

	0+000	0+050	0+100	0+150	0+200	0+250	0+300	0+350	0+400	0+450	0+500	0+550	0+600	0+650	0+700	0+750	0+800
Proposed Height	1105.00	1098.00	1092.00	1087.00	1083.00	1080.00	1077.00	1075.00	1073.00	1071.00	1069.00	1067.00	1065.00	1063.00	1061.00	1059.00	1057.00
Ground Height	1105.00	1098.00	1092.00	1087.00	1083.00	1080.00	1077.00	1075.00	1073.00	1071.00	1069.00	1067.00	1065.00	1063.00	1061.00	1059.00	1057.00
Chainages	0+000	0+050	0+100	0+150	0+200	0+250	0+300	0+350	0+400	0+450	0+500	0+550	0+600	0+650	0+700	0+750	0+800
Distance	0+000	0+050	0+100	0+150	0+200	0+250	0+300	0+350	0+400	0+450	0+500	0+550	0+600	0+650	0+700	0+750	0+800
Station NO.	0+000	0+050	0+100	0+150	0+200	0+250	0+300	0+350	0+400	0+450	0+500	0+550	0+600	0+650	0+700	0+750	0+800
Curve Band																	

MINISTRY OF WORKS
THE UNITED REPUBLIC OF TANZANIA

THE PROJECT FOR REHABILITATION OF
TANZAM HIGHWAY (KITONGA GORGE SECTION)
IN
THE UNITED REPUBLIC OF TANZANIA

NIPPON KOEI CO.,LTD
IN ASSOCIATION WITH
JAPAN ENGINEERING CONSULTANTS CO.,LTD

Plan & Profile (8/13)

SCALE
H=S:1:2,500
V=S:1:500

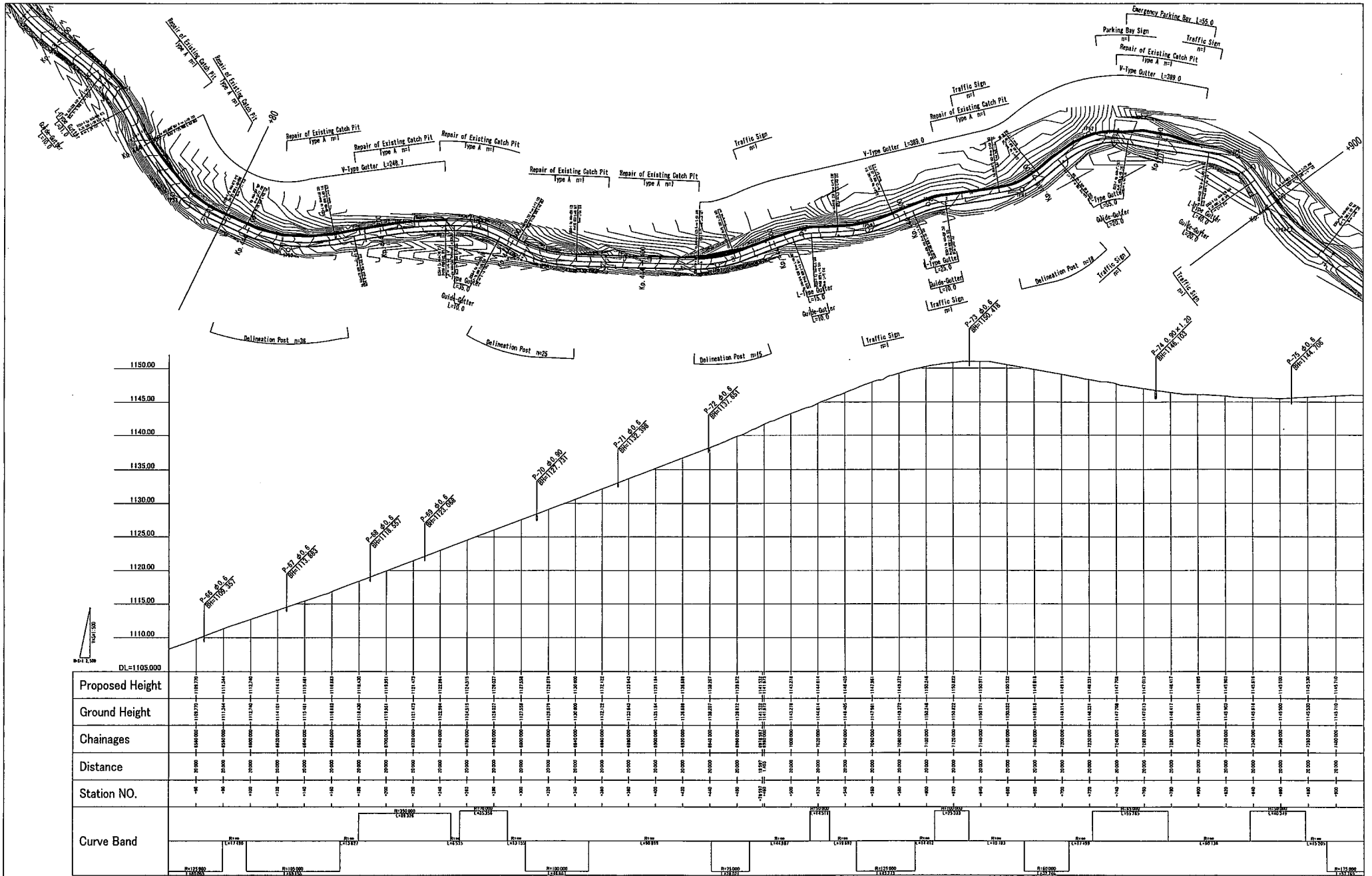
MINISTRY OF WORKS
THE UNITED REPUBLIC
OF TANZANIA

