

2.2.2.2.3 Plan for traffic safety facilities

(1) Road marking

The road shall be marked with center line and margin line over the entire length. Continuous line (incl. sidewalk), dotted line and zebra stripes shall be used.

(2) Road lighting

If taking into consideration that the planned road runs through urban districts, the area around the intersections and the bus stops should be lighted for the sake of safety. It is, however, required to pay special attention to management and maintenance of street lights after installation since such facilities are managed by the local government concerned (Temeke city government for the planned road) in Tanzania.

(3) Guard rails

The road shall be provided with guard rails in the portions where it runs on embankment and the difference of elevation between it and roadside exceeds a dangerous limit.

(4) Safety fences, etc.

The following facilities for traffic safety shall be provided in the following places on the planned road as required:

Fall prevention fence: Before and after the bridge; Cut & Fill section having big difference of height where many pedestrians are expected, etc.

Guard post: In section before and after guard rail.

(5) Kilometer posts

No kilometer posts are found at present within the city of Dar es Salaam. Kilometer post shall, however, be installed at certain intervals for Kilwa road as a local trunk road also from the viewpoint of helpfulness for road maintenance and management.

2.2.2.2.4 Plan for bus terminals

(1) Facilities for bus service

1) Bus stops

It is required for planning the bus stops to take into consideration the local topography, connection with adjacent roads after widening to 4 lanes, estimated number of bus users, etc. The bus stops shall thus be planned at intervals of 500 m in principle also in consideration of expected location of bus stations based on the BRT program.

2) Bus terminals

There are 2 main bus terminals on the existing road: Rangitatu bus terminal near the terminal point of the existing road at about 11 km, and Mutongani bus terminal near the middle point at about 5 km. For Mutongani, it seems practical to locate the bus terminal along the planned road, judging from the status of development and existing houses in the adjacent area. On the other hand, a few candidate sites were proposed for the bus terminal at Rangitatu from Tanzanian side during the field survey. Therefore, the idea to locate the bus terminals along the planned road and the alternative idea to locate them according to the proposal shall be studied in the Project. Expected location of the bus stations based on the BRT program shall also be considered at the study.

(2) Plan for the Rangitatu bus terminal

There was a consultation with TANROADS during the field survey concerning the both bus terminals to discuss about the extent and contents of improvements to them incl. the question whether such improvements are necessary at all within the Project. In the consultation, provision of the bus terminals on another site was also proposed as an alternative to the basic idea to provide them within the site of Kilwa road.

According to TANROADS, any facility outside the road site is under control of the local government concerned (here: Temeke municipal council). Based on the results of discussion with TANROADS, a consultation was held among the Temeke municipal council, TANROADS and the investigation team, where 2 candidate sites near Rangitatu were presented by the Temeke municipal council as shown in the figure below. After ascertaining the local circumstances (houses, public facilities, etc.) of the both sites, solution for the preferred site was discussed also from the viewpoint of enhancement of social activities by the local residents and communities.

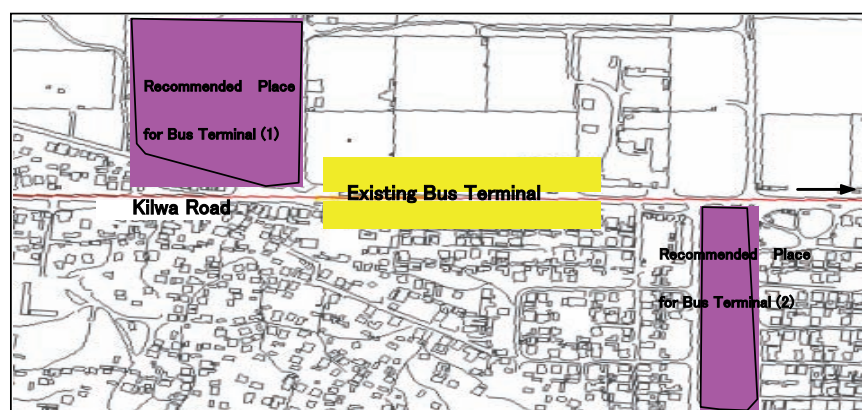


Figure 2.9 Candidate site for Rangitatu bus terminal

The following figure shows an image of bus terminal if constructed outside the road site:

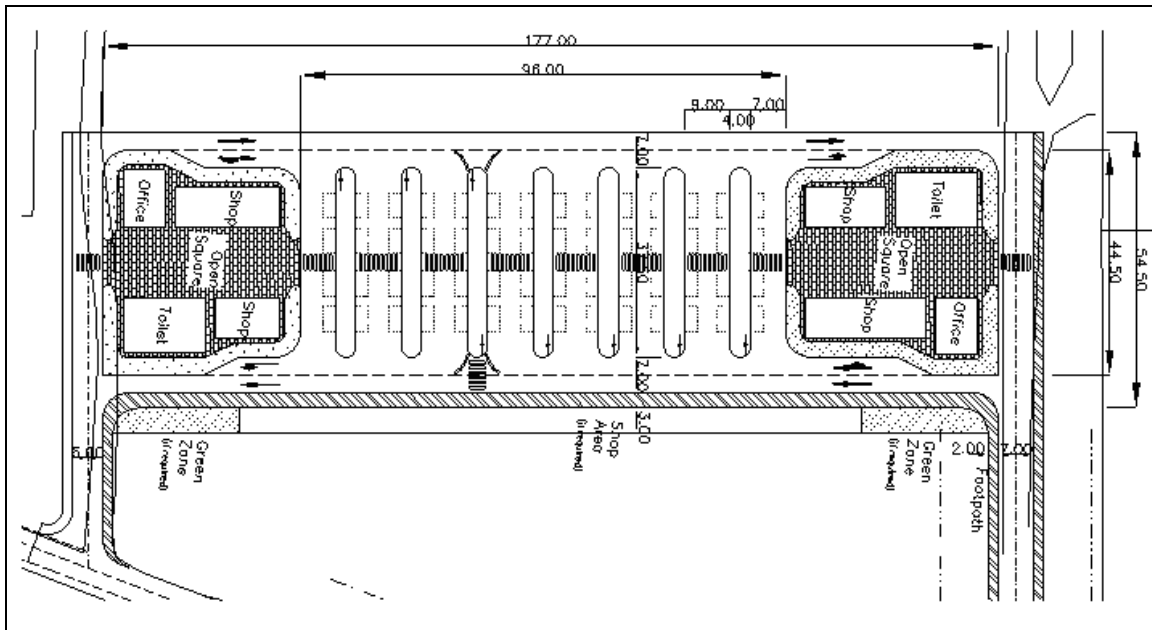


Figure 2.10 An image of bus terminal

2.2.3 Basic Design Drawings

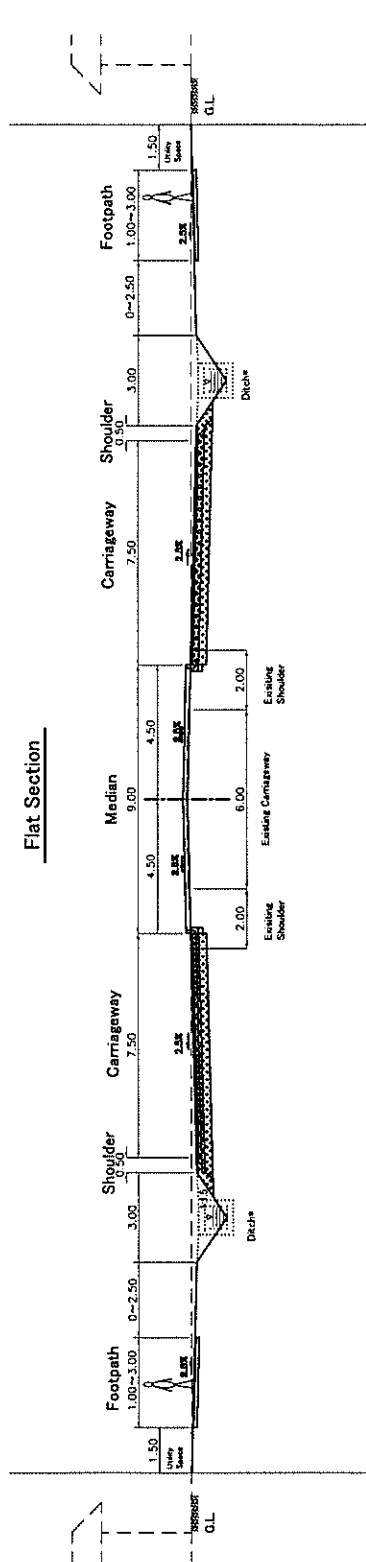
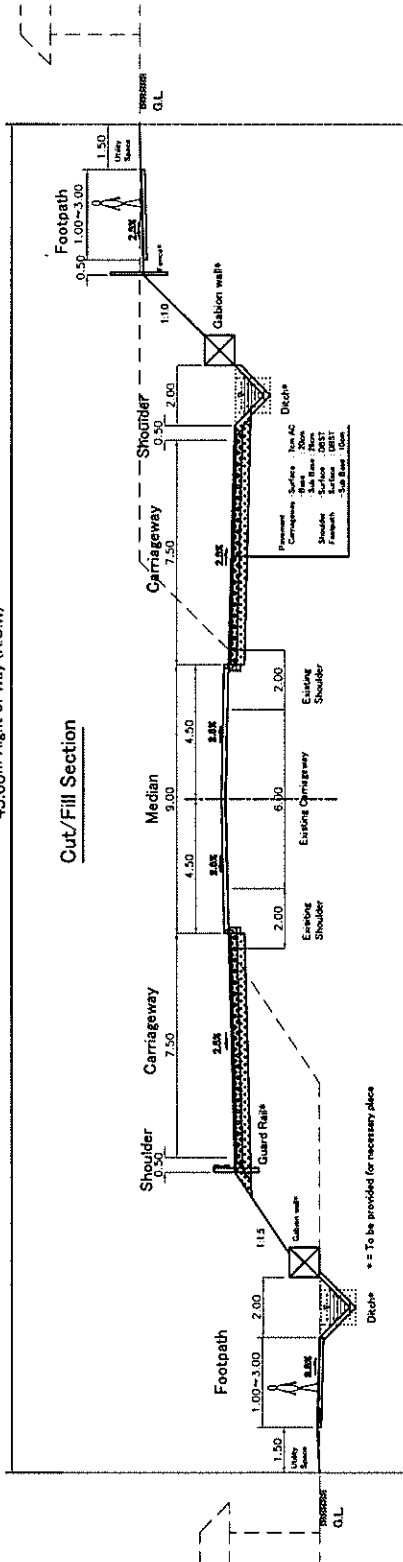
The basic design drawings prepared on the basis of the said basic plan are listed up below:

List of basic design drawings

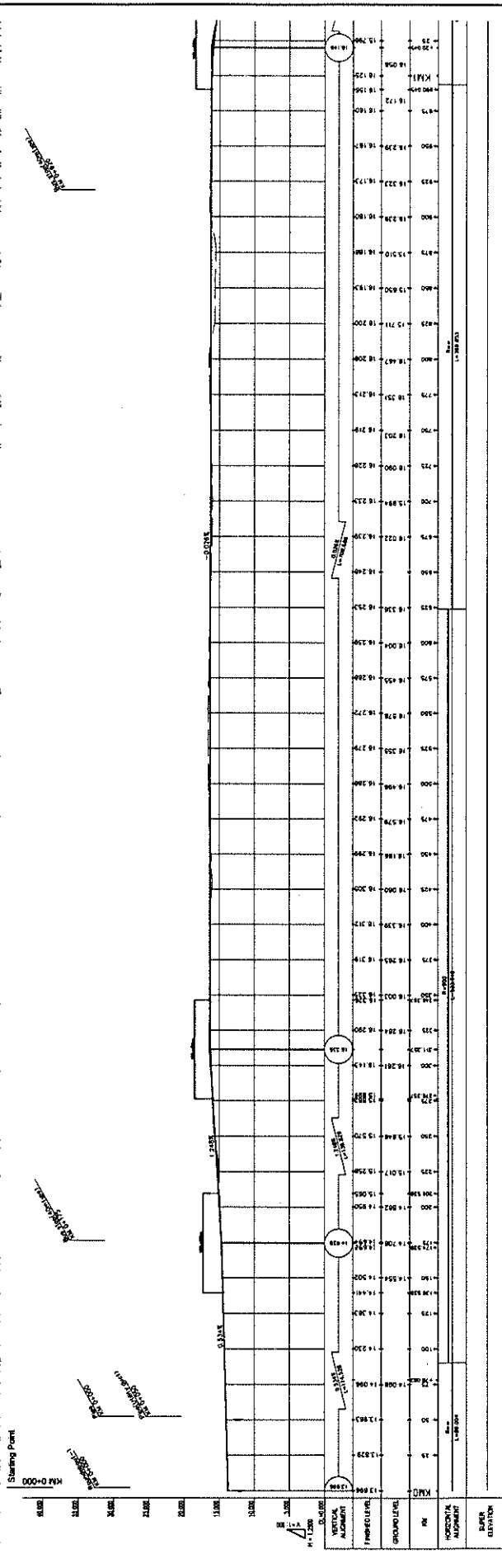
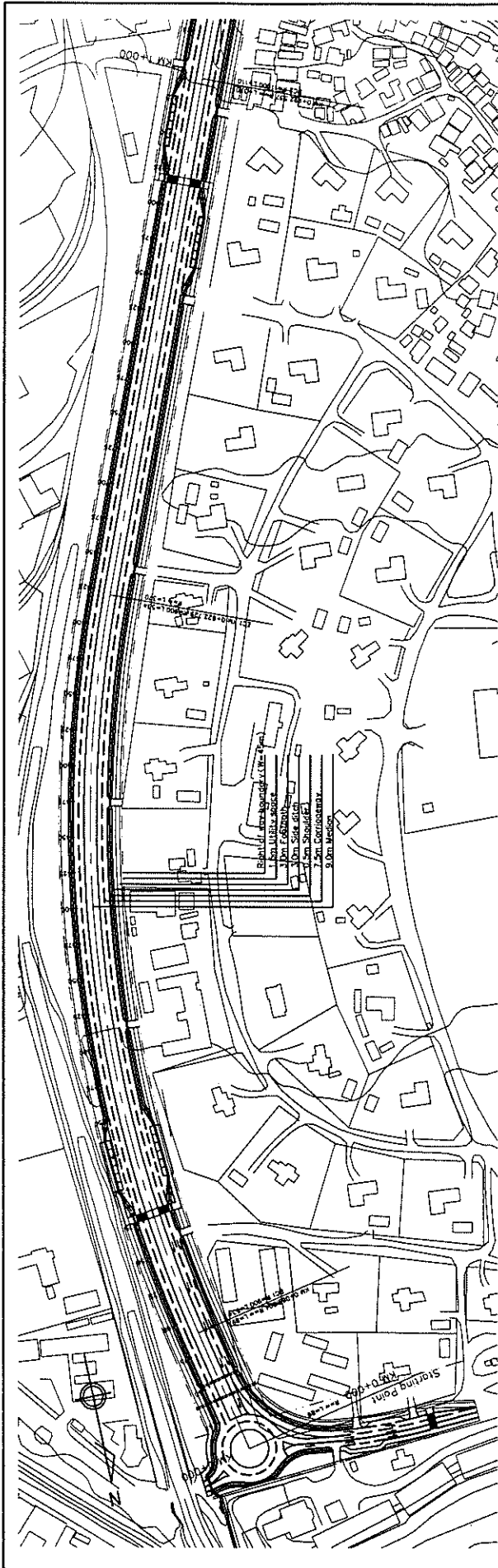
Dwg.-No.	Contents of the drawings	Number of sheets
A-1~B-12	Typical cross sections, plans and longitudinal sections	13
C-1~C-6	Typical drawings of structures for drainage traversing the road	6
D-1~D-7	Drawings of auxiliary facilities and safety facilities	7

TYPICAL CROSS SECTION

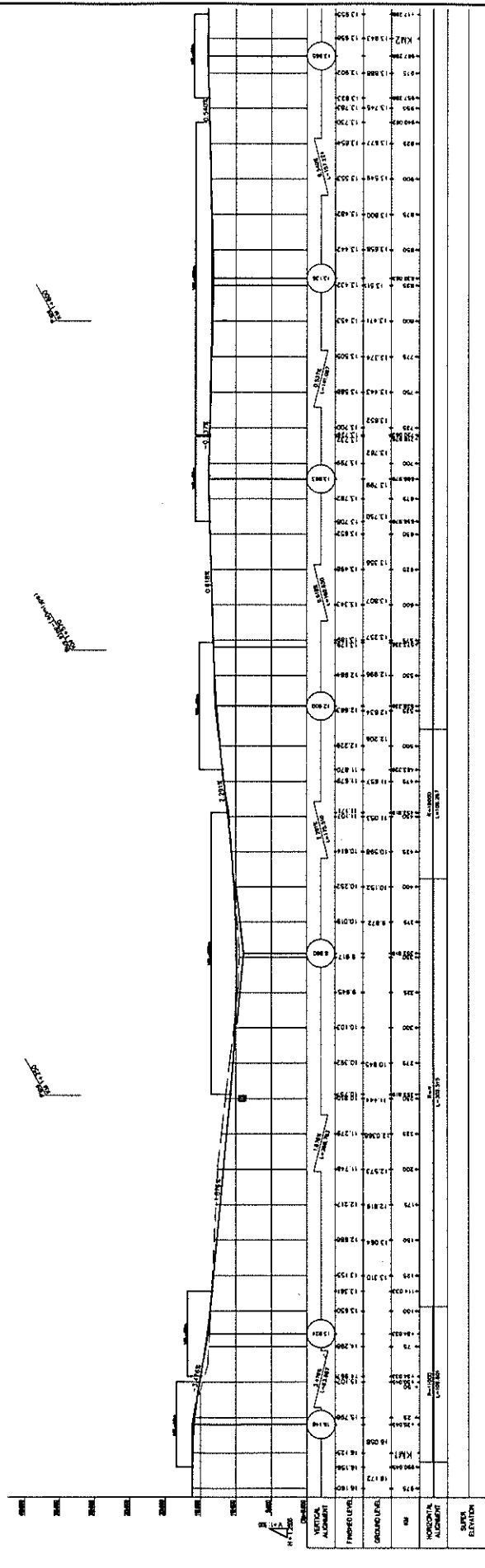
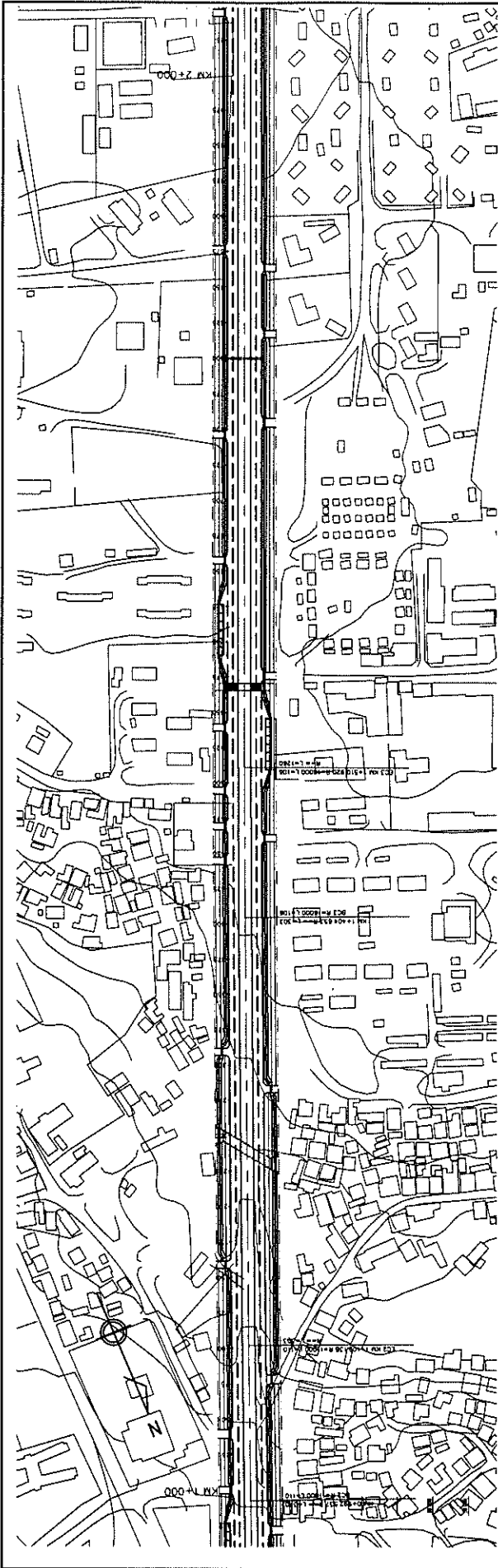
45.00m Right of Way (R.O.W)



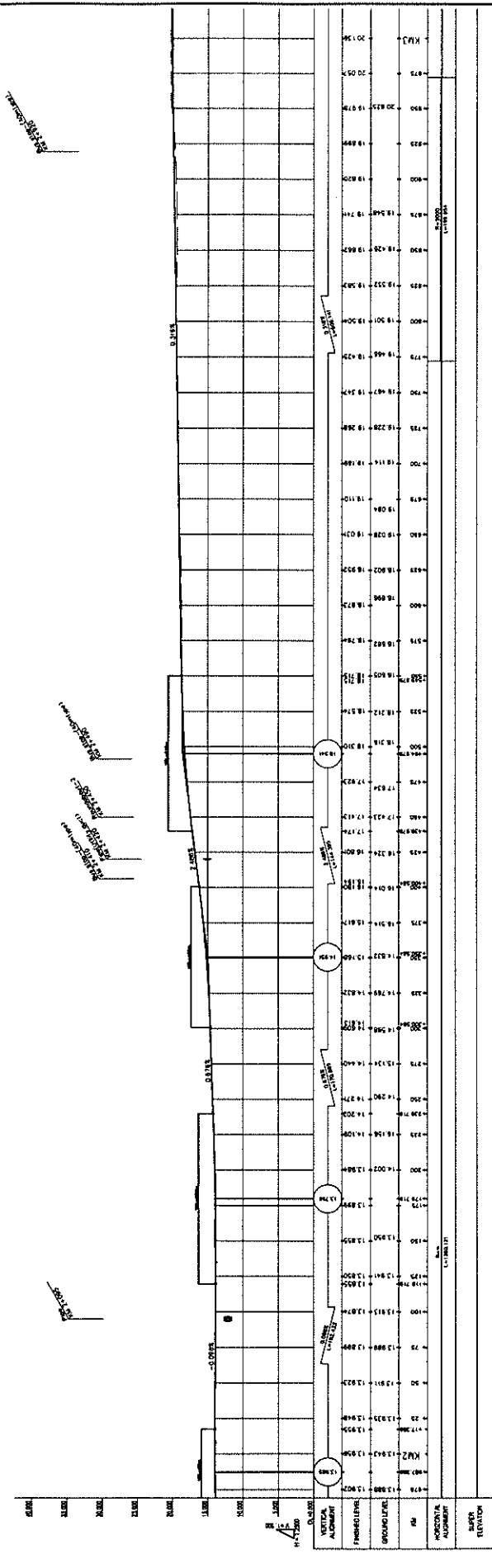
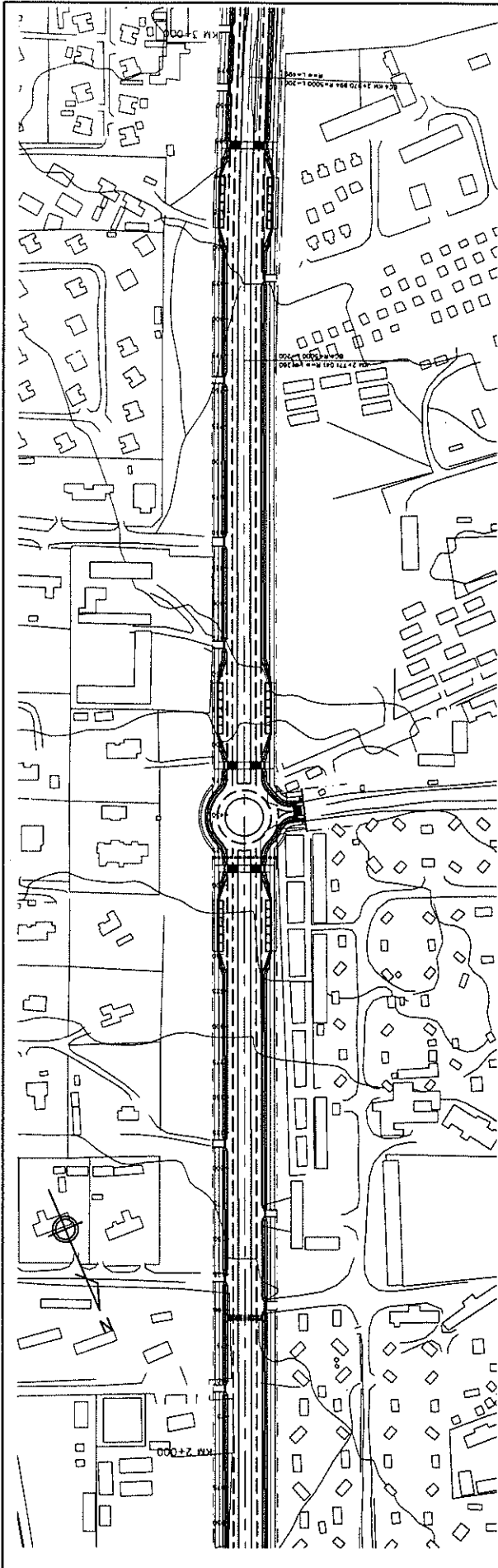
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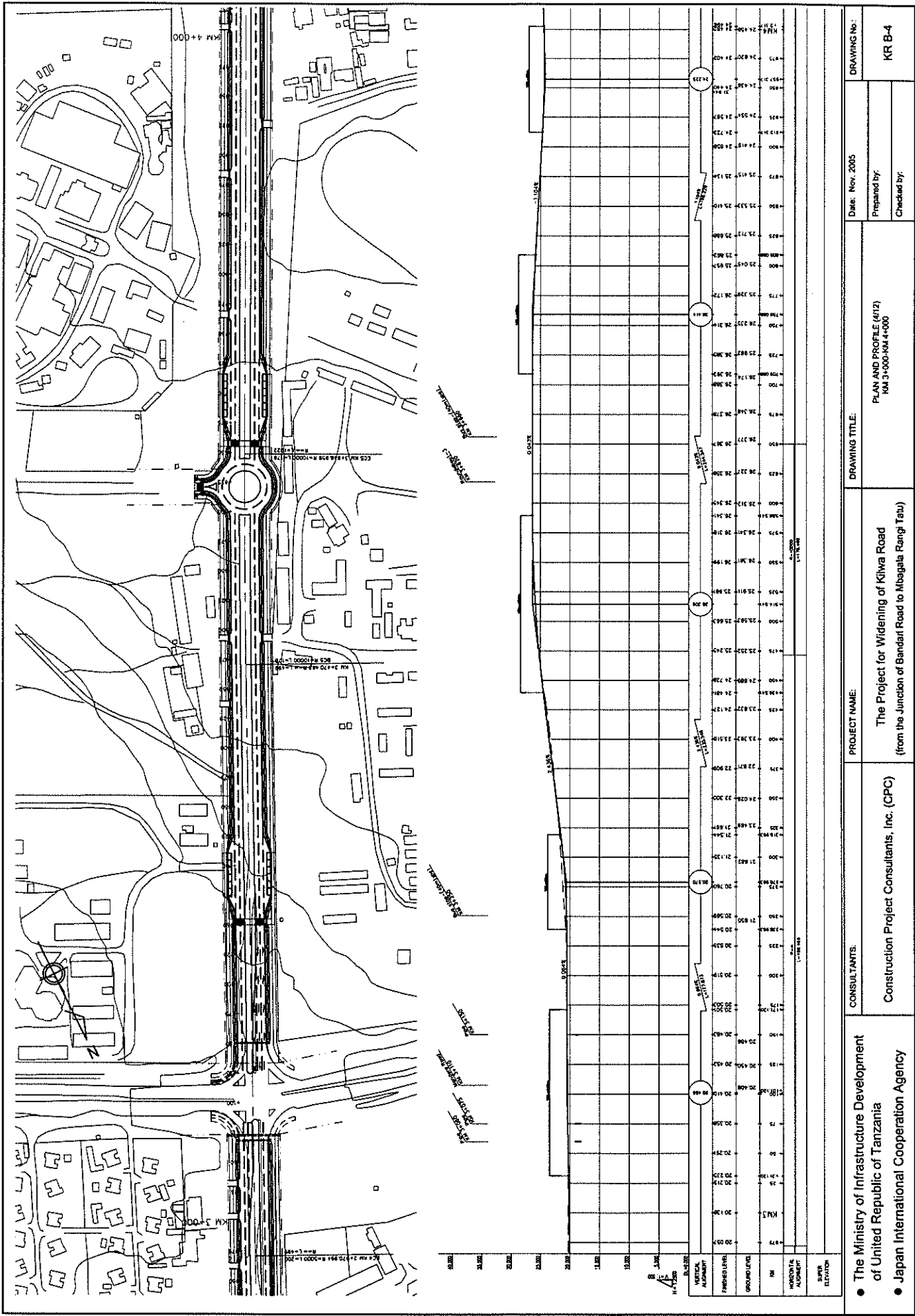
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				The Ministry of Infrastructure Development of United Republic of Tanzania ● Japan International Cooperation Agency

