construction, securing a means of water supply, and drawing in electricity to the site, etc., must be reliably implemented before the start of construction work or by the completion of construction.

(2) Implementation of Tax Exemption Measures

This Project is expected to be implemented with Japanese grant aid. Based on the E/N and G/A, internal taxes must be exempted. These include customs duties and value added tax attached to the procurement of goods and services related to project implementation. Working together with SRA, MoET must take the necessary tax exemption measures during the project implementation stage without delay.

3-2. Required Inputs from Partner for Achieving the Overall Project Plan

The items to be undertaken by the Swaziland side in order for the effects of the Project to be manifested and sustained are as follows.

(1) Appropriate Allocation of Teachers

So that the new teachers who will be needed after implementation of the Project can be allocated immediately after completion of the facilities, advance hiring and assignment is necessary. The number of teachers must meet the allocation standard, and they must have the knowledge and capacity necessary for implementing inclusive education.

(2) Preparation of Textbooks, Teaching Materials, and Consumables for Experiments and Practical Learning

Textbooks for students must be appropriately prepared, consumables for experiments and practical learning must be continuously procured, and facilities and equipment should be used effectively.

(3) Implementation of Appropriate Operation and Maintenance

The budget necessary for operation and maintenance of the target school must be continuously secured, appropriate operation and maintenance of facilities and equipment must be performed, and school buses must be continually operated and maintained as necessary under the supervision of MoET.

3-3. External Conditions

(1) No Changes in Swaziland Educational Policy

The Government of Swaziland's upper level policies state the promotion of Inclusive Education, which aims for fair and equitable education through the expansion of school enrollment to all children, including those with disabilities. Since the Project is positioned to directly support Swaziland's upper level plans and action plans, their upper level plans must continue to progress in order for the effects of the Project to be manifested and continued.

(2) Stability of Economic and Security Conditions

In order for the Project to be smoothly implemented, the security conditions of Swaziland must maintain stability. Additionally, in order for Project facility construction and equipment procurement to be achieved as planned, economic conditions and the current level of prices must remain stable, and the continued stable procurement (import) of fuel such as petroleum must be maintained.

3-4. Project Evaluation

3-4-1 Relevance

(1) Beneficiaries of the Project

The direct beneficiaries of the Project are the students, including those with disabilities who enroll at the target school, as well as the teachers. However, with the expansion of access to secondary education and improvement in the enrollment environment within the community, many local residents, as well as citizens of the country will benefit.

(2) Consistency with Upper Level Plans

In the 1997 National Development Strategy (Vision 2022) and the Poverty Reduction Strategy and Action Plan formulated in 2007, the Government of Swaziland has positioned human resource development, poverty reduction, and socio-economic growth as its top priority strategies, and will strive to achieve educational sector development and Education for All (EFA). Additionally, the Swaziland Education and Training Sector Policy announced the promotion of Inclusive Education, which aims for fair and equitable education through the expansion of school enrollment to all children, including those with disabilities. MoET is currently planning the Ministries' Action Plans to 2018 and 2022 based on upper level plans and strategies, and is advancing its activities in the field of secondary education, with the goal of improving the net enrollment rate and promoting enrollment of orphans and vulnerable children (OVC), including children with disabilities and SEN children. By building new facilities and installing equipment to implement inclusive education at the secondary education level, the Project directly supports secondary

education in Swaziland and the strategic challenges involved with inclusive education, and is thus consistent with upper level plans.

(3) Consistency with Japanese ODA Policies

In the Country Assistance Policy for Swaziland, support for human resources has been set forth under the broad objective of development support for reducing poverty. The Project will be implemented with the goal of improving access to secondary education in Swaziland, and since this will create a basis for human resource development through education, it is consistent with Japanese ODA policies.

3-4-2 Effectiveness

(1) Quantitative Effects

The Project, when implemented, expects the following quantitative effects.

Table 3-1 Expected Quantitative Effect

Indicators	Baseline (2016)	Target (2024) 5 years after the completion of project
Number of classrooms provided with essential environment appropriate for students with disabilities	0	20
Number of enrolled students provided with learning environment appropriate for students with disabilities	0	800

Note: Both are calculated based on 40 persons per classroom.

(2) Qualitative Effects

The Project, when implemented, expects to bring about the following qualitative effects.