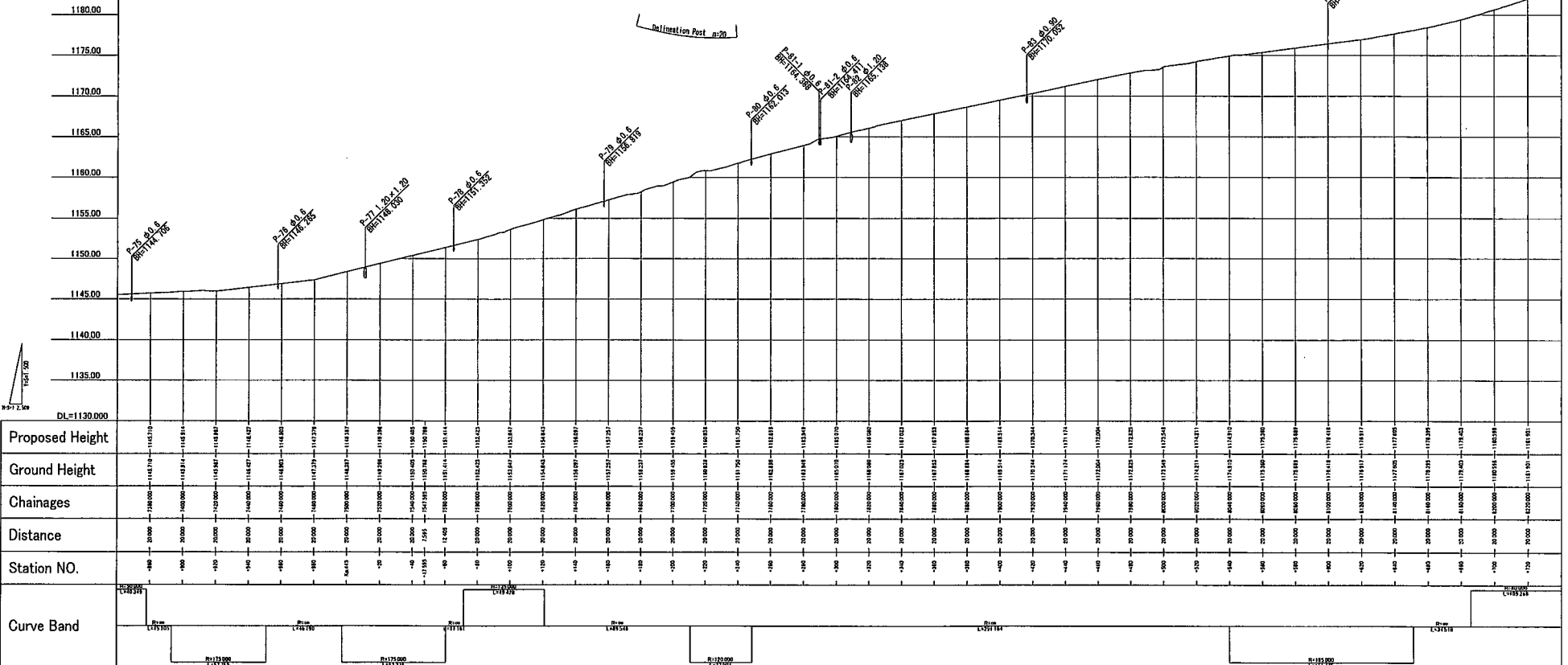
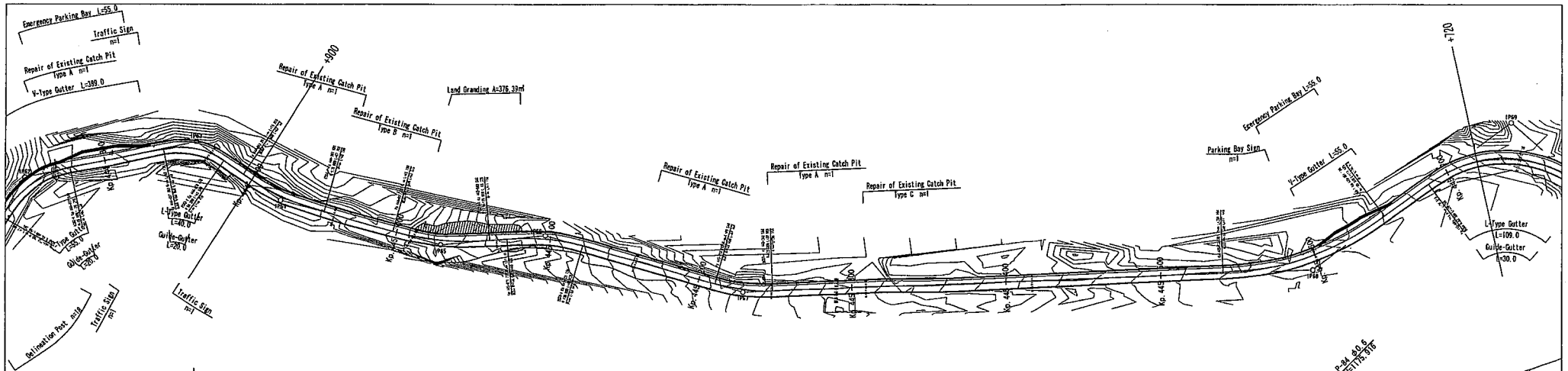
APPROVED
DATE