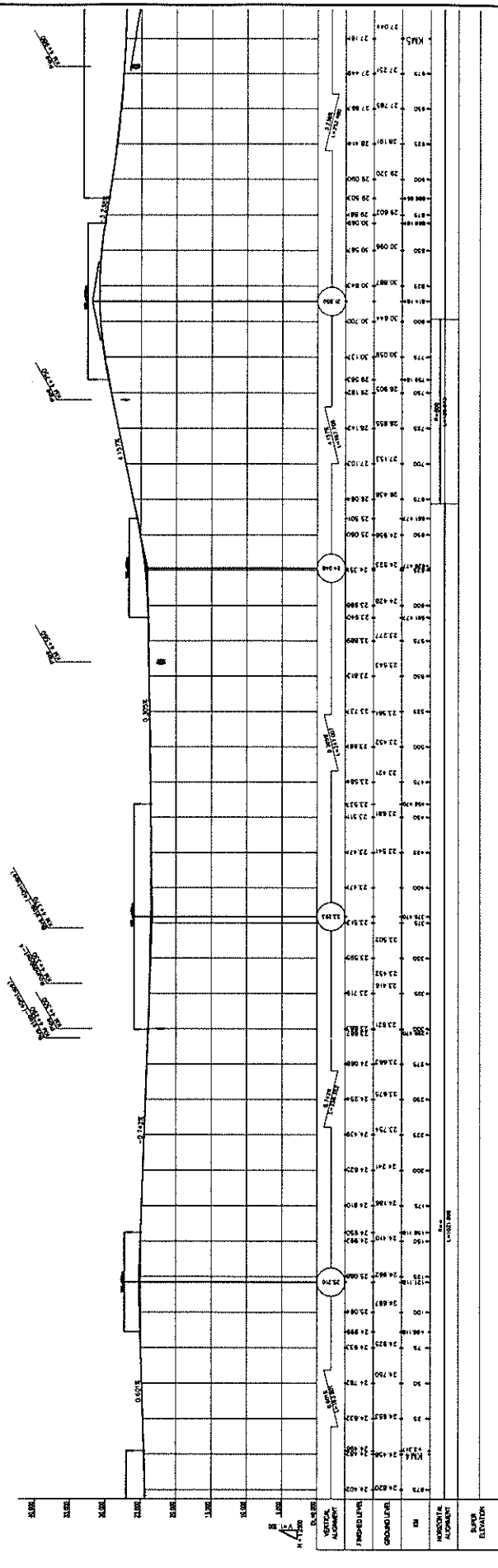
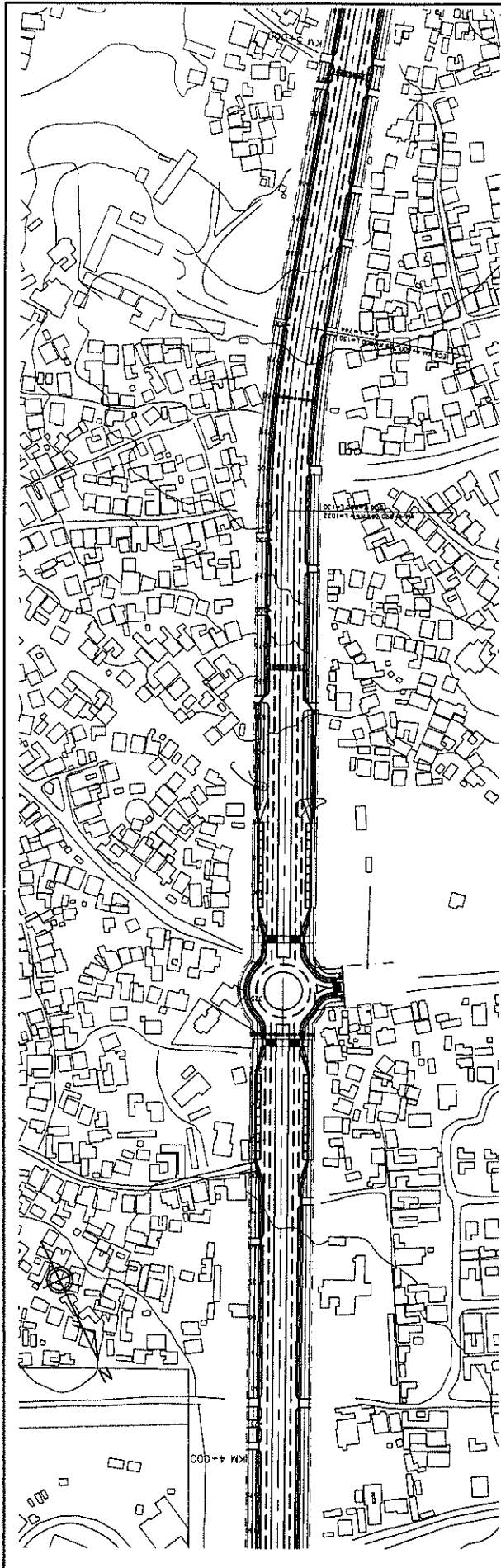


CONSULTANTS: The Ministry of Infrastructure Development of United Republic of Tanzania ● Japan International Cooperation Agency	PROJECT NAME: The Project for Widening of Kihwa Road (from the Junction of Bandani Road to Mbagala Rangit Tatu)	DRAWING TITLE: PLAN AND PROFILE (2/2) KM 1+000-KM 2+000	DRAWING No.: KR B-2
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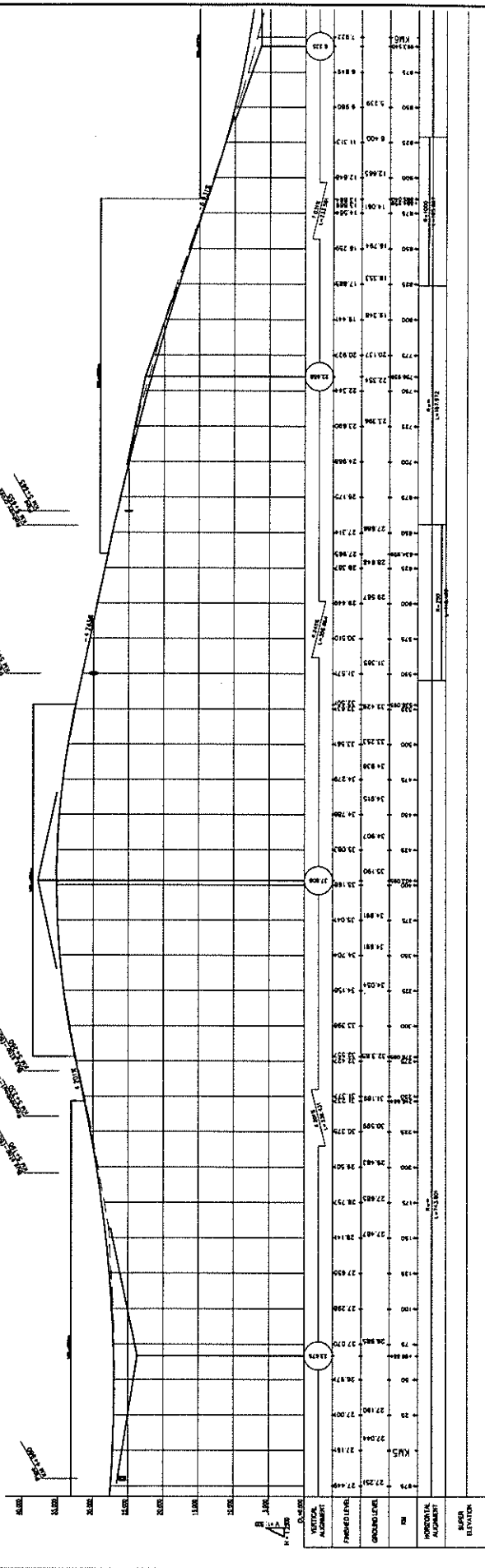
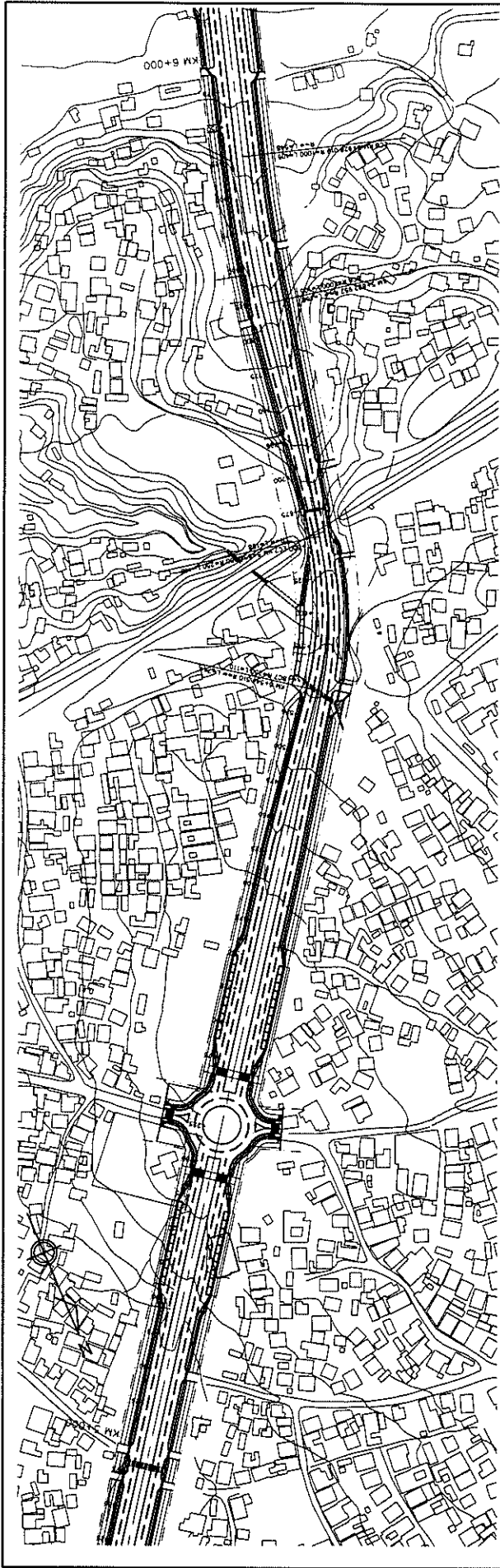


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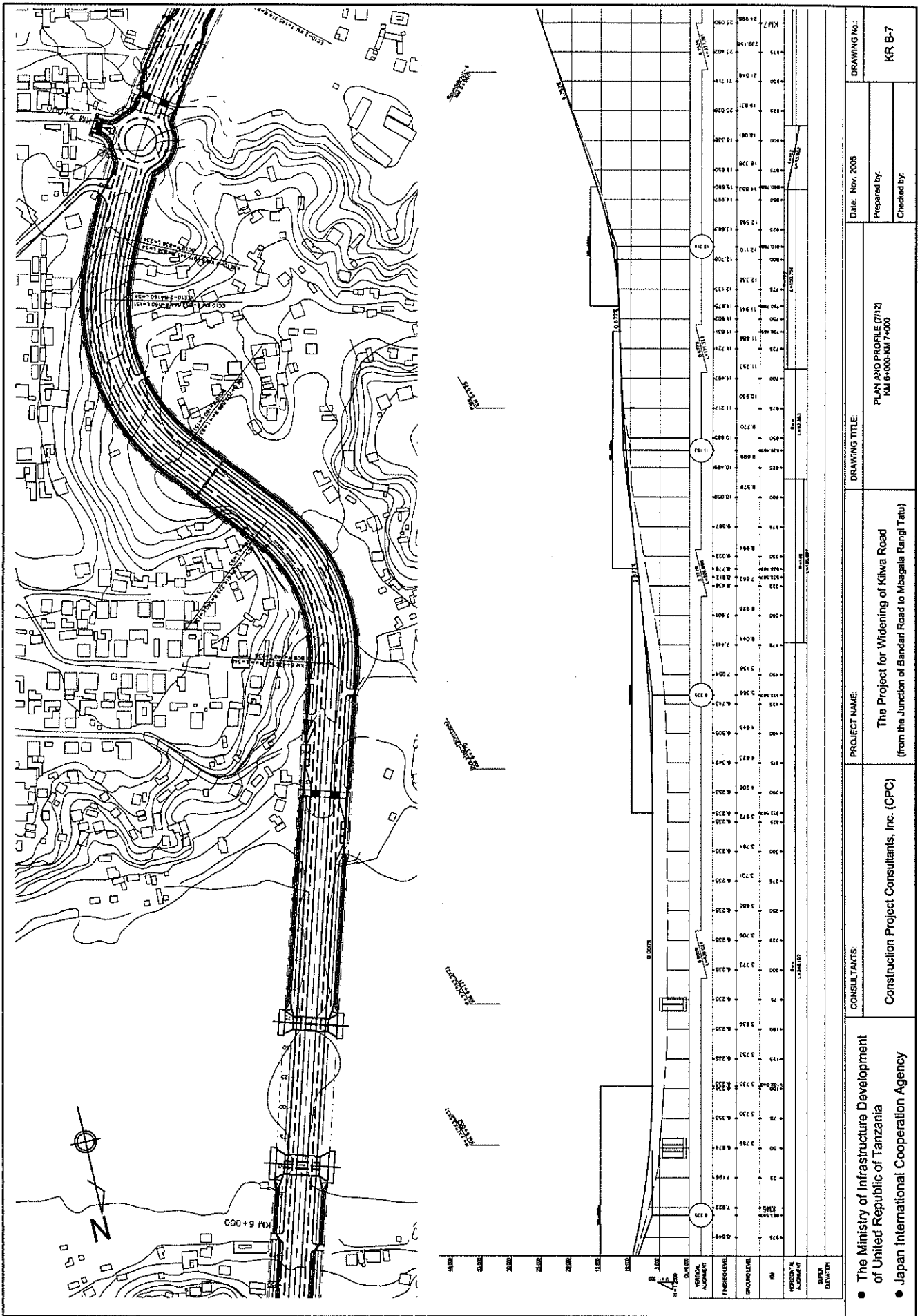


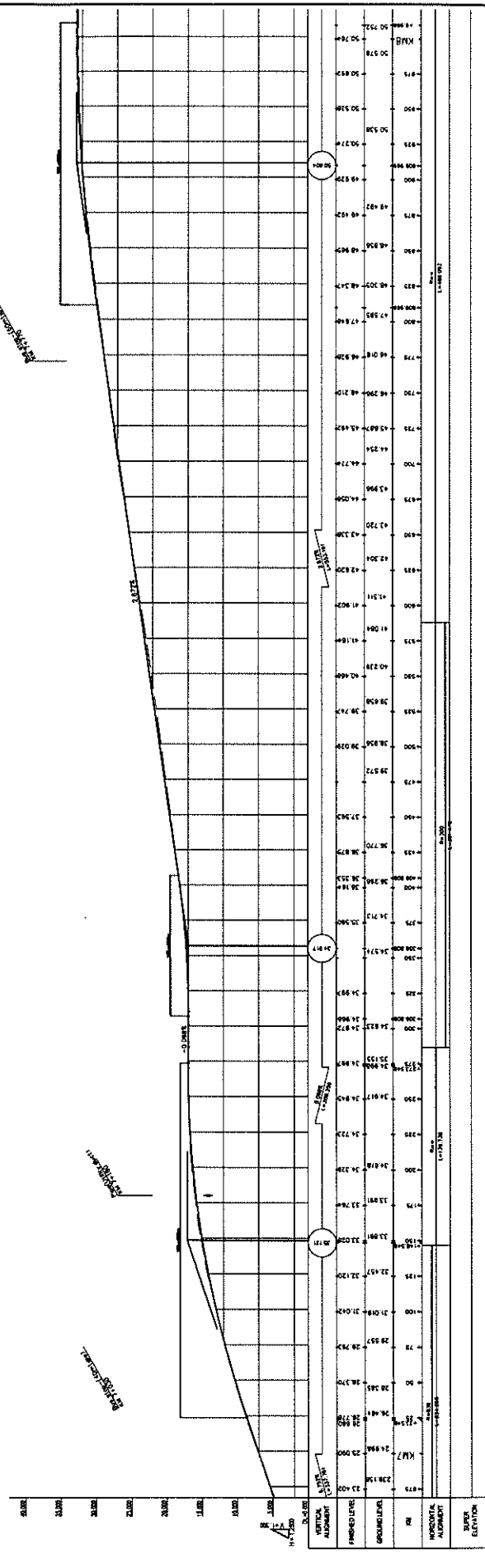
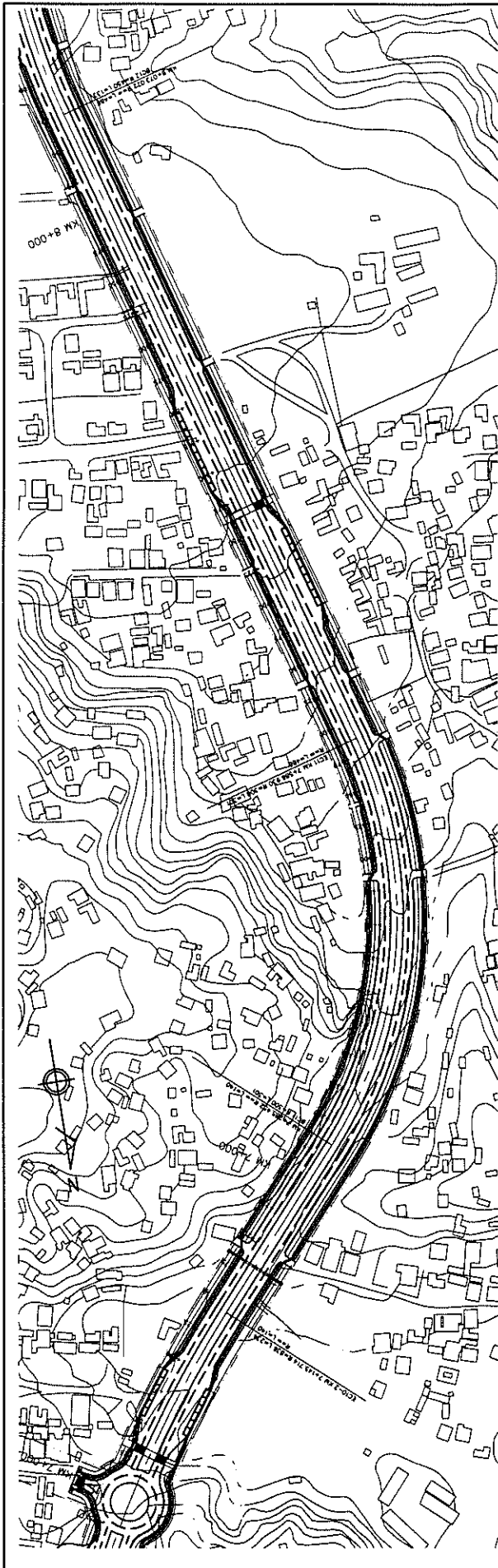


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The Ministry of Infrastructure Development of United Republic of Tanzania		Japanese International Cooperation Agency		

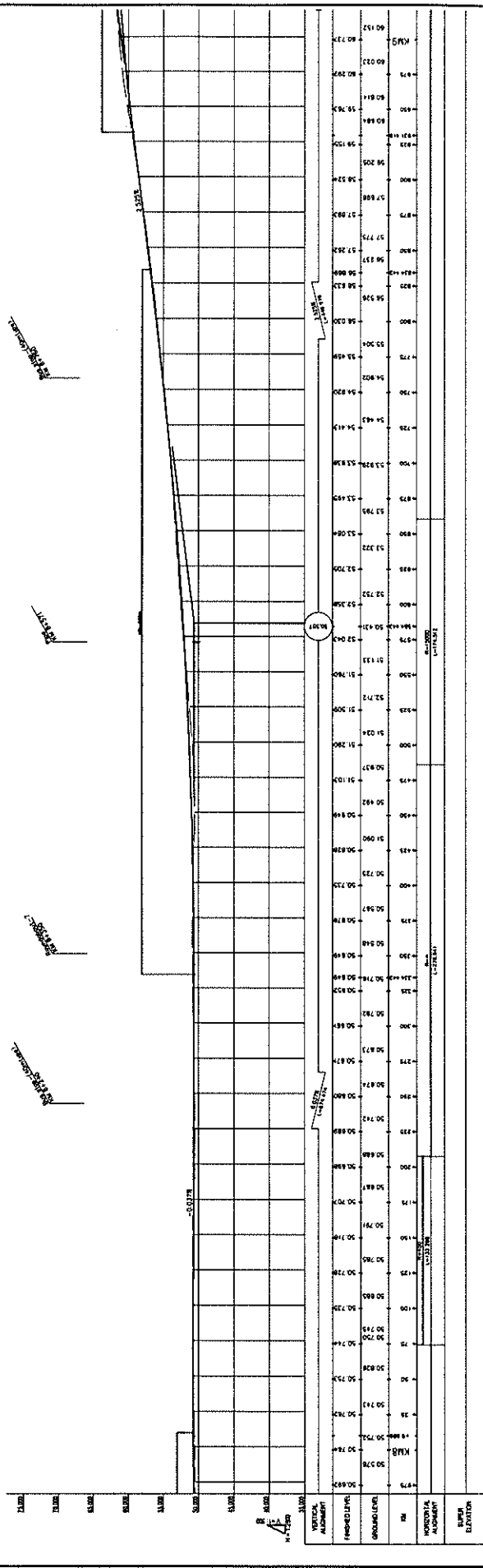
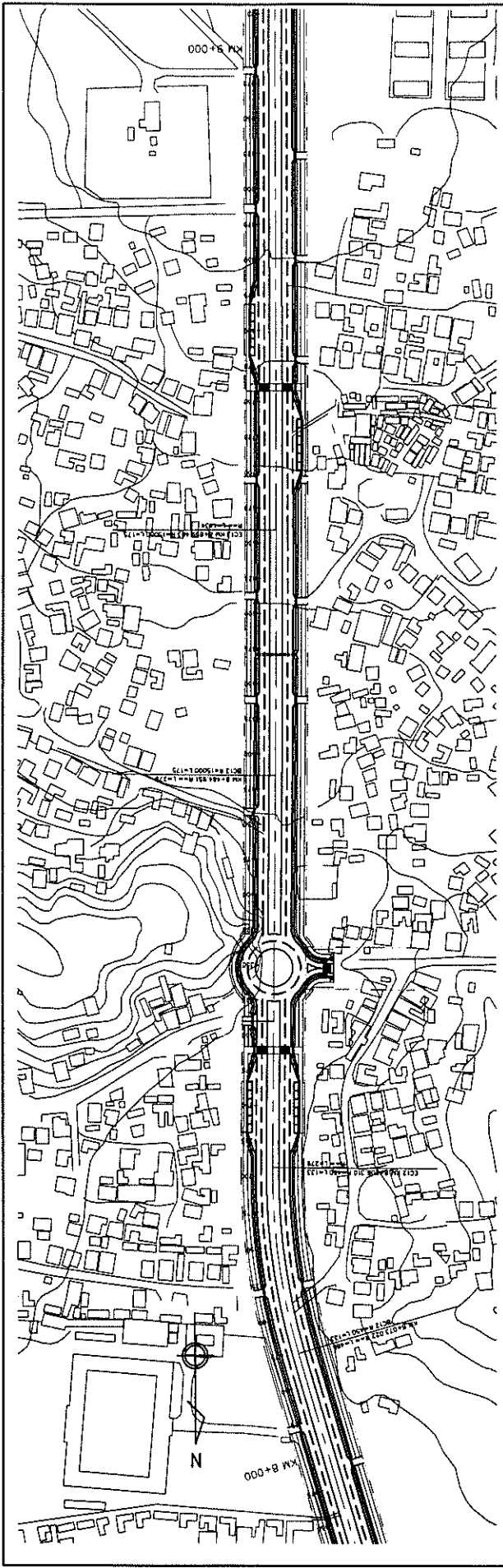


