A.2 Contract Documents (Draft)

A.2.1 Contract Agreement (Draft)

CONTRACT AGREEMENT

MODEL INFRASTRUCTURE IMPROVEMENT WORKS
FOR
HORTICULTURAL DEVELOPMENT PROJECT

The Contract Agreement (hereinafter, together with all the Appendices attached hereto and forming an integral part hereof, referred to "the Agreement executed on the ..(day).. of ..(month).., 1988 at the JICA KENYA Office between Japan International Cooperation Agency, Kenya Office by Mr. Kenji KUMAGISHI titled Resident Representative as its authorized representative of JICA Kenya office, hereinafter referred to as "the JICA" of one part, and ..... (P.O. Box ..... Nairobi, Kenya) represented by Mr. ....., hereinafter referred to as "the Contractor" of the other part.

Both parties mutually agree under the termed of this Contract as follows:

Article 1 Purpose of Agreement and Contract Price

The JICA agrees to employ the contractor and the Contractor agrees to perform the Works for the construction of Model Infrastructure Improvement Works for the Horticultural Development Project in Kenya for the total amount of ..... Kenya Shillings (..... in letter ..... thousand Kenya Shillings), hereinafter referred to as "Contract Price".

Article 2 Scope of Works

The Contractor shall:

(1) perform the Work under the supervision of JICA's Experts in accordance with this Agreement, Conditions of Contract, General Specifications, Technical Specifications and Drawings;
(2) prepare working drawings, shop drawings, construction schedule and other technical documents and reports required by the JICA's Expert;
(3) be responsible for construction means, methods, techniques sequence and procedure, and for safety precautions and programmes in connection with the Work, which shall all be in accordance with the current relevant regulations and laws of the Republic of Kenya, and also for his failure to carry out the Works;

(4) carry out any modification, ammendent, change or alteration to the works as inspected by the JICA's Expert to comply with any current regulations or law in force in Kenya without any cost to the JICA.

Article 3 Payment

The JICA agrees to effect payments for the Works to the Contractor in the following manner:-

(1) Advance Payment, to be effected upon the bringing of equipment and materials required for the Works and properly stored at the job site by the Contractor and of value estimated by JICA's Expert.

Kenya Shillings ( ) which corresponds to Forty (40) per cent of the Contract Price shall be paid upon signing of this Contract.

(2) Final Payment, to be effected upon the satisfactory completion of the Works by the Contractor and accepted by JICA's Expert.

The remainder of Kenya Shillings ( ) which corresponds to Sixty (60) per cent of the Contract Price, shall be paid after issue of the Final Certificate by the JICA for payment to the Contractor. Payment under (2) shall be effected within ten (10) days after the respective acceptance of the Works by JICA's Expert.

Article 4 Time of Completion

The Contractor agrees to commence the Works at the site within ten (10) days from the date of signing of this Contract (commencement date) and the Contractor agrees to satisfactorily complete the Works within ( ) days (completion time) from the date hereof which will become due on (completion date).

If the Contractor fails to commence the Works by the above commencement date, or should in the course of the construction any event occur which may reasonably cause the JICA to believe that the Contractor will not be able to complete the Works on the completion date, or should the Contractor fail to complete the works by the completion date, or should the Contractor fail to meet any of the Contract requirements, the JICA shall have the right to terminate this Contract by giving written notice to the Contractor.

However, in case that the Contractor fails to complete the Works by the completion date, or to meet any of the Contract requirements, if the JICA's Expert judges that the Contractor has the ability for completion of the Works within reasonably extended period, the Contractor may be permitted by the JICA to continue the Works beyond the completion date but within the extended time.

Article 5 Compensation

If the JICA sustains any losses as direct or indirect damages caused by the Contractor's failure, the Contractor shall compensate the JICA for such losses. The parties agree that it is essential to complete the Work in time.

Article 6 The JICA right for default

The JICA has the sole and absolute right to decide whether to terminate the Contract, to claim the compensation for the damage as stated in Article 5. The expense due to the JICA exercising its right under this article shall be retained and deducted from any money due to the Contractor but yet unpaid. If the total amount of the loss is larger than the above mentioned, the Contractor agrees that the JICA has the right to retain the construction equipment, materials and supplies etc. of the Contractor and demand payment of the balance from such equipment etc. or proceeds of sale thereof.

Article 7 Inspection and Delivery of the Work

The JICA's Expert, authorized to act on behalf of the JICA will be appointed by the JICA and the JICA's Expert is entitled to do all things that the JICA may do so. The JICA's Expert shall control and supervise the Works and the Contractor shall promptly furnish all necessary facilities for proper

inspections of the Works in accordance with the request of the JICA Expert. At any moment the JICA's Expert can request the Contractor to stop the Works, if necessary and the Contractor shall have no claim on the JICA for extension of the completion time due to such suspension of the Works under this Article.

Upon completion of the entire Works, the Contractor shall request the JICA's Expert carry out a final inspection, and the JICA's Expert shall promptly inspect the work in the presence of the Contractor.

If the work fails to pass the inspection, the Contractor shall undertake repair or reconstruction work in accordance with the instruction of the JICA's Expert within the time of completion and shall have the said work reinspected by the JICA's Expert. After the JICA's Expert certifies the Works to have been complete, the Contractor shall hand over the Works immediately to JICA.

Article 8 Rectification of the defective construction

For a further period of one (1) year after satisfactory completion and final acceptance of the Works by the JICA; whether completed by the Contractor of by the new Contractor in case of termination of Contract under Article 4, and damage to the Works which is caused by the Contractor's fault, either because of defective workmanship or the use of inferior materials or any other cause, shall be made good as necessary by the Contractor to the satisfaction of the JICA at no extra cost.

In case of the termination of the Contract, the JICA may decide which part of the Works should come under the Contractor's responsibility, and requests the Contractor to make good of the damaged Works.

Should the Contractor fail to do so within period specified after receipt of written request to do so from the JICA, the JICA shall have the right to employ another Contractor to carry out such work and the Contractor agrees to bear all expenses incurred.

Article 9 Discrepancies among the Contract Documents

If, prior to or during the course of the Works, any discrepancies are found in the drawings and/or the Technical Specifications etc. attached to this Contract, the Contractor shall follow the ruling given by the JICA's Expert at no additional cost to the JICA.

Article 10 Construction Method and Temporary Works

The construction method including implementation schedule and plan of the temporary works such as installation of temporary facilities, offices, ware houses, construction roads, electric wiring, etc. shall be submitted by the Contractor and approved by JICA Expert.

Should the cost of the above temporary works be estimated in the unit cost of each work items of Bill of Quantities in this Contract, and the Contractor is not entitled to claim any amount of charges for the temporary works.

Article 11 Project Manager

The Contractor shall appoint a project manager at his own expense for the supervision of the Works performance, who shall be authorized to act on behalf of the Contractor, and the instructions given to him shall be deemed as given to the Contractor. Such project manager shall be a well English speaking person and accepted by the JICA, who shall stay at the job site all the time and shall not leave without obtaining the prior approval of JICA's Experts. If the Contractor replaces the project manager, the Contractor shall obtain the prior approval from the JICA in writing.

Article 12 Replacement of Labour, Engineer and Foreman

The JICA's Expert may request the Contractor to remove any of the Contractor's labours, foremen or engineers if it appears to the JICA's Expert that such labour, foreman or engineer is incompetent for his job or is not suitable or is not capable of handling his workmen or staff, and the Contractor shall promptly replace any such labour foreman or engineer. No extra cost or claim for extension of time will be allowed because of such replacement.

Article 13 Sub-Contractor

The Contractor shall not sub-contract or assign any portion of the Works under his Contract without obtaining the prior approval of the JICA who has the sole right to decide which portion of the Works may be sub-contracted or assigned to the Sub-Contractor. However, the Contractor shall be fully responsible for the Works done by the Sub-Contractor.

Article 14 Notice

All Notices required by this Contract shall be effective only at the time of receipt thereof, and only when received by the parties concerned at following address:-

The JICA:	KENYA Office	P.O. Box 50572 NAIROBI KENYA
The Contractor		P.O. Box KENYA

All Notices required by the terms of this Contract shall be made in writing in English Language, and delivered by registered mail or hand delivery.

Article 15 Settlement of Disputes

If any dispute or difference of any kind between the JICA or the JICA's Expert and the Contractor whatsoever arising out of or relating to the Contract, or the execution of the Works, whether during the progress of the Works or after their completion and whether before or after the termination, abandonment or breach of the Contract, it shall be settled by mutual agreement.

This Contract is executed in duplicate of the same tenor, one of the original copy to be kept by JICA and the other original copy to be kept by the Contractor. Both the JICA and the Contractor have set their signatures and affixed the seals thereto in the presence of the witnesses.

The JICA

Mr. KENJI KUMAGISHI
Resident Representative
KENYA OFFICE
Japan International Cooperation Agency
P.O Box 50572 NAIROBI KENYA

The CONTRACTOR

Date:

A.2.2 General Conditions (Draft)

MODEL INFRASTRUCTURE IMPROVEMENT WORKS
FOR
HORTICULTURAL DEVELOPEMENT PROJECT

GENERAL CONDITIONS

1. Scope of General Specifications

a. The several documents forming the Contract of the Model Infrastructure Improvement Works for Horticultural Developement Project (hereinafter referred to as "the Contract") are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be explanied and adjusted by the JICA's Expert (hereinafer referred to as " the Supervisor"), who shall thereupon issure to the Contractor instructions.

b. Unless it is legally or physically impossible, the Contractor shall excute and complete the Works and remedy any defects therein in accordance with the the Contract to the satisfaction of the Supervisor. The Contractor shall comply with and adhere strictly to the Contract or not, touching or concerning the Works. And any other incidental works shall be completed by the Contract under the Supervisor's instruction even if it is not pointed out in the Specification.

c. The Supervisor shall have authrity to issure to the Contractor, from time to time, such supplementally Drawings and instructions as shall be necessary for the purpose of the proper and adequate execution and completion of the Works and remedying of any defects therein. The Contractor shall carry out and be bound by the same.

d. In case that a better measures should be found out in order to execute the Works, the Contracor can plan and submit to the Supervisor, for approval.

2. Ambiguity of Design, Adverse Physical Obstructions or Conditions.

The Contractor shall forthwith give notice to the Supervisor and take instructions from the Supervisor in the following cases:

a. In case that there are discrepancies of contents among the design documents.

b. In case that the design documents shall not be clear.

c. In case that the design documents shall not be correspond to the Site.

d. In case that during the execusion of the Works the Contractor encounters physical obstructions or physical conditions, other than climatic conditions on the Site, which obstructions or conditions is not foreseerable by an experinced contractor.

3. Small Variations

The Supervisor shall make any variation of the form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall be appreciate, he shall have authority to instruct the Contracor to do and the Contracor shall do any of the following:

a. increase or decrease the quantity of any work included in the Contract,

b. change the character or quality or kind of any such work,

c. change the levels, lines, position, and dimensions of any part of the Work,

d. change any specified sequence or timing of construction of any part of the Works.

In this case, the Contract cost shall not be changed.

4. Design Changes

The Contractor shall not make any variation without an instruction of the Supervisor. However, in case that the Contractor should be requested to make any large variation or execute additional work of any kind necessary for the completion of the Works, the Contractor will submit a statement showing the description and quantity of all materials to the Supervisor for his letter of approval, and then will execute such works.

In case that the Contractor should be instructed on the Site without the letter of

approval, the Contract will deliver to the Supervisor a priced statement of the labor and materials used within ten(10) days after the Supervisor's instruction. The unit cost will be the same at the time of the Contract.

5. Statutory Obligations

The Contractor shall comply with all statutory obligations and the regulations of any Government or local authority, public service or official body relating to the execution of the Works, both on and off the Site.

6. Notices, Fees and Charges

The Contractor shall give all notices and pay all fees and charges required by any local authority, public service or statutory or official body.

7. Expense including the Contract Cost

The Cost of the following works are included in the Contract Cost;

a. Expenses for the execution and for the inspection or test of materials.

b. Expenses for the temporary works.

c. Expenses for the removal of obstruction.

d. Expenses for the temporary services.

8. Expenses not including in the Contract Cost

The following expenses shall be borne by the JICA.

a. Expenses for the removal of large size obstruction which lays under the ground and is not foresseeable.

b. Expenses for the handing over ceremony. However the Contractor shall be cooperate to arrange the ceremony with the JICA..

9. Patents Rights

The Contractor shall save harmless and indemnify the JICA from and against all claims and proceedings for or on account of infringement of any patent rights, design trademark or name or other protected rights in respect of any Contractor's Equipment, materials or Plant used for or in connection with or for incorporation in the Works and from and against all damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto, except where such infringement results from compliance with the design or specification provided by the Supervisor.

10. Prevention of Accident, Nuisance, Damage or Loss

a. The Contractor shall take all precautions necessary to ensure the safety of all persons engaged upon or visiting the Works, and observe strictly the safety regulations of Government and/or local authorities.

b. The Contractor shall take all precautions necessary to prevent loss or damage by fire to the Works or to adjacent property.

c. The Contractor shall comply with any satutory requirements relating to control of noise levels on the Site.

d. The Contractor shall take all precautions necessary to prevent nuisance from water, smoke, dust, rubbish and other causes.

e. The Contracor shall obtain permission in writting from the owner of adjoining property if requiring to erect scaffolding on or otherwise use adjoining property, and pay any charges in connection therewith, shall clear away and make good on completion or when directed by the adjoining owner.

f. The Contractor shall notify all service authorities of proposed works before commencing site operations. So far as reasonable ascertain the location of services or confirm that none exists in the vicinity of the Works, and shall not interfere with the operation of services without the consent of the service authority. If any damage results to public or private services, the Contractor shall notify the Employer immediately and pay all costs of reinstatement.

g. The Contractor shall keep the approaches to the Site clear of mud and debris and ensure that no damage is caused to public or private roads and footpaths, and bear the costs of any necessary reinstatement or making good.

h. The Contractor shall protect and preserve all trees and shrubs except those directed by the Supervisor to be removed.

i. The Contractor shall protect existing buildings, fences, gates, walls, cables and other features on the Site which are to remain in position during the excavation of the Works.

j. The Contractor shall take all necessary precautions to prevent damage to adjoining property. Any damage occurring must be made good to the satisfaction of the Supervisor and/or owner(s) of adjoining property at the Contractor's expense.