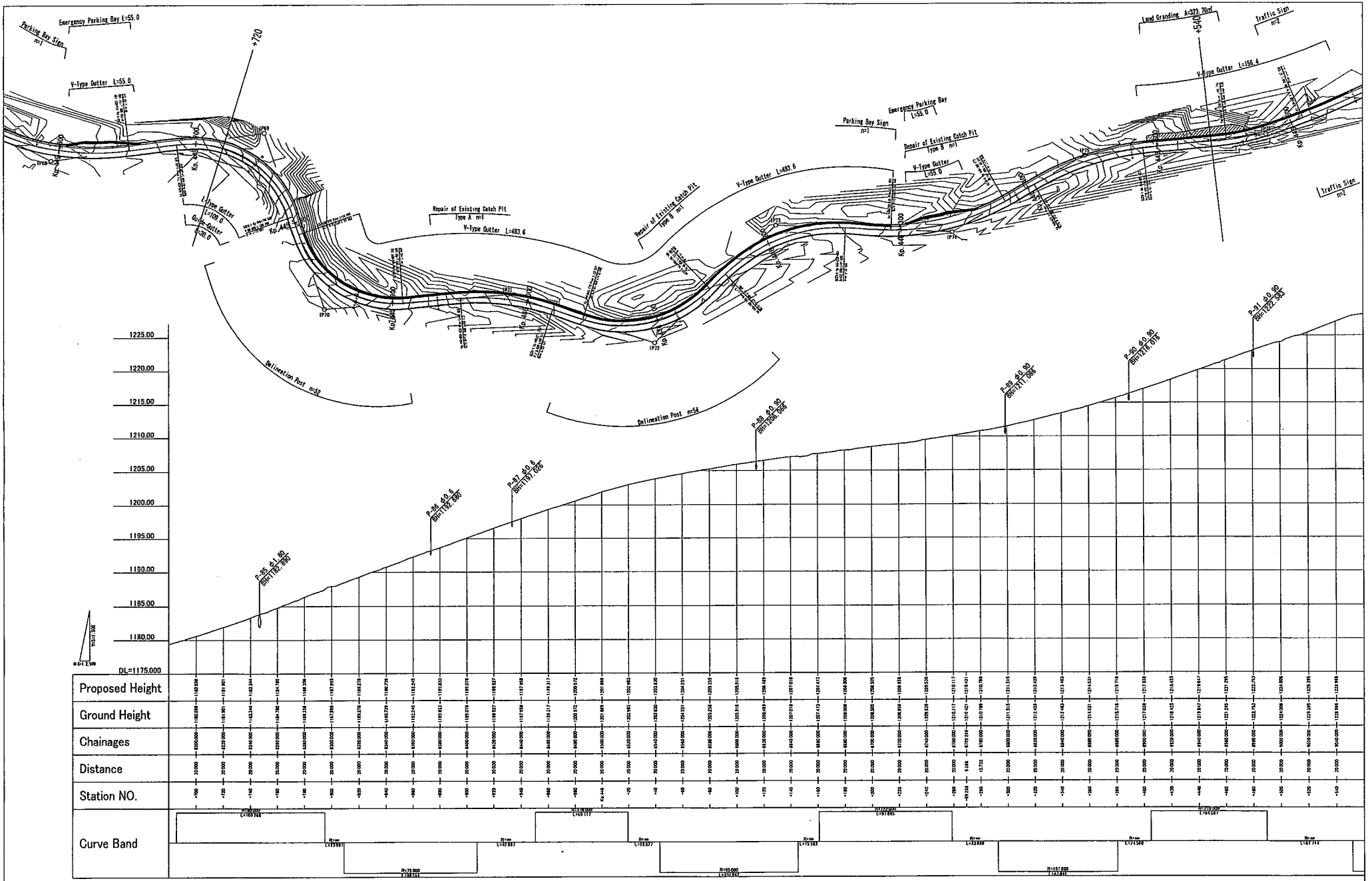
PREPARED CHECKED
SUBMITTED

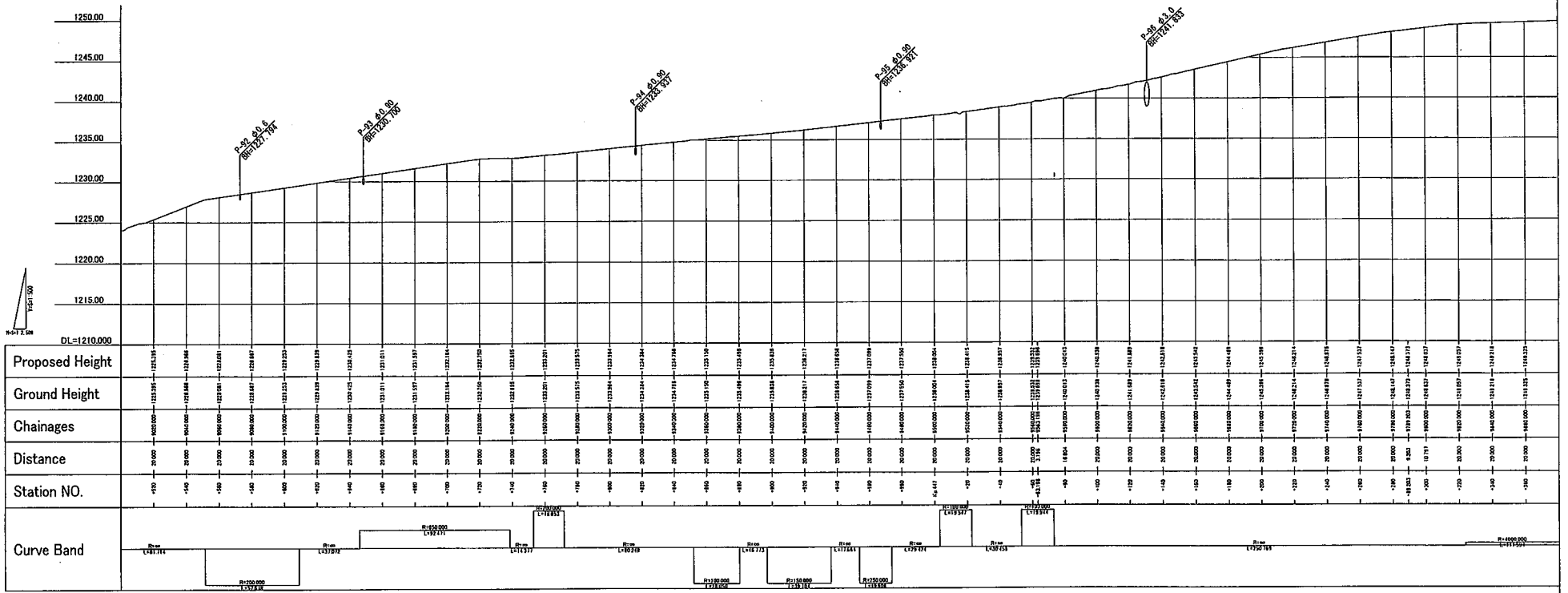
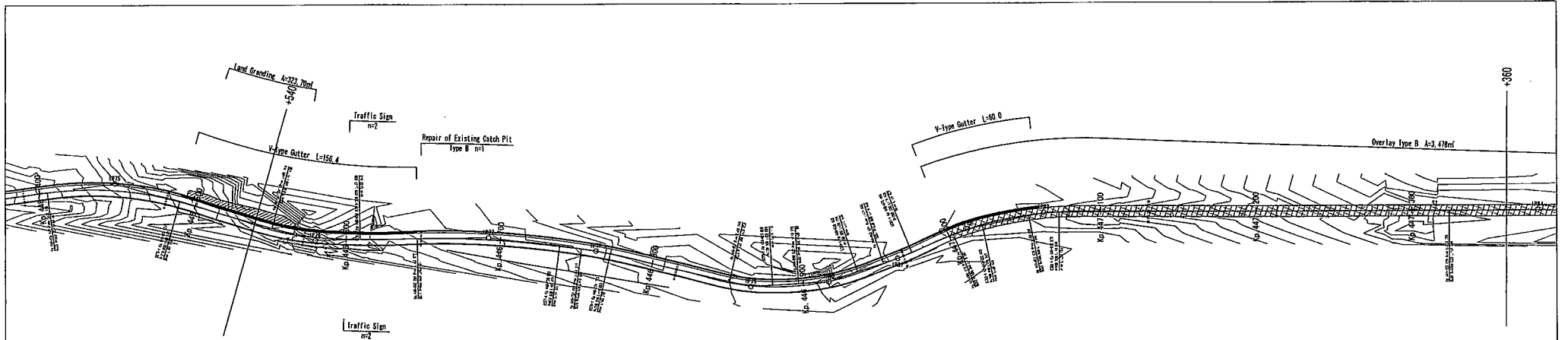
DATE
Dec.2001

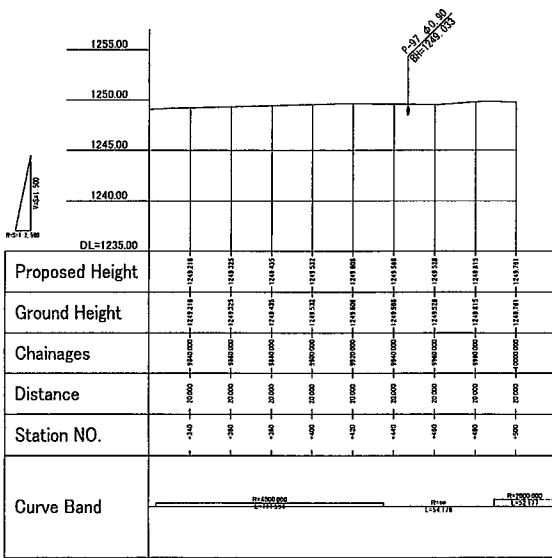
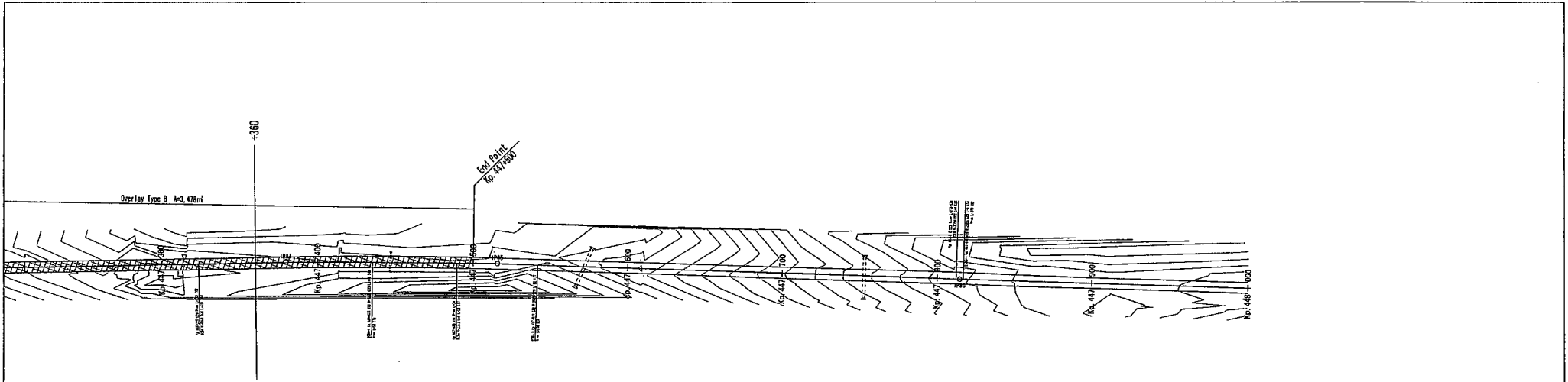
SHEET NO