1) More accessible educational environment is provided for students with disabilities, which will enhance the quality of and motivation for their learning.

2) The target schools will be reference, visited, and inspected by stakeholders as a model secondary school for promoting inclusive education, which will contribute to the spread of inclusive education in Swaziland.

In light of the above, the Project is highly relevant, and considered effective.

Appendices

1. Member of the Survey Team

1-1 Field Survey I (November 16 to December 12, 2015)

Mr. Kazuro SHIBUYA	Leader	Deputy Director, Basic Education Division, Basic Education Group, Human Development Department, JICA
Mr. Jin HIROSAWA	Project Planning	Deputy Director, Grant Aid Project Management Division 2, Financial Cooperation Implementation Department, JICA
Mr. Hiroyuki IGUCHI	Chief Consultant/ Facility Planning	Matsuda Consultants International Co., Ltd.
Mr. Mitsuhiro SHIMADA	Architectural Design	Matsuda Consultants International Co., Ltd.
Mr. Takuya YAMADA	Construction Planning/ Cost Estimation	Matsuda Consultants International Co., Ltd.
Ms. Kyoko KOJIMA	Education Planning	INTEM Consulting, Inc.
Mr. Seiichi OUCHI	Equipment Planning	INTEM Consulting, Inc.
Mr. Tsuyoshi SASAKA	Environmental and Social Considerations	IC Net Limited
Mr. Amos Muchanga	Consultant Coordinator	Matsuda Consultants International Co., Ltd.

1-2 Field Survey I-2 (July 24 to August 6, 2016)

Mr. Takao MARUYAMA	Leader	Deputy Director, Basic Education Division, Basic Education Group, Human Development Department, JICA
Mr. Hiroyuki IGUCHI	Chief Consultant/ Facility Planning	Matsuda Consultants International Co., Ltd.
Mr. Mitsuhiro SHIMADA	Architectural Design	Matsuda Consultants International Co., Ltd.
Mr. Hiroyuki HARA	Equipment Planning	INTEM Consulting, Inc.

1-3 Field Survey II-1 (November 20 to November 29, 2016)

Mr. Takao MARUYAMA	Leader	Deputy Director, Basic Education Division, Basic Education Group, Human Development Department, JICA
Mr. Hiroyuki IGUCHI	Chief Consultant/ Facility Planning	Matsuda Consultants International Co., Ltd.
Mr. Mitsuhiro SHIMADA	Architectural Design	Matsuda Consultants International Co., Ltd.