11. Progress

a. Programme

The Contractor shall prepare and agree with the Supervisor a Construction programme within one week after award of the Contract in approved form for the whole of the Works, including the work of sub-contractors and other work concurrent with the Contract immedeately. And he submit one copy to the Supervisor, and retain one copy in the Site Office. Submission of programmes will not relieve the Contracotr of his obligations to apply in writting for instructions as required by the conditions of the Contract, and receipt of programmes by the Supervisor will neither affect the Contract completion date nor relieve the Contractor of his responsibility to complete the Works by that date.

b. Record Progress

The Contractor shall record daily progress on a copy of the progress chart kept on the Site. He shall update or redraft if any circumstances arise which affect the progress of the Works, and submit copies of all revisions to the Supervisor.

c. Site Meeting

The Contractor shall hold site meeting when required by the Supervisor. He shall attend site meetings, and inform sub-contractors when their presence is required. The Supervisor will take and distribute the minutes of site meetings.

d. Submission of Progress Chart

The Contractor shall submit the progress chart showing the whole and each separate part of the works as built.

12. Rate of Progress

If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works or any Section is at any time, in the opinion of the Supervisor, too slow to complete with the Time for Completion, the Supervisor shall so notify the Contractor who shall thereupon take such steps as are necessary,

subject to the consent of the Supervisor, to expedite progress so as to comply with the Time for Completion. The Contractor shall not be entitled to any additional payment for taking such steps.

13. Subcontracting

The Contractor shall not subcontract the whole of the Works. Except where otherwise provided by the Contract, the Contract shall not subcontract any part of the Works without the prior consent of the Supervisor. Any such consent shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts, defaults and neglects of any Subcontractor, his agents, servants or workmen.

14. Notice of Works

The Contractor shall inform in writting the progress of the Works, the matters arised in the meeting, any instruction items, materials carried into the Site, and so on, to the Supervisor. And he shall submit a table of the amount of work done, any documents and drawings showing the work as built to the Supervisor monthly.

15. Submission of Document

The Contractor shall submit all important documents from or to any Government authority, local authority, public service, and official body relating to the execution of the Works attaching with the inventory to the JICA through the Supervisor at the Time for Completion.

16. Work at Completion

Upon the issue of any Taking-Over Certificate the Contractor shall clear away and remove from that part of the Site to which such Taking-Over Certificate relates all Contractor's equipment, surplus material, rubbish and temporary works of every kind, and leave such part of the Site and Works clean and in a workmanship condition to the satisfaction of the Supervisor.

17. Handing Over

The Contractor shall attend the handing-over inspection, and shall arrange with the Supervisor for joints inspection. The Contracotr shall be cooperate with the Supervisor in order to submit the documents concerned and necessary matters to the JICA.

18. Defects Liability

If any defect, shrinkage or other fault in the Works apperas at any time prior to the end of the Defect Liability Period, the Supervisor may instruct the Contractor to search under the directions of the Supervisor for the cause thereof. If such defect, shrinkage or other fault is one for which the Contractor is liable, the cost of the work carries out in searching as aforesaid shall be borne by the Contractor and he shall in such case remedy such defect at his cost.

19. Photograph

The Contractor shall take photographs of the Works when required by the Supervisor, and submit.

A.2.3. Technical Specifications (Draft)

MODEL INFRASTRUCTURE IMPROVEMENT WORKS
FOR
HORTICULTURAL DEVELOPMENT PROJECT

TECHNICAL SPECIFICATIONS

1. GENERAL

a. No interruption or disturbance to the research work at NHRS.

b. No use of the site for any purpose other than carrying out the Works.

c. The Contractor shall, with due care and diligence, execute and complete the Works and remedy any defects therein in accordance with the provisions of the Contract. The Contractor shall provide all superintendence, labor, materials, Plant, Contractor's Equipment and all other things, whether of a temporary or permanent nature, required in and for such design, execution, completion and remedying of any defects, so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract.

d. The Contractor shall take full responsibility for the adequacy, stability and safety of all Site operations and methods of construction. Provided that the Contractore shall not be responsible for the design or specification of the Works.

2. FENCE WORK

2-1 POSTS AND STRUTS

a CONCRETE POSTS AND STRUTS GENERALLY: to BS 1722: Part 1, Appendix A, manufactured generally as specified in F08 and F09: Precast Concrete Units, and of approved manufacture. The concrete is to be Class 20/(10 mm)(1:2:4 mix, aggregate 10 mm maximum).

b REINFORCEMENT OF CONCRETE POSTS AND STRUTS:

1. Intermediate posts over 2.45m 4×8 mm bars
2. Straining posts over 2.45m 4×10 mm
3. Struts over 2.45m 4×8 mm

Bars are to be made up into a prefabricated cage, with stirrups 2.65 mm dia. (12 swg) at centres not exceeding 380 mm. Bars must extend to within 25 mm of the ends of the posts, and have a minimum cover of 16 mm.

c CONCRETE POSTS AND STRUTS FOR CHAINLINK FENCES: to BS 1722: Part 1, Table 3.

Holes for	Intermediate		Straining posts		Struts	
wires	length	base	length	section	length	section
3	1.60m	100 x 100	1.6	125 x 125	1.50	100 x 75
3	1.87m	125 x 125	1.87	125 x 125	1.82	100 x 75
3	2.07m	125 x 125	2.07	125 x 125	1.98	100 x 75
3	2.63m	125 x 125	2.63	125 x 125	2.59	100 x 85
6	3.04m*	125 x 125	3.04	125 x 125	2.59	100 x 85

* length measured on centre line. The top 0.45m of posts is cranked inwards at 45 degrees, giving an overall height of 3.10m. Intermediate posts are to taper to the top, 75×75 mm for 100×100 mm base, 100×100 mm for 125×125 mm base.

Straining posts and struts must be morticed and tenoned, and struts must be holed on the rake for wires.

d CONCRETE POSTS AND STRUTS FOR STRAINED WIRE FENCES: to BS 1722: Part 3, Table 2:

Holes for	Intermediate		Straining posts		Struts	
wires	length	base	length	base	length	base
3	1.50m	100 x 100	1.50	100 x 100	1.45	75 x 75
5	1.67m	100 x 100	1.82	125 x 125	1.50	100 x 75
6	1.90m	125 x 125	2.02	125 x 125	1.80	100 x 75
8	2.70m	125 x 125	2.22	125 x 125	1.98	100 x 75

Straining posts and struts must be morticed and tenoned, and struts must be holed on the rake for wires.

2-2 WIRE AND MESH

a GALVANISED LINE WIRE FOR CHAINLINK FENCING: to BS 4102, of the following diameters:

Chainlink pattern	Line wire diameter
Medium	3.00 mm

b GALVANISED TYING WIRE: to BS 4102, 2.00 diameter.

c GALVANISED CHAINLINK: to BS 4102, Table 6, of the pattern specified or shown on the drawings and of 50 mm mesh.

Pattern	Wire diameter
Medium	2.50 mm

2-3 FITTINGS

a EXTENSION ARMS for barbed wire: mild steel to BS 1722: Part 1, cranked at 45 degrees, slotted for three strands of barbed wire at centres not exceeding 150 mm.

To concrete and timber straining posts: 50×50×6.3 mm mild steel angle.

b GALVANISED STEEL EYE BOLT STRAINERS AND WINDING BRACKETS: to BS 1722.

c BOLTS, NUTS AND WASHERS: ISO metric to BS 4190.

d GALVANISED WIRE STAPLES: to BS 1494: Part 2, 3.7 mm (9 swg)×32 mm.

2-4 SUNDRIES

a CONCRETE is specified in F02: Concrete Work.

b BLACK BITUMEN COATING SOLUTION: to BS 3461, Type 1.

c METALWORK for gates and posts is specified in P02: Metalwork Generally.

2-5 PREPARING POSTS

a TIMBER POSTS: drill for line wire at the heights specified. Coat bottom end with bitumen to a height of 300 mm above ground level. Notch straining posts for struts in the top third of post exposed above ground level.

b STEEL POSTS: drill straining posts and struts for connection by two bolts 10 mm diameter at a point in the top third of post exposed above ground level.

2-6 FIXING POSTS

a SET OUT posts to the approval of the Supervisor. Do not commence excavation or fixing until the post layout has been approved. The top of the fencing is to follow the profile of the ground, but without abrupt changes of level, unless otherwise directed or shown on the drawings.

b STRAINING POSTS are to be provided at all ends and corners, at changes in direction or acute changes in level, and at intervals not exceeding 50 m.

c STRUTS: fit to straining posts in the direction of each line of fencing secured to them.

d INTERMEDIATE POSTS are to be provided at intervals not exceeding 3 m.

e POST HOLES: posts and struts are to be set into the ground to the following depths:

1. Fence height exceeding 1.4m 0.75m deep.

Excavate holes for posts and struts not less than 450×450 ㎜ in plan.

f FIXING POSTS AND STRUTS: insert post or strut, support in position, fill excavation with concrete Class Q (1:3:6) to not less than half its depth and compact. Backfill with suitable excavated materials well compacted.

2-7 FIXING WIRES AND MESH

a TIMING: do not strain wires until at least seven days after fixing posts.

b FIXING LINE WIRES:

1. Thred through holes in posts and connect to eye bolt strainers at ends and angles.
2. Strain taut to the approval of the Supervisor.

c FIXING BARBED WIRE:

1. Slot into steel extension arms and strain taut to the approval of the Supervisor.
2. Staple to timber posts, straining taut as the work proceeds.
3. Wire firmly to concrete posts, straining taut as the work proceeds.

d FIXING CHAINLINK: wire firmly to each line wire at horizontal centres not exceeding 600 ㎜.

2-8 FABRICATING AND HANGING GATES

a FABRICATE metal gates and posts as specified in P03: Metalwork Generally "Workmanship"

b HANG GATES true to line and level on posts fixed as specified for steel fenceposts.

3. METAL WORKS (GATES)

3-1 GENERALLY

a MATERIALS AND WORKMANSHIP for the following are specified in P02 and P03: Metalwork generally:

Plates, bars, sections, and tubes
Sheet metal
Wire mesh and expanded metal
Composite units.

b SUNDRIES are specified with the constructions in which they occur.

c COMPOSITE STANDARD UNITS: include for assembling and jointing.

3-2 MATERIALS GENERALLY

a MATERIALS specified in this section may be applicable to any or all of the subsequent subtrades in Metalwork.

b SUPPLIES: obtain all materials from suppliers approved by the Supervisor.

c STANDARDS: produce the manufacturer's certificate of compliance with the standards specified if so requested by the Supervisor.

d FINISHERS: metal commodities for making components must be either prefinished or suitable to receive the finishes specified.

3-3 SECTIONS

a HOT ROLLED STEEL SECTIONS except equal and unequal angles: to BS 4: Part 1, made from steel to BS 4360: Part 2.

b HOT ROLLED EQUAL AND UNEQUAL ANGLES: to BS 4: Part 1 (metric converted from imperial dimensions) or to BS 4848: Part 4 (coordinated metric dimensions). Do not substitute sections of dimensions other then those specified without the prior approval of the Supervisor.

c HOT ROLLED HOLLOW STEEL SECTIONS: to BS 4: Part 2, made from steel to BS 4360: Part 2.

d HOT ROLLED STEEL BARS: to BS 4449.

e COLD ROLLED STEEL SECTIONS: to BS 2994, made from steel to BS 1449: Part 1B (HR, CR, HS or CS quality unless otherwise spedified or shown on the drawings).

f STEELTUBES AND TUBULARS: to BS 1387, Medium thickness unless otherwise specified. If steel tubes to BS 1775 are required, they will be specified or shown on the drawings.

3-4 MESH

a STEEL MESH FABRIC: to BS 4483, welded type, and of square, structural or long mesh as specified or shown on the drawongs.

3-5 PLATE, SHEET AND STRIP

a STEEL PLATE for welding: to BS 4360, Section 2 unless otherwise specified. Steel to this Standard is equally suitable for bolting and rivetting, and may be used unless steel plate to BS 1449 is specified.

b STEEL PLATE, SHEET AND STRIP to BS 1449: Use only if specified or shown on the drawings.

3-6 SUNDRIES

a ELECTRODES for metal-arc welding mild and medium tensile steels: to BS 639.

b FILLER RODS AND WIRES for gas welding of steel, copper, aluminium and alloys: to BS 1453.

c FILLER METALS FOR BRAZING: to BS 1845.

d FASTENINGS FOR GALVANISED STEEL: galvanised unless otherwise specified.

e FASTENINGS FOR PLATED METALS: plated to match unless otherwise specified.

f BOLTS, SCREWS AND NUTS: ISO metric black hexagon to BS 4190 unless otherwise specified or shown on the drawings. Bolts and screws generally are to be of a length such that two complete threads will produce through the nut after tightening.

g WASHERS: black steel to BS 4320 unless otherwise specified or shown on the drawings, and of diameters recommended for the sizes of bolts in use.

h MACHINE SCREWS AND NUTS: ISO metric to BS 4183, or other approved.

i RIVETS: to BS 4620 or BS 641 as appropriate for the application.

j STEEL RIVETS FOR COLD CLOSING: to BS 1109.

k MASTIC FOR BEDDING JOINTS IN COMPONENTS: of approved manufacture and type, suitable for the application.

3-7 WORKMANSHIP GENERALLY

a WORKMANSHIP specified in this section may be applicable to any or all of the subsequent subtrades in Metalwork.

b APPROVED SUPPLIERS: if so specified or directed by the Supervisor, metalwork is to be fabricated by an approved supplier.

c SAMPLES: if so specified or directed by the Supervisor, submit samples of fabricated metalwork and obtain his approval before ordering or manufacturing in bulk.

3-8 FABRICATING

a PROTECT during fabrication all surfaces which will be visible in completed work.

b COLD FORMED WORK: to be free from warping, buckling and fractures.

c CORNERS: mitre junctions of identical sections unless otherwise specified.

d HOLES: from without distprtion of the surrounding metal. Clearance holes for bolts are to be to BS 4186.

e MOVING PARTS: when assembled all moving parts must move freely and without binding.

f CLEANING: remove all burrs and sharp arrises which would be visible after fixing or dangerous to the user.

g JOINTS:

1. Rivetted joints are to be drawn tightly together, with rivets closed to completely fill the holes.
2. Mechanical joints are to be tight with no visible gaps.
3. Mechanical joints of components which are to be located externally must be bedded in mastic,including all mating surfaces, cleats and other fixings.
4. Connect cleats to frames with countersunk machine screws unless otherwise specified or approved.

3-9 WELDING AND BRAZING

a PREPARATION: remove grease, dirt, moisture and oxide from edges to be welded. Remove scale and residue from arc and powder cutting by machining or hand griding.

b ACCURACY:

1. Ensure accurate fit, using clamps and jigs where practicable.
2. If approved by the Supervisor, use tack welds for temporary attachment where jigging is not practical.

c TACK WELDS: use only for temporary attachment unless otherwise specified.

d WELDS: make joints with parent and weld metal fully fused throughout, with no holes, porosity or cracks.

e SPATTER: prevent weld spatter falling on surfaces of materials which will be self finished and visible in completed work. Ensure complete removal of flux residues and slag.

f BUTT WELDS which will be visible in completed work are to be finished smooth and flush adjacent surfaces.

g WELDING OF STEEL to be by one of the following methods:

1. Mild steel: gas welding to BS 693.
2. Mild steel: metal-arc welding to BS 1856.
3. Steel tubes to BS 1775: metal-arc welding to BS 938.
4. Steel (carbon content not exceeding 0.12 percent): projection welding to BS 2630.
5. Mild steel sheets of total thickness not exceeding 8 ㎜: seam welding to BS 2937.
6. Other method approved by the Supervisor.