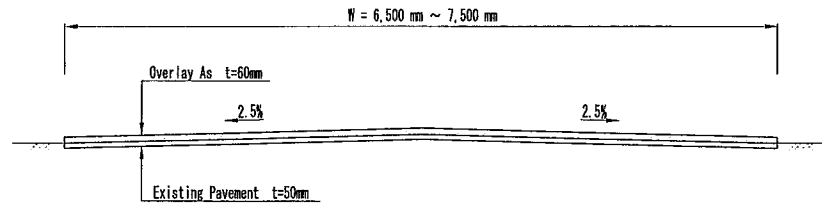






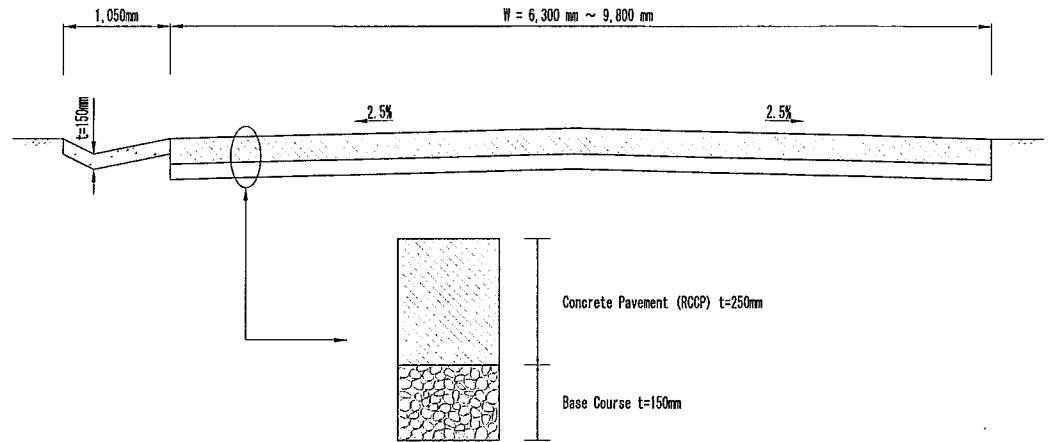
MINISTRY OF WORKS THE UNITED REPUBLIC OF TANZANIA	THE PROJECT FOR REHABILITATION OF TANZAM HIGHWAY (KITONGA GORGE SECTION) IN THE UNITED REPUBLIC OF TANZANIA	NIPPON KOEI CO.,LTD IN ASSOCIATION WITH JAPAN ENGINEERING CONSULTANTS CO.,LTD	Plan & Profile (13/13)	SCALE	MINISTRY OF WORKS THE UNITED REPUBLIC OF TANZANIA	APPROVED	NIPPON KOEI CO.,LTD IN ASSOCIATION WITH JAPAN ENGINEERING CONSULTANTS CO.,LTD	PREPARED CHECKED	DATE	SHEET NO
				H-S=1:2,500 V-S=1:500		DATE		SUBMITTED	Dec.2001	

Ov-A
Kp437+500~Kp439+500 L=2,000m



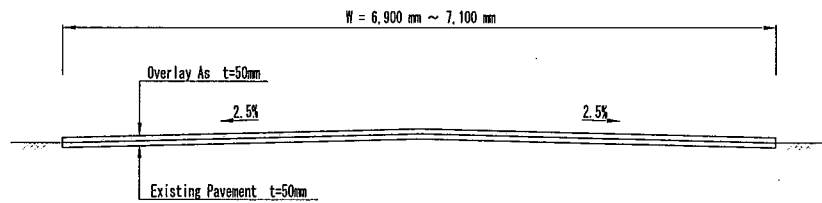
Item	Classification	Unit	Quantity	Type of Bitumen
As Overlay	AC20	m ²	13947.0	40/50

Reconstruction
Kp439+500~Kp447+000 L=7,500m



Item	Classification	Unit	Quantity	Remark
Concrete Pavement	σb=45	m ²	53139.6	RCCP
Base Course	CRS	m ²	53139.6	

Ov-b
Kp447+000~Kp447+500 L=500m

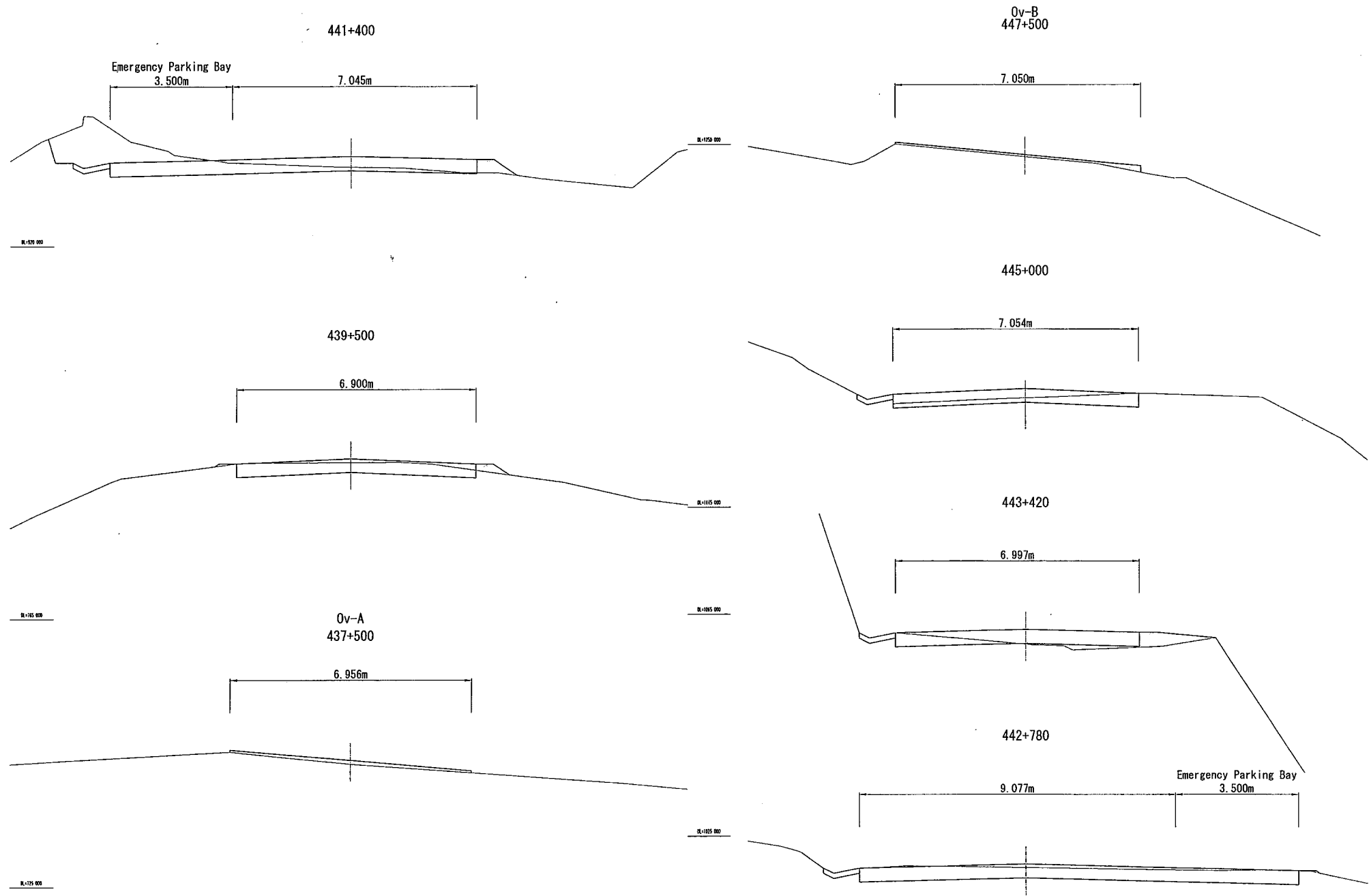


Item	Classification	Unit	Quantity	Type of Bitumen
As Overlay	AC20	m ²	3477.8	40/50

2-67

MINISTRY OF WORKS THE UNITED REPUBLIC OF TANZANIA	THE PROJECT FOR REHABILITATION OF TANZAM HIGHWAY (KITONGA GORGE SECTION) IN THE UNITED REPUBLIC OF TANZANIA	NIPPON KOEI CO.,LTD IN ASSOCIATION WITH JAPAN ENGINEERING CONSULTANTS CO.,LTD	Typical Cross Section	SCALE	MINISTRY OF WORKS THE UNITED REPUBLIC OF TANZANIA	APPROVED	NIPPON KOEI CO.,LTD IN ASSOCIATION WITH JAPAN ENGINEERING CONSULTANTS CO.,LTD	PREPARED CHECKED	DATE	SHEET NO
				S-150		DATE		SUBMITTED	Dec.2001	

2 - 68



MINISTRY OF WORKS THE UNITED REPUBLIC OF TANZANIA	THE PROJECT FOR REHABILITATION OF TANZAM HIGHWAY (KITONGA GORGE SECTION) IN THE UNITED REPUBLIC OF TANZANIA	NIPPON KOEI CO.,LTD IN ASSOCIATION WITH JAPAN ENGINEERING CONSULTANTS CO.,LTD	Cross Section	SCALE	MINISTRY OF WORKS	APPROVED	NIPPON KOEI CO.,LTD IN ASSOCIATION WITH JAPAN ENGINEERING CONSULTANTS CO.,LTD	PREPARED CHECKED	DATE	SHEET NO
				S=1:100	THE UNITED REPUBLIC OF TANZANIA	DATE		SUBMITTED	Dec.2001	

2-2-4 Implementation Plan

2-2-4-1 Implementation Policy

The Ministry of Works (MOW) of the Government of Tanzania will be responsible for the administrative control of the Project, including administration, collaboration, coordination and preparations for grant and the technical cooperation agreed upon between the two governments and for technical control as well as supervision.