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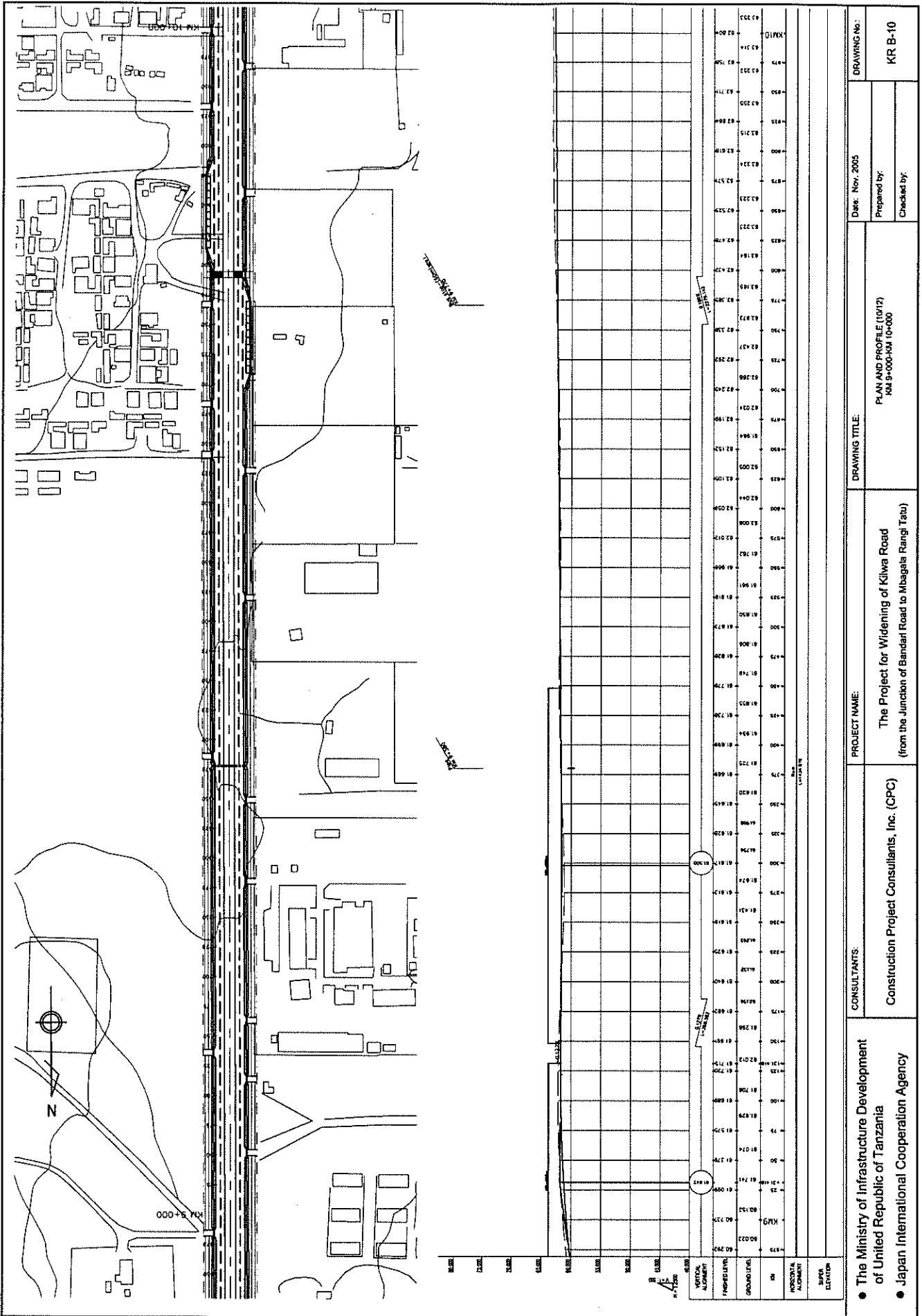


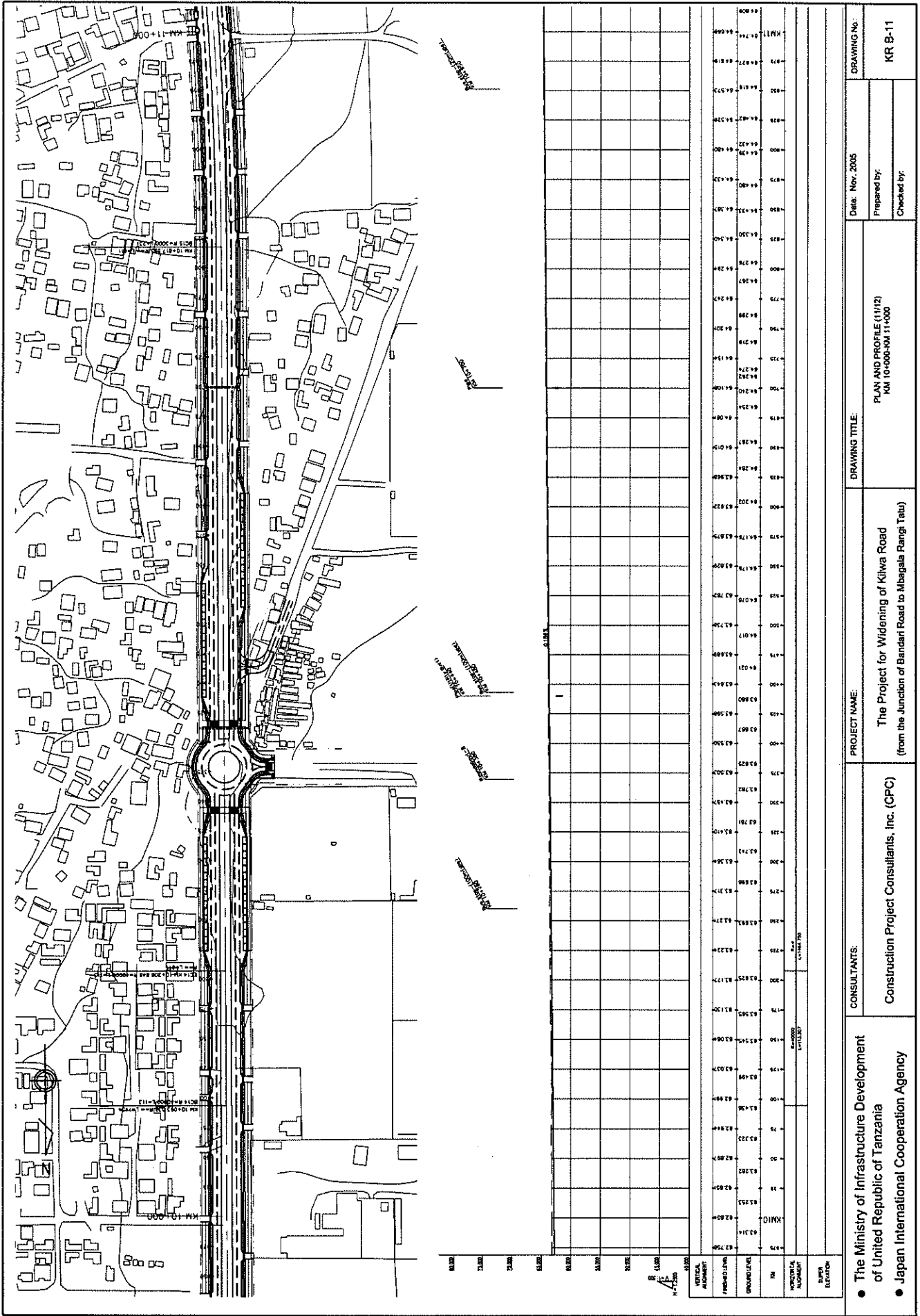


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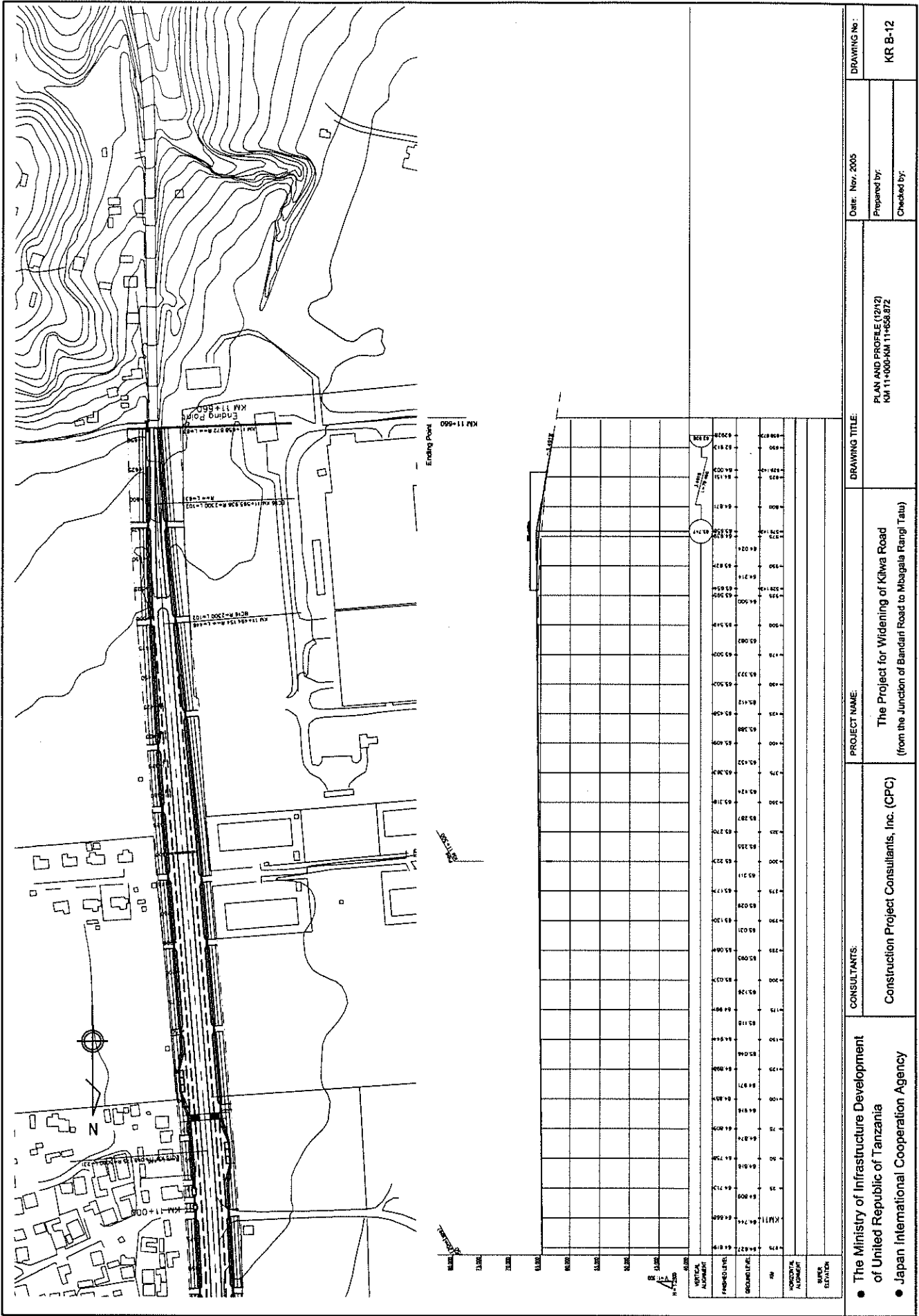


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Japan International Cooperation Agency			Japan International Cooperation Agency			Japan International Cooperation Agency			Japan International Cooperation Agency		





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CONSULTANTS: Construction Project Consultants, Inc. (CPC)		PROJECT NAME: The Project for Widening of Kiwa Road (from the Junction of Bandari Road to Mbagala Fanga Tatu)		DRAWING TITLE: PLAN AND PROFILE (2/42) KM 11+000-KM 11+650.872		Date: Nov. 2005 Prepared by: Checked by:		DRAWING No.: KR B-12		
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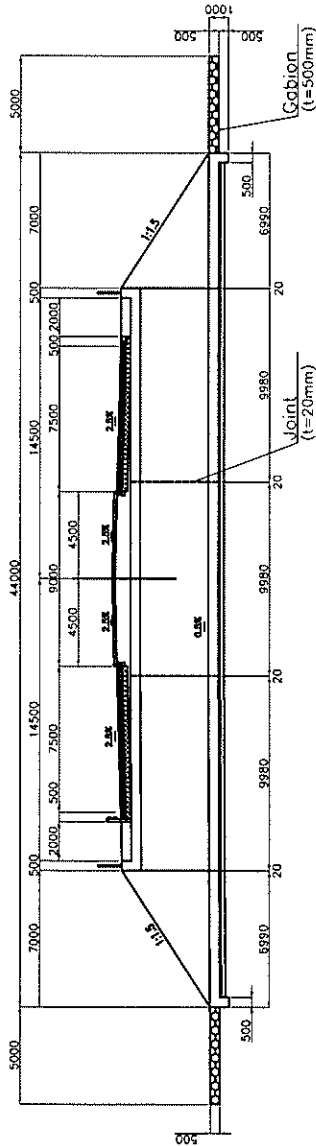
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15	5.675	Pipe	1.50	1	30	skew						
16	6.052	Box	3.5x5.0	3	34		5.710	12.5	1.400	ARMCO		
17	6.171	Box	3.5x5.0	2	35		6.200	8.6	7.25x1.5	Bridge	1	
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19	7.180	Pipe	0.90	1	31	Utility duct	7.450	16.0	0.45	Pipe	1	
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21	9.380	Pipe	0.90	1	31		9.380	9.7	0.60	Pipe	1	
22	10.440	Pipe	0.90	1	30	Utility duct						
23	10.700	Pipe	0.90	1	30		10.700	11.8	0.60	Pipe	1	
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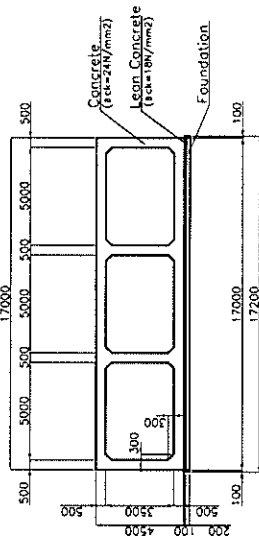
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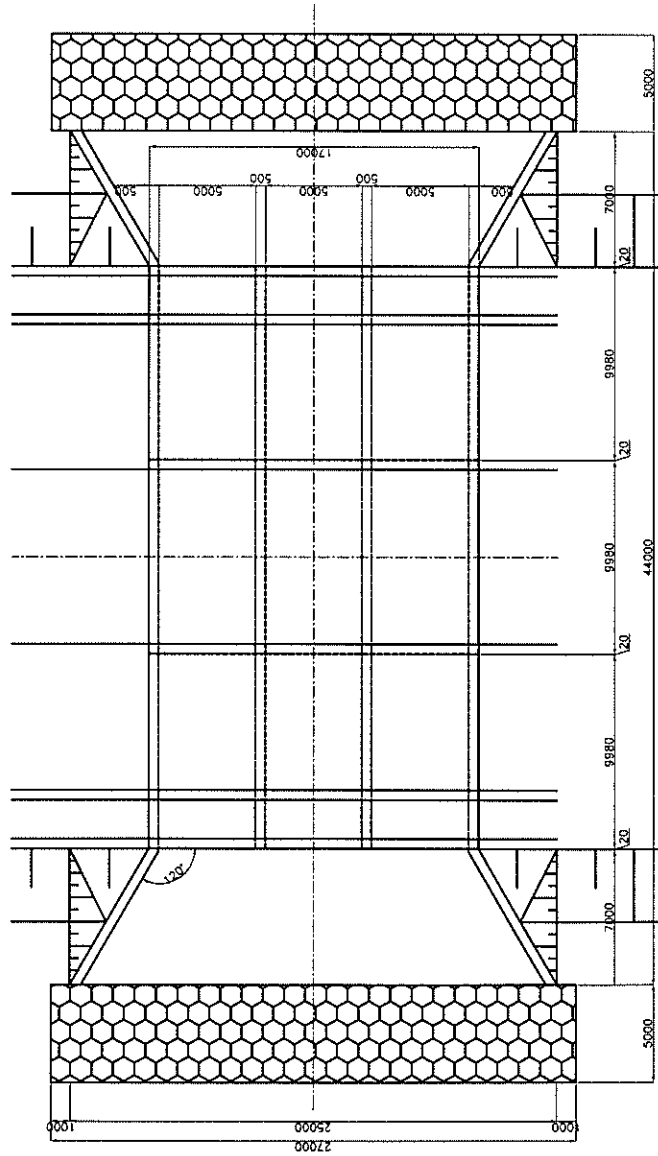
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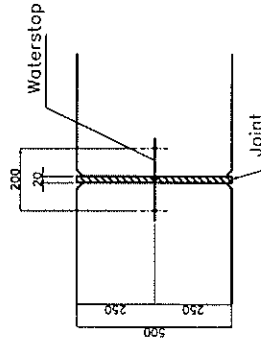
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PLAN



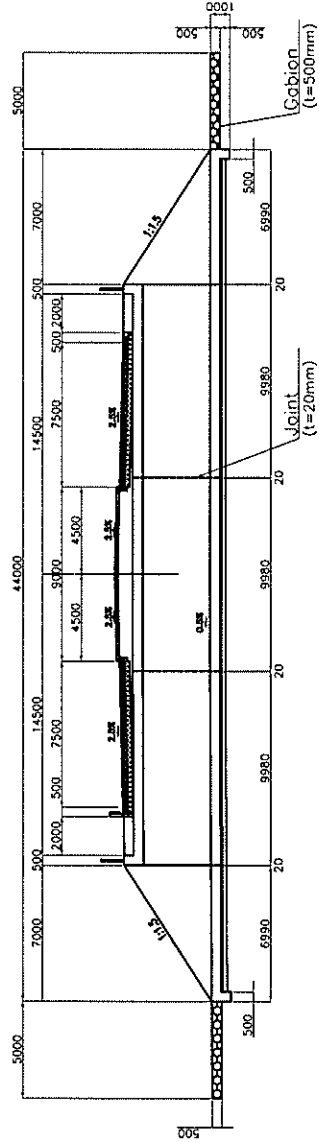
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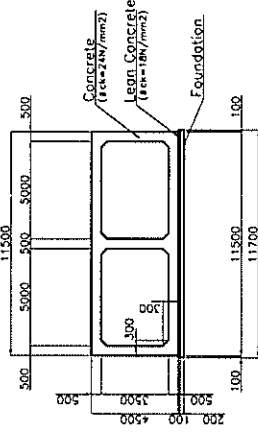
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	<p>Date:</p> <p>Prepared by:</p> <p>Checked by:</p>	<p>DRAWING No.:</p> <p>KR C-2</p>	

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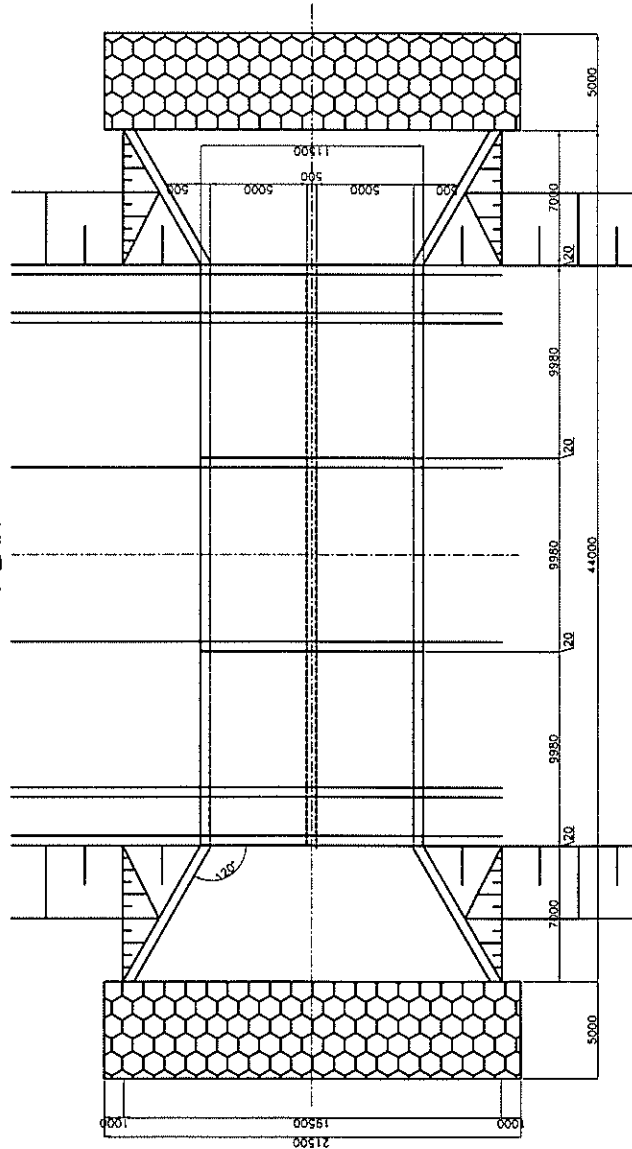
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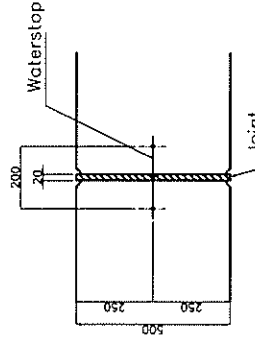
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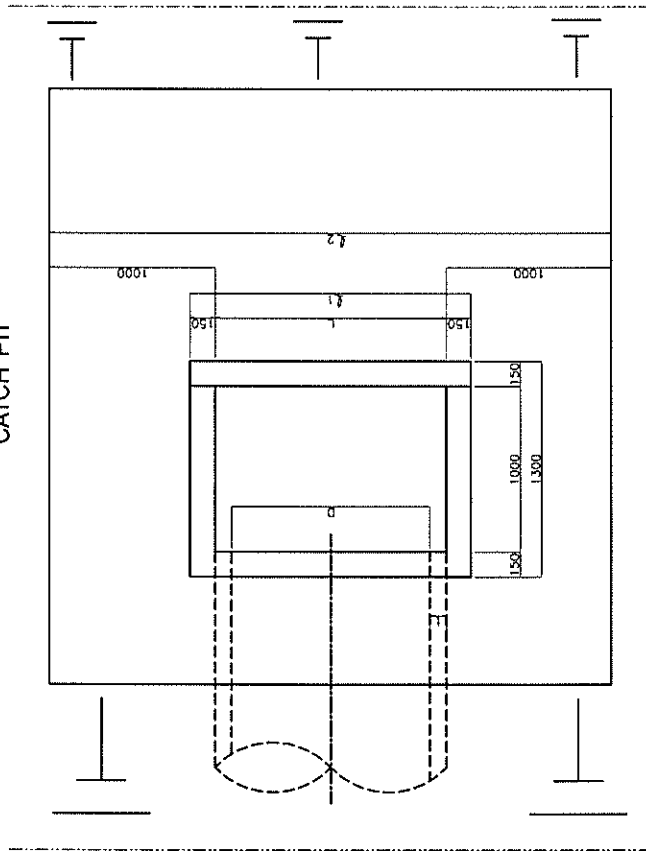


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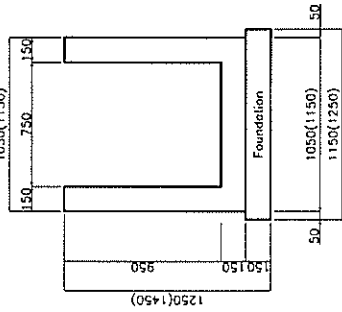
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CATCH PIT

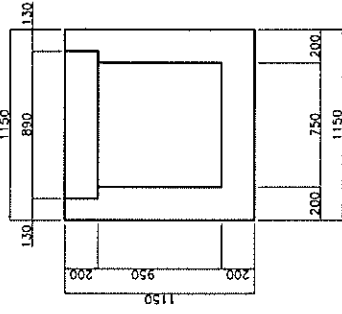


D	l	H	L	£ 1	£ 2
φ 300	40	300	500	800	1800
φ 600	70	600	800	1100	2800
φ 900	110	900	1100	1400	3100
φ 1200	140	1200	1400	1700	3400
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U Type Ditch

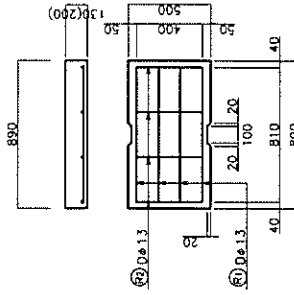
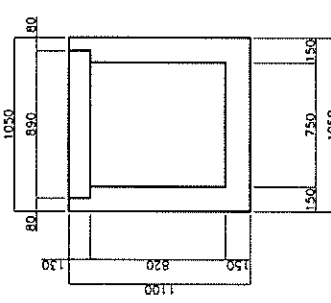


U Type Ditch (200mm Cover)