3-10 FINISHING METALWORK

a SAMPLES: submit samples of specified finished for the approval of the Supervisor.

b APPROVED SUPPLIER: all metal coatings are to be applied by a specialist firm approved by the Supervisor.

c METAL COATINGS:

1. Apply after fabrication is complete and all fixing holes have been drilled, unless otherwise specified.
2. Before applying coating, remove all welding slag, spatter, paints, grease, flux, rust, burrs and sharp arrises.
3. Make good all defects which would show after application of coating, and finish surfaces smooth.

d CHROMIUM PLATING: to BS 1224, Service Condition No.2, bring finish, unless otherwise specified.

e GALVANISING AND SHERARDISING: to BS 729.

f ZINK AND ALUMINIUM SPRAYING of ferrous metals: to BS 2569: Part 1.

g VITREOUS ENAMELLING: to BS 3830.

h ANODISING:

1. Pretreat surfaces before anodising to produce the final specified finish.
2. Anodise in accordance with BS 3987.
3. Obtain certification from the anodiser that the specification grade has been applied, and submit to the Supervisor.

3' SUBTRADE P10: STANDARD UNITS *MATERIAL*

3' -1 GENERAL

a MATERIALS AND SUNDRIES GENERALLY are specified in P02 Metalwork Generally *Material*

3' -2 COMPONENTS

a DELIVERY: do not deliver to site any components which cannot be unloaded immediately into suitable storage conditions.

b UNLOADED AND HANDLE components in accordance with manufacturer's recommendations. Do not damage or distort.

c FIREPROOF DOORS AND SHUTTERS: provide evidence that doors and shutters specified as fireproof or fire resisting meet the specified standards of fire resistance.

d STEEL CASEMENT WINDOWS AND DOORS: to BS 990: Part 2, but with red oxide dipped finish unless galvanising is specified. Obtain from an approved manufacturer. Windows and doors are to be complete with lugs, fixing screws, hinges and brass handles. Wiondows are to be fitted with stays, and doors with bolts, turnbuckles and mortice locks. Provide glazing cleats or clips.

e ALUMINIUM WINDOWS AND DOORS: materials, fabrication and detailed design to BS 4873, and of approved manufacture.

3' -3 SUNDRIES

a FIXING AND FASTENINGS: obtain from manufacturer of component being fixed.

b WOOD SCREWS: steel to BS 1210.

c BOLTS, SCREWS, NUTS AND WASHERS are specified in P02: Metalwork generally

d PLUGS: approved proprietary plugs of plastic or wood fibre. Do not use timber plugs.

e SELF-TAPPING SCREWS: to BS 4174, with anti-corrosive finish unless otherwise specified.

f BLACK BITUMEN COATING SOLUTIONS for cold application: to BS 3416, Type 1, of approved manufacture.

g JOINT BACKING STRIP: a type recommended by the joint sealant manufacturer for the application specified.

h BEDDING COMPOUND: of approved type and manufacture.

i POINTING SEALANT: of approved type and manufacture, suitable for use in tropical conditions.

3" SUBTRADE P11: STANDARD UNITS *WORKMANSHIP*

3" -1 GENERALLY

a HANDLE AND STORE components in accordance with manufacturer's recommendations. Make good immediately any damage to protective coatings.

b PROPRIETARY COMPONENTS: fix in accordance with manufacturer's recommendations.

c PROTECTION:

1. Retain protective coverings in place during fixing wherever practicable.
2. Provide additional protection as necessary to prevent marking of surfaces which will be visible in completed work.
3. Remove protection on completion.

3" -2 PREPARATION AND FIXING

a SUB-FRAMES: before fixing metal frames, prime timber sub-frames which are to be painted, including rebates.

b CORROSION PROTECTION: before fixing, ensure that concealed and contact surfaces of metal components are protected against corrosion. Inspect steel components and make good any damaged protective coatings to the approval of the Supervisor. Alminium (including anodised aluminium) which will be in contact with timber treated with preservatives, with cedar, iron, steel, copper alloys, concrete, mortal, plaster, rendering or soil must be treated with two coats of bitumen solution before fixing.

c LOADING: window and door frames must not carry any structural loads. When fixing, ensure that adequate provision is made for the deflection of beams and lintols.

d OPENING LIGHTS: keep closed and secured during all operations until fixed. Retain any clamping devices in position. Provide packing between light and frame to maintain correct clearances.

e PLACING: position and maintain frames and linings plumb, level and square, and in correct relation to wall faces and damp proof courses as shown on the drawings. Avoid displacement of damp proof courses.

f COMPOSITE ASSEMBLIES: all mating surfaces of metal-to-metal joints are to be bedded in mastic.

g SITE WELDING: do not weld on site without the prior approval of the Supervisor.

h LUGS: pack out with shims at fixing points when necessary.

i BUILDING IN: support and brace frames as necessary to prevent distortion of frames during erection of adjacent structure.

j PREPARED OPENINGS: pack joints to maintain specified widths, including positions where fixings tighten frame against structure.

k TIGHTENING: do not distort frames when tightening fixings.

3" -3 SEALING JOINTS

a PREPARATION: ensure that joints are dry. Remove all loose material, dust and grease. Prepare joints in accordance with sealant manufacturer's recommendations, using recommended solvents and primers where necessary. Mask adjoining surfaces.

b BACKING: insert backing strips in all joints to be pointed with sealant. Do not leave gaps, and do not reduce depth of joint for sealant to less than the minimum recommended by the sealant manufacturer.

c POINTING: fill joint cavity with sealant in accordance with manufacturer's recommendations. Tool sealant to form a smooth flat bead.

d FINISHING: remove excess sealant from adjoining surfaces, using cleaning materials recommended by the sealant manufacturer. Leave clean to the approval of the Supervisor. Replace if directed any materials permanently contaminated with sealant.

4. FARM ROAD IMPROVEMENT WORKS

4-1 GENERALLY

a REQUIREMENTS AND CONDITIONS for excavation and earthworks generally are specified in D01: Genral, D04: Excavation *Material* and D06: Hard fill *Material* and apply equally to Access Roads. The contracor's attention is drawn particularly to the following subsections:

0600	Generally
0700	Filling materials
0710	Plants and sundries
0810	Hard filling materials generally

4-2 HARD FILLING MATERIALS FOR ROADS

a MURRAM: naturally occuring lateritic gravels, either loose form or cemented, provided the cemented material can be broken up during excavation or compaction to pass a 37.5 mm sieve.

b STONE GENERALLY: clean, hard crushed rock, free from clay and other soft or deleterious matter, graded as specified for the application.

c CRUSHED STONE FOR BASES and sub-bases: maximum aize 75 mm, well graded between 75 mm and 0.075 mm, with 60% to 80% passing a 20 mm sieve. The Supervisor may require the grading to be varied within these limits to allow *maximum compaction*.

d REQUIREMENTS AND CONDITIONS for excavation and earthworks generally are specified in D01: General, D03: Site preparation *Workmanship* D05: Excavation *Workmanship* and D07: Hard fill *Worlmanship* and apply equally to Access Roads. The contractor's attention is drawn particularly to the following subsections:

0600	Excavation and earthwork generally
0630	Classification of excavation
0680	Site preparation generally
0720	Excavation and backfilling generally

0760	Obstructions
0770	Disposal of water
0780	Disposal of materials
0790	Planting
0850	Hard filling generally
0860	Placing and compaction of hard fill.

4-3 EXCAVATION

a EXCAVATE by hand or using approved plant. Do not disturb the subgrade surface.

b TRIM EXCAVATIONSA accurately to levels, cross falls and longitudinal falls. Remove all loose materials.

c COMPACT SUBGRADE to the Supervisor's approval, using an approved smooth steel wheeled roller of 4 to 8 Mg or a 2 to 4 Mg vibrating roller. A vibrating plate compactor may be used for the subgrade to footpaths and light access roads.

d SUBGRADE IN EMBANKMENTS: where the drawing show the subgrade to be above natural ground level, form embankments as shown on the drawings or instructed by the Supervisor, laid and compacted in layers not exceeding 250 mm deep.

4-4 LAYING AND COMPACTING BASES AND SUB=BASES

a SUBGRADE: treatment of subgrade is specified in D05: Excavation
Workmanship Ensure that subgrade has been trimmed to the levels, longitudinal and cross falls specified, and has been compacted as specified.

b SUB-BASE COURSES, where specified, shown on the drawings or directed by the Supervisor, are to comply with the specified

c MURRAM BASE: spread in a layer of uniform thickness across the whole width of the road, including such additional width as may be shown on the drawings. Wet and roll to achieve compaction of 98% of compaction at optimum moisuture content. Where the total base course thickness exceeds 150 mm, spread and compact in separate layers not exceeding 150 mm thickness each. Remove hard particles exceeding 75 mm maximum dimension.

d CRUSHED STONE BASE: min in an approved mechanical mixer, adding water as necessary to achieve the specified compaction. Spread without segregating the constituents in layers not exceeding 200 mm compacted thickness, and roll with a 4 to 8 Mg roller to 98% of maximum compaction.

5. TRELLIS WORKS

5-1 PIPES AND FITTINGS

a GENERALLY: where hot and/or cold water services are specified or shown on the drawings as galvanised mild steel tubing and fittings, the contractor will be permitted to excute the work using copper, UPVC or polythene pipes and fittings provided:

1. The prior approval of the Supervisor is obtained.
2. The installation complies in every respect with the requirements of the specification and any additional requirements of the Supervisor.
3. The materials substituted is suitable for the applications specified or shown on the drawings.
4. UPVC or polythene pipes are not used for hot water services.
5. The whole of the work is carried out at the rates and for the prices included in the tender. Any additional fittings, coupling and the like which may be required must be provided and fixed at the contractor's expense.

The substitution of galvanised steel piping and fittings for any other material specified or shown on the drawings will not be permitted.

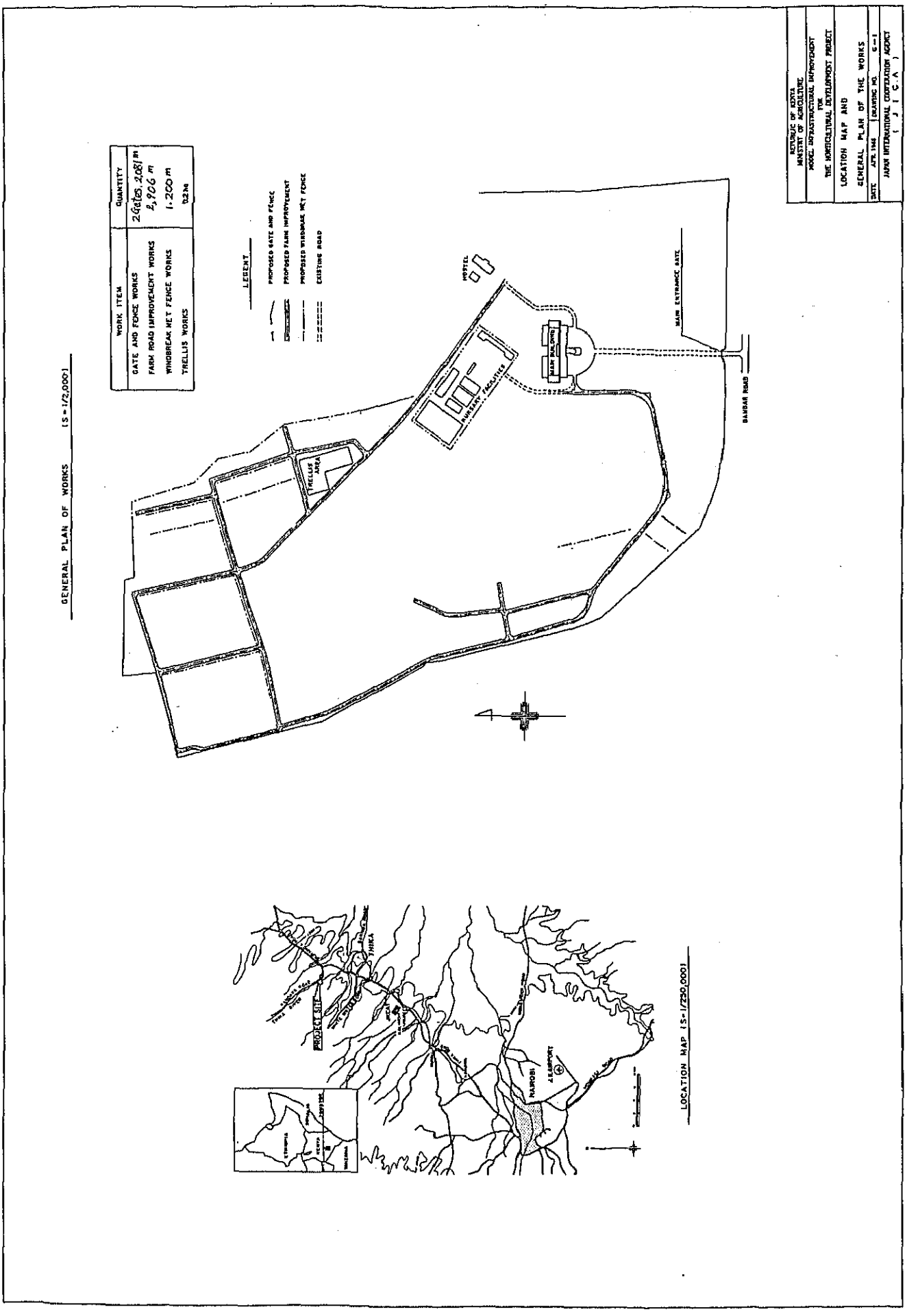
b GALVANISED STEEL PIPES: to BS 1387, with screwed and socketted joints to BS 21, of approved manufacture.

1. Medium guage (for general use): to Table 2.
2. Heavy guage (for pipework below ground): to Table 3.

Tubes must be cleanly finished, with smooth surfaces, free from defects and scale. Tubes must be supplied with clean, well-cut taper threads and with one screwed socket.