In connection with the implementation of the Project, the MOW will conclude a service agreement with the Japanese Consultant who participated in the basic design work conducted by the JICA and fully aware of the required work under the Project. This Consultant will conduct the following work based on full knowledge of the role of a consultant in a grant aid project.

- Detailed design for the Project
- Preparation of tender documents
- Supportive work regarding pre-qualification, tender and signing of contract
- Works supervision

The actual construction works will be conducted by a Japanese construction company (the Contractor) selected in accordance with the grant aid scheme of the Government of Japan. The Contractor will procure the necessary equipment and materials in an efficient and appropriate manner and will conduct the construction works in accordance with the work schedule.

(1) Project Implementation Principles

Assuming the Project's implementation within the framework of the grant aid scheme of the Government of Japan, the construction works must take the following principles into proper consideration.

- Utilization of local labor, equipment and materials will be planned in order to contribute to the creation of employment opportunities, facilitation of technology transfer and vitalization of the local economy, as well as to reduce a risk of social conflicts that might arise.
- A close liaisoning system incorporating the MOW of the Government of Tanzania, the Consultant and the Contractor will be established to ensure the smooth implementation of the Project.
- A realistic work plan will be formulated, taking the pattern of rain in the Project area, required period for the procurement of equipment and materials and the employment of

an appropriate construction method, etc. into consideration.

- The Japanese Contractor will be responsible for the construction of facilities and the procurement of equipment, etc. in accordance with the relevant contracts.
- The Contractor should establish a camp yard at a site provided by the MOW free of charge to proceed with the construction works.
- The relocation or removal of utility facilities which disrupt the work must be completed by the MOW prior to the commencement of the construction works. However, no such utilities have been found so far at site.
- The MOW will be responsible for coordinating the work with local people and those responsible for the management of the facilities affected by the Project.
- The Contractor will hand over each road section of which the rehabilitation work has been completed to allow such section to serve the public traffic. The TANROADS (Iringa Office) will be responsible for the maintenance of the road sections handed over by the Contractor.
- The climate in the Project area shows clear dry and rainy seasons. The construction is scheduled on an assumption that the Contractor is able to carry out earth works and pavement works during the rainy season since the rain is not continuing full day.

(2) Work Implementation System

the Japanese Contractor will, in principle, be directly responsible for the implementation of the Project, assuming the provision of grant aid cooperation by the Government of Japan, and will use local companies as subcontractors to conduct simple work under the management, technical guidance and work supervision of the Contractor in order to improve the capability of local companies under its management.

Furthermore, there is no local construction company in Tanzania which owns adequate equipment and machinery to conduct large-scale road rehabilitation work by itself.

(3) Dispatch of Japanese Engineers

Tanzania has a total population of 31 million (1998) and its primary education enrolment rate of 80% is much higher than that of neighboring countries. And, higher education is provided by the University of Dar es Salaam, the Sokoine Agricultural College and other technical colleges. Therefore, it is possible to employ the civil engineers who experienced construction work or educated in the colleges.

For the Project, it is planned to produce asphalt mixture and concrete through leased plants. The Project will use local subcontractors for the paving works, earth works, and structural works as much as practicable. Accordingly, Japanese engineers will be dispatched to Tanzania to guide for operation and quality maintenance of paving works, concrete and crushing plants, especially rolled compaction concrete pavement as the first case in Tanzania, and to control the quality of the works, all of which will have major implications on the successful outcome of the construction works.

2-2-4-2 Implementation Conditions

The following points must be carefully noted in regard to the construction works under the Project in view of the labour, social, site and material procurement conditions in Tanzania.

(1) Safety of Work while Permitting Traffic Flow

As the Project road is an international trunk road from Dar es Salaam to the west of Iringa, it will be practically impossible to halt the traffic during construction. The work will be progressed at a lane closed to provide a space for the work while the opposite lane always opens to the public traffic in accordance with the traffic control plan. Since it will be essential to conduct the work while ensuring the traffic flow and safety of workers and pedestrians, the contractor will assign full-time (24-hour) personnel responsible for traffic safety at each section of the road under construction.

(2) Environmental Conservation during Construction Period

- The waste from the construction such as asphalt concrete, concrete, oil and excess soil shall be managed and disposed under guidance of the Consultant and MOW.
- The contractor shall manage noise and dusts during the construction period. The Consultant and MOW will guide or instruct the contractor as to the level and measures to control noise and dusts including use or combination of equipment if received complains or suggestions from the public and other stakeholders.
- Collecting of Soil and Sand
- The borrow pit for fill materials shall be located in an area near the Kitonga gorge with sufficient distance from inhabitant areas.
- Collecting sand shall not be from riverbed, but from around the river. However, the contractor shall pay its attention to avoid bad influence and damages to the riverbank. Moreover, the Contractor shall regularly check and manage water quality of rivers.

(4) Testing of Rolled Compaction Concrete Pavement

The Project will use the rolled compaction concrete pavement as the first case in Tanzania. The Consultant will conduct trial mix to establish appropriate quality control methods for job-mix, consistency, strength and temperature and also to confirm construction equipment and construction methods during the detailed design stage. As the concrete pavement will be spread and compacted at steep grades, sufficient care will be taken to maintain proper quality and workmanship.

(5) Safety Measures for Work in Mountainous Area

In the Kitonga gorge, it is possible during the rainy seasons unstable rocks at hill slopes may fall to roadway or that slopes at valley side fail or eroded. Proper measures will be provided to maintain safety from these dangers.

(6) Respect of Labour Standards

The Contractor will employ local workers in accordance with the Labour Standards Law in Tanzania which demand that employers abide by the following obligations.

- Basic working hours : 45 hours/week
- Over-time payment : hourly wage x 1.5 for over-time beyond 45 hours/week
hourly wage x 2 for work on Sundays and national holidays
- Transport expenses and housing allowance : payment of appropriate transport expenses and housing allowance
- Paid holidays : 28 days/year; unused paid holidays are purchased by the employer
- Retirement allowance : (one month's wage) + (wage equivalent to days worked) + (remaining paid holidays un-bought)
- Maternity leaves : up to 3 months with a doctor's note
- Tax payment : local workers are liable to income tax (PAYE: Pay as You Earn)
- Social insurance : equal contributions by worker and employer

(7) Respect of Local Customs

When calculating the work schedule and total working days, etc., the religious and traditional customs in Tanzania must be taken into proper consideration. The national holidays in Tanzania are listed in Table 2-31.

Table 2-31 National Holidays in Tanzania

Date		National Holiday
January	1 st	New years days
	8 th & 9 th	Islam days*
January	12 th	Zanzibar Revolution days
March	17 th	Islam days*
April	21 st	Good Friday**
	24 th	Easter Monday**
	26 th	Union days
May	1 st	Workers days
June	15 th	Islam days*
July	7 th	National days
August	8 th	Farmer's days
December	9 th	Independence days
	25 th	Christmas days
	26 th	Boxing days

Notes: * Date of Islamic holidays subjected to yearly change.
** Date of Christian holidays subjected to yearly change.

2-2-4-3 Scope of Works

The Government of Japan and the Government of Tanzania will be responsible for the work described below for the implementation of the Project.