2. Study Schedule

2-1 Field Survey I

Date (in 2015)			JICA		Consultants						
			Leader	Project Planning	Chief Consultant(CC) Facility Planning	Equipment Planning	Environmental and Social Considerations	Education Planning (Swaziland)	Architectural Design (Swaziland)	Construction Planning/ Cost Estimation (Swaziland)	Consultant Coordinator
			Mr. SHIBUYA	Mr. HIROSAWA	Mr. IGUCHI	Mr. OUCHI	Mr. SASAKA	Ms. KOJIMA	Mr. SHIMADA	Mr. YAMADA	Mr. AMOS
1	15-Nov	S	JNB > Manzini (MTS) > Mbabane					HKG > JNB > Manzini (MTS) > Mbabane			JNB > Manzini
2	16-Nov	M	Discussion with MoET					Discussion with MoET			Cost Survey
								Discussion with SNU	Confirmation to Subcontractor		
3	17-Nov	T	- Visit to IE Model School (Ntuthukweni) - Visit to Requested Site and Special Needs School					- Visit to IE Model School (Ntuthukweni) - Visit to Requested Site and Special Needs School			
4	18-Nov	W	Discussion with MoET(M/D)					- Survey on situation of education - visit to feeder school	Site survey on H1, H2		Cost Survey
5	19-Nov	T	Ditto					Survey on situation of education	Site survey on L1, S2		
6	20-Nov	F	Signing on M/D > JNB, JICA in SA and Embassy of Japan					Ditto	- Site survey on S1, S3 - Contract to Subcontractor		
7	21-Nov	S	JNB >					Classification of Documents			> Maputo
8	22-Nov	S	JNB > DXB > HND			Classification of Documents	> JNB	Internal Meeting of Mission			
						JNB > Manzini(MTS) > Mbabane					
9	23-Nov	M				Discussion about equipments with MoET	Site survey on L2, L3, L4	Survey on situation of education	Site survey on L2, L3, L4		
10	24-Nov	T				- Discussion about equipments with MoET - Visit to IE Model School	Site survey on M1, M2, M5	- Survey on situation of education - Visit to IE Model School	Site survey on M1, M2, M5		
11	25-Nov	W				Ditto	Site survey on M3, M4	Survey on Soft-Component	Site survey on M3, M4		
12	26-Nov	T				- Discussion about equipments with MoET - Survey on Suppliers	Site survey on S1, S2, S3, S4, L1	Survey on situation of education and Soft-Component	Site survey on S4 and Existing school		
13	27-Nov	F				Ditto	Site survey on H2, H3'(substitutes)	Diito	Site survey on H3 and Existing school		
14	28-Nov	S				Survey on Suppliers	Analysis of Survey	Survey on situation of education	Survey on Suppliers		
15	29-Nov	S				Internal Meeting of Mission, Classification of Documents					> Mbabane
16	30-Nov	M				- Discussion about equipments with MoET - Survey on School Bus	- Meeting with MoET - Visit to MoNRE	Survey on Soft-Component and Other Donners	Survey on SPPRA, CIC, and Construction Company		
17	1-Dec	T			> JNB > Manzini	- Discussion about equipments with MoET - Survey on Suppliers	> Manzini Visit to LMB, MoTEA, and SEA	Survey on situation of education and Soft-Component	Survey on Tax Exemptions and Construction Company		
18	2-Dec	W			Visit to Sites	> JNB Survey on Suppliers	Visit to MoNRE, MoET, and LMB	Survey on situation of education and Other Donners	Survey on MPCU, Suppliers, and Consultants		
19	3-Dec	T			Ditto	Ditto	- Site survey on H3, H4 - Visit to MoTEA and SNTC	Ditto	Site survey on H4 and Existing school		
20	4-Dec	F			Discussion with SRA	Ditto	Confirmation of documents by MoET	Survey on situation of education	Survey on Suppliers and Consultants		
21	5-Dec	S			Facility Planning	JNB >			Cost Survey	Facility Planning	Cost Survey
22	6-Dec	S			Ditto	> HKG > Tokyo			Classification of Documents		
23	7-Dec	M			Discussion with MoET				Survey on Suppliers		
24	8-Dec	T			T/N				Ditto		
25	9-Dec	W			Supplementary Survey				- Survey on Suppliers - Visit to working site of construction company		
26	10-Dec	T			> JNB				Ditto		
27	11-Dec	F			Report to JICA in SA > HKG > Tokyo				- Discussion with MoET - Cost Survey	JNB >	- Discussion with MoET - Cost Survey
28	12-Dec	S							JNB >	> HKG > Tokyo	> Maputo
29	13-Dec	S							> HKG > Tokyo		

2-2 Field Survey I-2

Date (in 2016)			JICA	Consultants		
			Leader	Chief Consultant Facility Planning	Architectural Design	Equipment Planning
			Mr. MARUYAMA	Mr. IGUCHI	Mr. SHIMADA	Mr. HARA
1	23-Jul	S	HND > SIN			
2	24-Jul	S	SIN > JNB > Manzini			
3	25-Jul	M	- Discussion with MoET, Discussion with MoEPD/Aid Coordination - Discussion about M/D		Consultants' Meeting	Discussion about Equipments
4	26-Jul	T	- Discussion about M/D - Discussion with SRA, Discussion with MoET(M/D)	Discussion with MPP	Cost Survey (Construction Company)	Ditto
5	27-Jul	W	- Discussion with MoET (SEN) - Discussion with MoF, Signing on M/D	Discussion with MPP	Cost Survey (Facilities Company)	Survey on Supplier (about Procurements and Cost Survey)
6	28-Jul	T	Manzini > JNB		- Consultation about Firefighting - Cost Survey (Furniture)	Ditto
7	29-Jul	F			- Consultation with Electric Company - Discussion with MoET	Ditto
8	30-Jul	S			Supplementary Survey (Cost Survey)	Ditto
9	31-Jul	S			Manzini > Nelsprit	Ditto
10	1-Aug	M			Survey on Supplier (in SA)	Ditto
11	2-Aug	T			Ditto	Ditto
12	3-Aug	W			Ditto Nelsprit > Manzini	Ditto Manzini > JNB
13	4-Aug	T			- Discussion with MoET - Discussion with SRA	Survey on Supplier in SA (about Procurements and Cost Survey)
14	5-Aug	F			Consultants' Meeting	Ditto
15	6-Aug	S			Manzini > JNB	JNB >
16	7-Aug	S				> SIN > HND