() = 200mm Type

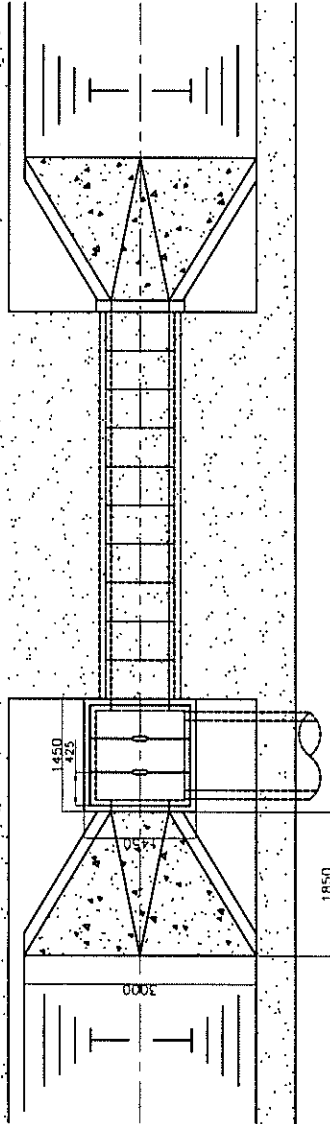
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<p>CONSULTANTS:</p> <ul style="list-style-type: none"> The Ministry of Infrastructure Development of United Republic of Tanzania Japan International Cooperation Agency 	<p>PROJECT NAME:</p> <p>The Project for Widening of Kliwa Road (from the Junction of Bandari Road to Mbaga Rangi Tatu)</p>	<p>DRAWING TITLE:</p> <p>CATCH PIT / U TYPE DITCH</p>	<p>DRAWING No.:</p> <p>KR C-4</p>
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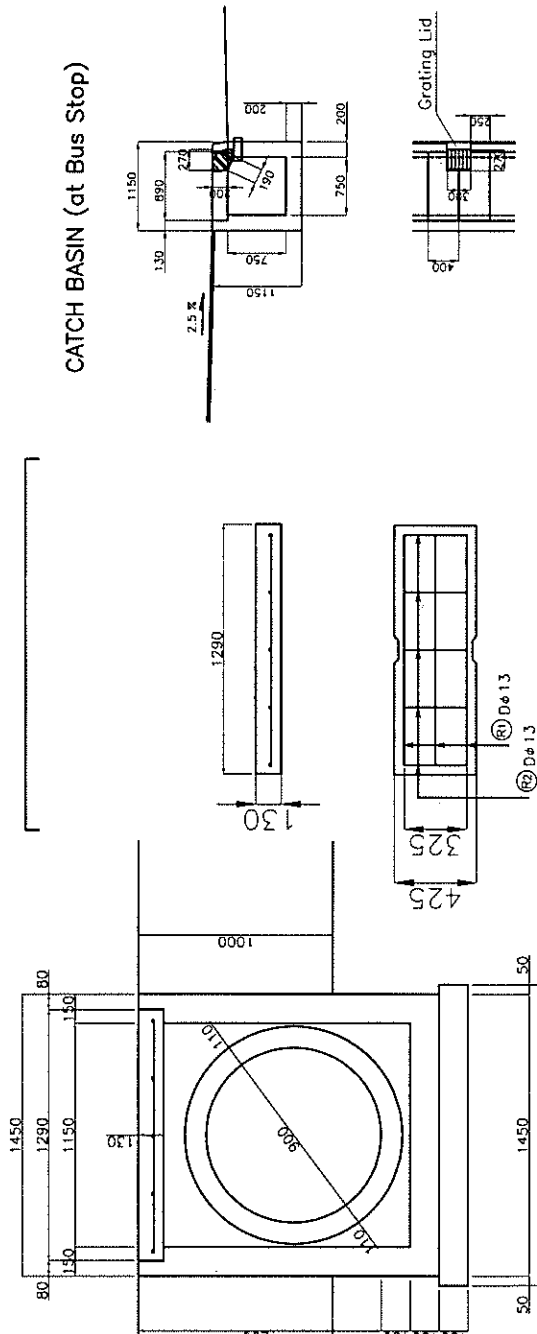
CATCH BASIN

Footpath

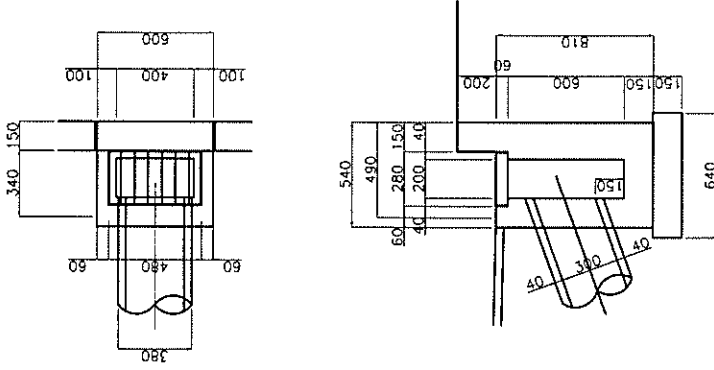


Carriageway

CATCH BASIN (at Bus Stop)

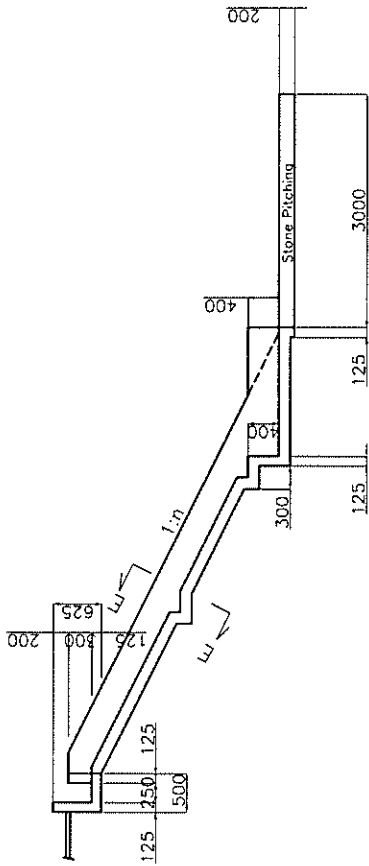


CATCH BASIN (at Superelevation)

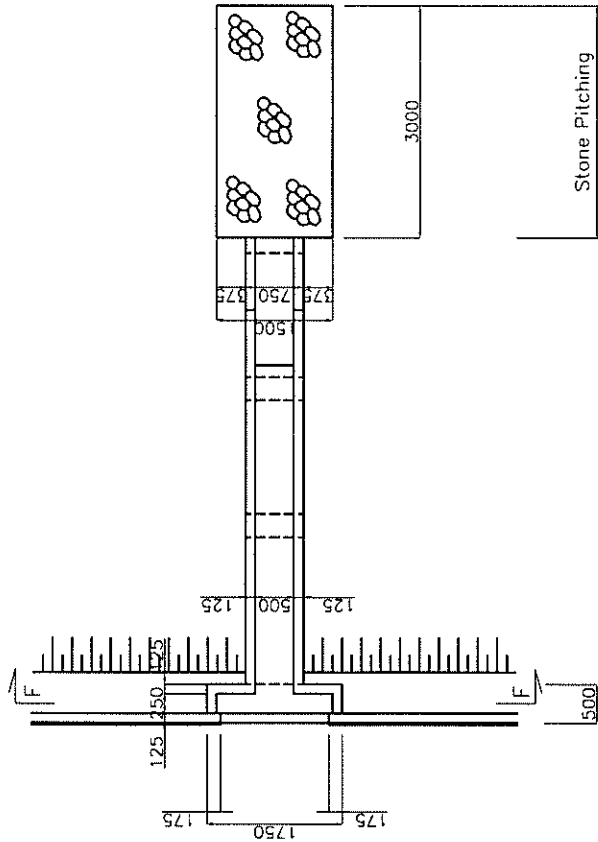


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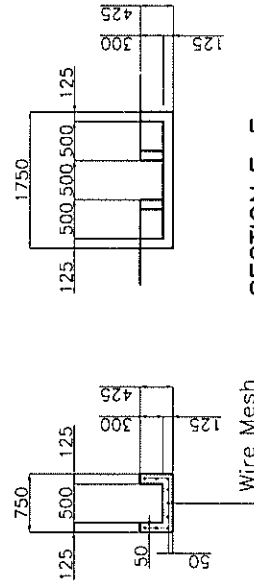
CHUTE DRAIN



SECTION C-C



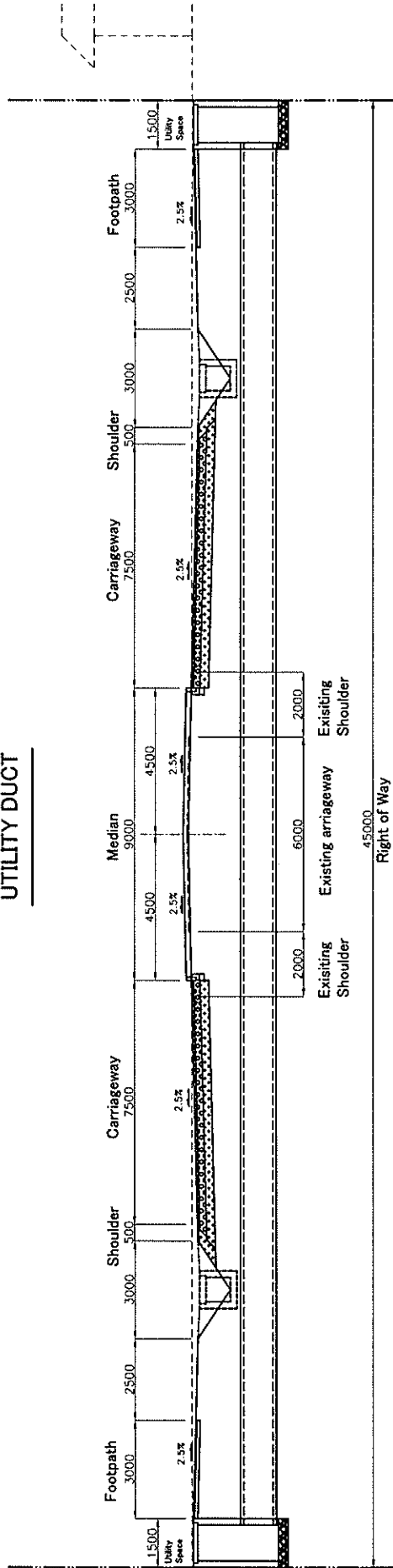
PLAN



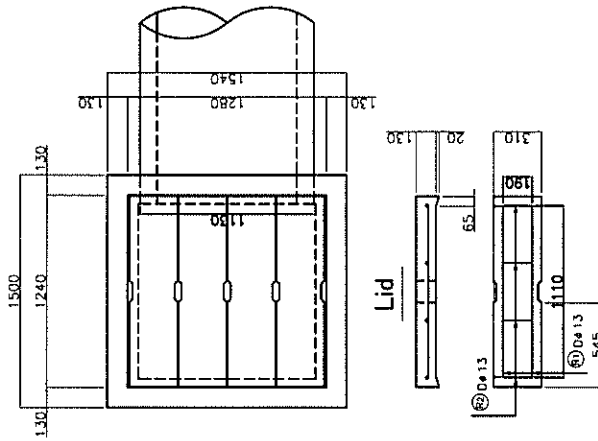
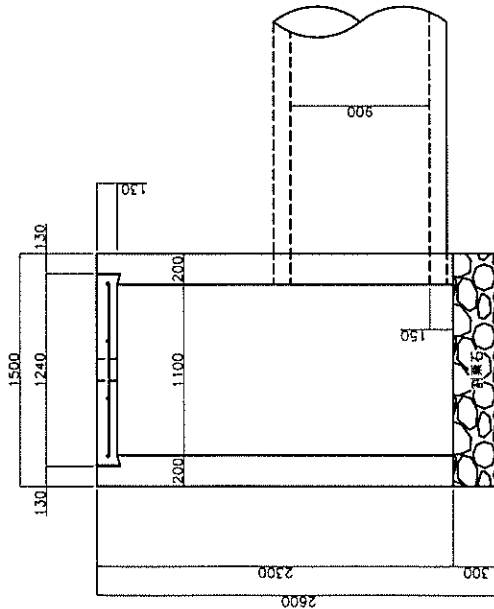
SECTION F-F

<p>CONSULTANTS: Construction Project Consultants, Inc. (CPC) The Ministry of Infrastructure Development of United Republic of Tanzania Japan International Cooperation Agency</p>	<p>PROJECT NAME: The Project for Widening of Kiwa Road (from the Junction of Bandari Road to Mbagala Rangi Tatu)</p>	<p>DRAWING TITLE: CHUTE DRAIN SCALE: AS SHOWN</p>		<p>Date:</p>	<p>DRAWING No.: KR C-6</p>
		<p>Prepared by:</p>	<p>Checked by:</p>		

UTILITY DUCT

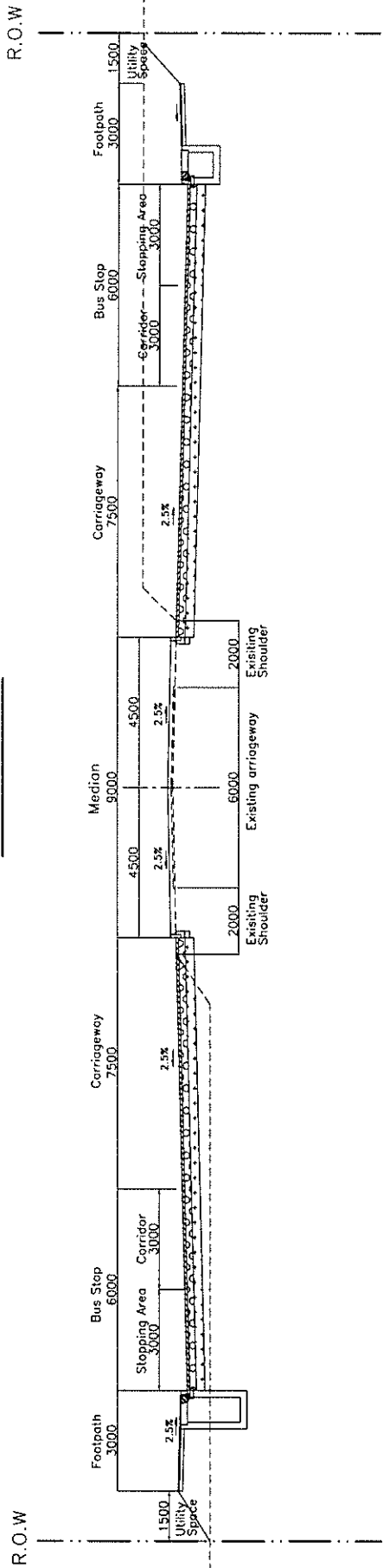


INFECTIOB BASIN

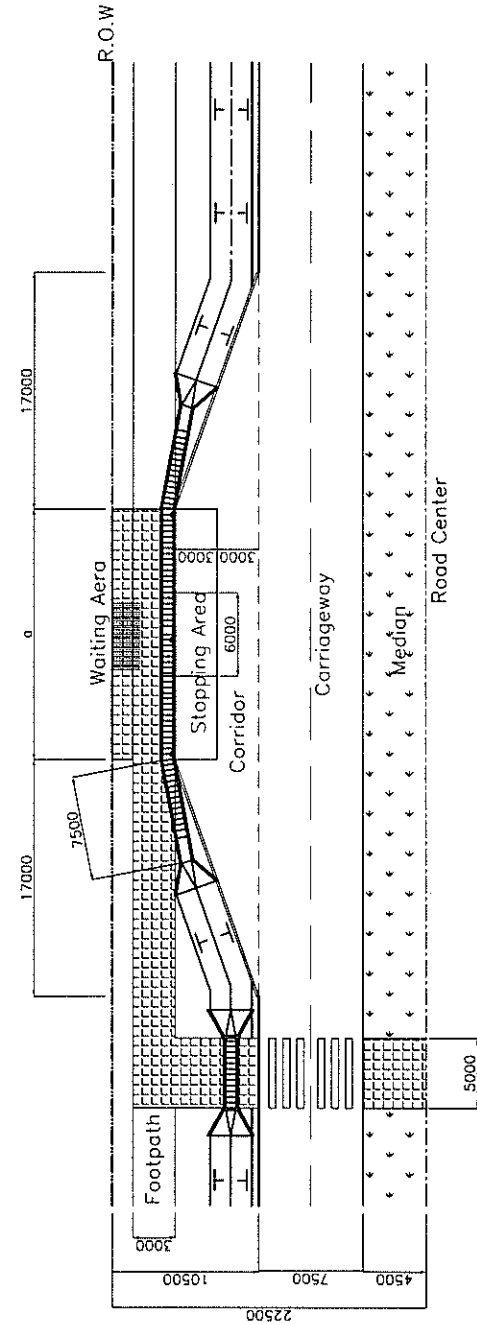


The Ministry of Infrastructure Development of United Republic of Tanzania ● Japan International Cooperation Agency	CONSULTANTS: Construction Project Consultants, Inc. (CPC)	PROJECT NAME: The Project for Widening of Kiwa Road (from the Junction of Bandaru Road to Mbagala Rangi Tatu)	DRAWING TITLE: UTILITY DUCT SCALE: AS SHOWN	DRAWING No.: KR D-1
	Date: Prepared by: Checked by:			

BUS STOP

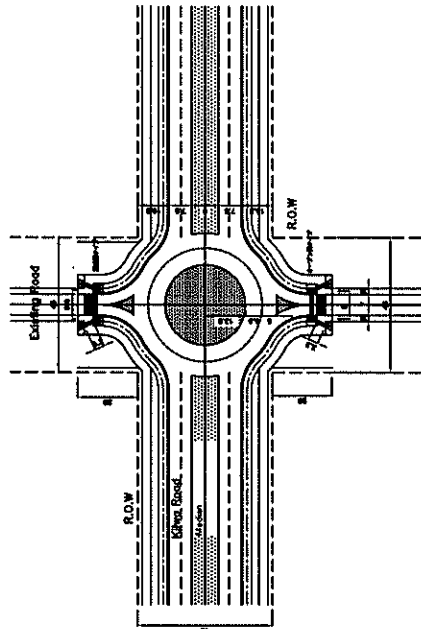


1:1	0
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40	36000
60	60000
100	96000

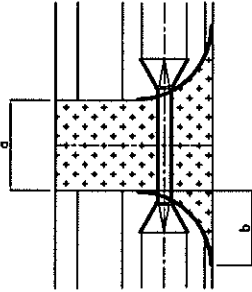


<p>● The Ministry of Infrastructure Development of United Republic of Tanzania</p> <p>● Japan International Cooperation Agency</p>	<p>CONSULTANTS:</p> <p>Construction Project Consultants, Inc. (CPC)</p>	<p>PROJECT NAME:</p> <p>The Project for Widening of Kilwa Road (from the Junction of Bاندant Road to Mbagala Rangl Tatu)</p>	<p>DRAWING TITLE:</p> <p>BUS STOP</p> <p>SCALE: AS SHOWN</p>
<p>Date:</p> <p>Prepared by:</p> <p>Checked by:</p>		<p>DRAWING No.:</p> <p>KR D-2</p>	

Roundabout (+ Shape)

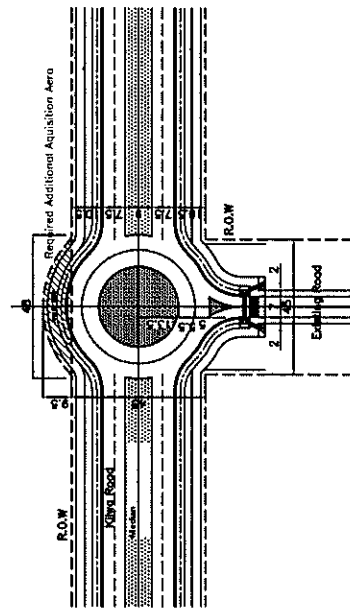


Access Road

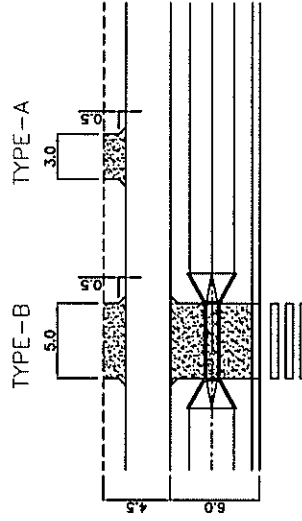


タイプ	a	b	基準
A	5	3	DBST
B	5	4	AC4cm
C	6	5	AC7cm

Roundabout (T Shape)



Entrance



● The Ministry of Infrastructure Development of United Republic of Tanzania
 ● Japan International Cooperation Agency

CONSULTANTS:

Construction Project Consultants, Inc. (CPC)

PROJECT NAME:

The Project for Widening of Kilwa Road
 (from the Junction of Bandani Road to Mbagala Rangit Tatu)

DRAWING TITLE:

JUNCTION PLAN
 SCALE: AS SHOWN

Date:

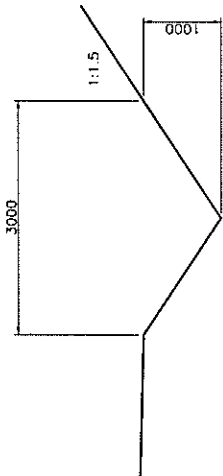
Prepared by:

Checked by:

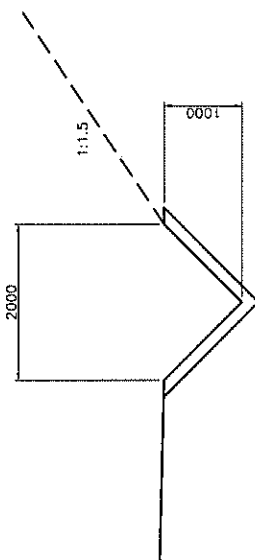
DRAWING No.:

KR D-3

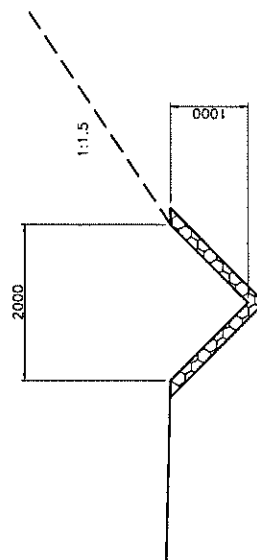
V Type Ditch



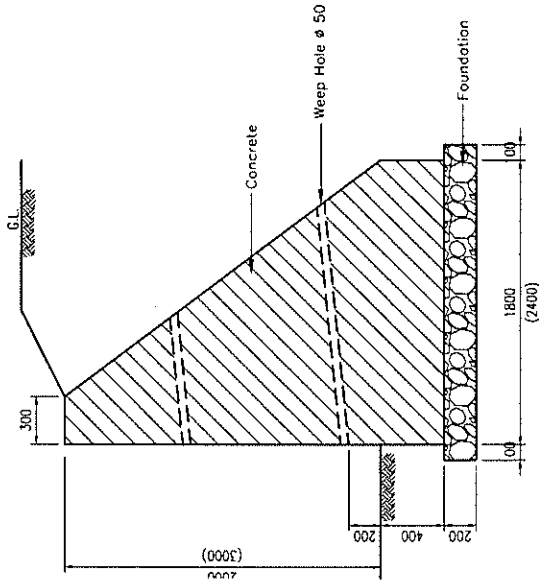
V Type Ditch (Soil Cement Type)



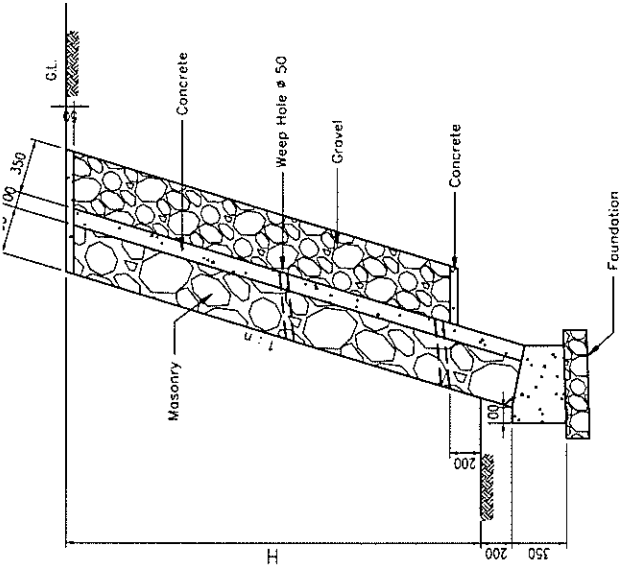
V Type Ditch (Stone Pitching Type)



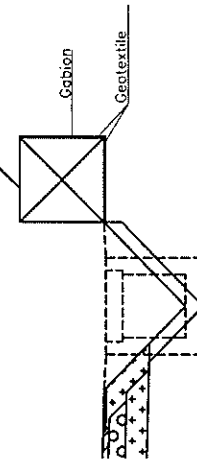
GRAVITY WALL



MASONRY WALL



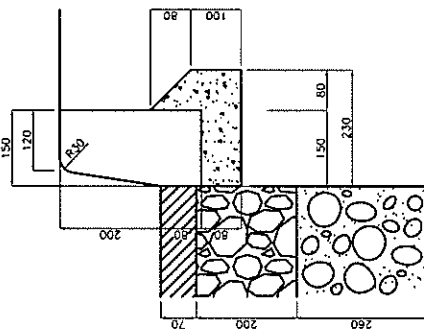
GABION WALL



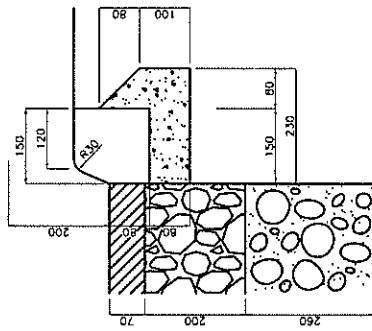
CONSULTANTS: Construction Project Consultants, Inc. (CPC)	PROJECT NAME The Project for Widening of Kilwa Road (from the Junction of Bاندان Road to Mbagala Rangj Tatu)	DRAWING TITLE: V TYPE DITCH / WALL SCALE: AS SHOWN		DRAWING No.: KR D-4
		Date:	Prepared by:	Checked by:

- The Ministry of Infrastructure Development of United Republic of Tanzania
- Japan International Cooperation Agency

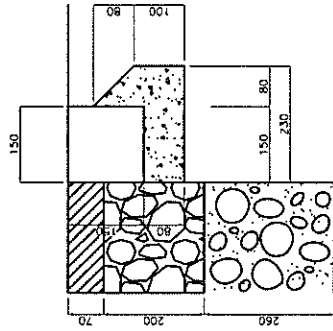
Kerb Stone
(Non Mountable Type)



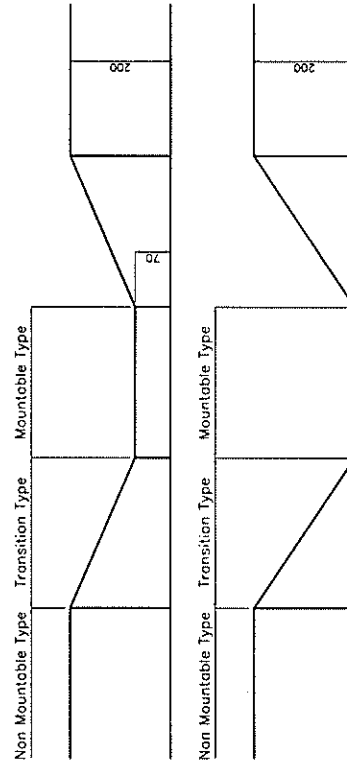
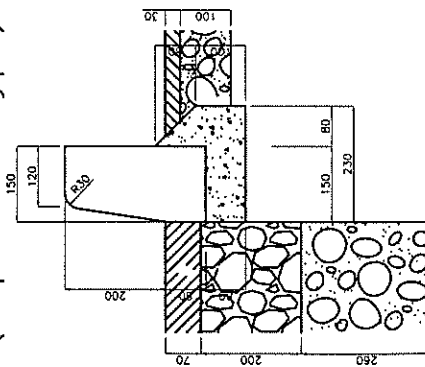
Kerb Stone
(Mountable Type)