(1) Scope of Works for Japanese Side

- 1) Construction of Facilities
 - Construction of the facilities indicated in Section 2-2, Basic Plan
 - Construction of traffic safety facilities related to the first item
 - Construction of temporary facilities (camp yard and office building, etc.)
- 2) Procurement of Equipment and Materials
 - Procurement of road construction equipment and materials and also construction machinery indicated in Section 2-4, Implementation Plan
- 3) Safety Measures
 - Safety control and safety measures required for the works

4) Consultancy Work

- Execution of the detailed design work, preparation of the tender and contract documents and supervision of the works indicated in Section 2-4, Implementation Plan

(2) Scope of Works for Tanzanian Side

1) Expropriation of Land and Compensation

- Expropriation of the land required for the construction of facilities indicated in Section 2.4, Implementation Plan and the removal of and compensation for buildings, etc. which hamper the planned work under the Project

2) Relocation of Facilities and Other Work

- Provision of temporary sites for camp yard and office building, etc. with free of charge
- Provision of a soil pit(s) and quarry for aggregate and stone which are required for the construction of facilities indicated in Section 2-4, Implementation Plan
- Deployment of local supervisors, provision of an office and means of transport for local supervisors and payment of their expenses

3) Safety Measures

- Arrangement of security for temporary facilities and work sites

4) Miscellaneous

- Provision of all conveniences for the entry to and stay in Tanzania of third country nationals (other than Tanzanian nationals)
- Exemption from or payment of customs duty, domestic taxes and levies imposed by the Government of Tanzania

2-2-4-4 Construction Supervision

(1) Consultancy Work

1) Scope of Consultancy Work

The Project will commence when the Government of Japan and the Government of Tanzania sign the E/N regarding grant aid for the Project. Following the signing of the E/N, the Consultant will conclude a consultancy agreement regarding assistance for the tender process and supervision of the construction works with the MOW which is the project implementation body on the Tanzanian side in accordance with the scope and procedure of the grant aid scheme of the Government of Japan based on the letter of recommendation issued by the JICA. The major items of the work involved in this agreement are described hereunder.

a. Detailed Design Stage

The Consultant will carry out the detailed engineering design of the road and prepare the tender draft final documents in compliance with concepts in the basic design.

b. Pre-Construction Stage

The MOW will conduct the tender with the assistance of the Consultant for the following matters.

- Public announcement of tender
- Pre-qualification
- Briefing on tender procedure and construction sites
- Evaluation of bids
- Contract negotiations

c. Construction Supervision Stage

Following the certification of the construction agreement by the Government of Japan, the Consultant will issue a notice to proceed with the works to the Contractor and begins its supervisory work. At the works supervision stage, the Consultant will directly report the work progress to the MOW, JICA office and the Embassy of Japan in Tanzania while conducting the administrative work in regard to work progress, quality, safety and payment for the Contractor and providing technical advice and instructions to improve the work of the Contractor. If necessary, the Consultant will discuss pending issues with the participated organizations.

2) Implementation Organization

a. Implementation Organization for Detailed Design, Tender Documents Preparation and Assistance for Tender

The assistance of the Consultant for the tender process will include the preparation of tender documents. The Consultant will pay particular attention to the following matters with full knowledge of the fact that the Project will be implemented under the grant aid scheme of the Government of Japan.

- The rules in the agreement should conform to the relevant international standards.
- The specifications for the works used by the Government of Tanzania should be taken into proper consideration.

The personnel assignment plan for the preparation of the tender documents and assistance for the tender should feature those people who are familiar with the Project site and the grant aid scheme of the Government of Japan. The major duties of the Consultant's staff are as follows:

- Chief engineer : coordination to ensure the smooth progress of contract of the Consultant and all of the work; supervision of the preparation of the tender documents including meeting with the Client
- Road engineer : detailed design of road, structures and drainage facilities, instruction of additional topographical survey
- Pavement/Road engineer : survey on and testing of aggregate, scrap asphalt pavement and other materials, pavement design and trial mixing test for rolled compaction concrete pavement, assistance of the road engineer
- Construction planning/Cost estimation: construction planning and cost estimation, assistance for the tender
- Tender documents preparation : preparation of tender documents and specifications

b. Works Supervision Organization

A road engineer with experience of grant aid projects will be assigned as a full-time supervisor (resident engineer) on-site. The chief supervisor will be dispatched at critical stages of the construction work for work coordination and other purposes. The major duties

of those engineers whose services are deemed to be required at different stages of the construction works are described below:

- Chief supervisor : contract for the Consultant supervision, assistance for the tendering, work coordination and technical control to ensure the smooth implementation of the works
- Full-time supervisor : daily project management and progress control
- Pavement engineer : supervision and guidance regarding the road paving works, including the rolled compaction concrete pavement and asphalt quality control of mixtures, strength and workmanship of asphalt and concrete pavement

(2) Construction Supervision

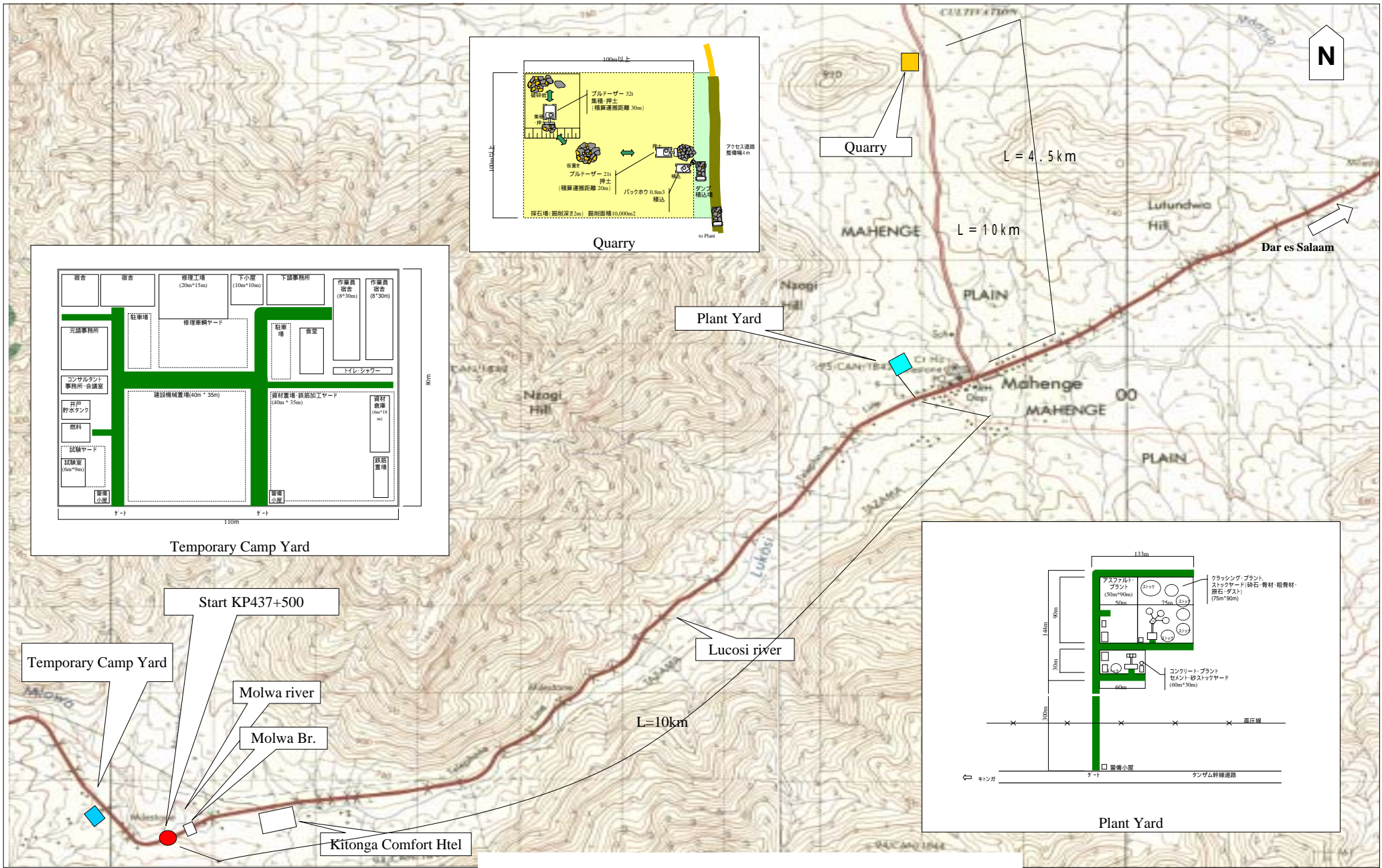
1) Basic Framework for Works Implementation

It is planned that the Contractor will use local construction companies as subcontractors to conduct simple work under its management, technical guidance and supervision so that local companies can develop their technical capability as well as maintenance capability for the new facilities constructed under the Project.