2-3 Field Survey II-1

Date (in 2016)			JICA	Consultants	
			Leader	Chief Consultant Facility Planning	Architectural Design
			Mr. MARUYAMA	Mr. IGUCHI	Mr. SHIMADA
1	19-Nov	S		NRT > HKG	
2	20-Nov	S		HKG > JNB > Manzini	
3	21-Nov	M		Explanation of Draft Report with Dep. of Planning/MoET and MPP	
4	22-Nov	T	HND > SIN	- Consultation of Tax Exemption with SRA and MoET - Consultation of Public Procurement with MPP	
5	23-Nov	W	SIN > JNB > Manzini	Supplementary Survey	
			Internal Meeting of Mission		
6	24-Nov	T	- Courtesy Call to Aid Coordination Unit - Courtesy Call to Under Secretary of MoET - Consultation on M/D with Department of Research and Planning and related department of MoET, with presence of Micro Project Programme Coordination Unit of Ministry of Economic Planning and Development and Aid Coordination Unit - Meeting with the Ministry of Finance		
7	25-Nov	F	- Signing of M/D - Visit to Sites	Supplementary Survey	- Supplementary Survey - Visit Contractors
8	26-Nov	S	Manzini > JNB		Ditto
9	27-Nov	S	JNB > SIN > HND		Classification of Documents
10	28-Nov	M			- Supplementary Survey - Visit Contractors
11	29-Nov	T			Manzini > JNB
12	30-Nov	W			JNB > HKG > HND

3. List of Parties Concerned in the Recipient Country

Ministry of Education and Training

Mr. Patrick N. Muir	Principal Secretary
Ms. Nompumelelo Dlamani	Under Secretary
Dr. Sibongile Mtshali-Dlain	Director of Education
Mr. Milton B. Simelane	Financial Controller, Accounts Division
Ms. Thavelo Mkhonta	Principal Accountant
Mr. Nkululeko Gwebu	Principal Education Planner, Policy & Budget Planning Unit, Research and Planning
Ms. Nonhlanhala Shongwe	Senior Planning Officer, Policy & Budget Planning Unit, Research and Planning
Mr. Madoda Khumalo	Planning Officer, Policy & Budget Planning Unit, Research and Planning
Mr. Stan Maphsa	Economist, Policy & Budget Planning Unit, Research and Planning
Mr. Mpendulo Khumalo E	Chief Inspector Secondary Secondary Education
Mrs. Cebsile Nxumalo	Senior Inspector for SEN Special Needs Education Unit, Secondary Education
Mr. Sipho M. Zwane	Senior Inspector for Sports & Arts
Ms. Turu Dube	Senior Inspector for Science
Ms. Fikile Mdluli	Senior Inspector for Mathematics
Mr. Inampasa Peter	Senior Inspector for French
Mrs. N. N. Dlamini	Senior Inspector for Consumer Science
Mr. Leonard Mgcibelo Tsela	Senior Inspector for ICT
Mr. Simon Dlamini	Senior Inspector for Agriculture
Ms. Thobile L. Gamedze	Senior Inspector for Nutrition
Mr. Sibsiso Vilakati	SNR Human Resources Officer Teaching Service Commission
Mr. Jabulane Shabalala	EMIS Manager
Mr. Mfamukhoma Mkambule	EMIS Supervisor
Ms. Phumaie Nxumalo	EMIS Administratior
Mr. Samuel Mkambule	Store Keeper
Mr. Clement Fana Dlamini	Transport Officers, General Administration
Mr. Barnabas Shabangu	School bus driver for children with special needs