Kerb Stone
(Flat Type)

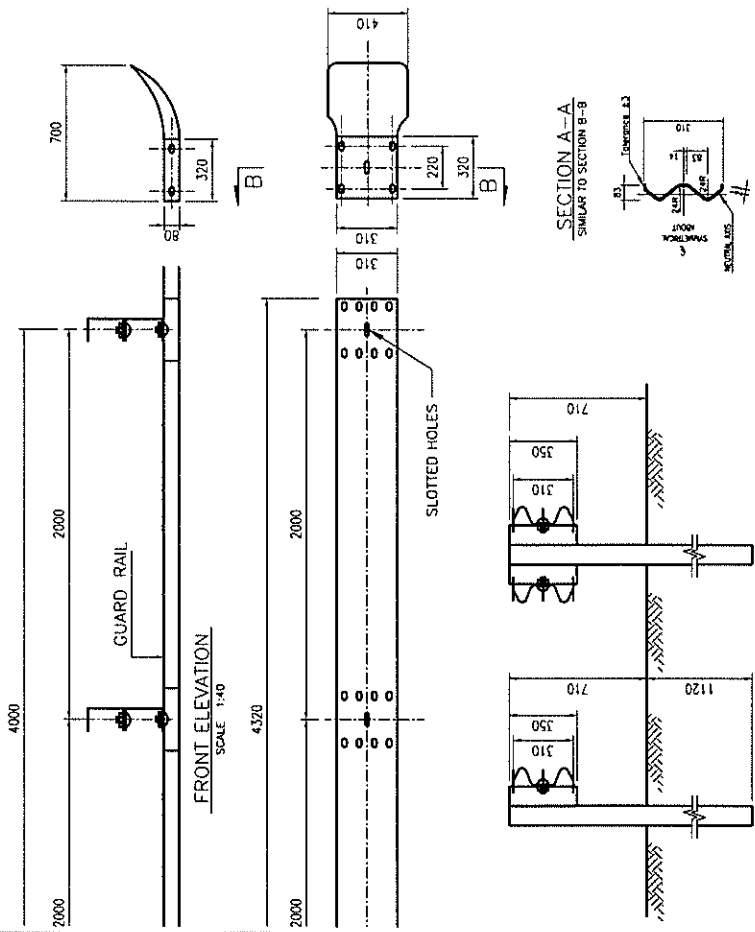


Kerb Stone
(Separation Type)

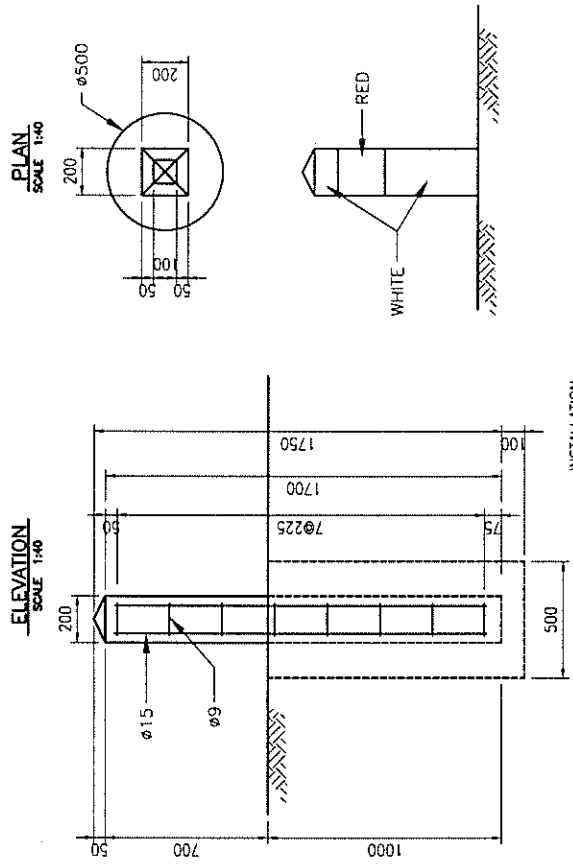


<p>CONSULTANTS:</p> <ul style="list-style-type: none"> The Ministry of Infrastructure Development of United Republic of Tanzania Japan International Cooperation Agency 	<p>PROJECT NAME</p> <p>The Project for Widening of Kilwa Road (from the Junction of Bandari Road to Mbagata Rang'i Tatu)</p>	<p>DRAWING TITLE:</p> <p>KERB STONE SCALE: AS SHOWN</p>	<p>Date:</p> <p>Prepared by:</p> <p>Checked by:</p>	<p>DRAWING No.:</p> <p>KR D-5</p>

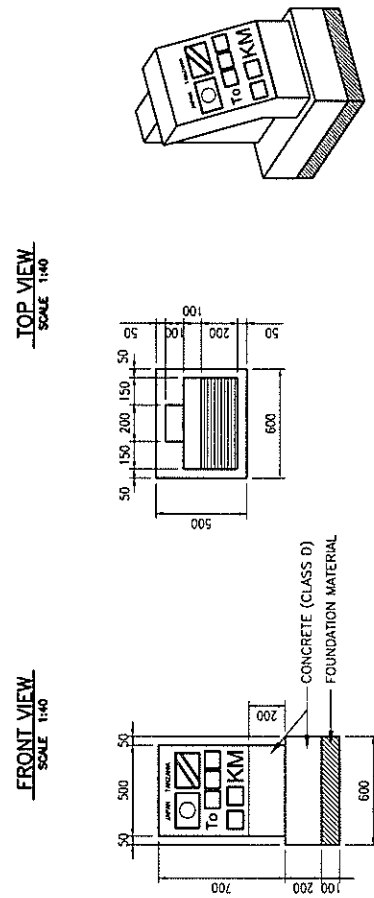
GUARD RAIL



GUIDE POST

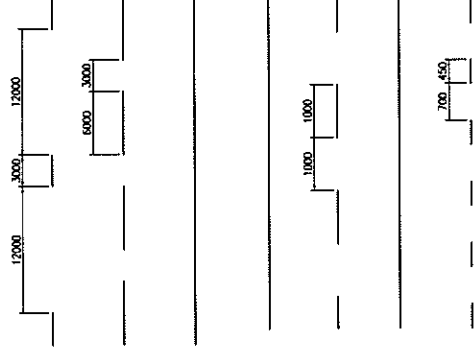


KILOMETER POST



The Ministry of Infrastructure Development of United Republic of Tanzania ● Japan International Cooperation Agency	CONSULTANTS: Construction Project Consultants, Inc. (CPC)	PROJECT NAME: The Project for Widening of Kilwa Road (from the Junction of Bandani Road to Mbagata Rangji Tatu)	DRAWING TITLE: GUARD RAIL / GUIDE POST / KILO POST	DRAWING No.: KR D-6
	Date: Prepared by: Checked by:	SCALE: AS SHOWN	Date: Prepared by: Checked by:	Date: Prepared by: Checked by:

LINE MARKINGS



線幅分限線、一般部(幅=150mm)

線幅分限線、フイカテ部(幅150mm)

線幅分限線、線幅部(幅150mm)

区画線(幅=50mm)

停止線、フイカテ部(幅=150mm)

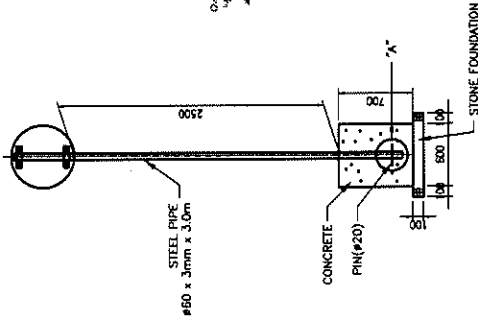
停止線(幅=300mm)

合流線(幅=150mm)

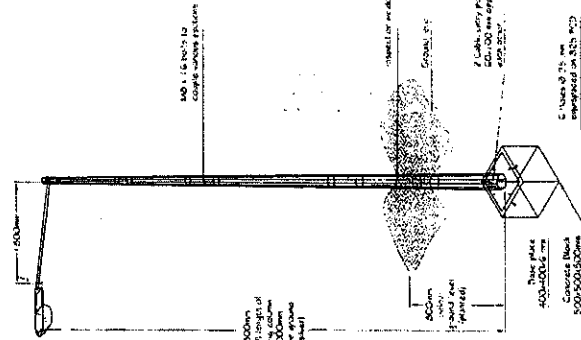
ZEBRA MARKING



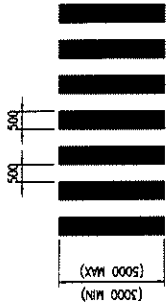
SIGN POST



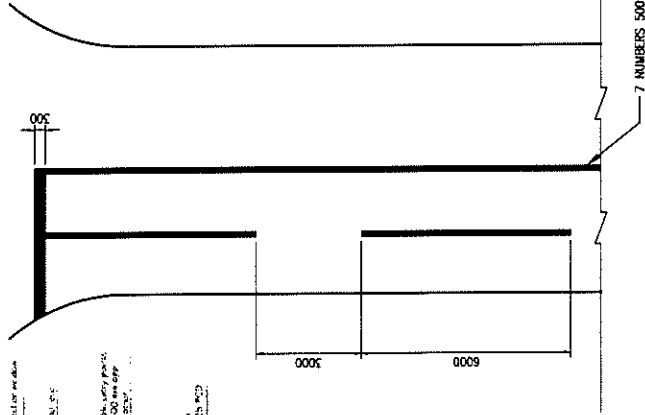
STREET LIGHT



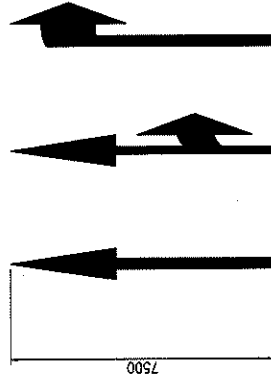
PEDESTRIAN CROSSING MARKING



STOP LINE MARKING



ARROWS



CONSULTANTS:	PROJECT NAME:	DRAWING TITLE:	DATE:	DRAWING No.:
			Prepared by:	KR D-7
The Ministry of Infrastructure Development of United Republic of Tanzania		MARKING/SIGN POST/STREET LIGHT		Checked by:
Construction Project Consultants, Inc. (CPC)		The Project for Widening of Kilwa Road (from the Junction of Bandari Road to Mbagata Rang'i Tatu)		
Japan International Cooperation Agency		SCALE: AS SHOWN		

2.2.4 Implementation Plan

2.2.4.1 Guideline for Execution

This Project will be implemented under the framework of grant aid by Japan so that the following points have to be taken into consideration as a guideline for execution.

- Local engineers, workers and materials shall be utilized as much as possible for contribution to employment creation, promotion of technology transfer and vitalization of local economy.
- A close communication system shall be established between the Tanzanian government, the consultant and the contractors so as to smoothly implement the Project.
- Temporary works for road construction shall be planned by assuring efficient materials delivery and efficient equipment operation. The local topographic and geological features, etc. shall be well grasped and reflected on the temporary work plan.
- A realistic execution scheme shall be formulated in consideration of rainfall patterns, time requirement for equipment and materials procurement, proper working methods, etc.
- Proper schedule for detour and time schedule of construction shall be drawn up in order to avoid any excessive hindrance to current traffic flow.

2.2.4.2 Precautions for Work Execution

The following points shall be considered in the phase of implementation of the Project:

(1) Observance of labor standard

The contractor shall observe the presently applicable laws and regulations of Tanzania concerning construction, pay serious attention to appropriate working conditions and practices in relation to employment, prevent any dispute with workers and secure safety.

(2) Environmental conservation during the construction period

The contractor shall conduct and supervise construction works while paying attention to the environmental precautions which have been given at receipt of the “construction permit” as the premise for the permit. In addition, the contractor shall take care of environmental preservation by taking measures against dust, turbid water, etc. which may arise out of waste disposal, surplus soil disposal, filling, paving, etc. in relation to removal of the existing structures (longitudinal and crosswise traversing drainage structures).

(3) Necessity of communicating means on the site

The planned road is classified into urban road, where traffic congestion takes place in the morning and evening, the route buses go back and forth and the neighboring residents come and go during the day. Minimum communicating equipment required for establishing a system of communication and management under such situation shall be taken into consideration in order to ensure safety for

general traffic, the neighboring residents and the people concerned in construction during construction as well as in emergency situations.

(4) Respect for local customs

A construction time schedule in accordance with the local religious customs and daily habits shall be considered in the phase of formulating the execution scheme.

(5) Insurance of traffic safety

Efficient traffic control shall timely be planned in line with the progress of construction for safe and smooth traffic on the existing road incl. provision of a partial detour. Detour is required during improvement work for the existing culverts and construction of the intersections.

(6) Circumstances around customs clearance

The execution scheme shall allow for time requirement for import, unloading, customs clearance, etc.

(7) Procurement of land for construction work

It shall be confirmed that pre-agreement for land use, payment of ground rent, etc. will properly be undertaken by the Tanzanian government.

(8) Coordination of construction time schedule with others

Progress of works on the Tanzanian side shall sufficiently be verified for coordination.

2.2.4.3 Delimitation of the Scope of Work

The scope of performance of Japan and that of the Tanzanian government are described in the following:

(1) Scope of work by Japan

1) Construction work

- Widening of the existing 2-lane road to 4-lane road and improvements to the drainage structures traversing the road for a total length of 11.6 km;
- Road construction incl. earth works, pavement of roadway and sidewalk, shoulder work, etc. and temporary works for it;
- Construction of structures traversing the river and temporary works for it;
- Installation of temporary facilities (base camp, office, storage, etc.).

2) Procurement of equipment and materials

Procurement of construction materials and equipment for construction of the road and structures described in 2.2.4.6 “Plan for equipment and materials procurement”.

3) Safety measures

Safety management and measures concerning execution of the construction works.

4) Consulting service

Drawing up of execution design, tender and contract documents and assistance for bidding as well as execution control as described in 2.4.4 “Execution design and execution control plan”.

(2) Scope of work by Tanzania

1) Acquisition of permission for construction works

Acquisition of permission for the construction works concerning the Project by TANROADS before bidding by contractors.

2) Customs clearance and procedure for tax exemptions

Support to facilitate customs clearance and procedure for tax exemptions at the Tanzanian port facilities concerning import of the equipment and materials for construction based on the list of imported articles prior to commencement of the construction works.

3) Expropriation of land and compensation

Insurance of the land necessary for facilities such as base camp, etc. given in the “Work execution plan” as well as of the place for disposal of wastes and surplus soil.

4) Support to facilitate relocation of public facilities, etc.

- Relocation of obstructive facilities (telephone cables, electric cables, sewer pipes, gas pipes, crude oil piping, advertising objects on the street);
- Relocation from the social environmental viewpoint (mosque, cemetery, Rangitatu bus terminal);
- Expropriation of land necessary in relation to construction of the major intersections;
- Insurance of yard for temporary facilities (camp yard, site for construction office, concrete mixing plant, etc.);
- Assignment of supervisory staff of TANROADS to relocated facilities, incl. insurance of office, means of transport and expenses for them.

5) Others

- Support to facilitate immigration, stay, etc. of the Japanese and people from any third country (other than Tanzanian people) engaged in implementation of the Project;
- Exemption or refunding of customs, domestic taxes, surtaxes, etc. imposed by the Tanzanian government;
- Appointment of counterpart as well as insurance of means of transport and expenses for the personnel.

2.2.4.4 Execution Design and Execution Control plan

(1) Procedure for implementation of consulting service

Conclusion of the exchange of notes (E/N) concerning grant aid for the Project between the governments of Japan and Tanzania forms the precondition for implementation of the Project. After conclusion of the E/N, the consultant shall conclude a consultancy agreement with TANROADS as the implementation organ on Tanzanian side according to the scope and procedure of the grant aid by Japan on the basis of the letter of recommendation by JICA to proceed with execution design, assistance for bidding and execution control. The principal contents of service to be contained in the consultancy agreement are as follows:

1) Stage of drawing up tender documents (construction document stage)

Execution design of each facility shall be made in accordance with the report of review of the basic design to draw up tender documents for approval by TANROADS.

2) Tender stage

TANROADS will select a pre-qualified contractor of Japanese nationality by open bidding with assistance by the consultant. The representatives of the Tanzanian government participating the bidding and conclusion of construction contract will have to own the authority for contract approval and to be capable of making judgment on technological matters. The assistant service by the consultant in the tender stage is as follows:

① announcement of tender, ② pre-qualification, ③ bidding and evaluation of tenders, ④ contract conclusion.

(2) Organization for implementation

Assignment of consulting staff and their duties in the construction document stage and tender stage shall be as follows:

1) Execution design and preparation of tender documents

A design team organized under controller shall make execution design. Engineers in the team and their roles are as follows:

Table 2.9 Personnel assignment for execution design

Person in charge of	Grade	Role	On site	In Japan	Total M/M
(1) Project Manager	2	Overall control	2.66	1.5	4.16
(2) Road design (I)	3	Road design plan, longitudinal section, pavement design, quantity calculation	3.66	2.5	6.16
(3) Road design (II)	4	Preparation and check of drawings	0	3.0	3.0
(4) Investigation and design of road structures	3	Investigation of structures such as culvert, etc. and stream regime, design of the above, drawings, quantity calculation	3.0	1.5	4.5
(5) Investigation of natural conditions (incl. environmental consideration)	4	Investigation of materials of road, detailed surveying, control of environmental management plan	1.0	1.0	2.0
(6) Execution planning, estimation	3	Temporary work plan, measures against obstacles, investigation of prices, execution plan, estimation	1.0	3.0	4.0
(7) Tender documents	4	Preparation of tender documents	0	2.5	2.5
Total					26.32

The service for execution design includes preparation of the tender documents. In consideration that this Project is based on the grant aid by Japan, attention shall be paid to the following:

- The forms for instruction to bidders and for contract shall be in accordance with the guideline for grant aid of Japan.

The technical specifications shall be prepared with the main aim of ensuring sufficient quality while referring to the technical specifications on Tanzanian side.

- Persons who are acquainted with the design contents with relation to the study on basic design and the execution design shall play a key role in preparation of the tender documents.

2) Organization for implementation of bidding assistance

Persons in charge and their roles for smooth implementation of bidding are as follows:

Table 2.10 Personnel assignment for tendering

Person in charge	Grade	Role	On site	In Japan	Total M/M
(1) Project Manager	2	Coordination for smooth bidding and overall control.	0.66	0	0.66
(2) Bidding specialist	3	Assignment of person in charge of road design (I). Check of tender documents, announcement of bidding and various services concerning bidding and evaluation of tenders.	0.66	0	0.66

In addition, assignment of assistants shall be planned as follows, without being included in the number of M/M:

- Bidding assistants: Check of tender drawings and assistance of bidding specialist. Bidding assistance by the consultant shall cover contract conclusion and confirmation of contract authentication.

3) Organization for execution control (organization for site control by the consultant)

After contract conclusion with the contractor, the consultant shall issue the notice to commence to him and proceed with execution control. Within the framework of execution control, the consultant shall directly report to TANROADS about the progress of construction, control the progress, quality and safety of the contractor’s work, manages payment to him and make proposal for betterment of the construction works, etc. Furthermore, the consultant shall make monthly report to the Japanese Embassy in Dar es Salaam and the Tanzanian office of JICA. In 1 year after completion of execution control, the consultant shall perform inspection of the completed construction works to terminate his consulting service. Assignment of consulting staff and their duties for execution control shall be as follows:

Table 2.11 Assignment of consulting staff for execution control

Person in charge of	Grade	Role	On site	In Japan	Total M/M
(1) Control	2	Overall control	1.0	0	1.0
(2) Execution control on site	3	Overall control on the site	26.5	0	26.5
(3) Inspection of completion	4	Inspection of completion	0.23	0	0.23

2.2.4.5 Quality Management Plan

A laboratory shall be provided in the base camp, for which a minimum necessary equipment for concrete quality test shall be procured from Japan. Technical staff shall be assigned to the laboratory so that the needs for quality management on the site may be satisfied. The principal items of quality management for work execution in the Project are as given in the following table:

Table 2.12 Items of quality management

Item		Test method	Test frequency	
Base	Mixed materials		Liquid limit, plasticity index	
			Gain size distribution (mixture)	
			Aggregate strength test (TFV)	
			Aggregate density test	
			Max. dry bulk density (compaction test)	
Construction		Density test (degree of compaction)	Once / day	
Prime coat , tack coat	Materials	Bituminous material	Quality certificate	For each material type
			Storage and spraying temperature	Each time of delivery
Asphalt	Materials	Bituminous material	Quality certificate, composition analysis table	
			Aggregate	Gain size distribution (mixture)
		Coefficient of water absorption		For each material type
	Aggregate strength test (TFV)			
	Mixing test		Stability	Each time of mixing
			Flow value	
			Percentage of air voids	
			Voids of mineral aggregate	
			Tensile strength (indirect)	
			Residual stability	
	Paving		Mixing temperature	As required
			Laying temperature	Each time of transport
			Sampling, Marshall stability test	Approx. once / day
Concrete	Materials	Cement	Quality certificate, results of chemical & physical test	For each material type
		Water	Results of composition test	For each material type
		Admixture	Quality certificate, composition analysis table	For each material type
		Fine aggregate	Specific gravity under oven dry condition	For each material type
			Grain size distribution, fineness modulus	
			Rate of clay agglomerate and soft fine pieces	
		Coarse aggregate	Specific gravity under oven dry condition	For each material type
	Gain size distribution (mixture)			
	At mixing test		Compressive strength test (cubic specimen)	Each time of mixing
	At placing		Slump test (concrete)	For each material type
			Air content	For each material type
Temperature			For each material type	
Strength			For each material type	
Reinforcing bars	Materials	Quality certificate, results of tensile test	For each lot	

2.2.4.6 Plan for Procurement of Equipment and Materials

(1) Circumstances around procurement of equipment and materials for construction

The equipment and materials for construction shall principally be procured from the countries as given in Table 2.13.

Table 2.13 Method of materials procurement

Materials	Local	Japan	Third country	Remarks
Crushed stone, concrete aggregates (sand, gravel, coral stone) for road	○			Locally procurable
Reinforcing bars	○			Imported articles procurable locally
Wood materials (plywood, square timber, log)	○			Locally procurable; relatively expensive, but import difficult due to restriction by the government
Cement	○			Locally procurable
Asphalt materials	○			Imported articles procurable locally
Fuels, lubricants	○			Imported articles procurable locally
Paint for road marking	○			Imported articles procurable locally

Essential construction materials such as aggregate for road base, bituminous materials, cement, reinforcing bars, concrete aggregate and wooden materials are procurable in Tanzania. Major reasons for the above mentioned method for materials procurement are described in the following:

① Banking materials, crushed stone for road, concrete aggregate (sand, gravel)

Banking materials are of laterite basis for the most part. Soil samples were taken from 3 candidate sites within 20 km from the planned road and their quality data were confirmed by CBR test, etc.

Crushed stone and hard aggregate for road base and surface course as well as concrete aggregate which are satisfactory in both quality and quantity must be obtained from places in a radius of about 130 m from the city of Dar es Salaam so that their unit price is on a high level. Coral stone is utilized for road base. However, coral stone which is good in quality is getting fewer and must be procured from places in a radius of 20 km from the city of Dar es Salaam.

Sand can be procured from 2 places of river terrace within a 10 km range from the planned road. The sand is proved to be a harmless aggregate also in view of alkali-silica reaction. Household rubbishes have accumulated in the surface layer in the area for additional lanes over the entire length of the planned road (depth: 30 ~ 50 cm) and thus must be removed. The layer or subgrade beneath this surface layer is of silty sand. It seems possible, instead of making a crushed stone base, to use this existing subgrade material in combination with cement stabilization for the subbase course so that transport cost for crushed stone can be saved. Therefore, the subgrade material of the existing road shall be utilized for the subbase course by mixing it with laterite material containing good gravel from a nearby candidate site for soil collection and by combining with cement stabilization to satisfy the required specifications for subbase course incl. CBR value, etc.

② Asphalt materials, fuels

It is common to import and purchase asphalt materials and fuels from Saudi Arabia mainly through an agency of TERMOCOTANK of Tanzania. Import is possible also through agencies of TOTAL

KENIYA, OLIXY TANZANIA, etc. All of them have supplied these materials at prices linked with market prices and in a stable quantity in the past. Asphalt materials and fuels as imported articles shall be procured locally since they are satisfactory also in quality. Asphalt mixtures for pavement are available as the product from a construction company in Dar es Salaam.

③ Cement

Cement is produced by 4 domestic companies and thus procurable locally in consideration that they are capable of supplying cement of good quality in a stable quantity. In spite of domestic production using domestic raw materials, however, the cement price is higher than that in Japan because of expensive electric power used in the production process. On the other side, it is difficult to import cement due to restriction by the Tanzanian government. A potential cement supplier for the Project will be TANGA CEMENT located at a distance of 15 km in northwest direction from the planned road, who operates around the clock and produces about 2,200 t cement a day. Incidentally, normal Portland cement (Class 32.5 N, Class 42.5 N) is the main type of cement produced in Tanzania. High early strength Portland cement is not produced there.

④ Reinforcing bars

Reinforcing bars are produced by 6 manufacturers in Tanzania by rolling billets imported from South Africa in accordance with the AASHTO standard. As their products show some variation in tensile strength, dimensions and shape due to questionable quality management, it is necessary to compare them with imported products as to price, quality, etc. Incidentally, qualitatively satisfactory reinforcing bars procurable locally as imported article come from South Africa and other countries such as Egypt, Ukraine, Slovakia, etc.

⑤ Other construction materials

Joint sealing materials, cut-off plates, etc. are difficult to procure locally. They shall be procured from Japan, not from adjacent countries, for the sake of reliable procurement as well as from the viewpoint of quality and economy.

⑥ Surveying devices and communication equipment

Surveying devices and communication equipment shall be procured from Japan for reasons of quality and ease of handling.

(2) Plan for carry-in of procured materials

The manner of carry-in and transport of procured materials shall be studied by calculation of handling distance.

(3) Construction machinery

The method for procurement of major construction machinery shall be as given in Table 2.14. It is possible to locally procure construction machines through utilization of them owned by local subcontractors. Delivery from Japan shall, however, be examined for special machines (such as temporary machines for cofferdam construction, etc.) and power machinery incl. generators, underwater pumps, etc. used daily from the viewpoint of usability in Tanzania and management on the site and especially for the purpose of insurance of safety.

For asphalt plant, aggregate batcher and concrete mixing plant, cost comparison was made between 2 different solutions: utilization of a local rental system and procurement of imported plants. Concerning the base course materials, mixing on the site (ratio adjustment of crushed stone and sand) was examined because the purchased materials will be delivered without mechanical stabilization to require adjustment to the specifications.