2) Temporary Facilities Construction Work

a. Temporary Yard

On receiving the notice to proceed, the Contractor will immediately start to arrange the required construction machinery, construction materials and manpower. The camp yard will be established at a site which will be provided by the Tanzanian side free of charge and such temporary facilities as an office building and stock yard, etc. will be constructed as shown in Fig. 2-14.



b. Temporary Power Supply

Since there is no public power supply near the Kitonga gorge, movable generators will be mobilized for power supply for the Project implementation.

c. Water Supply

A new well will be drilled at the camp yard and used for drinking water of the staff and workers after treatment and boiling. The water necessary for the construction works will be transported by a water tanker from the Lukosi river.

3) Major Works

As the Project road is an international trunk road from the Dar es Salaam port to neighboring counties as well as a regional trunk road which functions as a main transportation route for agricultural products and daily life of the people along the Project. Therefore, the utmost priority must be given to maintaining a safe traffic flow and total road closure to traffic during the construction period must be avoided. The construction work must proceed with ensuring the sufficient function of the road with safety though it may reduce efficiency in some extent. In principle, the work will be conducted in the daytime and night work will be conducted when such work is absolutely necessary.

Therefore, it will be impossible to halt the traffic during construction. Since it will be essential to conduct the work while ensuring the traffic flow and safety of workers and pedestrians, personnel responsible for traffic safety at each section of the road under construction will be stationed.

The work on the subject road will be conducted taking the requirements described below into full consideration.

- The work will be progressed at a lane closed for the work while the opposite lane always opens to the public traffic, according to the traffic control plan.
- The road shall be opened to the public traffic for 24-hours.

4) Works Control

It will be necessary for the Japanese Contractor to conduct proper quality control as well as schedule control. The project implementation plan, therefore, provides for sufficient interim inspections and schedule control for the work to be conducted by local subcontractors to ensure high work quality. A Japanese engineer responsible for such inspection and quality control will be posted on-site.

5) Traffic Control during Construction Works

In principle, total road closure will not be allowed under the Project. Therefore, the implementation of the planned work allowing vehicle flow will require the Contractor to prepare an implementation plan which deploys personnel responsible for traffic control at those sections where the work is in progress.

As the Project is the rehabilitation of an existing road, it is a major issue how to secure vehicle flow on the road while the work is in progress. It will, therefore, be necessary to carrying out the work on one side at a time. Since the traffic volume at night is not much different from daytime, utmost care should be taken for safe passage of traffic at night.

2-2-4-5 Quality Control Plan

The following manuals of Tanzania will be used for the quality control of material and construction stage:

- Pavement and Materials Manual 1999, Ministry of Works
- Standard Specification for Road Works 2000, Ministry of Works
- Laboratory Testing Manual 2000 (Central Material Laboratory), Ministry of Works

Quality control tests are basically based on the above Manuals, as shown in Table 2-34.

Table 2-32 Quality Control Tests Plan

Item			Test Method	Frequency	Specification	Test No.
Crushed Rock Base	Mixed Material		Liquid Limit, Liner Shrinkage	Every mixing	PMD 7.6	CML 1.2, 1.4
			Sieve Gradation		PMD 7.6	CML 1.7
			TFVsoaked & TFV dry		PMD 7.6	CML 2.7
			Aggregate Density		PMD 7.6	
			Maximum Dry Density		PMD 7.6	
Paving		Field Density (Compaction)	Daily			
Prim Coat	Material	Bitumen	Quality Certificate		SSR 4102	
			Storage and Spraying Temperature	Every Truck	SSR 4106	
Asphalt Concrete	Material	Bitumen	Quality Certificate & Chemical Analysis	Every material		
		Aggregate	Sieve Gradation	Every mixing	PMD 10.18	CML 1.7
	Water Absorption		Every material	PMD 10.18	CML 3.13	
	TFVsoaked & TFV dry			PMD 10.18	CML 2.7	
	Mix Requirements		Marshall Stability	Every mixing	PMD 10.18	CML 3.18
			Marshall Flows		PMD 10.18	CML 3.18
			Air Voids		PMD 10.18	CML 3.18
			Voids in Mineral Aggregate : VMA		PMD 10.18	CML 3.18
			Indirect Tensile Strength		PMD 10.18	CML 3.21
			Imersion (Strength) Index		PMD 10.18	CML 3.21
			Bitumen Content		SSR 4201	CML 3.5
	Paving		Max. Temperature of Asphalt at Mixing	If any		
			Temperature for Compaction	Every truck	PMD 10.19	
Coring and Laboratory Tests			Daily			
Concrete	Material	Cement	Quality Guarantee, Chemical & Physical Analysis	Every material	SSR 6402	
		Water	Chemical Analysis	Every material		
		Admixture	Quality Guarantee, Chemical Analysis	Every material		
		Fine Aggregate	Bulk Specific Gravity Dry	Every material	SSR 6402	
			Sieve Gradation, Finesse Modulus		SSR 6402	
			Clay and Friable Particles		SSR 6402	
		Coarse Aggregates	Bulk Specific Gravity Dry	Every material	SSR 6402	
			Flakiness Index		SSR 6402	CNL 2.4
			Sieve Gradation			
	Sodium Sulfate Soundness		SSR 6404			
	Mixing Test		Compressive Strength at 7 days & 28 days	Every mixing	SSR 6404	
			Flexure Strength at 7 days & 28 days			
			Consistency for RCCP (Marshall test. Etc.)			
	Casting		Slump (Concrete)	Daily	SSR 6404	CML 2.11
			Concrete Temperature before Casting	Daily		
	Strength		Compressive Strength at 7 days & 28 days	Daily or >50m ³		
	Re-bar	Material		Quality Certificate	Each lot	

2-2-4-6 Procurement Plan

(1) Procurement of Construction Equipment and Materials

The major construction materials procured under the Project are cement, asphalt, reinforcing bars, steel sheets and secondary concrete products.

- **Portland Cement**

There are several manufacturers of Portland cement, including good quality of Twiga cement, Mbeya cement, and Tanga cement. It is confirmed that agency of Mbeya cement and Tanga cement are stationed in Iringa town and supply and quality of cement will be no problem.

- **Ready-mixed Concrete**

There is no local producer of fresh concrete near the Project site. Therefore, it is necessary to mobilize and set up a concrete mixing plant. In the case of small quantities, manual mixing may be conducted.

- **Reinforcing Bars**

The reinforcing bars are produced in Tanga and Dar es Salaam. The reinforcing bars imported from South Africa and Russia are also available in Dar es Salaam.

- **Secondary Concrete Products**

Flush kerb stones U-shaped ditches and concrete pipes, etc. are manufactured in Dar es Salaam from which they can be supplied to the Project. However, since the long transportation distance will cause high costs, it is desirable that the Contractor casts those products at sites.

- **Asphalt and Asphalt Emulsion**

The use of locally produced asphalt emulsion is best avoided because of problems of quality and its unstable supply. Therefore, it will be necessary to import asphalt and asphalt emulsion from South Africa via a local agent in Dar es Salaam.

- **Asphalt Mixing Plant, Concrete Mixing Plant and Crushing Plant**

Several local companies in Dar es Salaam have asphalt plants, concrete plants and crushing plants. It will be possible to hire those plants and install them at site. Those plants should be installed at the place where sufficiently far from camp yard, staff quarters and local residences to avoid noise and dust pollution.

- **Quarry and Borrow Pits**

No crushing plants are operating near Iringa and it is necessary to transport the aggregate from Dar es Salaam or Mbeya where about 450km away from the Project site, if purchased. There are not many suitable rock sources for aggregate of asphalt concrete,

concrete and base courses near the Project site. The boulders and partly outcropped rocks found at where 10km to east from the Project site and further 5km to north are very hard and costly to excavate and crush. The rock located in the Kitonga gorge and that in Ilura, which is an old quarry used for the TANZAM Highway construction and 15km away to west from the Project site, are insufficient in strength to meet the requirements specified in the Pavement Design Manual of Tanzania. The crushed stone used for the Wami River Small Scale Irrigation Development Project seems to be suitable for concrete and base courses but its access road is in bad condition. Fig.2-15 shows expected locations of quarries and borrow pits for the Project.