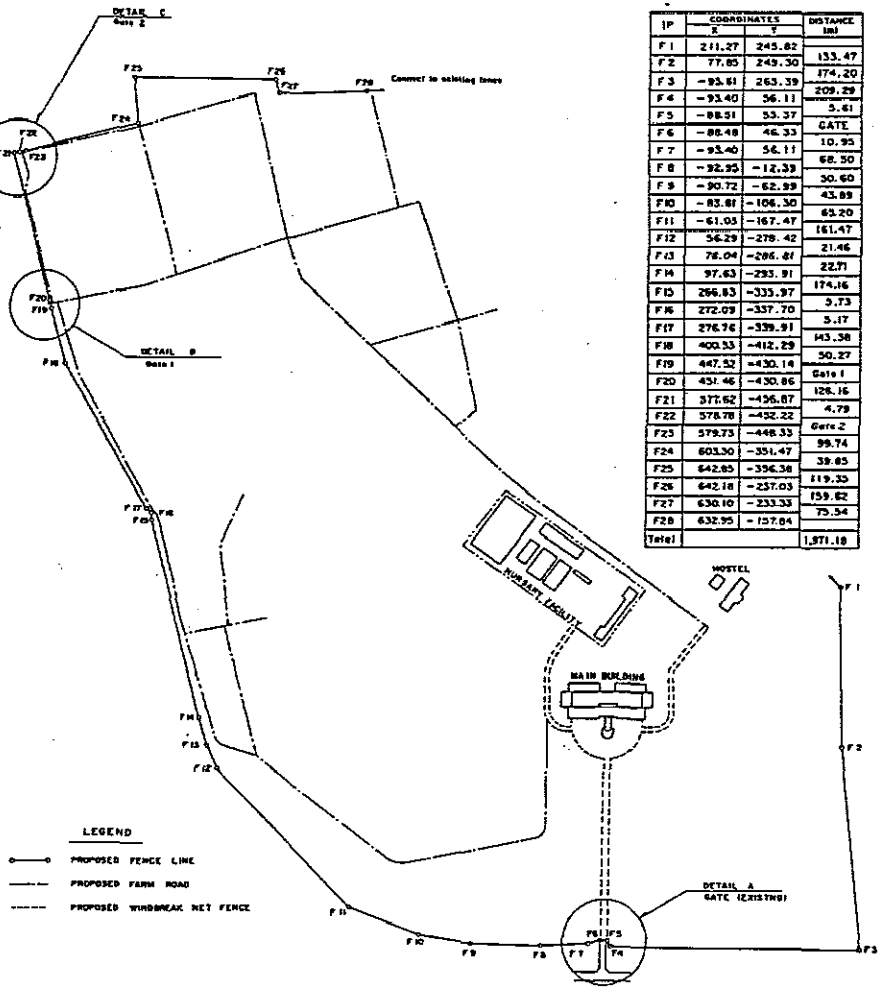
c GALVANISED MALLEABLE CAST IRON PIPE FITTINGS for use with galvanised steel pipes to BS 1387: to BS 143 and 1256, of approved manufacture. Castings must be smooth and free from blowholes, pitting, sand and other defects. Galvanising is to be to BS 729.

A.2.4 Tender Drawings

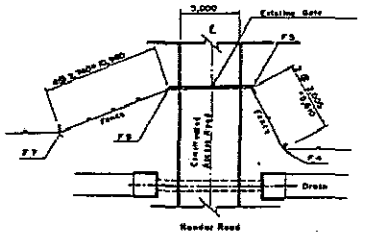


FENCE LENGTH

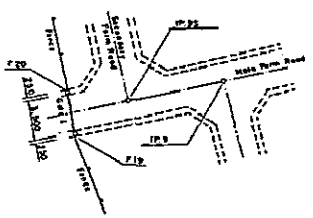
IP	COORDINATES X	COORDINATES Y	DISTANCE (m)
F1	211.27	245.82	133.47
F2	77.85	249.30	174.20
F3	-93.81	263.39	209.29
F4	-93.40	56.11	5.61
F5	-88.51	53.37	GATE
F6	-88.48	46.33	10.95
F7	-93.40	56.11	68.50
F8	-92.95	-12.39	30.60
F9	-90.72	-42.99	43.89
F10	-83.81	-106.30	65.20
F11	-61.03	-167.47	161.47
F12	54.29	-278.42	21.46
F13	78.04	-286.81	22.71
F14	97.63	-293.91	174.16
F15	266.83	-333.97	5.73
F16	272.09	-337.70	5.17
F17	276.76	-339.91	143.38
F18	400.53	-412.29	50.27
F19	447.52	-430.14	Gate 1
F20	451.46	-430.86	126.16
F21	377.62	-436.87	4.79
F22	378.78	-452.22	Gate 2
F23	579.73	-448.33	99.74
F24	603.30	-351.47	38.85
F25	642.85	-356.38	119.35
F26	642.18	-237.03	159.82
F27	630.10	-233.33	75.54
F28	632.95	-157.84	
Total			1,971.18



GENERAL LAYOUT OF FENCE/GATE WORKS (S=1/2,000)



DETAIL A (S=1/200)



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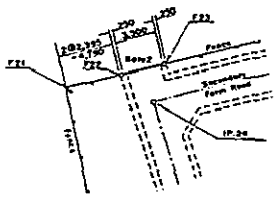
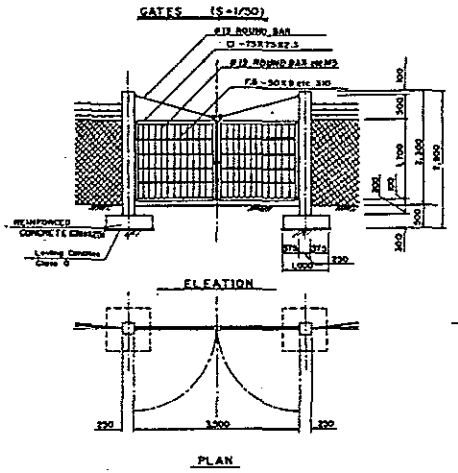
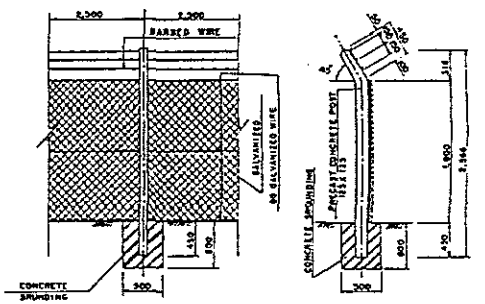


DETAIL C (S=1/200)

GATES (S=1/30)



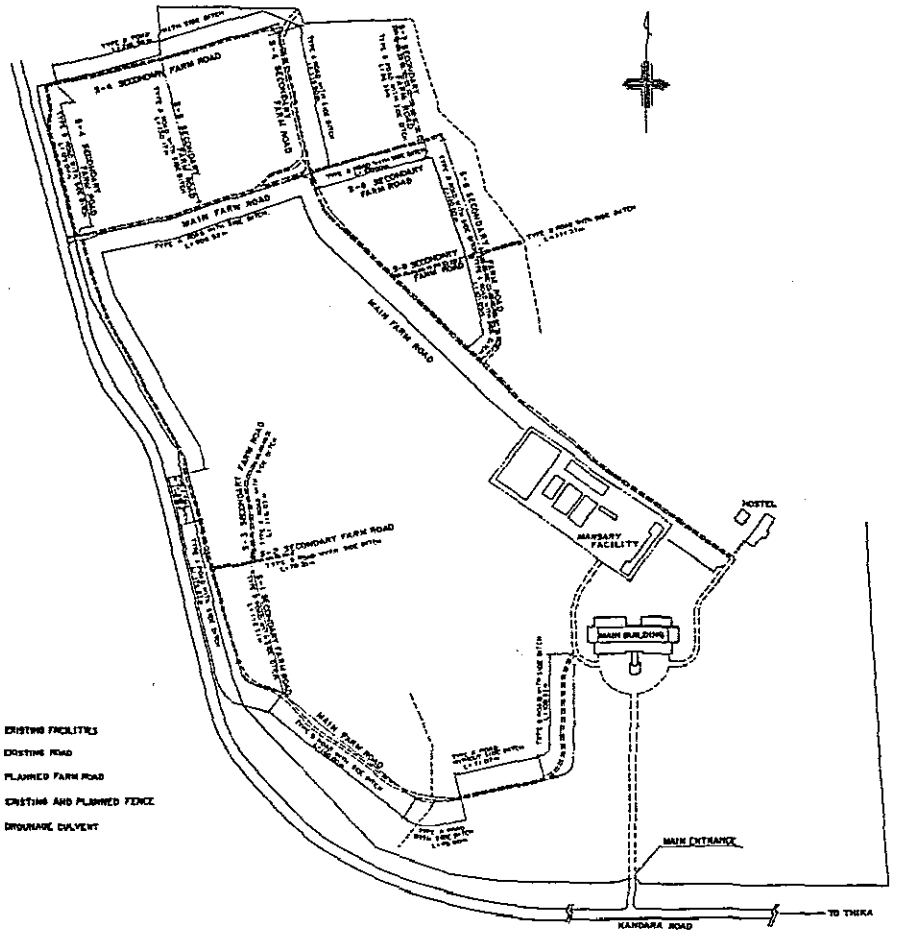
STANDARD SECTION OF FENCE (S=1/30)



NOTES

1. Existing Fence / Gates shall be demolished carefully for future reuse of material.
2. Fence to be installed newly shall be on the same line of existing fence line.
3. Over excavation for Gate / Fence posts shall filled be lean concrete Celass For MOW's specification.
4. Location and length of works are subject to change by the Engineer.

REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
GATES AND FENCING WORKS	
GENERAL LAYOUT AND GATES/FENCE	
DATE APR. 1988	DRAWING NO. F-01
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	

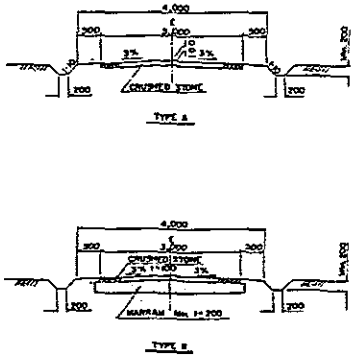


GENERAL LAYOUT (S= 1 / 2,000)

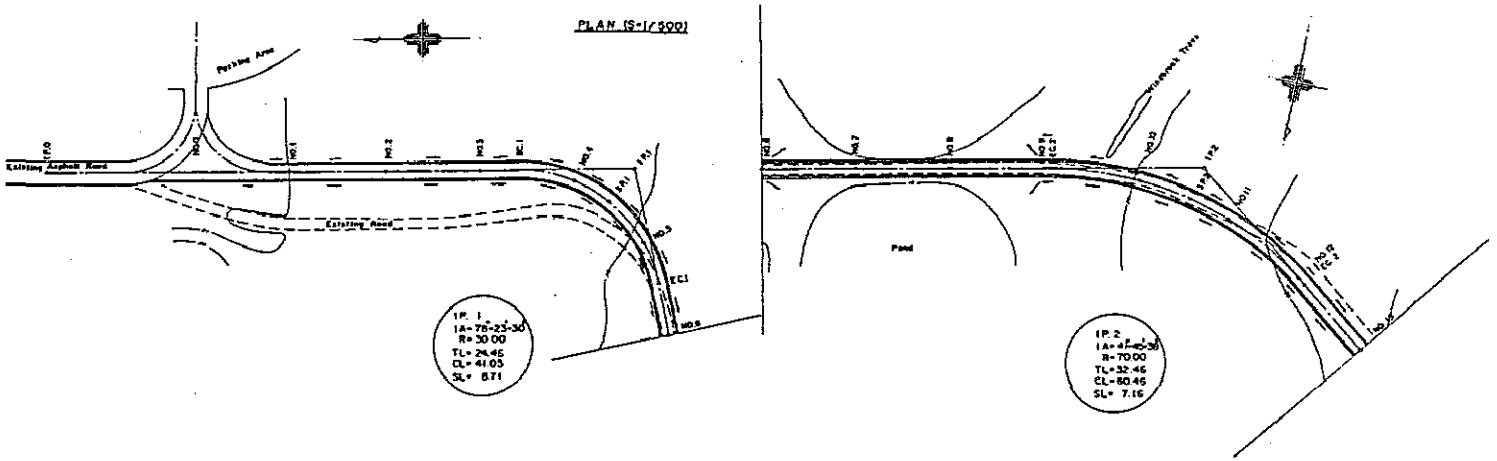
COODINATES OF I.P.

I.P	COODINATES X	Y
I.P.0	+123.85	0.00
I.P.1	0.00	0.00
I.P.2	−26.04	−128.74
I.P.3	+67.23	−240.63
I.P.4	+77.74	−278.65
I.P.5	+187.75	−311.39
I.P.6	+227.13	−320.00
I.P.7	+263.69	−329.84
I.P.8	+384.04	−386.29
I.P.9	+452.21	−417.69
I.P.10	+463.75	−346.17
I.P.11	+505.72	−224.53
I.P.12	+472.86	−212.17
I.P.13	+293.73	−25.22
E.P	+179.34	−133.77
I.P.17	+176.46	−273.40
I.P.17A	+157.30	−305.63
I.P.18	+177.33	−269.50
I.P.19	+184.46	−237.44
I.P.20	+244.89	−277.95
I.P.21	+288.21	−258.51
I.P.9A	+400.37	−425.78
I.P.22	+346.37	−447.05
I.P.23	+358.45	−443.72
I.P.24	+376.49	−449.43
I.P.25	+800.84	−351.54
I.P.25A	+474.99	−318.29
I.P.26	+829.77	−253.20
I.P.27	+537.92	−114.13
I.P.28	+332.78	−131.42
I.P.29	+628.15	−133.47
I.P.30	+438.18	−79.18
I.P.31	+447.30	−46.40
I.P.32	+417.41	−153.38
I.P.33	+362.23	−63.20
I.P.34	+348.38	−80.84

STANDARD CROSS SECTION OF FARM ROAD (S=1/50)



REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
FARM ROAD IMPLEMENTATION WORKS	
LAYOUT AND STANDARD SECTION	
DATE APR. 1988	DRAWING NO. R-1
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	