As stated in the above, it shall be the principle to use local subcontractors who make construction machinery available. As the number of locally available construction machines is limited for the period of construction, a shortage shall be offset by procurement from Japan.

Table 2.14 Procurement method for major construction machinery

Machinery	Method of procurement			Remarks
	Local	Japan	Third country	
Bulldozer	○			Local procurement
Back hoe	○			Local procurement
Wheel loader	○			Local procurement
Dump truck	○			Local procurement
Motor grader		○		Procurement from Japan
Macadam roller	○			Local procurement
Rubber-tired roller	○			Local procurement
Vibrating roller	○			Local procurement
Stabilizer	○			Local procurement
Concrete mixing plant	○			Local procurement
Agitator Truck		○		Procurement from Japan
Asphalt plant		○		Procurement from Japan
Asphalt finisher	○			Local procurement
Chip Spreider		○		Procurement from Japan
Wheel crawler crane, 25 t		○		Procurement from Japan
Engined generator (Diesel)		○		Procurement from Japan

2.2.4.7 Time Schedule of Project Implementation

A time schedule of project implementation (a draft) prepared on the basis of procedure for grant aid by Japan is given in Fig. 2.13.

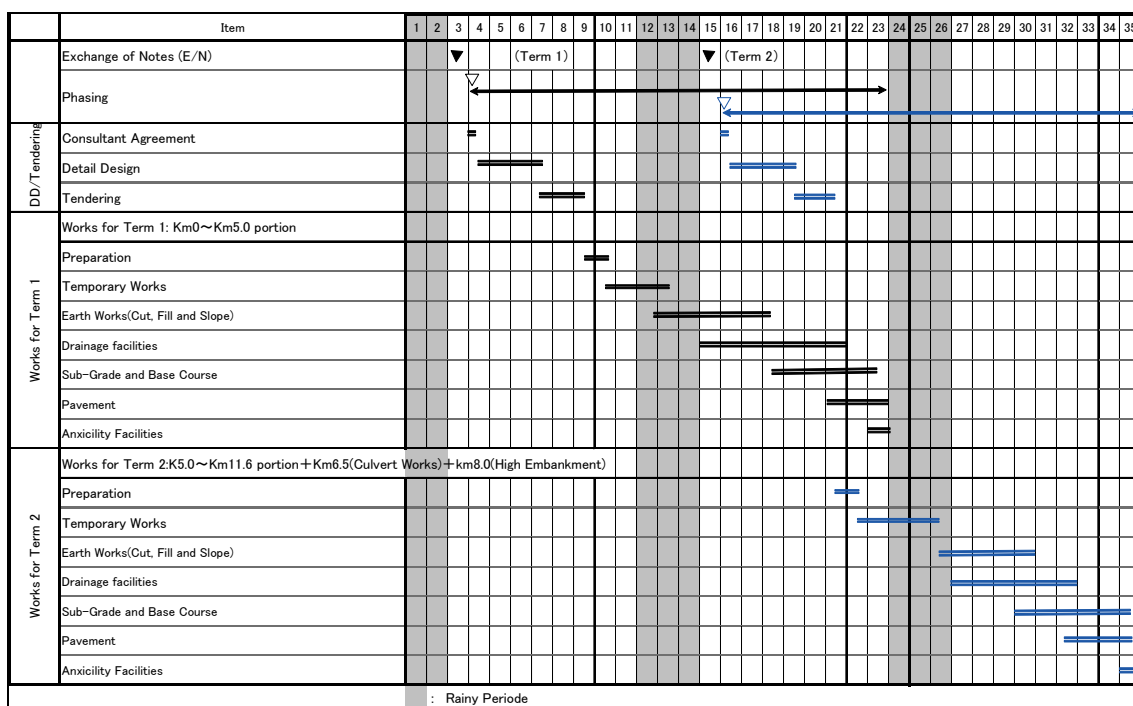


Figure 2.11 Time schedule of Project implementation (a draft)

2.3 Outline of the Work Undertaken by the Tanzanian Side

2.3.1 General Requirements for the Grant Aid Assistance Project of Japan

The following lists the general items of the project undertaken by the Tanzanian side stipulated in the minutes of meeting agreed upon and later confirmed by the both governments.

- Secure the land needed for the project before the commencement of construction work.
- Exempt Japanese nationals from customs tax, domestic tax and other forms of public charges for service and materials that are supplied under approved contracts.
- Provide necessary convenience and assistance to the Japanese nationals who enter and reside in Tanzania for the project implementation in order to facilitate supply of service and materials under approved contracts.

2.3.2 Specific Requirements for This Project

The items undertaken by the Tanzanian side that are specific to this project and not included in the general requirements are as follows.

1) Relocation of obstacles

The obstacles found along the urban road are listed in Table 2.15 below.

Table 2.15 Relocation of obstacles

Name of obstacle		Organization concerned	Address	Fax/Tel/E-mail	As-built plans	After-relocation plans	Relocation schedule	Cost estimate for relocation (million TS)	Remarks
1	Telephone line	TTCL	POBOX9070	T.2142233	Not available	Not available	2005/2006	321	Relocation cost for 3.2 km section already secured
			Dar es Salaam	F.2112335	To be confirmed on site		Fiscal year	(from 3.2 km point to terminal point)	
								32 MIL₴	
2	Power line	Tanesco	POBOX9024	T.111041	Not available	Not available	2005/2006	28	Relocation has started at some locations
			Dar es Salaam	F. 113836	To be confirmed on site		Fiscal year	2.0km section only	
								Estimated for entire section(2*11.6/2)*28:32.50MIL₴	
3	Water supply and sewer pipelines	Dawasco	POBOX1573	T. 2762479	Available for 0 km – 10.2 km section	Available for 0 km – 10.2 km section	2005/2006	2,530	
			Dar es Salaam	F. 2762480	Not available for 10.2 km – 11.6 km section	Not available for 10.2 km – 11.6 km section	Fiscal year	2.38 Mil.US\$	
								250MIL₴	
4	Gas pipelines	Pan African Energy Tanzania Ltd.	POBOX 80139		To be confirmed on site	To be confirmed on site	Already relocated	-	Already relocated for the section between Mandela intersection and KTM fabric factory
			Dar es Salaam						
5	Crude oil pipeline	TAZAMA	POBOX 9043	T. 2118883	To be confirmed on site	To be confirmed on site	2005/2006	215	
			Dar es Salaam	F. 2119003			Fiscal year	(0.2 MIL.US\$)	
								21.5MIL₴	
		BP	POBOX 9043	T. 2111269	To be confirmed on site	To be confirmed on site	2005/2006	Under process	
			Dar es Salaam	F. 2112726			Fiscal year	Estimated based on Tazama	
						2.5MIL₴			
6	Roadside billboards	Advertiser	Permission was originally given under the condition that the billboards are relocated unconditionally as required. – Income of Road Fund from advertisement						

According to the data provided by relevant agencies (partly estimated by the Study Team) upon request by TANROADS, a 340 million yen of relocation cost is anticipated.

The Tanzanian government should allocate an appropriate amount in the fiscal 2006/2007 and 2007/2008 budgets for TANROADS to cover this cost.

2) Relocation in consideration of socio-environmental issues

The government of Tanzania will need to shoulder the following relocation costs to ensure socio-environmental consideration.

Table 2.16 Cost Estimate for Relocation

Item of relocation	Estimated cost (TS)	Remarks
Mosque	160 million (16 million yen)	Estimate by Study Team
Cemetery	43 million (4.3 million yen)	Estimate by Temeke City
Rangitatu bus terminal	276 million (27.6 million yen)	Estimate by Temeke City
Total	479 million (47.9 million yen)	

3) Responsibility for land acquisition cost

Construction of roundabouts at the start point and major intersections of the project road will require land acquisition. However, relocation of buildings and other facilities concerning the construction is not required.

4) Responsibility for securing temporary construction yard

Construction yard for contractors will be required as follows.

-Size of construction yard : 100m×100m

-Duration of use : 2 years

2.3.3 Requests to the Government of Tanzania

The following are the requests to the government of Tanzania for smooth implementation of the construction.

1) Holding explanatory meetings with the residents living along the project road

TANROADS is expected to hold meetings with the residents along the project road or with their representatives to explain the project immediately after the E/N for official implementation of the project is signed.

2) Traffic safety

The Tanzanian side is expected to inform the drivers passing the construction sites of the construction work and to instruct them to follow the direction of traffic control personnel.

3) Assuring publicity of inconveniences during construction

Since certain degree of inconveniences caused by the construction work are anticipated, the Tanzanian side is expected to inform thoroughly the residents, via public media such as radio broadcast, of inconveniences during the construction.

2.4 Operation and Maintenance Plan of the Project

The following maintenance work for the facilities will be required during the operational stage after the completion of the project.

(1) Regular maintenance work

The maintenance such as repair work regularly required throughout a year, especially after the rainy season, is listed below.

- Patching up the dam aged asphalt layer (filling potholes)
- Repairing the roadbed as required
- Reshaping the road shoulders (slopes of road cuts)

Since the project road is an urban road, constant and regular cleaning of road side gutters and transversal drainage structures will be required.

(2) Periodic maintenance work

- Repair of roadbed
- Resurfacing (overlaying)
- Repair of road shoulders
- Repair of drainage structures

TANROADS currently contracts out repair work such as those described above to local contractors and no operational problems are found. It is expected to conduct regular rounds of inspection at sufficient intervals for early detection of damage on structures because it will ensure earlier repair.

2.5 Estimated Project Cost

2.5.1 Estimated Cost for the Grant Aid Project

(1) Cost shouldered by the Japanese side

The estimated costs are preliminary and subject to a review by the Japanese government concerning the decision on implementation by the grant aid scheme. Therefore it does not specify the official amount limit that would appear in the E/N.

Estimated project cost : approximately 2,497 million yen

Table 2.17 Estimated Project Cost (Shouldered by the Japanese side)

Cost division	Total (million yen)
1) Construction	2,343
• Direct construction	1,852
• Field expense	149
• Temporary facilities	184
• General management	158
2) Design and supervision	154
Total	2,497

(2) Cost shouldered by the Tanzanian side

The cost for the Tanzanian side is estimated to be 3.96 billion TS (approximately 400 million yen) for relocation of obstacles, relocation of facilities for socio-environmental consideration, land acquisition, and securing temporary construction yard.

(3) Conditions for cost estimation

1) Foreign exchange rate

1 US dollar = 109.54 Japanese yen (as of the end of August 2005)

2) Duration of construction

The implementation requires 32 months in two stages that include detailed designing and construction as shown in the implementation schedule.

3) Other conditions

— This project is implemented in accordance with the grant aid scheme of the government of Japan

— The exchange rate above is subject to change by the government of Japan

2.5.2 Operation and Maintenance Cost

The operation and maintenance cost estimated based on the operation and maintenance plan described earlier is shown in Table 2.18.

Table 2.18 Major O/M items and cost

(1TS = 0.1 yen)

O/M Type	Frequency	O/M item	Specifications	Unit	Unit cost (TS)	Unit work amount	Number of work	Cost (TS)
Regular	Every year	Patching	0.1% of the total paved area	m ²	24,500	174	9	38,367,000
		Roadbed repair	0.1% of the total paved area	m ²	18,450	174	9	28,892,700
		Road shoulder repair	0.1% of the total road	m ²	14,000	12	9	1,461,600
		Cleaning of structures	-	m ³	2,000	327	9	5,877,000
		Subtotal – I						
							Annual =	7,459,830
Periodic	8 th year	Roadbed repair	2.0% of the total paved area	m ²	24,500	3,480	1	85,260,000
		Overlay	2.0% of the total paved area	m ²	18,450	3,480	1	64,206,000
		Road shoulder repair	3.0% of the total road	m ²	14,000	348	1	4,872,000
		Repair of structures	-	m ³	161,000	327	1	52,566,500
		Subtotal – II						
Sum of regular and periodic maintenance – III (=I+II)								281,502,800
General administrative cost			10% of III	formula	-	-	-	28,150,280
Grand total								309,653,080
Per year cost								30,965,308

Japanese yen equivalent = 3,100,000

The cost summary above shows that the responsibility of the Tanzanian side is 31 million TS (equivalent of 3.1 million yen) annually for both regular and periodic maintenance. This is 1.3 % of the total annual budget of 2.3 billion TS (230 million yen) of TANROADS Dar es Salaam office and is considered to be a reasonable load.

Chapter 3 Project Evaluation and Recommendation

Chapter3 Project Evaluation and recommendation

3.1 Project Effect

Kilwa road has a function of an urban road for the municipality of Temeke which it runs through and trunk road leading to the southern regions. Thus the implementation of the project is considered to benefit the 3.5 million residents living in the city and along the entire southern coastal regions. The expected benefit from implementation of this project is listed in the following sections.

Direct benefit

Upgrading of Kilwa road from the current single-lane (per direction) to double-lane road is expected to improve the actual traffic average speed: 7km/hour to 20km/hour during the peak commuting hours in the morning and evening. As a result, the moving time will be shortened.

Indirect benefits

- Improvement of the road by this project is expected to contribute to reduction of traffic accidents rate per kilometer so that the safety of citizen life will be assured.
- Improvement in bus services to go to school and to work is expected to benefit the lower income families.
- Rehabilitation of drainage facilities is expected to improve the hygienic conditions to the residents in the area.
- The project is expected to promote the accessibility of the agricultural product from the southern region to the area that can act as a center of regional development in future.

3.2 Recommendation

This project aims at securing smooth traffic by upgrading Kilwaroad from the current single-lane road to a double-lane road. The implementation of the project will directly contribute to alleviation of traffic congestion on the urban roads in Dar es Salaam, which is considered to be the major rationale for the project implementation. In addition, as the traffic congestion in peak time shall be more terrible temporarily during the execution, it is necessary to avoid unexpected trouble among the road users to whom the pre-notice shall be given in time.

Appendices

- Appendix 1. Member List of the Survey Team**
- Appendix 2. Survey Schedule**
- Appendix 3. List of Party Concerned in Tanzania**
- Appendix 4. Minutes of Discussion**
- Appendix 5. Other Relevant Data**

Appendix 1. Member List of the Survey Team

1.1 Field survey in Tanzania for the basic design study

No.	Name	Job title	Occupation
1	Hiroyuki HAYASHI	Leader	Transportation and Electric Power Team, Project Management Group I, Grant Aid Management Department, JICA.
2	Shozo INOUE	Chief Consultant/Road Planner/Specialist on the Environmental & Social Consideration	Construction Project Consultants, Inc.
3	Hideaki MORITA	Assistant Chief Consultant/ Road Designer 1	Construction Project Consultants, Inc.
4	Yoshinori OOHIRO	Road Designer 2	Construction Project Consultants
5	Toshifumi TANAKA	Natural Condition Surveyor	Construction Project Consultants
6	Tetsumi MASUI	Cost Estimator / Construction Planner	Construction Project Consultants, Inc.

1.2 Explanation of draft basic design report in Tanzania

No.	Name	Job title	Occupation
1	Naoki TAKAHASHI	Leader	Deputy Resident Representative, JICA Tanzania Office
2	Shozo INOUE	Chief Consultant/ Road Planner/Specialist on the Environmental & Social Consideration	Construction Project Consultants, Inc.
3	Hideaki MORITA	Assistant Chief Consultant/ Road Designer 1	Construction Project Consultants, Inc.

Appendix 2. Survey Schedule

2.1 Field survey in Tanzania for the basic design study

Order	Month	date	JICA OFFICIALS	Chief Consultant/Road Planner /Specialist on the Environmental & Social Consideration	Road Designer 1	Road Designer 2	Natural Condition Surveyor	Cost Estimator / Construction Planner
			Hiroyuki HAYASHI	Shozo INOUE	Hideaki MORITA	Yoshinori OOHIRO	Toshifumi TANAKA	Tetsumi MASUI
			PROGRAM	PROGRAM	PROGRAM	PROGRAM	PROGRAM	PROGRAM
1	7	25	Mon		HND/KIX,JL1319 20:40-21:55		HND/KIX,JL1319 20:40-21:55	
2		26	Tue		KIX/DXB,EK317 (-)23:15-05:10 DXB/DES,EK719 08:10-14:30		KIX/DXB,EK317 (-)23:15-05:10 DXB/DES,EK719 08:10-14:30	
3		27	Wed		Negotiation with Local Consultaqt		Negotiation with Local Consultaqt	
4		28	Thu		Negotiation with Local Consultaqt		Negotiation with Local Consultaqt	
5		29	Fri		Investigation		Investigation	
6		30	Sat		Document Arrangement		Document Arrangement	
7		31	Sun		Internal Meeting		Internal Meeting	
8	8	1	Mon	HND/KIX,JL1319 20:40-21:55	HND/KIX,JL1319 20:40-21:55	Investigation	Investigation	
9		2	Tue	KIX/DXB,EK317 (-)23:15-05:10 DXB/DES,EK719 08:10-14:30	KIX/DXB,EK317 (-)23:15-05:10 DXB/DES,EK719 08:10-14:30	Investigation	Investigation	
10		3	Wed	EOJ,MOW .TANROAD	EOJ,MOW .TANROAD	EOJ,MOW .TANROAD	EOJ,MOW .TANROAD	
11		4	Thu	TANROAD	TANROAD	TANROAD	Investigation (Quarry,BP)	
12		5	Fri	Discussion	Discussion	Discussion	Investigation (Quarry,BP)	
13		6	Sat	Site Investigation	Site Investigation	Site Investigation	Investigation	
14		7	Sun	Site Investigation	Data Arrangement	Data Arrangement	HND/KIX,JL1319 20:40-21:55	HND/KIX,JL1319 20:40-21:55
15		8	Mon	Site Investigation	Site Investigation	Site Investigation	KIX/DXB,EK317 (-)23:15-05:10 DXB/DES,EK717 14:30-20:50	KIX/DXB,EK317 (-)23:15-05:10 DXB/DES,EK717 14:30-20:50
16		9	Tue	Signature of M/D	Signature of M/D	Investigation	Investigation	Investigation
17		10	Wed	EOJ,JICA DES,KQ483,15:15	EOJ,JICA DES,KQ483,15:15	Investigation	Investigation	Investigation
18		11	Thu	HND, JL1316,19:45	Investigation	Investigation	Investigation	Investigation
19		12	Fri		Investigation	Investigation	Investigation	Investigation
20		13	Sat		Investigation	Investigation	Investigation	Investigation
21		14	Sun		Investigation	Investigation	Investigation	Data Arrangement
22		15	Mon		Investigation	Investigation	Investigation	Investigation
23		16	Tue		Investigation	Investigation	Investigation	Investigation
24		17	Wed		Investigation	Investigation	Investigation	Investigation
25		18	Thu		Investigation	Investigation	Investigation	Investigation
26		19	Fri		Investigation	Investigation	Investigation	Investigation
27		20	Sat		Investigation	Investigation	Investigation	Investigation
28		21	Sun		Data Arrangement	Data Arrangement	Investigation	Data Arrangement
29		22	Mon		Investigation	Investigation	Investigation	Investigation
30		23	Tue		Investigation	Investigation	Investigation	Investigation
31		24	Wed		Investigation	Investigation	Investigation	Investigation
32		25	Thu		Analysis of Data	Analysis of Data	Investigation	Investigation
33		26	Fri		EOJ,JICA	EOJ,JICA	Investigation	EOJ,JICA
34		27	Sat		Internal Meeting	Internal Meeting	Internal Meeting	Internal Meeting
35		28	Sun		Analysis of Data	Analysis of Data	Analysis of Data	Analysis of Data
36		29	Mon		DES/NRB,KQ483 15:15-16:30 NRB/DXB,KQ310 19:30-01:45(+)	DES/NRB,KQ483 15:15-16:30 NRB/DXB,KQ310 19:30-01:45(+)	Analysis of Data	DES/NRB,KQ483 15:15-16:30 NRB/DXB,KQ310 19:30-01:45(+)
37		30	Tue		DXB/KXB,EK316 02:50-17:20 KXB/HND,JL1316 18:40-19:45	DXB/KXB,EK316 02:50-17:20 KXB/HND,JL1316 18:40-19:45	Analysis of Data	DXB/KXB,EK316 02:50-17:20 KXB/HND,JL1316 18:40-19:45
38		31	Wed				Analysis of Data	Analysis of Data
39	9	1	Thu				Analysis of Data	Analysis of Data
40		2	Fri				Internal Meeting	Internal Meeting
41		3	Sat				Data Arrangement	Data Arrangement
42		4	Sun				DES/DXB,EK720 15:45-00:20(+)	DES/DXB,EK720 15:45-00:20(+)
43		5	Mon				DXB/KXB,EK316 02:50-17:20 KXB/HND,JL1316 18:40-19:45	DXB/KXB,EK316 02:50-17:20 KXB/HND,JL1316 18:40-19:45

2.2 Explanation of draft basic design report in Tanzania

Order	Month	date		JICA OFFICIALS	Chief Consultant/Road Planner /Specialist on the Environmental & Social Consideration	Road Designer 1
				Naoki TAKAHASHI	Shozo INOUE	Hideaki MORITA
				PROGRAM	PROGRAM	PROGRAM
1	2	4	Sat		HND/KIX,EK6251 20:40-22:00	HND/KIX,EK6251 20:40-22:00
2		5	Sun		KIX/DXB,EK317 (-)23:15-05:55 DXB/DES,EK719 08:10-14:40	KIX/DXB,EK317 (-)23:15-05:55 DXB/DES,EK719 08:10-14:40
3		6	Mon	Internal Meeting	JICA,MOID,TANROADS	JICA,MOID,TANROADS
4		7	Tue		Discussion	Discussion
5		8	Wed		Discussion	Discussion
6		9	Thu	Signature of M/D	Signature of M/D	Signature of M/D
7		10	Fri		Data Arrangement	Data Arrangement
8		11	Sat		Data Arrangement	Data Arrangement
9		12	Sun		Data Arrangement	Data Arrangement
10		13	Mon	EOJ, MOF	EOJ, MOF	EOJ, MOF
11		14	Tue		DES/DXB,EK720 15:45-00:15(+)	DES/NRB,KQ483 15:15-16:30 NRB/DXB,KQ310 19:30-01:45(+)
12		15	Wed		DXB/KXB,EK316 02:50-16:40 KXB/HND,EK6252 18:30-19:35	DXB/KXB,EK316 02:50-16:40 KXB/HND,EK6252 18:30-19:35

Appendix 3. List of Party Concerned in Tanzania

<u>Ministry of Infrastructure Development</u>		
Mr. John W.H.V.Kijazi	:	Permanent Secretary
Mr. Leopold J. K.N. Mujjungi	:	Director for Trunk Roads
Mr. Edwin Mujwahuzi	:	Assis. Director for Trunk Road Division
Mr. I.Mwanawima	:	Assis. Director for Maintenance
<u>Tanzania National Roads Agency: Tanroads</u>		
Dr. F.Y. Addo - Abedi	:	Chief Executive
Mr. Boniface H.P. Nyiti	:	Acting Chief Executive
Mr. Arnold . J. Maeda	:	Acting Manager Projects Preparation Unit
Mr. W. Shila	:	Coast Zonal Manager
Mr. J.B.Kiiza	:	South Highland Zonal Manager
Mr. Thomas Mosso	:	Director of Engineering
Mr. V.K.Ndyamukama	:	Director of Maintenance
Mr. Ndyamukama.J	:	Regional Manager of Dar es Salaam
Mr. Mohamed Besta	:	Pavement and Materials Engineer
Mr. Issa Mlyomi	:	Bridge Maintenance Engineer
Mr. Ebenezer R. Mollel	:	Acting Maneger Design
Mr. Sanjo M.Mgeta	:	Senior Environmentalist
Mr. M.O.Mataka	:	Pavement/Materials Engineer
Mr. Katura O.R	:	Maintenance Engineer, Dar es Salaam Regional Office
Mr. Martin A.M	:	Road Inspector, Dar es Salaam Regional Office
Mr. Kashililika E	:	Road Inspector, Dar es Salaam Regional Office
<u>Temeke Municipal Council</u>		
Mr. I. Nyundo	:	Municipal Director
Mr.E.G. Dumulinyi	:	Municipal Planner
Mr.Ayobu Bahati	:	Municipal Engineer
Mr. B.Sasi	:	Valuer
Mr.I.M. Maiba	:	Land Officer
<u>Dar es Salaam City Council</u>		
Mr. Raymond P.Mbilinyi	:	Project Manager of BRT
Mr. Enoch J. Kitandu	:	Transportation Engineer of BRT
Mr.Elkin Bello	:	Project Consultant of Logit, Brazil
<u>Ministry of Finance</u>		
Mrs. Mwanakombo Ngingite	:	Ag. Assistant Commissioner Bilateral Section
Mrs.Joyce Momburi	:	Alternate Desk Officer (Japan)
<u>Ambassade of Japan</u>		
Mr. Iatsuya Ikeda	:	Ambassador
Mr.Tomio Harada	:	Second Secretary
<u>JICA Tanzania Office</u>		
Mr. Toshihiro Obata	:	Resident Representantive
Mr. Hiroyuki Kinomoto	:	Former Deputy Resident Representantive
Mr. Naoki Takahashi	:	Deputy Resident Representantive
Mr. Takeshi Oikawa	:	Assistant Resident Representantive

Appendix 4. Minutes of Discussions

- 4. 1 Field survey in Tanzania for the basic design study

- 4, 2 Explanation of draft basic design report in Tanzania

4. 1 Field survey in Tanzania for the basic design study

**Minutes of Discussions
on the Basic Design Study on
the Project for Widening of Kilwa Road
(from the Junction of Bandari Road to Mbagala Rangi Tatu)
in the United Republic of Tanzania**

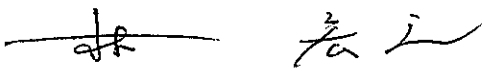
In response to the request from the Government of the United Republic of Tanzania (hereinafter referred to as "Tanzania"), the Government of Japan decided to conduct the Basic Design Study (hereinafter referred to as "the Study") on the project for Widening of Kilwa Road (from the Junction of Bandari Road to Mbagala Rangi Tatu) (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent to Tanzania the Basic Design Study Team (hereinafter referred to as "the Team"), headed by Mr. Hiroyuki Hayashi, Transportation and Electric Power Team of the Project Management Group I, Grant Aid Management Department, JICA, and is scheduled to stay in the country from August 2 to September 4, 2005.

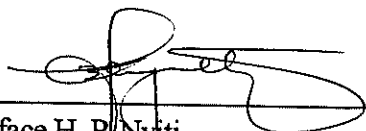
The Team held discussions with the concerned officials of the Government of Tanzania.