Regional Education of MoET

Mr. Malimi W. Mamba	Regional Education Officer of Manzini Region
Mr. Philip Mamba	Inspector of primary school of Manzini Region
Ms.Fikile Shongwe	Regional Inspector for SEN of Manzini Region
Ms. Thuli T. Langwenya	Regional Education Officer of Hhohho Region
Ms. Khabo Cabo	Inspector of secondary school of Hhohho Region
Mr. Magongo Mphiwa	Inspector of primary school of Hhohho Region
Mrs. Thabile Nxumalo	Regional Education Officer of Shiselweni Region
Mr. Eric M. Dlamini	Inspector for secondary school of Shiselweni Region
Mr. Wellington S. Mdluli	Regional Education Officer of Lubombo Region
Mr. Roberi S. Motsa	Inspector of primary school of Lubombo Region

Ministry of Economic Planning & Development

Mr Anthony N. Mthunzi	Principal Economist – Head of ACMS
Mr. Sabelo Mazibuko	Planning Officer, Aid Coordination and Management Section

Ministry of Natural Resources

Mr. Patrick B.S. Mkhonta	Land Surveyor (GIS) Surveyor General's Department

Ministry of Housing & Urban Development

Mr. Tito Simelane	Director of Urban Government

Swaziland Revenue Authority

Ms. Nompumelelo W. Dlamini	Commissioner- Domestic Tax
Ms. Ntombifuthi Nhlengethwa	Acting Director Legislative
Ms. Bongekile Singwane	Manager Legislative
Ms. Magdelene Dlamini	Manager Legislative

St Francis High School (Hhohho)

Mr. Christopher Simelane	Deputy Head Teacher
Mr. Advent Dcamin	School Manager

St Joseph High School (Manzini)

Mr. Thwala Andreas	Head Teacher

Masibekela High School (Hhohho)

Mr. Enock Dlamini	Head Teacher

Mandulo High School (Manzini)

Mr. Dennis Dludlu	Head Teacher

Ebenezer High School (Shiselweni)

Mr. Dumsani Shabangu	Head Teacher

Salem High School (Shiselweni)

Mr. George S. Dlamini	Head Teacher

Mhulatane High School (Shiselweni)

Mr. Mandla Dlamini	Head Teacher

Mbabane Central High School (Hhohho)

Mr. Stephen Ngwenya	Teacher

Mbekelveni High School (Manzini)

Ms.Joyce Nxumalo	Acting Head Teacher

High School for the Deaf (Lubombo)

Ms. Zodwa B. Thawala	Head Teacher

Entuthukweni Primary School (Hhohho)

Mr. Solomon Nhleugethwa	Senior Teacher

St Joseph Primary School (Manzini)

Mr.Willfred Qintzi	Head Teacher
Mr.Jeremia Mzileni	Head of VI

Equinisweni Primary School (Shiselweni)

Mr. Duncam S. Mzima	Head Teacher

Siteki Primary School for the Deaf (Lubombo)

Ms. Honeyclale	Deputy Head Teacher

Mbasheni Primary School (Hhohho)

Ms. Duduzile Bhembe	Head Teacher

Rosenberg Primary School (Hhohho)

Ms. Lungile Felicity Mihupha	Head Teacher

Boyane Primary School (Manzini)

Ms. Lenny N. Hlawe	Head Teacher

Technical & Financial Partners and NGO

Mr. Ibrahima Diallo	Education Specialist, UNICEF
Mr. Andreas H. Schott MA	Team Leader, General Education Advisor, European Union (EU)
Ms.Hazel Zungu	Secretary General, UNESCO
Mr. Mgongeni Nkabinde	Educational Technical Program Manager, World Vision
Ms. Tembeni Dlamini	Design, Monitoring & Evaluation Coordinator, World Vision

Health Institution, University, Disability Organization

Ms. Sharoon Hlatshwayo	Occupational Therapists, National Psychiatric Referral Hospital
Mr.Tuemba Jomo Thwala	Lecturer in Special/ Inclusive Education on Visual Impairment, Southern African Nazarene University
Mr. Bongmi Makama	Swaziland Association of Visually Impaired

Laerskool Kempton Park Full Service School

Mr. Andre Page	Head Teacher
Mrs. Deidre Opperman	Head, Inclusive Education

Japan International Cooperation Agency in South Africa

Mr. Hiroyuki Kinomoto	Chief Representative
Mr. Keiji Ishigame	Senior Representative
Mr. Hiroshi Mochizuki	Representative
Ms. Eva Nderymaki	Senior Programme Officer
Mr. Daisuke Sagiya	Disability Mainstreaming Advisor