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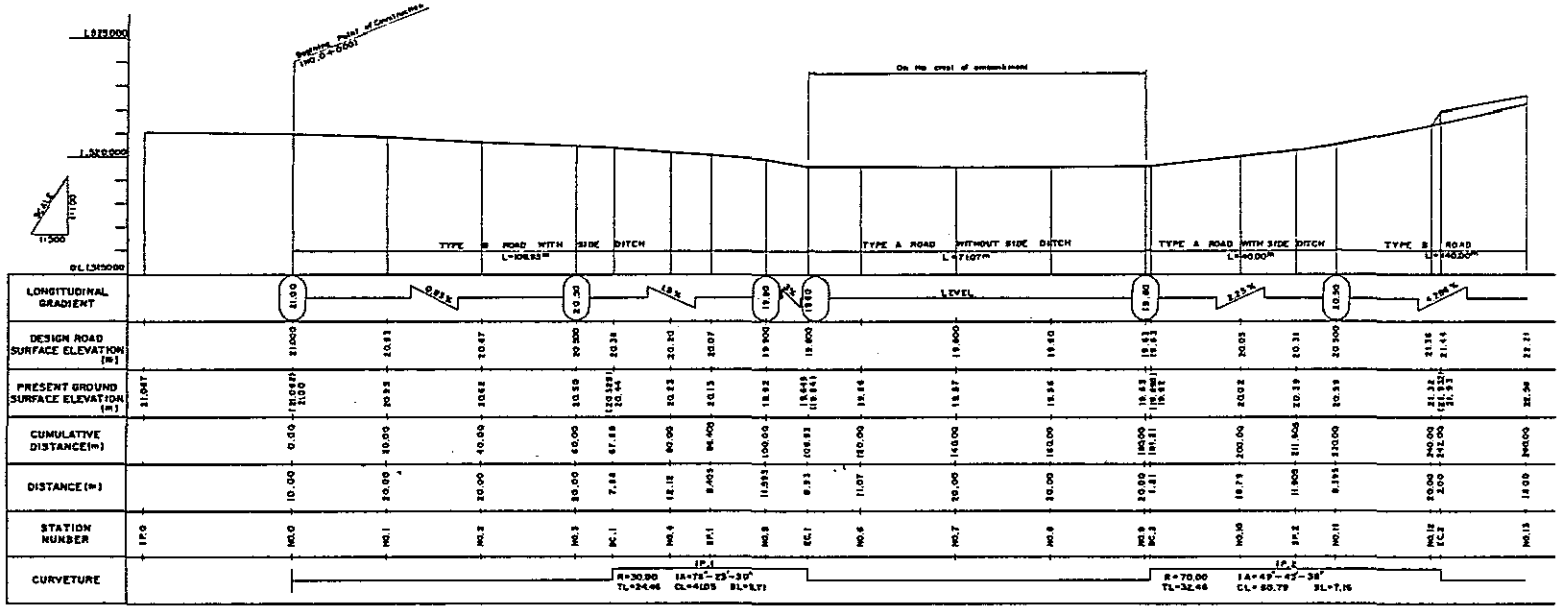
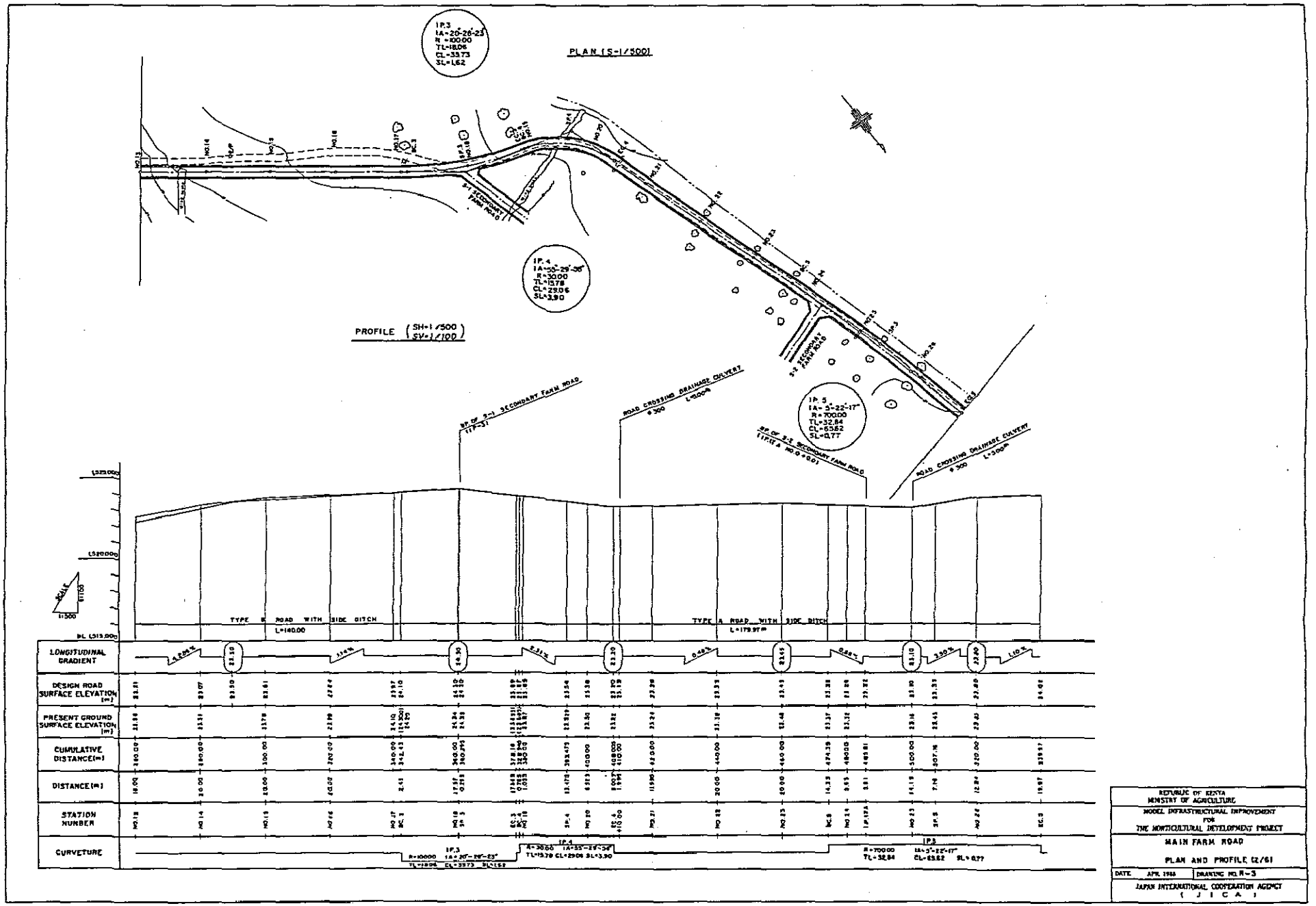
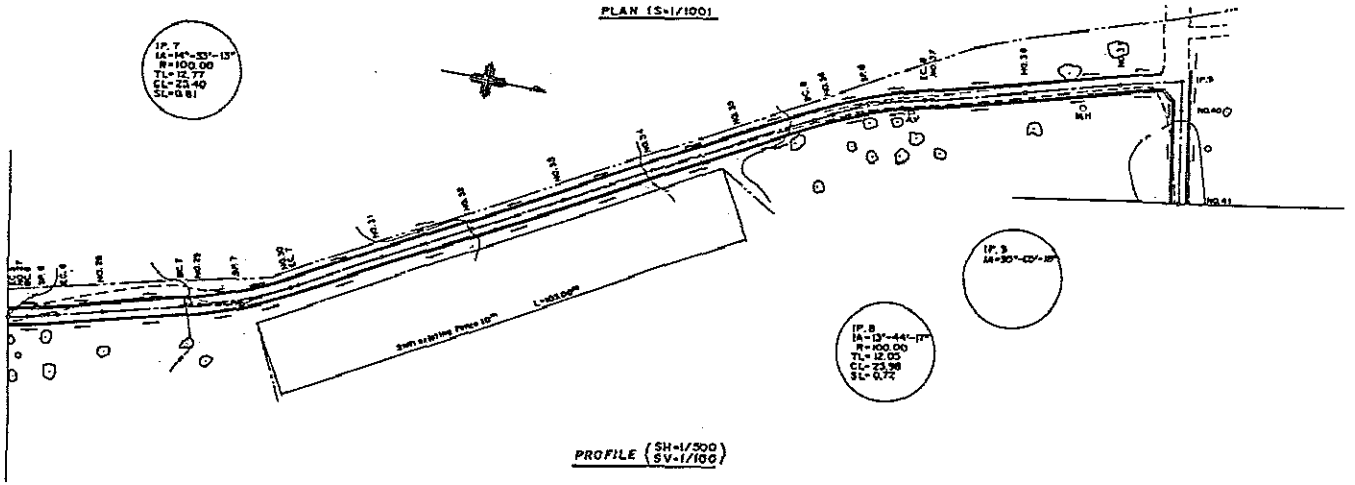


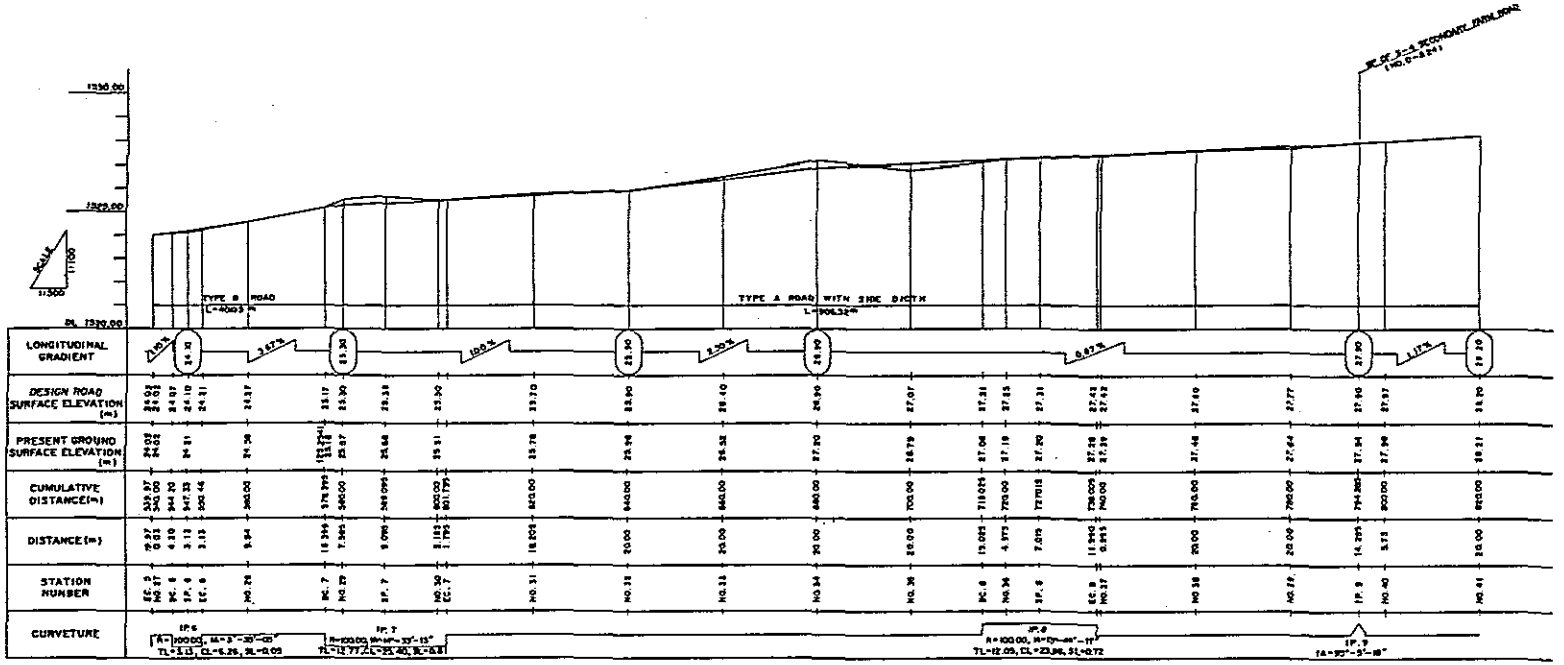
REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
MAIN FARM ROAD PLAN AND PROFILE (1/5)	
DATE APR. 1986	DRAWING NO. R-2
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	


PLAN (S=1/5000)
PROFILE (SH=1/500 SV=1/100)
IP.3
IA=20°-26'-25"
R=10000
TL=1806
CL=3573
SL=162
IP.4
IA=55°-29'-36"
R=3000
TL=1578
CL=2906
SL=390
IP.5
IA=3°-22'-17"
R=70000
TL=3284
CL=6562
SL=077
TYPE B ROAD WITH SIDE DITCH
L=140.00
TYPE A ROAD WITH SIDE DITCH
L=179.97m
ROAD CROSSING DRAINAGE CULVERT
ROAD CROSSING DRAINAGE CULVERT
LONGITUDINAL GRADIENT
DESIGN ROAD SURFACE ELEVATION (m)
PRESENT GROUND SURFACE ELEVATION (m)
CUMULATIVE DISTANCE(m)
DISTANCE(m)
STATION NUMBER
CURVETURE
REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT
MAIN FARM ROAD
PLAN AND PROFILE (2/6)
DATE APR. 1988
DRAWING NO. R-3
JAPAN INTERNATIONAL COOPERATION AGENCY
(J I C A)

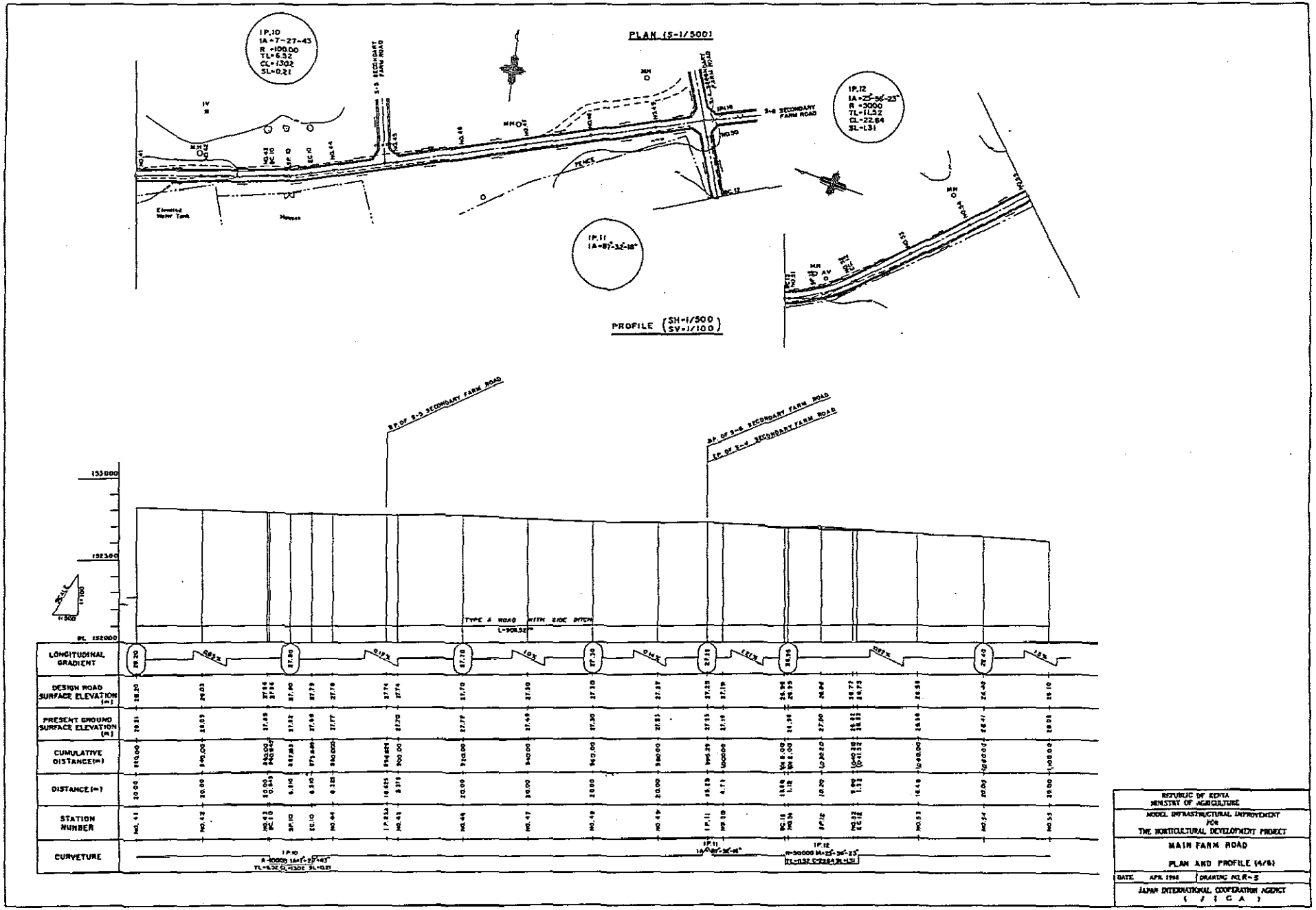
PLAN (S=1/100)