In the course of the discussions, both sides have confirmed the main items described in the attached sheets. The Team will proceed with further works and prepare the draft report.

Dar es Salaam, August 5, 2005

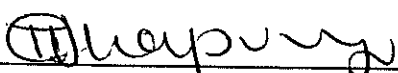


Hiroyuki Hayashi
Leader
Basic Design Study Team
Japan International Cooperation Agency



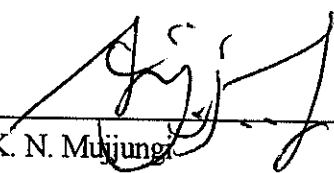
Boniface H. P. Nyiti
Acting Chief Executive
Tanzania National Roads Agency (TANROADS)

Witnessed by



Joyce Mapunjo
Commissioner, External Resources
Ministry of Finance
The United Republic of Tanzania

Witnessed by



Leopold J. K. N. Mujunga
Director for Trunk Roads
Ministry of Works
The United Republic of Tanzania



ATTACHMENT

1. Objective

The objective of the Project is to widen the Kilwa Road from the Junction of Bandari Road to Mbagala Rangi Tatu.

2. Project Site

The sites of the Project are shown in Annex-1.

3. Organizations concerned in Tanzania

(1) The Responsible Ministry is the Ministry of Works (MOW).

(2) The Implementing Agency is the Tanzania National Roads Agency (TANROADS).

The organization structures of MOW and TANROADS are shown in Annex-2-1 and 2-2.

4. Components Requested by the Government of Tanzania

After discussions with the Team, the following components were finally requested by the Tanzanian side;

- Widening of the Kilwa Road between Junction of Bandari Road to Mbagala Rangi Tatu about 11.6 km long to 4-lane carriageway.
- Reconstruction of bridge/culvert at Mzinga River.
- Provision of Bus Terminal(s) along the Kilwa Road.
- Allow space for the Bus Rapid Transit (BRT).

The Team will assess the appropriateness of each component, prioritise and show the results to the Tanzanian side at the time of submitting the draft report.

5. Japan's Grant Aid Scheme

(1) The Tanzanian side understands the Japan's Grant Aid scheme and the necessary measures to be taken by the Government of Tanzania explained by the Team as described in Annex-3.

(2) The Tanzanian side promised to take measures, as described in Annex-4, necessary for smooth implementation of the Project as a condition for the Japan's Grant Aid to be implemented.

6. Schedule of the Study

(1) The Team will proceed with further studies in Tanzania until September 4, 2005.

(2) JICA will prepare the draft report in English and dispatch a team to Tanzania in order to discuss its contents in the middle of January 2006.

(3) When the contents of the draft report are accepted in principle by the Government of Tanzania, JICA will complete the final report and send it to the Government of Tanzania around April 2006.

7. Information Disclosure

Both sides agreed that information disclosure regarding all the studies and surveys especially for the Environmental and Social Considerations (hereinafter referred to as "ESC") on the Project shall be implemented in accordance with the regulation of JICA Guidelines for Environmental and Social Considerations.

8. Explanation of the Policy of the Government of Japan

The Team explained the present policy of the Government of Japan as follows:

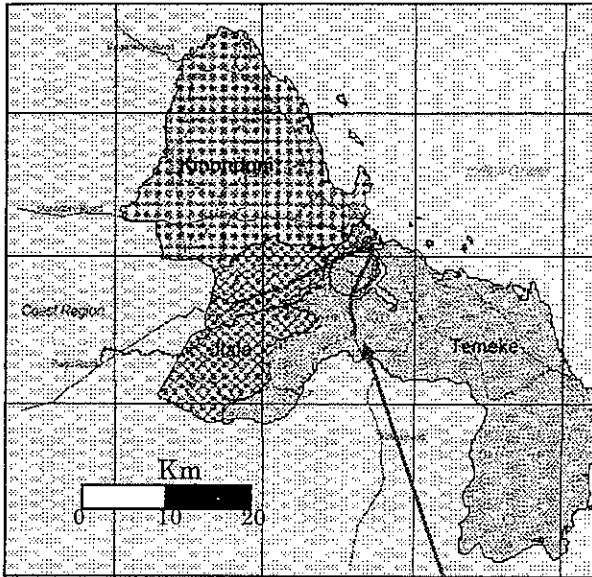
- (1) The Ministry of Foreign Affairs of Japan (hereinafter referred to as "MOFA") makes its own Environmental and Social Considerations Guideline for Grant Aid Project, making reference to the JICA Guidelines for Environmental and Social Considerations as well.
- (2) MOFA sets the critical path(s) for each stage of a project from the viewpoints of the Environmental and Social Considerations (hereinafter referred to as "ESC") and MOFA may suspend the implementation of a project unless otherwise the process of the ESC is followed.

Both sides reconfirmed that there is, in principle, no serious ESC issues including involuntary resettlement on the Project. In the event that other ESC issues, which are not shown in the Minutes of Discussion, are found through the Basic Design Study, the Tanzanian side should take measures necessary for solving the issues in accordance with due process stipulated in the relevant act(s) and/or law(s) and report its results to the Japanese side through JICA Tanzania Office by due date(s), which will be set in the Minutes of Discussions for the meeting of the draft report in January 2006.

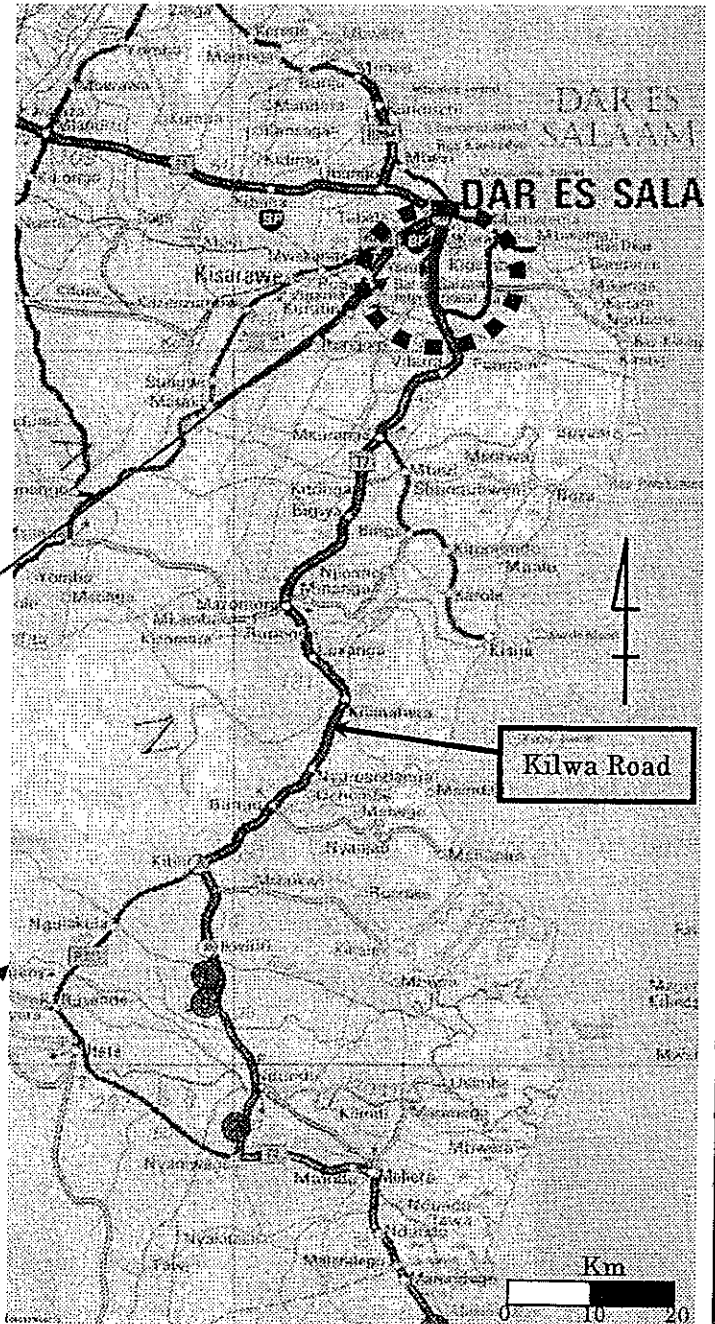
9. Other Relevant Issues

- (1) The Tanzanian side should submit answers in English to the Questionnaire, which the Team handed to the Tanzanian side, by August 12, 2005.
- (2) The Tanzanian side should provide necessary number(s) of counterpart personnel to the Team during the field survey.
- (3) The Tanzanian side should take special measures for the Project as below;
 - Coordination of the relocation of public utilities.
 - Acquisition of adequate area for existing Mbagala Rangi Tatu Bus Terminal.
 - Coordination of the improvement of the existing drainage flow by the relevant authorities, taking into account the upcoming project.
 - Coordination of the relocation of the Mosque at km5.7 including public consultation with the Mosque community.
- (4) Both sides confirmed that 30 m on either side from the centerline of the Mandela Road at the junction of Kilwa-Mandela should be excluded from the Project. The Junction will be improved by the project for improvement of the Mandela Road funded by EU which starts in 2006.
- (5) Both sides confirmed that the name of the Project should be "the Project for Widening of Kilwa Road (from the Junction of Bandari Road to Mbagala Rangi Tatu)" instead of "the Project for Widening of Kilwa Road from the Junction of Bandari Road to Mbagala Rangi Tatu Bus Terminal" shown in the application form for Japan's Grant Aid.

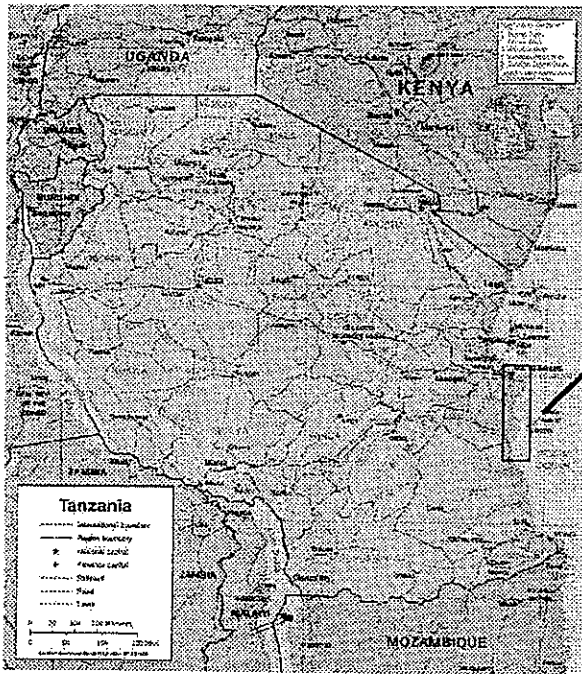
Dar es salaam City



STUDY SECTION



Kilwa Road

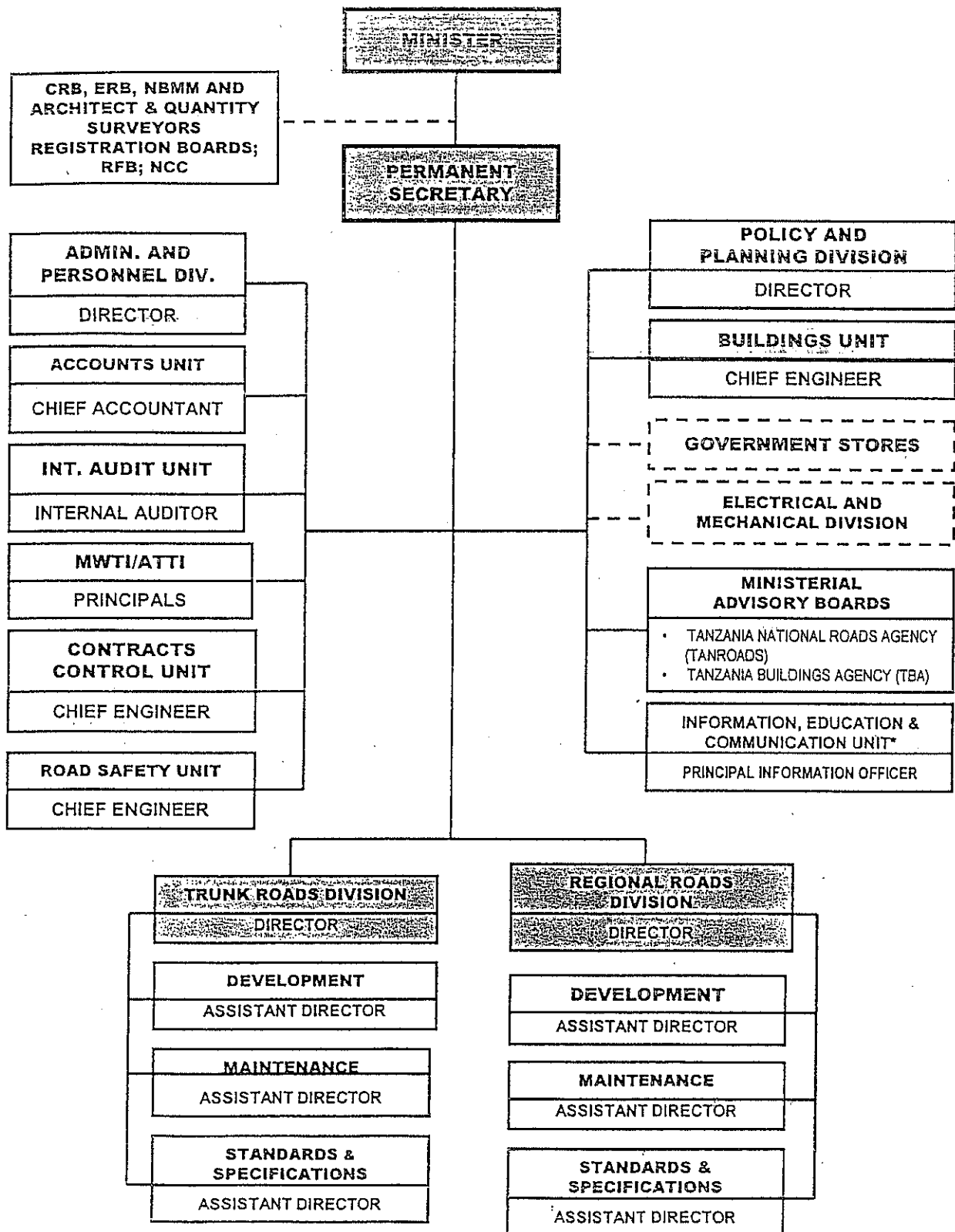


LOCATION MAP

THE BASIC DESIGN STUDY ON THE PROJECT
FOR
WIDENING OF KILWA ROAD
(FROM THE JUNCTION OF BANDARI ROAD TO MBAGALA RANGI TATU)
IN
UNITED REPUBLIC OF TANZANIA

Chart III

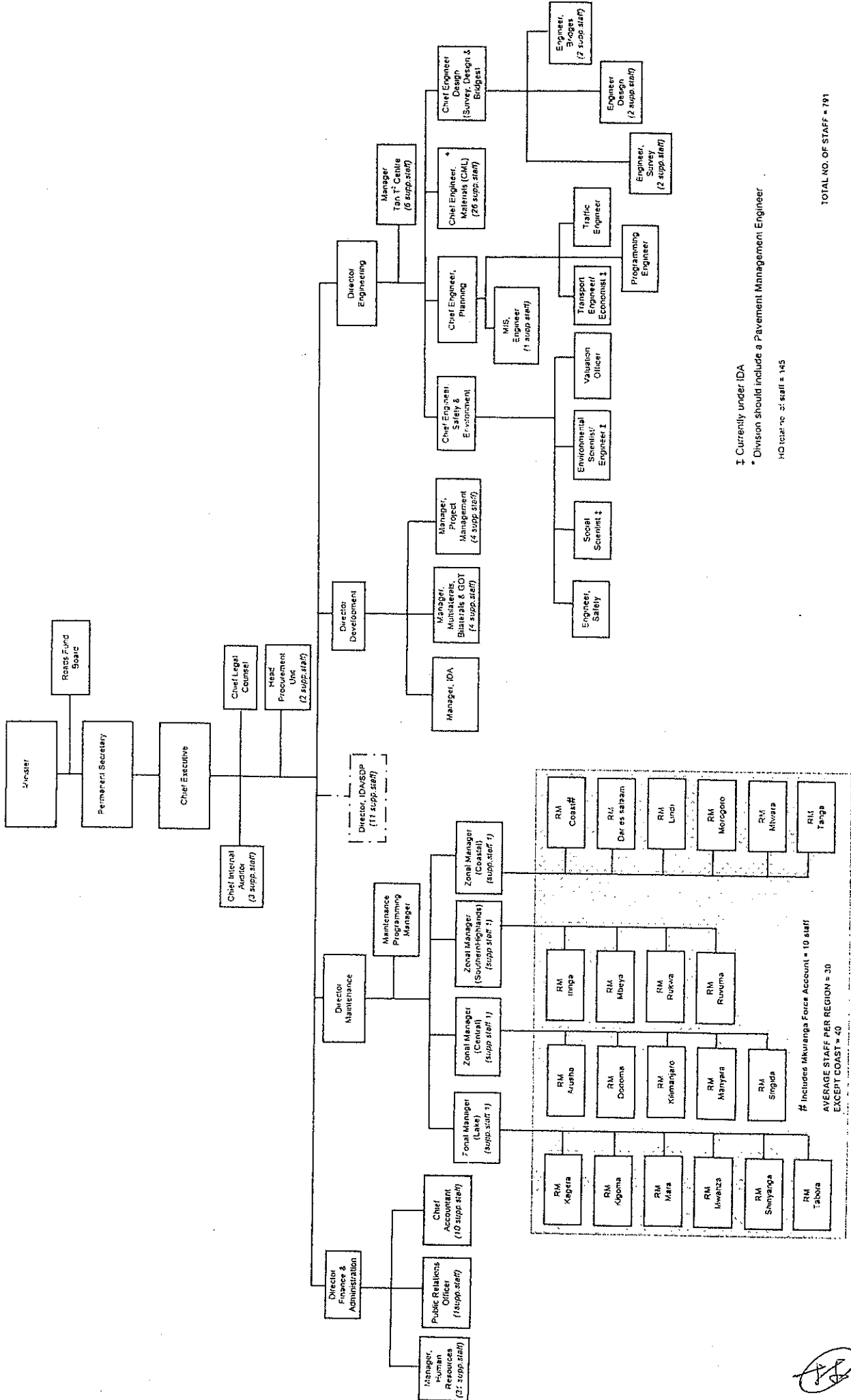
ORGANISATION STRUCTURE OF THE MINISTRY OF WORKS
(Approved by the President on 14th November, 2002)



Key:

Proposed Executive Agency MWTI: Morogoro Works Training Institute ATTI: Appropriate Technology Training Institute

*Creation of the Information, Education and Communication Units in all the Ministries was approved by the President on 28th January, 2003 and its implementation in the Ministry was effected by President's Office, Public Service Management's letter Ref.C/BA/218/248/01/17 of 19th February, 2003



‡ Currently under IDA
 * Division should include a Pavement Management Engineer
 † Total no. of staff = 145

Includes Mkuwanga Force Account = 10 staff
 AVERAGE STAFF PER REGION = 30
 EXCEPT COAST = 40

TOTAL NO. OF STAFF = 791



Japan's Grant Aid Scheme

The Grant Aid scheme provides a recipient country with non-reimbursable funds to procure the facilities, equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with the relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials as such.

1. Grant Aid Procedures

Japan's Grant Aid scheme is executed through the following procedures.

Application	(Request made by a recipient country)
Study	(Basic Design Study conducted by JICA)
Appraisal & Approval	(Appraisal by the Government of Japan and Approval by Cabinet)
Determination of Implementation	(The Notes exchanged between the Governments of Japan and the recipient country)

Firstly, the application or request for a Grant Aid project submitted by a recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA (Japan International Cooperation Agency) to conduct a study on the request.

Secondly, JICA conducts the study (Basic Design Study), using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid scheme, based on the Basic Design Study report prepared by JICA, and the results are then submitted to the Cabinet for approval.

Fourthly, the project, once approved by the Cabinet, becomes official with the Exchange of Notes (E/N) signed by the Governments of Japan and the recipient country.

Finally, for the smooth implementation of the project, JICA assists the recipient country in such matters as preparing tenders, contracts and so on.

2. Basic Design Study

1) Contents of the Study

The aim of the Basic Design Study (hereinafter referred to as "the Study"), conducted by JICA on a requested project (hereinafter referred to as "the Project") is to provide a basic document necessary for the appraisal of the Project by the Government of Japan. The contents of the Study are as follows:

- Confirmation of the background, objectives, and benefits of the requested project and also institutional capacity of agencies concerned of the recipient country necessary for the Project's implementation.
- Evaluation of the appropriateness of the Project to be implemented under the Grant Aid scheme from a technical, social and economic point of view.
- Confirmation of items agreed upon by both parties concerning the basic concept of the Project.
- Preparation of a basic design of the Project
- Estimation of costs of the Project

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the Project is confirmed considering the guidelines of Japan's Grant Aid scheme.

The Government of Japan requests the Government of the recipient country to take whatever measures are necessary to ensure its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the organization in the recipient country actually implementing the Project. Therefore, the implementation of the Project is confirmed by all relevant organizations of the recipient country through the Minutes of Discussions.

2) Selection of Consultants

For smooth implementation of the Study, JICA uses (a) registered consultant firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the Study is(are) recommended by JICA to the recipient country to also work on the Project's implementation after the Exchange of Notes, in order to maintain technical consistency.

3. Japan's Grant Aid Scheme

1) Exchange of Notes (E/N)

Japan's Grant Aid is extended in accordance with the Notes exchanged by the two Governments concerned, in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid, etc., are confirmed.

2) "The period of the Grant Aid" means the one fiscal year which the Cabinet approves the Project for. Within the fiscal year, all procedures such as exchanging of the Notes, concluding contracts with (a) consulting firm(s) and (a) contractor(s) and final payment to them must be completed.

However in case of delays in delivery, installation or construction due to unforeseen factors such as natural disaster, the period of the Grant Aid can be further extended for a maximum of one fiscal year at most by mutual agreement between the two Governments.

3) Under the Grant Aid, in principle, Japanese products and services including transport or those of the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant Aid may be used for the purchase of the products or services of a third country.

However, the prime contractors, namely, consulting, contracting and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

4) Necessity of "Verification"

The Government of recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. This "Verification" is deemed necessary to secure accountability to Japanese taxpayers.

5) Undertakings required of the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

- a) To secure land necessary for the sites of the Project and to clear, level and reclaim the land prior to commencement of the construction.

- b) To provide facilities for the distribution of electricity, water supply and drainage and other incidental facilities in and around the sites.
- c) To secure buildings prior to the procurement in case the installation of the equipment.
- d) To ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid.
- e) To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts.
- f) To accord Japanese nationals, whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

6) "Proper Use"

The recipient country is required to operate and maintain the facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for this operation and maintenance as well as to bear all the expenses other than those covered by the Grant Aid.

7) "Re-export"

The products purchased under the Grant Aid should not be re-exported from the recipient country.

8) Banking Arrangements (B/A)

- a) The Government of the recipient country or its designated authority should open an account in the name of the Government of the recipient country in a bank in Japan (hereinafter referred to as "the Bank"). The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by the Government of the recipient country or its designated authority under the Verified Contracts.
- b) The payments will be made when payment requests are presented by the Bank to the Government of Japan under an authorization to pay (A/P) issued by the Government of the recipient country or its designated authority.

9) Authorization to Pay (A/P)

The Government of the recipient country should bear an advising commission of an Authorization to Pay and Payment commissions to the Bank.

Major Undertakings to be taken by Each Government

No.	Items	To be covered by Grant Aid	To be covered by Recipient Party
1	To secure land		●
2	To clear, level and reclaim the site when needed		●
3	To construct gates and fences in and around the site	(●)	(●)
4	To construct roads		
	1) Within the site	●	
	2) Outside the site when needed	N/A	N/A
5	To bear the following commission to the Japanese bank for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
6	To ensure prompt unloading and customs clearance at port of disembarkation in recipient country		
	1) Marine (Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	●	
7	To accord Japanese nationals, whose services may be required in connection with the supply of the products and the services under the verified contract, such facilities as may be necessary for their entry into Tanzania and stay therein for the performance of their works		●
8	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in Tanzania with respect to the supply of the products and services under the verified contracts		●
9	To maintain and use properly and effectively the facilities constructed and equipment provided under the Japan's Grant		●
10	To bear all the expenses, other than those to be borne by the Japan's Grant, necessary for construction of the facilities		●

(B/A: Banking Arrangement, A/P: Authorization to pay)

4, 2 Explanation of draft basic design report in Tanzania

**Minutes of Discussions
on the Basic Design Study on
the Project for Widening of Kilwa Road
(from the Junction of Bandari Road to Mbagala Rangi Tatu)
in the United Republic of Tanzania
(Explanation on the Draft Report)**

In August, 2005, the Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a Basic Design Study Team on the Project for Widening of Kilwa Road (from the Junction of Bandari Road to Mbagala Rangi Tatu) (hereinafter referred to as "the Project") to the United Republic of Tanzania (hereinafter referred to as "Tanzania") and through discussion, field survey, and technical examination of the results in Japan, JICA prepared a draft report of the study.

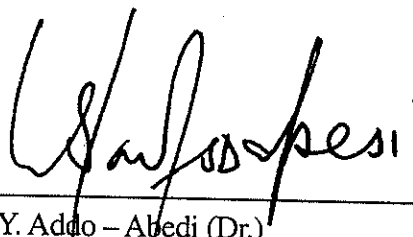
In order to explain and consult the Government of Tanzania on the components of the draft report, JICA sent to Tanzania the Draft Report Explanation Team (hereinafter referred to as "the Team"), which is headed by Mr. Naoki TAKAHASHI, Deputy Resident Representative of JICA Tanzania Office, and is scheduled to stay in the country from February 5 to 14, 2006.

As a result of discussions, both sides have confirmed the main items described in the attached sheets.

Dar es Salaam, February 9, 2006

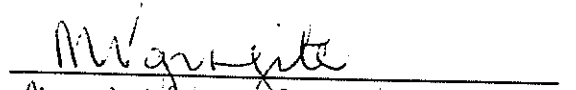
高橋直樹

Naoki TAKAHASHI
Leader
Draft Report Explanation Team
Japan International Cooperation Agency




F. Y. Addo - Abedi (Dr.)
Chief Executive
Tanzania National Roads Agency (TANROADS)

Witnessed by



MWANAKEMBO NGING'ITI
Acting Commissioner, External Resources
Ministry of Finance
The United Republic of Tanzania

Witnessed by



Leopold J. K. N. Mujjungi
Director for Trunk Roads
Ministry of Infrastructure Development
The United Republic of Tanzania

ATTACHMENT

1. Components of the Draft Report

The Tanzanian side agreed and accepted in principle the components of the Draft Report explained by the Team.