- Construction Equipment and Machinery

Several large construction companies in Dar es Salaam possess equipment for road construction. The construction equipment seems to be able to be hired but it may not be enough since the absolute number is insufficient.

Table 2-33 Procurement Sources of Construction Materials and Equipment

Item	Tanzania	Third Country	Japan
Cement	O		
Concrete	O		
Secondary Concrete Products	O		
Reinforcing Bars	O		
Bitumen	O		
Asphalt Mixing Plant	O	O	
Concrete Mixing Plant	O	O	
Crushing Plant	O	O	
Construction Machinery	O	O	
Other Machinery and Materials	O	O	

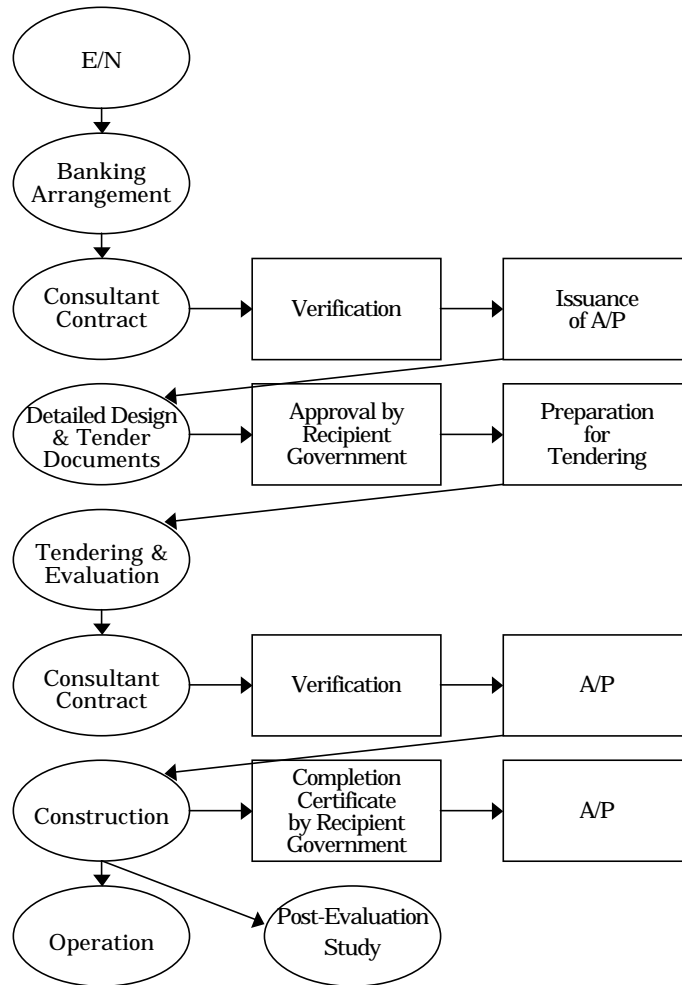


Fig. 2-15 Location Map of Quarry and Borrow Pit

2-2-4-7 Implementation Schedule

Following the signing of the E/N in regard to the consultancy work (assistance for the tender and supervision of the construction works) and the main work, the Consultant will immediately conclude a consultancy contract with the MOW and will officially commence the Project as a grant aid project of the Government of Japan. To assist the tender to be held by the Government of Tanzania, the Consultant will provide assistance for a series of tender-related work, i.e. pre-qualification, tender, selection of the Contractor and signing of the agreement for the construction work, etc. The Contractor will then conclude the construction contract with the Government of Tanzania. Following approval of the contents of the construction works by the Government of Japan, the Contractor will commence the work on receiving the relevant notice to proceed by the Consultant.

Assuming the implementation of the Project under the grant aid scheme of the Government of Japan, the Project will be implemented in accordance with the processes described in Fig. 2-16.



Note (1)E/N : Exchange of Note
 (2)A/P : Authorization to pay

Fig. 2-16 Project Implementation Processes Under Grant Aid Scheme

The Project is divided into the following three stages for its actual implementation in line with the principles described in Section 2.3, Basic Design and in consideration of the urgency, size, contents and cost of the Project and the anticipated grant aid for the Project.

Stage 1: Detailed Design Stage

- Detailed design : 4.0 months

Stage 2-1: Tender and Pavement Construction of 2.5km

- Tender Process + Construction period : 4.0 months + 6.0 months

Stage 2-2: Pavement Construction of 7.5km

- Construction period : 7.0 months

As a result, the implementation schedule for the Project was established as shown in Table 2-34. The total implementation period was estimated to be approximately 21 months,

consisting of 4.0 months for the Detailed Design Stage, 10.0 months for the Term 1 Tender process and construction works, 7.0 months for the Term 2 construction works,

Table 2-34 Project Implementation Schedule

		1	2	3	4	5	6	7	8	9	10	11	12	
Detailed Design	Field Survey	[Bar]												
	Work in Japan	[Bar]												
	Report				[Bar]					Total 4 months				
Construction	Term 1	Tender Process	[Bar]											
		Preparation Works					[Bar]							
		Crushing Stone								[Bar]				
		Pavement Works									[Bar]			
		Drainage Works										[Bar]		
		Structure Works										[Bar]		
		Total 10 months												
		Term 2	Preparation Works	[Bar]										
	Crushing Stone		[Bar]											
	Pavement Works		[Bar]											
	Drainage Works		[Bar]											
	Miscellaneous Works							[Bar]						
	Finishing Work								[Bar]					
Total 7 months														
Total		17 months												

2-3 Obligations of Recipient Country

The Government of Tanzania will undertake the following work for the implementation of the Project.

- 1) To provide data and information required for the implementation of the Project.
- 2) To secure the necessary road sites, if any.
- 3) To relocate or remove utility facilities which hamper the road work, if any.
- 4) To ensure the speedy customs clearance of the equipment procured out side Tanzania
- 5) To exempt the equipment, etc. procured in accordance with certified contracts and Japanese nationals working for the Project from customs duty, VAT, inland taxes and levies.
- 6) To provide all conveniences for persons providing services in accordance with certified contracts for their entry to and stay in Tanzania to perform their assigned duties
- 7) To open a project account for its banking services at the assignment foreign exchange bank in Japan based upon the Banking Arrangement (B/A).
- 8) To issue the Authorization for Payment (A/P).
- 9) To bear the costs of that work which is not included in the scope of work for the Japanese side
- 10) To provide soil and sand borrow areas for embankment and concrete work free of charge
- 11) To provide quarry sites where the crushing stone for base course, aggregate for concrete

and asphalt concrete can be collected free of charge

- 12) To provide a site to house the temporary facilities (camp yard and office building, stock yard, workshop, etc.)
- 13) To provide a plants yard to product the crushed stone, hot-mixed asphalt and concrete.
- 14) To provide abandonment places without environmental impact, wasting established asphalt concrete, concrete, etc. which were removed for replacement.
- 15) To provide security at the site and camp yard.

Cost estimation for the part of the Project that will be implemented by MOW is as follows:

Item	Expense (000 Tshs.)
House relocation expense for the temporary camp yard, plant yard, and abandonment place for construction debris etc. if any.	1,500
Expense for the monitoring of environmental impact, and necessary procedures	800
Total	2,300

2-4 Project Operation Plan

After completion of the Project, good maintenance work will keep the road and road facilities good condition, which item and frequency are as follow;

Category	Frequency	Place	Work Item
Routine Maintenance Work	2 times per year	Road Shoulder	Glass cutting and levering of road side
		Drainage Facilities	Cleaning catch basin and transverse culvert
Routine Investigation and Repair Work	1 time per year	Slope	Repair of eroded slope
		AC Pavement	Repair of pot hole and crack
		Concrete Pavement	Repair of space of joint and crack
Investigation and Repair Work	Properly	Catch Basin	Repair of broken grating
		Delineator Post	Repair of broken post
		Road Sign	Repair of broken sign
		Lane Marking	Re-paint

The additional maintenance cost for the concrete pavement in a year requires amounts to 500,000Tshs. This amount is equivalent to 0.14% of total budget for maintenance cost for road and bridges in TANZAM Highway in year 2001/2002.

Item	Contents	Expence (Tshs.)
Concrete Pavement (7.5km)	Repair of space of joint and crack	500,000