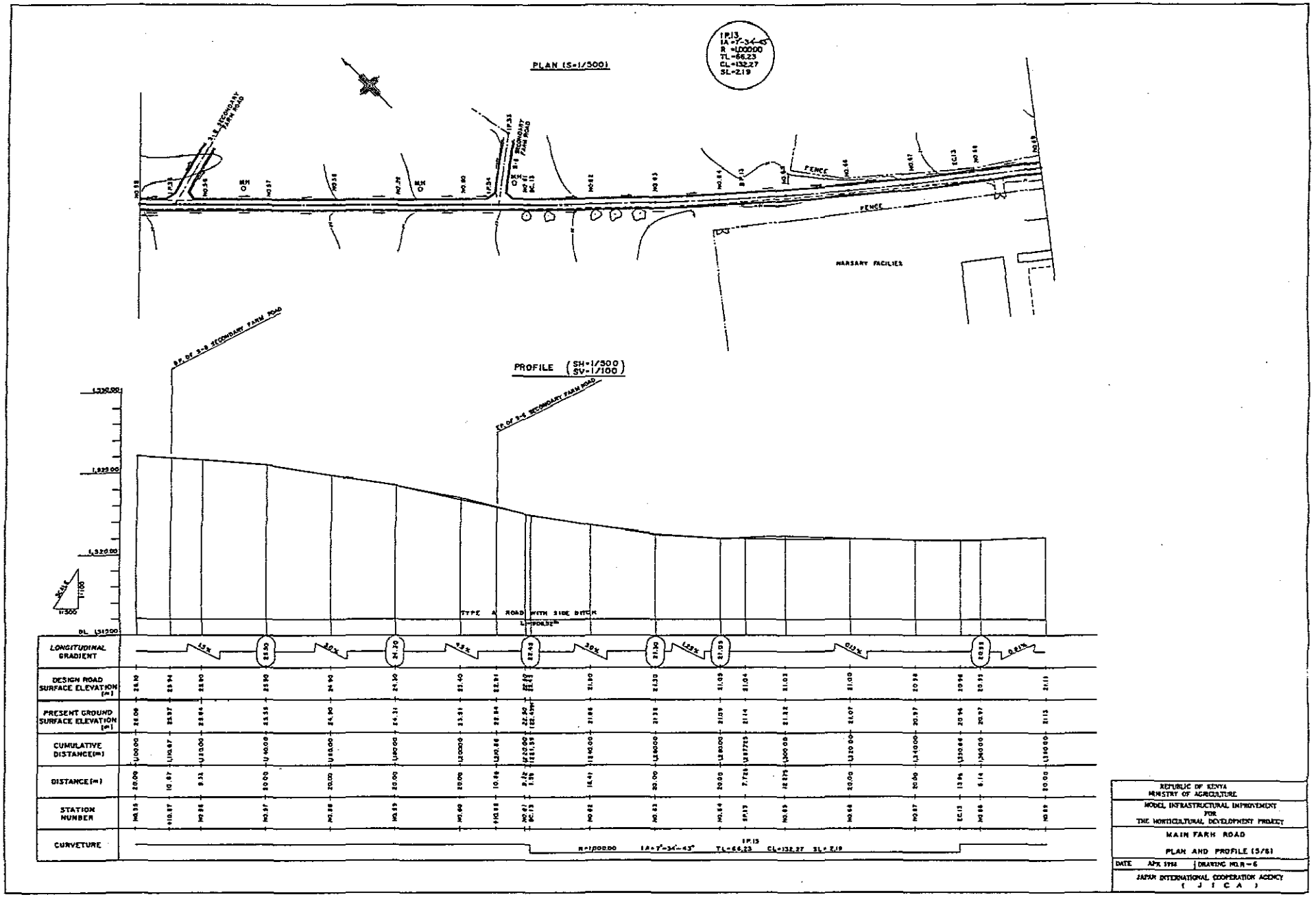


PROFILE (SH=1/500 SV=1/100)

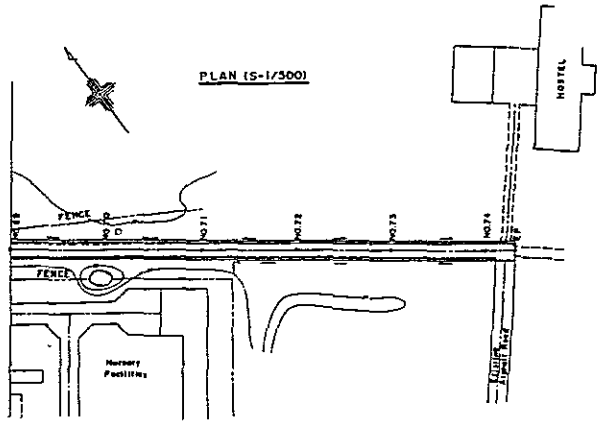


REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
MAIN FARM ROAD PLAN AND PROFILE (3/6)	
DATE APR. 1988	DRAWING NO. R-4
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	


PLAN (S-1/5001)
IP.10
IA=T-27-43
R =100.00
TL=6.52
CL=13.02
SL=0.21
IP.12
IA=25°-36'-23"
R =3000
TL=11.52
CL=22.64
SL=1.31
IP.11
IA=87°-32'-18"
PROFILE (SH=1/500 SV=1/100)
B.P. OF S-3 SECONDARY FARM ROAD
E.P. OF S-4 SECONDARY FARM ROAD
TYPE A ROAD WITH SIDE DITCH
L=908.52m
LONGITUDINAL GRADIENT
DESIGN ROAD SURFACE ELEVATION (m)
PRESENT GROUND SURFACE ELEVATION (m)
CUMULATIVE DISTANCE(m)
DISTANCE(m)
STATION NUMBER
CURVETURE
REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT
MAIN FARM ROAD
PLAN AND PROFILE (4/6)
DATE APR. 1986
DRAWING NO.R-5
JAPAN INTERNATIONAL COOPERATION AGENCY
(J I C A)



REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
MAIN FARM ROAD PLAN AND PROFILE (5/6)	
DATE APR 1988	DRAWING NO.R-6
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	



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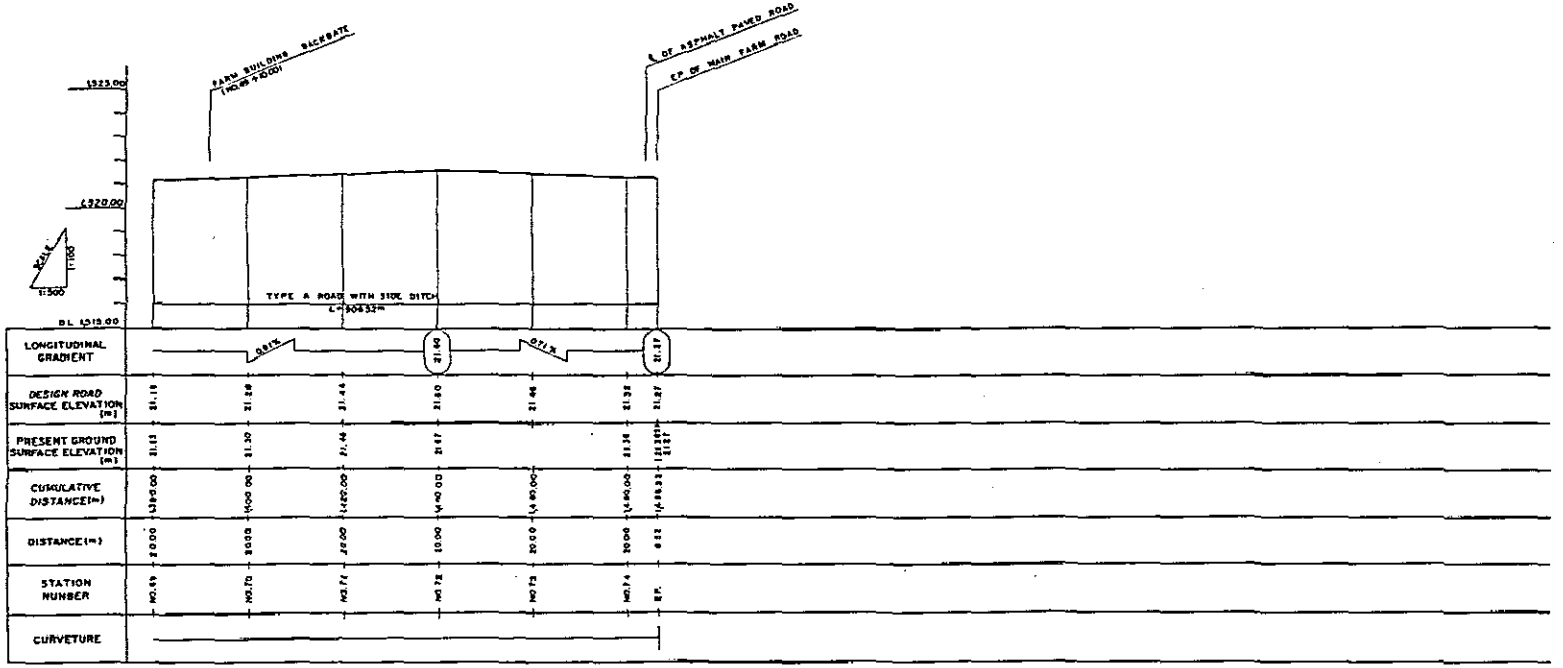
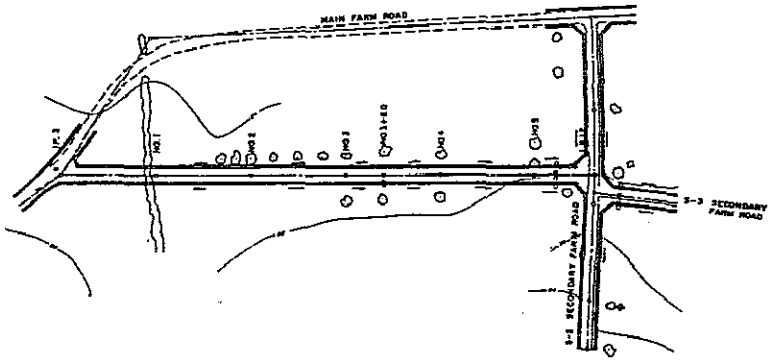


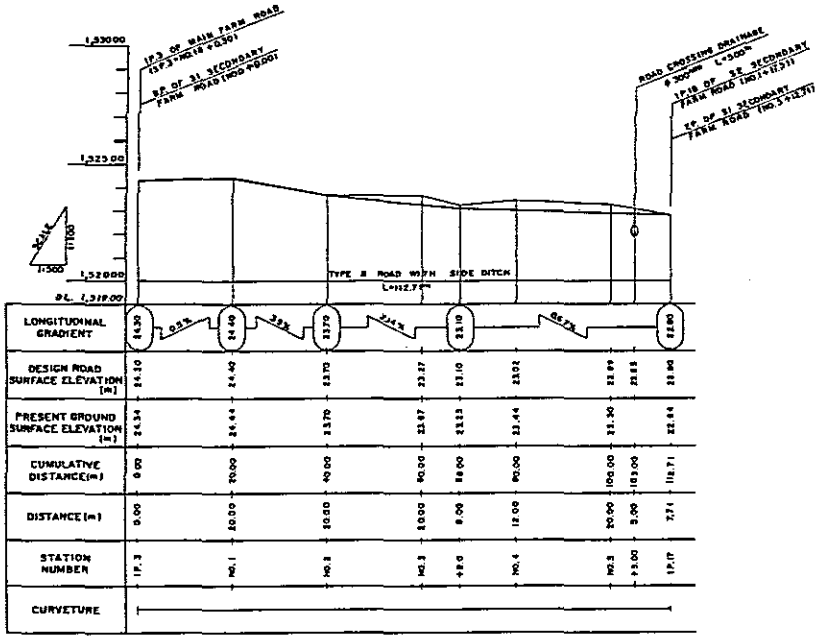
REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
MAIN FARM ROAD PLAN AND PROFILE (6/6)	
DATE: APR. 1988	DRAWING NO. R-7
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	

S1 SECONDARY FARM ROAD

PLAN (S=1/500)

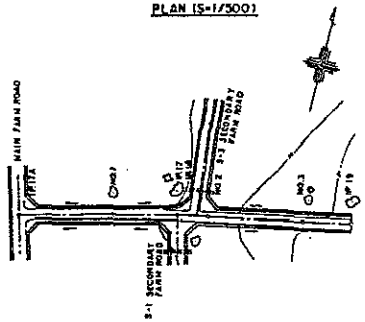


PROFILE (SH=1/500 SV=1/100)