2. Schedule of the Study

JICA will complete the Final Report in accordance with the confirmed items and submit it to the Tanzanian side around April 2006.

3. Organizations concerned in Tanzania

(1) The Responsible Ministry is changed from the Ministry of Works (MOW) to the Ministry of Infrastructure Development (MOID). The new organization structures of MOID is under preparation.

(2) The Implementing Agency is the Tanzania National Roads Agency (TANROADS), which remains unchanged.

4. Other Relevant Issues

(1) The TANROADS should obtain the certificate for approval of the Limited Environmental Examination (LEA) from the Road Sector Environmental Section (RS-ES), MOID by the end of March 2006.

(2) Regarding the major undertakings to be done by the Tanzanian side, which were confirmed in the previous Minutes of Discussions signed by both sides on August 5, 2005, the Tanzanian side explained the update status to the Team as follows;

a) The Tanzanian side shall complete the relocation of the following public utilities within the assigned time table .

-Items of public utilities to be relocated

Telephone line

Electric power line

Water supply and sewer pipeline

Gas pipeline

Crude oil pipeline

Roadside billboards and other public utility, if any

-Assignment schedule

From km 0 to km 5: before the commencement of phase 1 works scheduled in December 2006

From km5 to km 11.6: before the commencement of phase 2 works scheduled in December 2007

b) The Tanzanian side shall coordinate the acquisition of adequate area for the replacement of the existing Mbagala Rangi Tatu Bus Terminal with the Temeke Municipal Council.

c) The Tanzanian side shall coordinate the improvement of the drainage flow with the relevant authorities, taking into account the upcoming project.

d) The Tanzanian side shall complete the relocation of the Mosque at km5.4 before the commencement of phase 2 works scheduled in December 2007 through the public consultation with the Mosque community.

(3) The Tanzania side should allocate the necessary budget for the undertakings to be done on a timely manner, based on the provisional amount shown in the draft report.

Appendix 5. Other Relevant Data

- 5.1 Memorandum of discussion with the Temeke Municipal Council
- 5.2 Memorandum of discussion with the Project Management Unit of BRT
- 5.3 Technical Note for the Project
- 5.4 Results of Traffic Investigation
- 5.5 Data for Pavement Design
- 5.6 Results of the Geotechnical Investigation
- 5.7 Results of DCP Investigation

5.1 Memorandum of discussion with the Temeke Municipal Council

Construction Project Consultants Inc
YSK Bidg 3-23-1 Takadanobaba Shinjuku-ku, Tokyo 169-0075 Japan
Phone : (81)3-5337-4062 Fax : (81)3-5337-4092

Project for Widening of Kilwa Road
(From the Junction of Bandari Road to Mbagala Rangi Tatu)

Dar es Salaam, 17th august 2005

Our Ref : CPC / Dar/KILWA/No.1
Subject : Memorandum of discussion

The meeting regarding to the captioned Project held on 16th august 2005 at the Temeke Municipal Council. The contents of meeting are given as below.

1. Participants

Temeke municipal council	Mr. I. Nyundo Mr. F.G. Dumulinyi Mr. B.Sasi Mr.I.M. Maiba Mr.Ayobu Babati	Municipal Director Municipal Planner Valuer Land Officer Municipal Engineer
Tanroads, DSM	Mr. Ndyamukama.J Mr. Katura O.R Mr.Kashililika E	Regional Manager,DSM Tanroads Maintenance Engineer, DSM Tanroads Road Inspector, DSM Tanroads
Study team for the Project	S. Inoue H.Morita	Chief consultant Road designer

2. Contents of the discussion

1) Rangitatu bus terminal

The municipal side proposed two alternative site. One is located at 500m back side to the BP of the project from the actual center of bus terminal and the other is just behind the actual bus terminal.

The study team explained that the relocation of petty traders in the identified location must be cleared from the point of social environmental issue.

2) Drainage issue

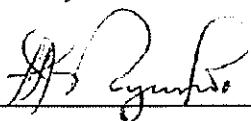
The study team explained that the drainage facilities of the project will be considered within the right of way (ROW) and that the drainage out of ROW will be arranged by the municipality and the MOW (Tanroads).


3) Mosque


It was confirmed that the relocation of mosque will be arranged by the stakeholders.

4) Cemeteries

The municipal side agreed to give the detail information of required relocation of tombs where are located within ROW (22.5m from center line of existing road) to the study team.


I. Nyundo
Municipal Director, Temeke


Ndyamukama.J
Regional Manager, DSM
Tanroads


S Inoue
Chief consultant

5.2 Memorandum of discussion with the Project Management Unit of BRT

Construction Project Consultants Inc
YSK Bldg 3-23-1 Takadanobaba Shinjuku-ku., Tokyo 169-0075 Japan
Phone : (81)3-5337-4062 Fax : (81)3-5337-4092

Project for Widening of Kilwa Road
(From the Junction of Bandari Road to Mbagala Rangi Tatu)

Dar es Salaam, 22th August 2005

Our Ref : CPC / Dar/KILWA/No.2

Subject : Memorandum of discussion (Explanation of each side project)

The meeting regarding to the captioned subject held on 19th August 2005 at the DSM City Council. The contents of meeting are given as below.

1. Participants


PMU of DART	Mr. Raymond P.Mbilinyi Mr. Enoch J. Kitandu	Project Manager of DART Transportation Engineer of BRT
Tanroads, DSM	Mr. Katura O.R Mr. Kashililika E	Maintenance Engineer, DSM Tanroads Road Inspector, DSM Tanroads
Study team for the Project	Mr. S. Inoue Mr. H. Morita Mr. T. Tanaka	Chief consultant Road designer Natural Condition Surveyer

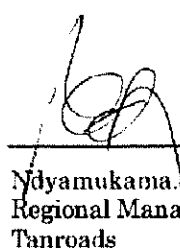
2. Discussion

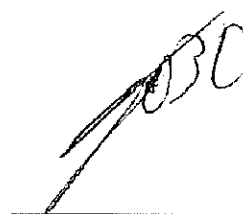
1) The study team explains briefly the Project based on the inception report.

2) The PMU explains the DART Project as follows.

- The detail design of Morogoro road main line and the access lines are under preparation.
- Kilwa line has the second priority due to the importance of connection to Kaliakoo access.
- The space of BRT in Kilwa road can be reserved at the center portion by 9m from the beginning to Rangi Tatu bus terminal as long as possible.
- The bus stops can be located at the appropriate interval.


Raymond P. Mbilinyi
Project Manager of DART


Ndyamukama J.
Regional Manager, DSM
Tanroads


S. Inoue
Chief consultant

5.3 Technical Note for the Project

Construction Project Consultants Inc
YSK Bidg 3-23-1 Takadanobaba Shinjuku-ku., Tokyo 169-0075 Japan
Phone : (81)3-5337-4062 Fax : (81)3-5337-4092

Project for Widening of Kilwa Road
(From the Junction of Bandari Road to Mbagala Rang'i Tatu)

Dar es Salaam, 25th August 2005

Our Ref : CPC / Dar/KILWA/No.3
Subject : Technical Note for the Project

The meeting regarding to the captioned subject held on 24th august 2005 at Tanroads head quarter. The technical notes are given as below.

1. Explanation of preliminary outline of road design

The study team explained the preliminary idea of road design and exchanged the technical point of view with the concerned engineers of Tanroads.

2. Technical note of Geometrical Standard to be used for the road design

Description	Units	Value	
Design Speed	Km/hr	60	
No. of Lanes	No.	4	
Right of Way Width	m	45	
Carriageway Width	m	7.5/ direction	
Central Median Width	m	9.0	
Cross Fall on Carriageway	%	2.5	
Cross Fall on Shoulder	%	2.5	
Minimum Radius of Horizontal Curve	m	135	
Maximum Gradient	%	7	
Maximum Superelevation	%	6	
Fill Slope	Granular soil	Angle	variable
	Hard Rock	Angle	1:0.5
	Decomposed Rock	Angle	1:0.75
	Other than Rock	Angle	1:1

3. Technical note for the structure design

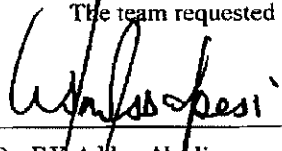
-Live Load

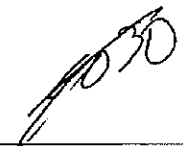
Class B Load of Japan Road Association will be applied.

*To check against BS loading
HA + 37.5 units HB*

-Seismic design

The team requested the confirmation of seismic design.


Dr. F.Y. Addo · Abedi
Chief Executive of Tanroads


Mr. S. INOUE
Chief Consultant of JICA Study Team

5.4 RESULTS OF TRAFFIC INVESTIGATION
(1) Analysis of the AADT2005 (Annual average daily traffic)

Site: KILWA ROAD

Description	Mon		Tue		Wed		Thu		Fri		Sat		Sun		Average	
	Traffic	Variation	Traffic	Variation	Traffic	Variation	Traffic	Variation	Traffic	Variation	Traffic	Variation	Traffic	Variation	Traffic	Variation
Near starting point							10,478		14201		8568					
Mndera							10,772		15349		9870					
Temeke									19283							
Rangitatu							10,118		14645		11160					
Near ending point									3782							
Average							10,456		13,452		9,866					11,258
Valuation							0.929		1.195		0.876					
Weekly valuation	0.865		0.971		0.900		0.927		1.227		0.834		1.166			
Seasonal valuation	1.000		1.000		1.000		1.000		1.000		1.000		1.000			
Applicable value	9,735		10,936		10,129		10,456		13,452		9,866		13,125			11,100

=AADT

Note : The seasonal variation for the city road was not considered

: The weekly variation factor was referred to the value of the traffic count that had been carried out in 2003.

: Actual average value applied for Thu., Fri. and Sat. data

Reference data for weekly valuation









Traffic measured in year 2003 for approx. 3km design between Mandera-Temeke Junction.

Date	Weekly Valuation		Spot-1		Spot-2		Spot-3		Spot-4		Spot-5 (Both dir.)		Spot-6 (Both dir.)	
	Traffic	Variation	Traffic	Variation	Traffic	Variation	Traffic	Variation	Traffic	Variation	Traffic	Variation	Traffic	Variation
Mon	0.865		5,345		4,683		9,085		7,145		10,028		16,233	
Tue	0.971		6,331		6,529		8,181		7,881		12,860		16,062	
Wed	0.900		5,652		6,126		7,149		7,869		11,778		15,018	
Thu	0.927		5,769		6,411		7,435		7,992		12,180		15,427	
Fri	1.227		9,207		7,132		11,082		9,142		16,339		20,224	
Sat	0.834		5,647		0.866		7.073		0.801		-		-	
Sun	1.166		7,691		7,012		11,790		8,546		14,703		20,336	
Average			6,520		6,316		8,828		8,096		12,981		17,217	

5.4 RESULTS OF TRAFFIC INVESTIGATION

(2) Equivalent Standard Axle Load (ESAL) during the Design Period

Site : Kilwa Road

Description	Motor Cycles	Car/ Taxi/ Jeep	Mimbus/ Pickup/ Wagon	Medium/ Large Bus	2-axle Truck	3-axle Truck	Trailer Truck	Ohters	Total
									
Vehicle Composition %	3.8%	46.2%	41.7%	0.1%	5.1%	2.0%	0.9%	0.2%	100.0%
AADT 2005	422	5128	4629	11	566	222	100	22	11,100
Growth Rate (%)	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	4.5%	
AADT 2006 (Construction)	441	5,359	4,837	11	591	232	105	23	11,599
AADT 2007 (Construction)	461	5,600	5,055	12	618	242	110	24	12,122
AADT 2008 (Construction)	482	5,852	5,282	13	646	253	115	25	12,668
AADT 2009 (year 1)	504	6,115	5,520	14	675	264	120	26	13,238
AADT 2010 (year 2)	527	6,390	5,768	15	705	276	125	27	13,833
AADT 2011 (year 3)	551	6,678	6,028	16	737	288	131	28	14,457
AADT 2012 (year 4)	576	6,979	6,299	17	770	301	137	29	15,108
AADT 2013 (year 5)	602	7,293	6,582	18	805	315	143	30	15,788
AADT 2014 (year 6)	629	7,621	6,878	19	841	329	149	31	16,497
AADT 2015 (year 7)	657	7,964	7,188	20	879	344	156	32	17,240
AADT 2016 (year 8)	687	8,322	7,511	21	919	359	163	33	18,015
AADT 2017 (year 9)	718	8,696	7,849	22	960	375	170	34	18,824
AADT 2018 (year 10)	750	9,087	8,202	23	1,003	392	178	36	19,671
AADT 2019 (year 11)	784	9,496	8,571	24	1,048	410	186	38	20,557
AADT 2020 (year 12)	819	9,923	8,957	25	1,095	428	194	40	21,481
AADT 2021 (year 13)	856	10,370	9,360	26	1,144	447	203	42	22,448
AADT 2022 (year 14)	895	10,837	9,781	27	1,195	467	212	44	23,458
AADT 2023 (year 15)	935	11,325	10,221	28	1,249	488	222	46	24,514
AADT 15 years total	10,490	127,096	114,715	315	14,025	5,483	2,489	516	275,129
15 years total traffic	3,828,850	46,390,040	41,870,975	114,975	5,119,125	2,001,295	908,485	188,340	100,422,085
One direction traffic	1,914,425	23,195,020	20,935,488	57,488	2,559,563	1,000,648	454,243	94,170	50,211,043
One lane traffic (after 4 lane)	957,213	11,597,510	10,467,744	28,744	1,279,781	500,324	227,121	47,085	25,105,521
Axle configuration	2	2	2	2	2	3	5	-	
% of Loaded Vehicle	80%	80%	80%	80%	80%	80%	80%	80%	
ESA (Empty vehicle)	0	0	0	0.000	0.086	0.120	0.084	0	
ESA (Loaded vehicle)	0	0	0.002	1.385	4.670	8.840	10.840	0.002	
ESA 15 years total 2009-2023)	-	-	16,748	31,848	4,803,275	3,550,297	3,946,822	151	12,300,000

5.5 PAVEMENT DESIGN

Site: Kilwa Road

				Input data of each Layer			
				Surface	Base Course	Sub base Course	Sub grade
Layer coefficient				0.44	0.14	0.13	
Surface	Road mix asphalt		0.20				
	Plant mix asphalt		0.44				
	Sand asphalt		0.40				
Base Course	Crushed stone		0.14				
	Cement treated						
	compressive s.t. 7days >650psi (45.7kg/cm2)		0.23				
	compressive s.t. 7days >=550psi (38.6kg/cm2)		0.20				
	compressive s.t. 7days <400psi (28.1kg/cm2)		0.15				
	Bituminous treated						
	Coarse graded		0.34				
	Sand asphalt		0.30				
	Lime treated		0.15 ~ 0.30				
Sub-base Course	Sandy gravel		0.13				
	Sand or sandy clay		0.05 ~ 0.10				
Drainage coefficient				1.1	1.1		
	excellent	drain 2 hour	1.2				
	good	drain 1 day	1.1				
	fair	drain 1 week	1.0				
	poor	drain 1 month	0.9				
	very poor	no - drain	0.8				
Analysis year	n	years	15				
Traffic growth rate	r		4.50%				
Total ESAL for Analysis year	@	Initial Million	0.592				
		Terminal Million	12.300				
				$S_n = @ * ((r + 1)^n - 1) / (r - 1)$			
Reliability	50%	0.000	Rural express way 85%	-1.037	-1.282	-1.282	-1.282
	60%	-0.253	Urban express way 90%	-1.282			
	Local road 70%	-0.524	Very important 95%	-1.645			
	Secondary 75%	-0.647	Most important 98%	-2.327			
	Primary 80%	-0.841	99.9%	-3.090			
Combined standard error of the traffic prediction and performance prediction				0.4	0.4	0.4	
		Flexible pavements	0.3 ~ 0.4 ~ 0.5				
		Rigid pavements	0.2 ~ 0.3 ~ 0.4				
Performance Serviceability Index	Initial	Flexible pavements	4.2	4.2	4.2	4.2	
		Rigid pavements	4.5				
	Terminal	Unacceptable people	12% 3.0	55% 2.5	85% 2.0	2.0	2.0
Resilient modulus for surface				350,000	31,000	18,600	13,500
	Base course	psi	5,000 ~ 62,000	MR base course = $E_{bs} = 10^{((a_2 + 0.977) / 0.249)}$			
	Sub-base	psi	3,000 ~ 32,000	MR sub-base = $E_{sb} = 10^{((a_3 + 0.839) / 0.227)}$			
	Sub grade	psi	2,500 ~ 15,000	MR sub-grade = $1500 (750 \sim 3000) * CBR$			

$$\text{Log}_{10}(W_{18}) = ZR * S_0 + 9.36 * \text{Log}_{10}(SN + 1) - 0.20 + \text{Log}_{10}(dPSI / (4.2 - 1.5)) / (0.4 + 1094 / (SN + 1)^{5.19}) + 2.32 * \text{Log}_{10}(MR) - 8.07$$

	Thickness (cm)	cm / inch	Coefficient Layer	Structure Number	Cumulative SN	ZR	S0		
Surface pavement	> 4 inch	7	2.756	0.44	1.213	1.213	-1.282	0.40	
Base Course	> 8 inch	20	7.874	0.14	1.1	1.213	2.425	-1.282	0.40
Sub base course	> 8 inch	26	10.236	0.13	1.1	1.464	3.889	-1.282	0.40

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Reference only	unit price \$/cm	dPSI loss	MR	Log(W18)	Total ESA	Condition lim -> 0	Thickness (cm)
Surface pavement	1.80	2.2	31,000	4.861	0.073	-12.227	7 Surface
Base Course	0.30	2.2	18,600	6.087	1.223	-11.077	20 Base course
Sub base course	0.06	2.2	13,500	7.122	13.234	0.934	26 Sub-base

Performance period 15.819 years

Reference Comparison : Tanzania Standard Type and JICA B/D

Description	ST	AC	Base	SubBase		Total SN
				C2(2Mpa)	C1(1Mpa)	
TCL10	30mm		150mm		200mm	
	SN	0.55	0.35		0.25	119
TCL20		50mm	150mm	150mm	150mm	
	SN	1.00	0.35	0.30	0.25	185
JICA B/D		70mm	200mm		260mm	
	SN	1.00	0.35		0.25	205

5.6 Results of Boring Investigation

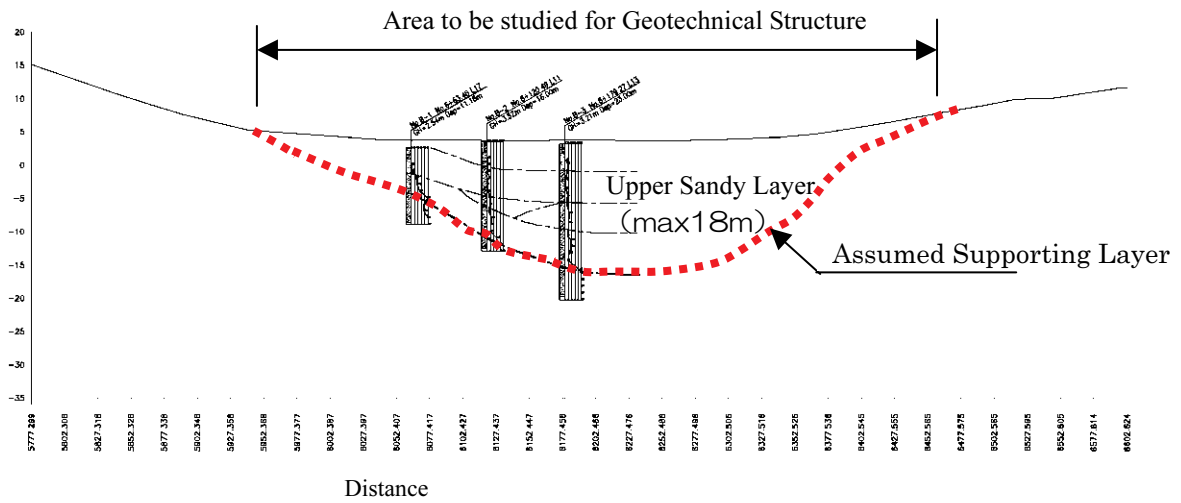


Fig.1 Geotechnical Analysis in the Kizinga River Basin

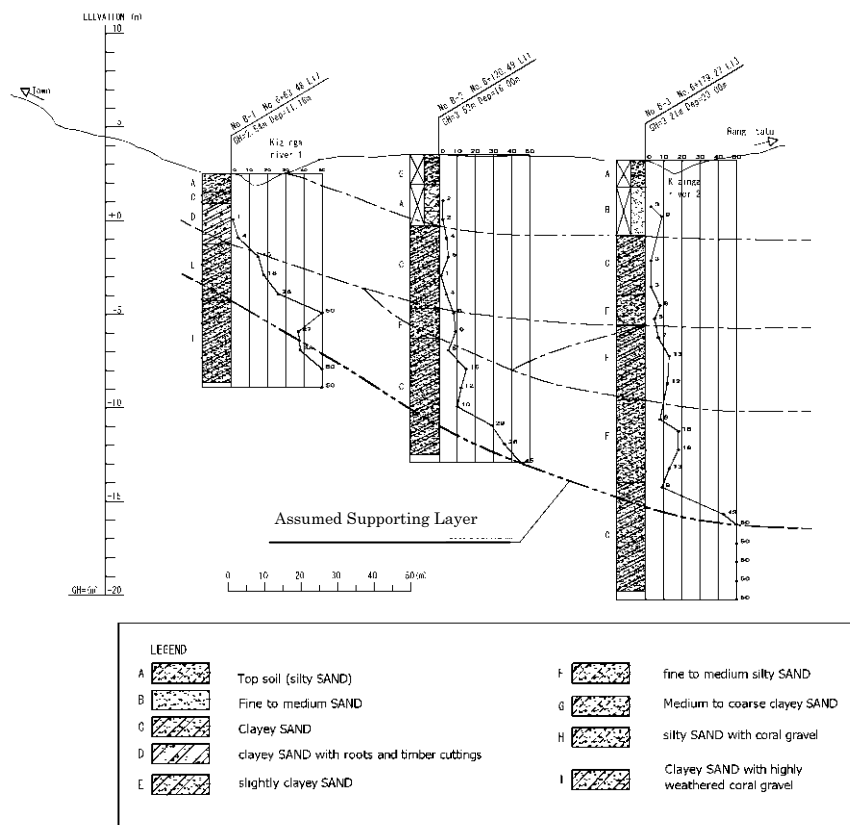


Fig.2 Geotechnical Profile Based on the Boring Results (Kizinga)

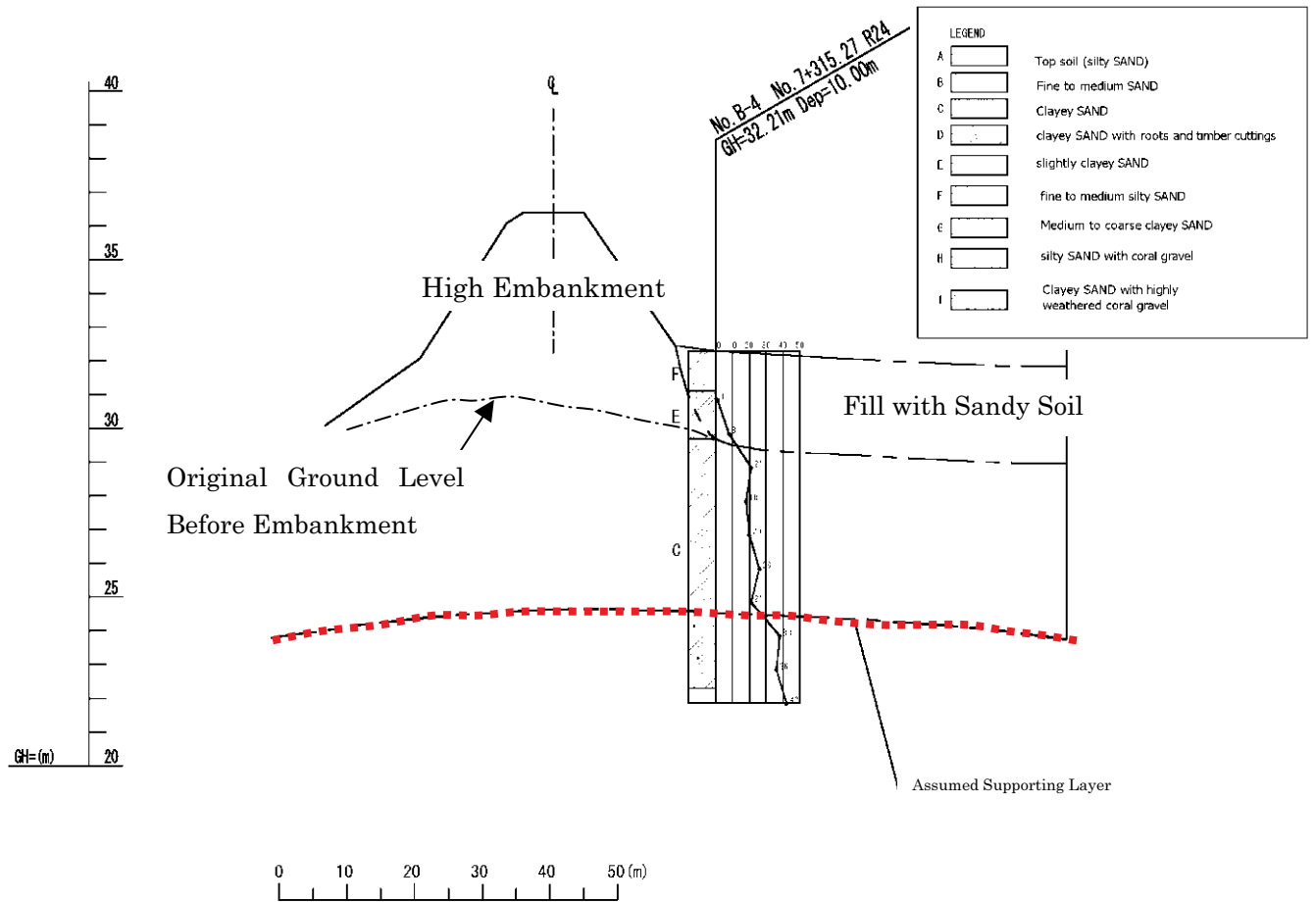


Fig.3 Geotechnical Profile on High Embankment Portion (KM7.2)

5.7 Results of DCP Investigation