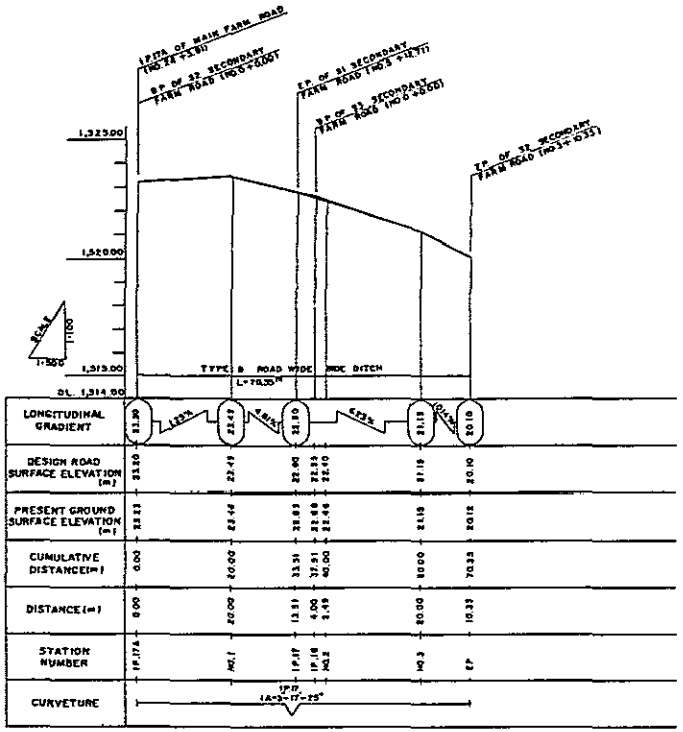


S2 SECONDARY FARM ROAD

PLAN (S=1/500)



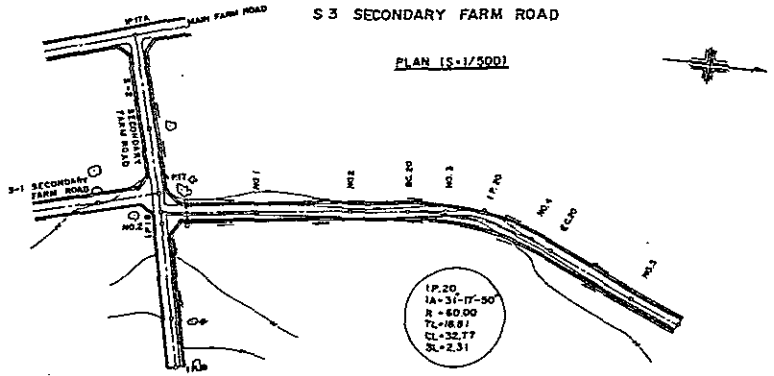
PROFILE (SH=1/500 SV=1/100)



REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
S1 AND S2 SECONDARY FARM ROAD PLAN AND PROFILE	
DATE APR 1988	DRAWING NO. R-8
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	

S3 SECONDARY FARM ROAD

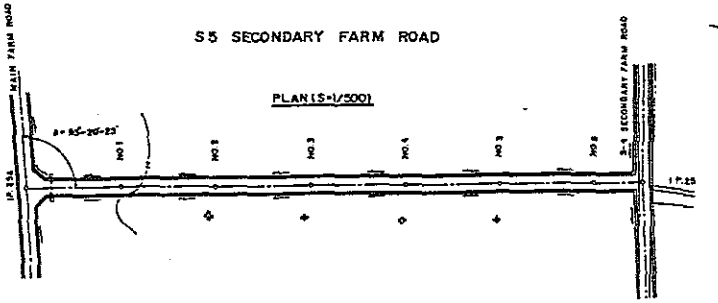
PLAN (S=1/500)



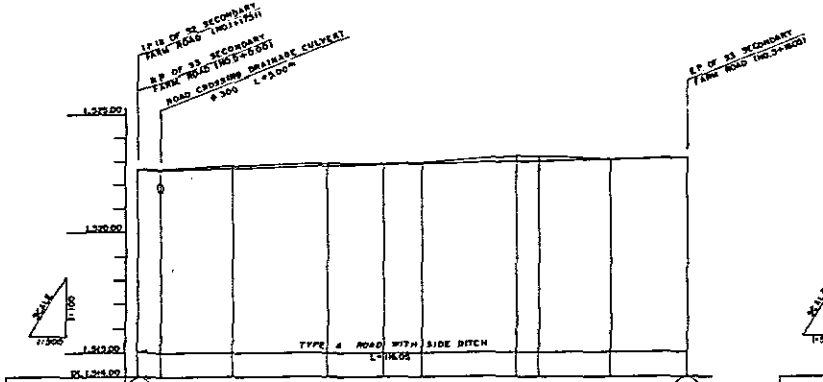
PROFILE (SH=1/500 SV=1/100)

S5 SECONDARY FARM ROAD

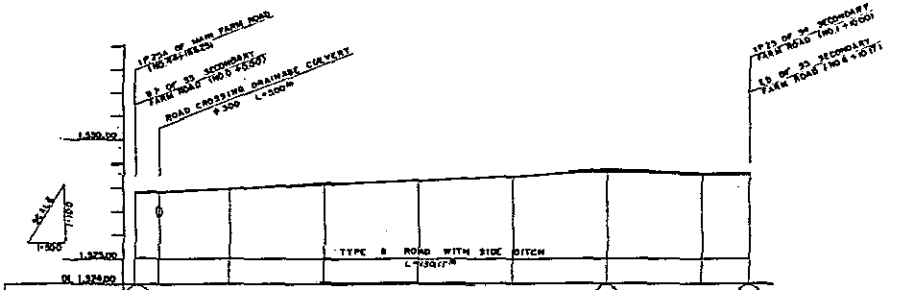
PLAN (S=1/500)



PROFILE (SH=1/500 SV=1/100)

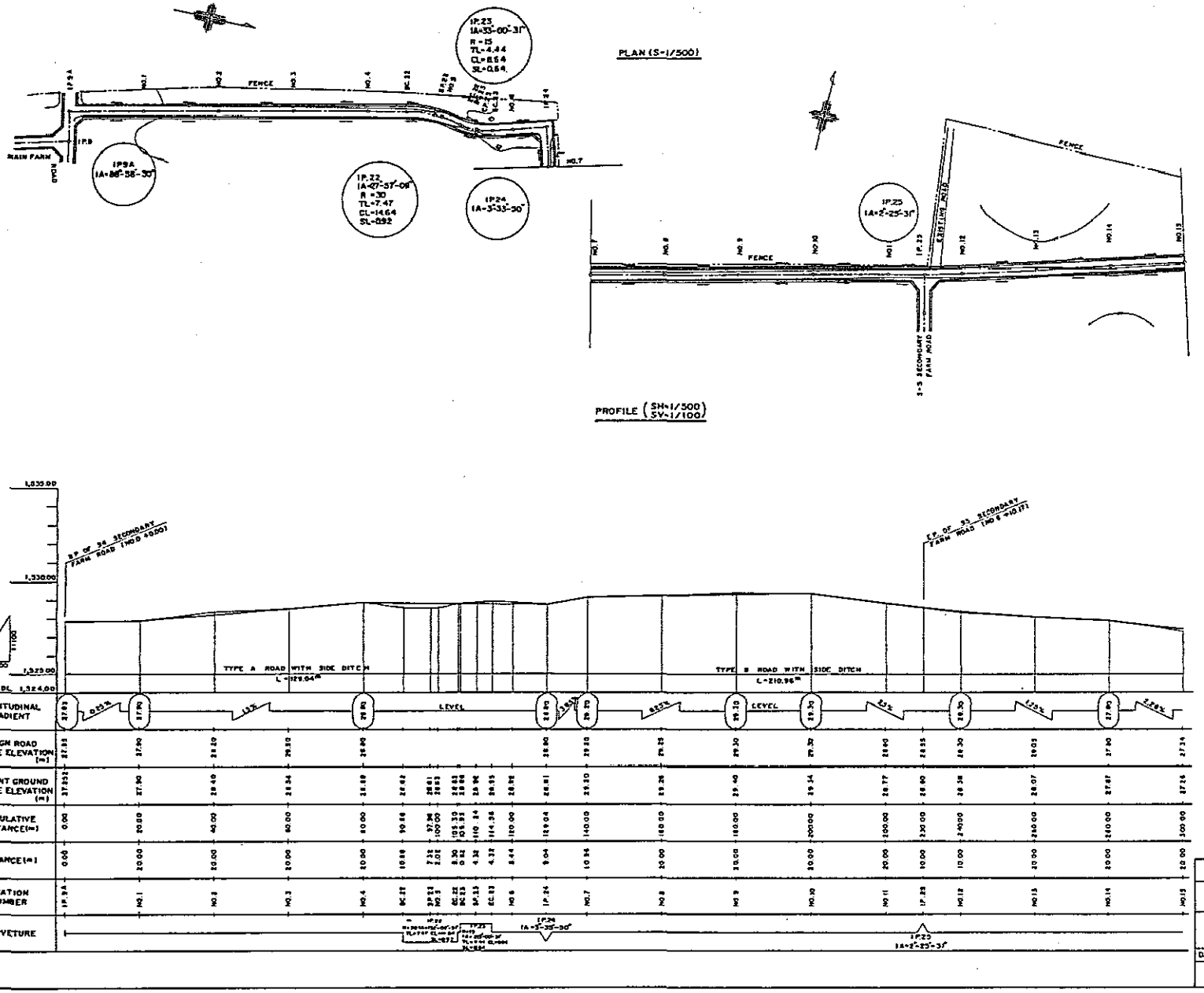


LONGITUDINAL GRADIENT	22.84		0.24%							23.30
DESIGN ROAD SURFACE ELEVATION (m)	22.84	22.90	23.06	23.17	23.34	23.39	23.00	23.05	23.11	23.30
PRESENT GROUND SURFACE ELEVATION (m)	22.84		22.79	22.90	23.32	23.38	23.21	23.24	23.12	23.30
CUMULATIVE DISTANCE(m)	0.00	6.00	20.00	40.00	54.83	60.00	80.00	84.72	100.00	116.05
DISTANCE(m)	0.00	6.00	14.00	20.00	14.83	5.17	20.00	4.72	15.27	16.05
STATION NUMBER	IP.19	+6.00	NO.1	NO.2	NO.2+14.83	NO.3		NO.4	NO.4+15.27	NO.5	IP
CURVETURE	IP.20 R=60 IA=19°-42'-10" TL=10.98 CL=20.77 SL=2.31									



LONGITUDINAL GRADIENT	27.74		0.81%					0.33%		28.35
DESIGN ROAD SURFACE ELEVATION (m)	27.74	27.79	27.92	28.10	28.28	28.47	28.45	28.48	28.50	28.35
PRESENT GROUND SURFACE ELEVATION (m)	27.44		27.93	28.08	27.83	28.07	27.75	27.99	27.99	27.80
CUMULATIVE DISTANCE(m)	0.00	6.00	20.00	40.00	60.00	80.00	100.00	110.00	130.17
DISTANCE(m)	0.00	6.00	14.00	20.00	20.00	20.00	20.00	10.00	20.17
STATION NUMBER	IP.24A	+6.00	NO.1	NO.2	NO.3	NO.4	NO.5	NO.6	IP.25
CURVETURE									

REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
S3 AND S5 SECONDARY FARM ROAD	
PLAN AND PROFILE	
DATE APR. 1988	DRAWING NO. R-9
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)	



REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE

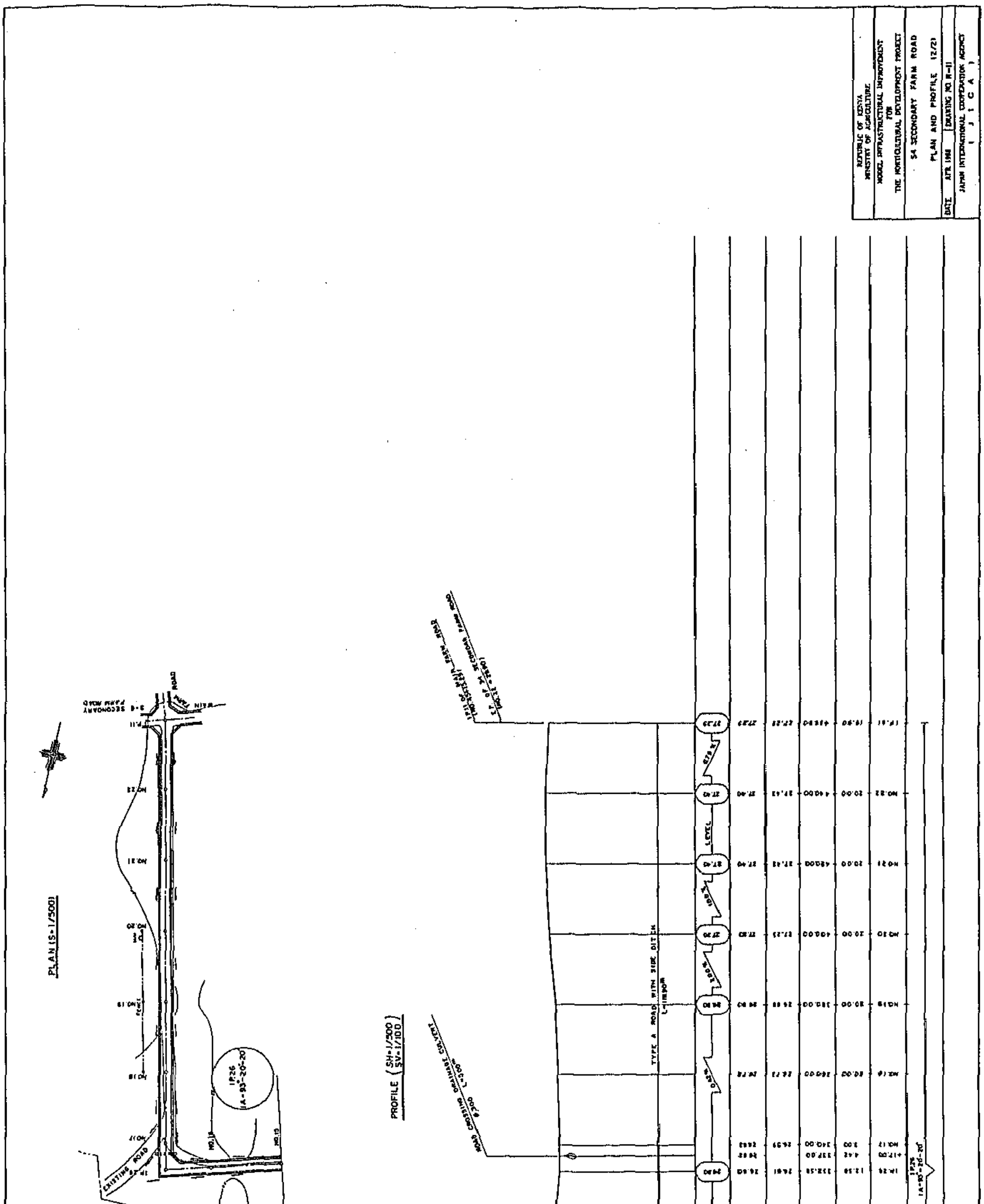
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT

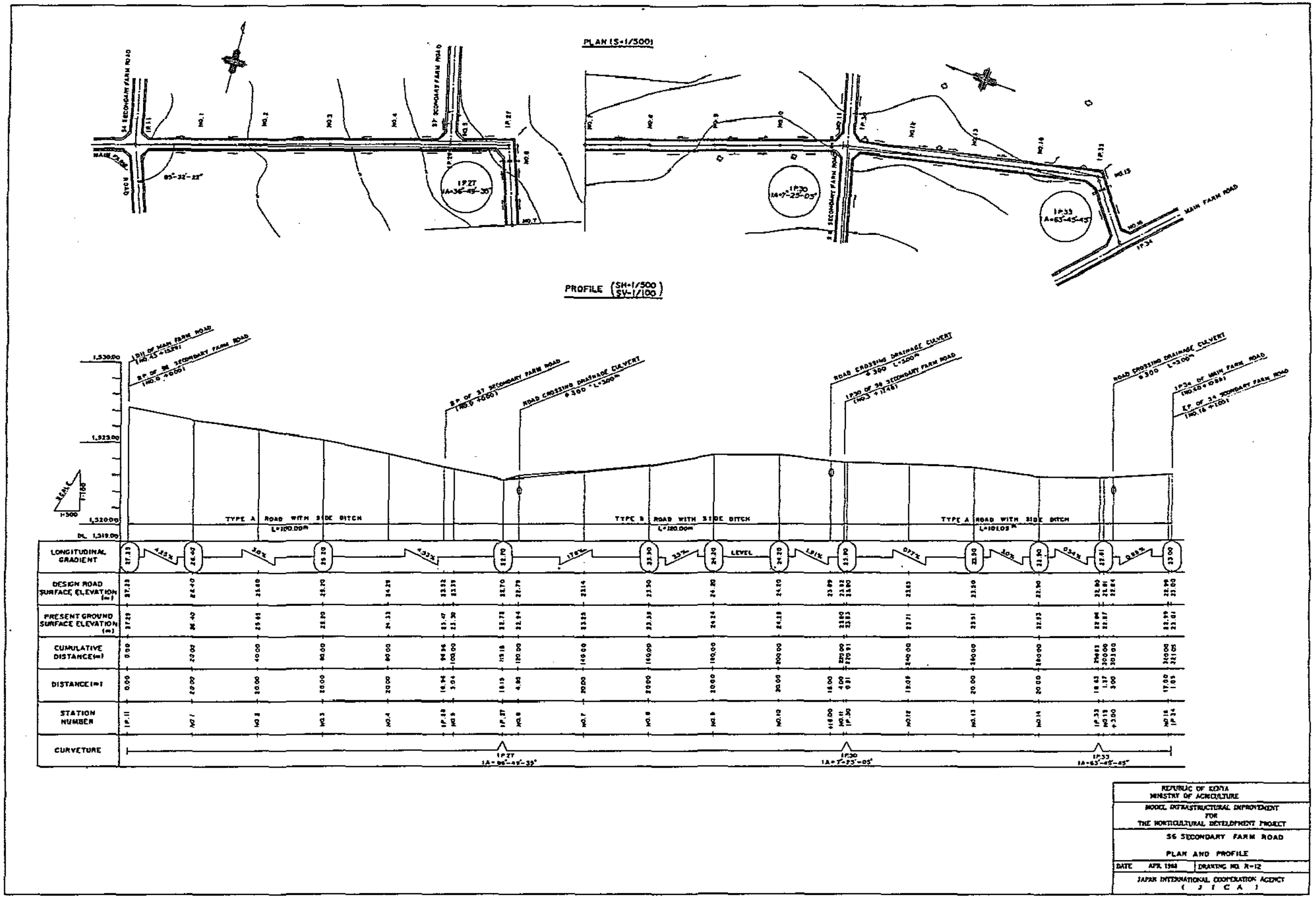
S4 SECONDARY FARM ROAD

PLAN AND PROFILE (1/2)

DATE APR. 1988 | DRAWING NO. R-10

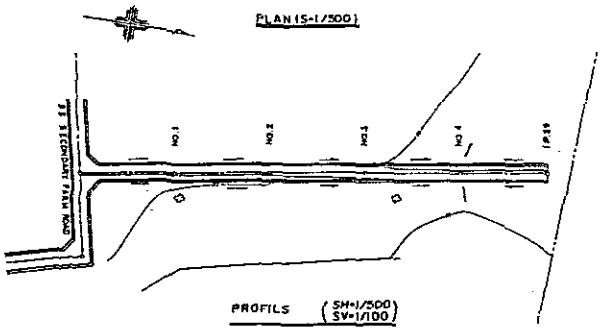
JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)


REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT
S4 SECONDARY FARM ROAD
PLAN AND PROFILE (2/2)
DATE APR 1998
DRAWING NO R-11
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)
PLAN (S=1/500)
PROFILE (SH=1/500, SV=1/100)
LONGITUDINAL GRADIENT
DESIGN ROAD SURFACE ELEVATION (m)
PRESENT GROUND SURFACE ELEVATION (m)
CUMULATIVE DISTANCE (m)
DISTANCE (m)
STATION NUMBER
CURVETURE
EXISTING ROAD
FENCE
MAIN FARM ROAD
TYPE A ROAD WITH SIDE DITCH
TYPE B ROAD
LEVEL

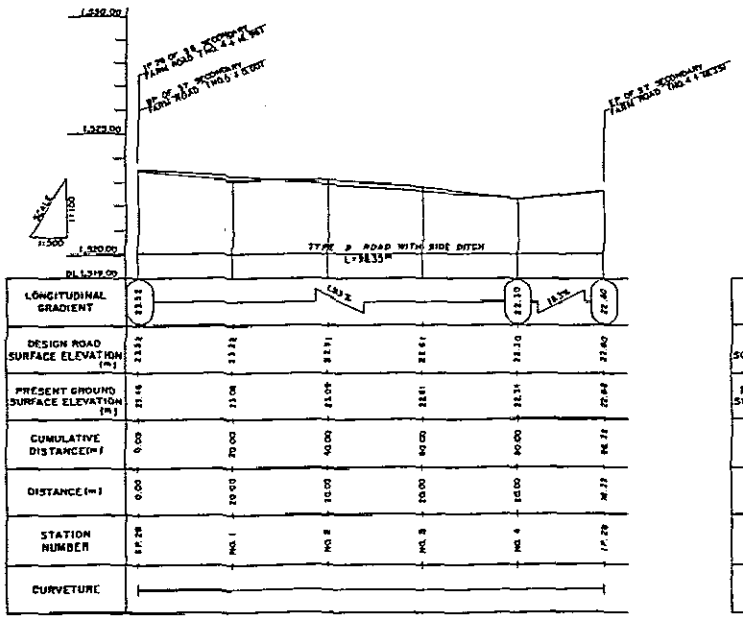

PLAN (S=1/500)
PROFILE (SH=1/500 SV=1/100)
TYPE A ROAD WITH SIDE DITCH
TYPE B ROAD WITH SIDE DITCH
LONGITUDINAL GRADIENT
DESIGN ROAD SURFACE ELEVATION (m)
PRESENT GROUND SURFACE ELEVATION (m)
CUMULATIVE DISTANCE (m)
DISTANCE (m)
STATION NUMBER
CURVETURE
REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT
56 SECONDARY FARM ROAD
PLAN AND PROFILE
DATE APR. 1988
DRAWING NO. R-12
JAPAN INTERNATIONAL COOPERATION AGENCY
(J I C A)

S-7 SECONDARY FARM ROAD

PLAN (S=1/500)

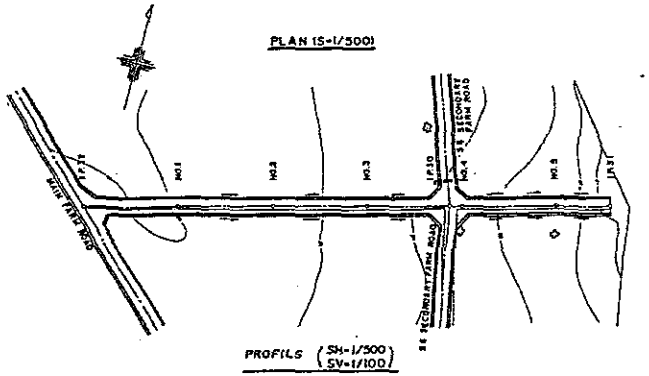


PROFILS (SH=1/500 SV=1/100)

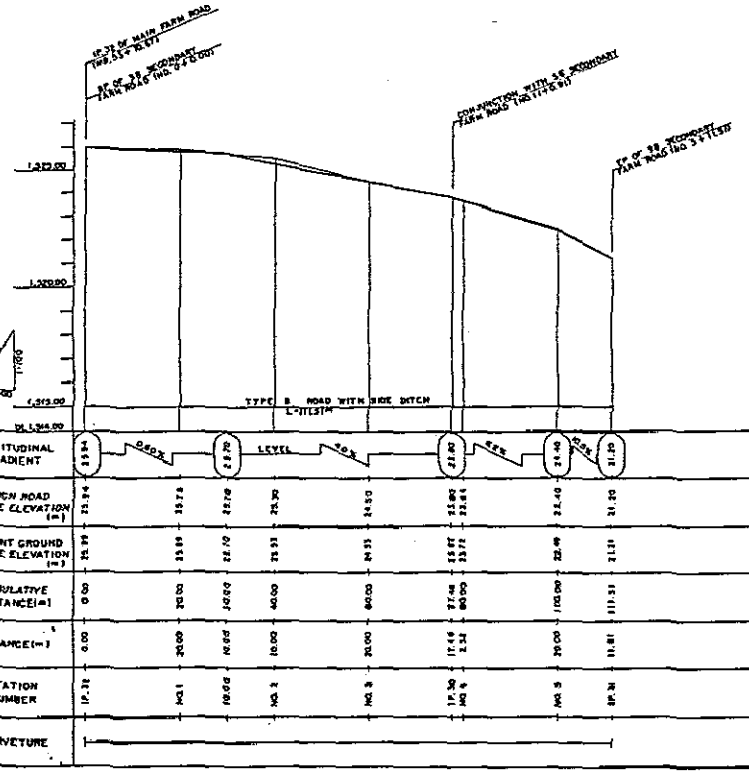


S-8 SECONDARY FARM ROAD

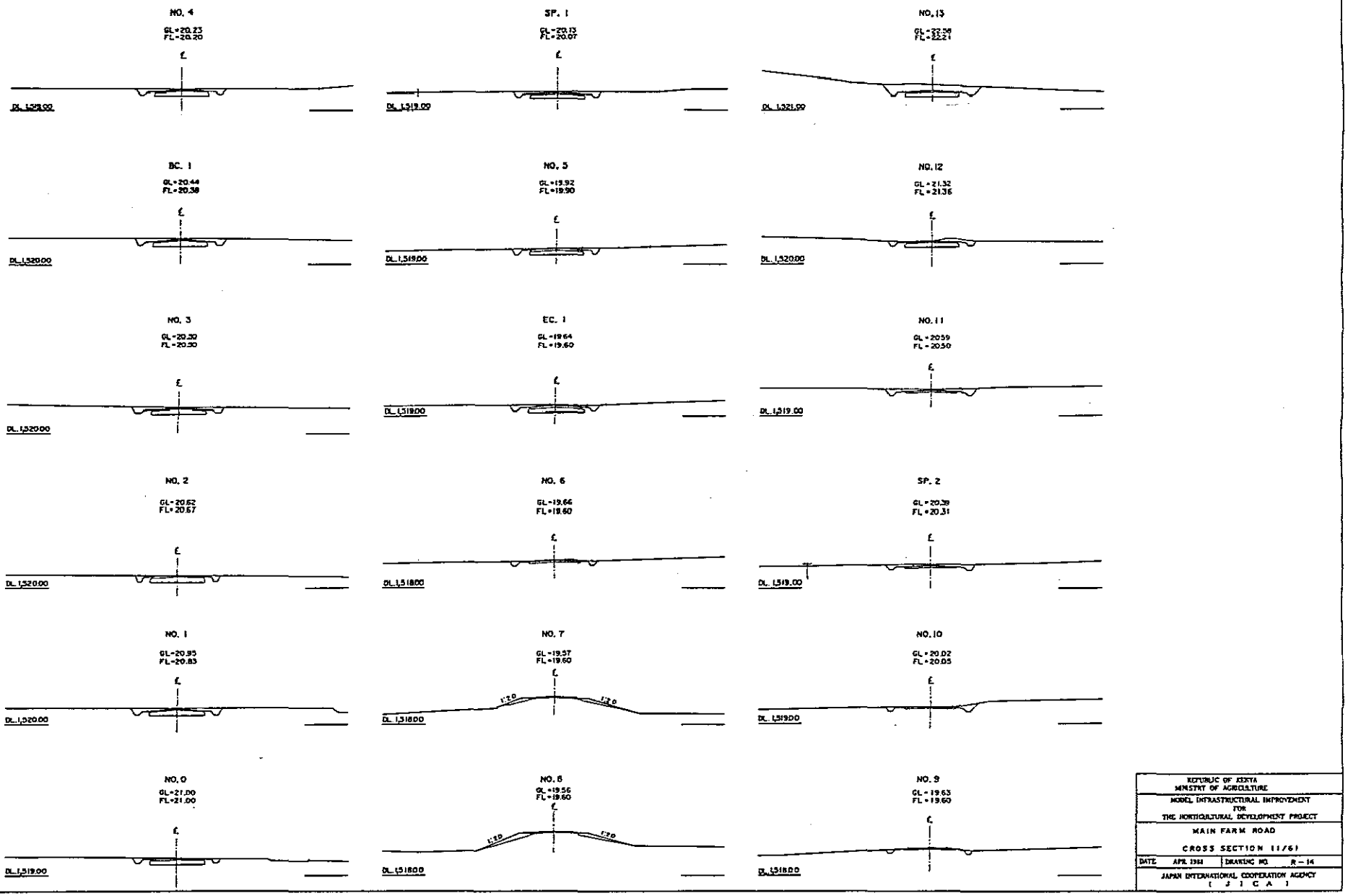
PLAN (S=1/500)



PROFILS (SH=1/500 SV=1/100)



REPUBLIC OF KENYA MINISTRY OF AGRICULTURE
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT
S7 AND S8 SECONDARY FARM ROAD PLAN AND PROFILE
DATE APR. 1988 | DRAWING NO. R-13
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)



REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE

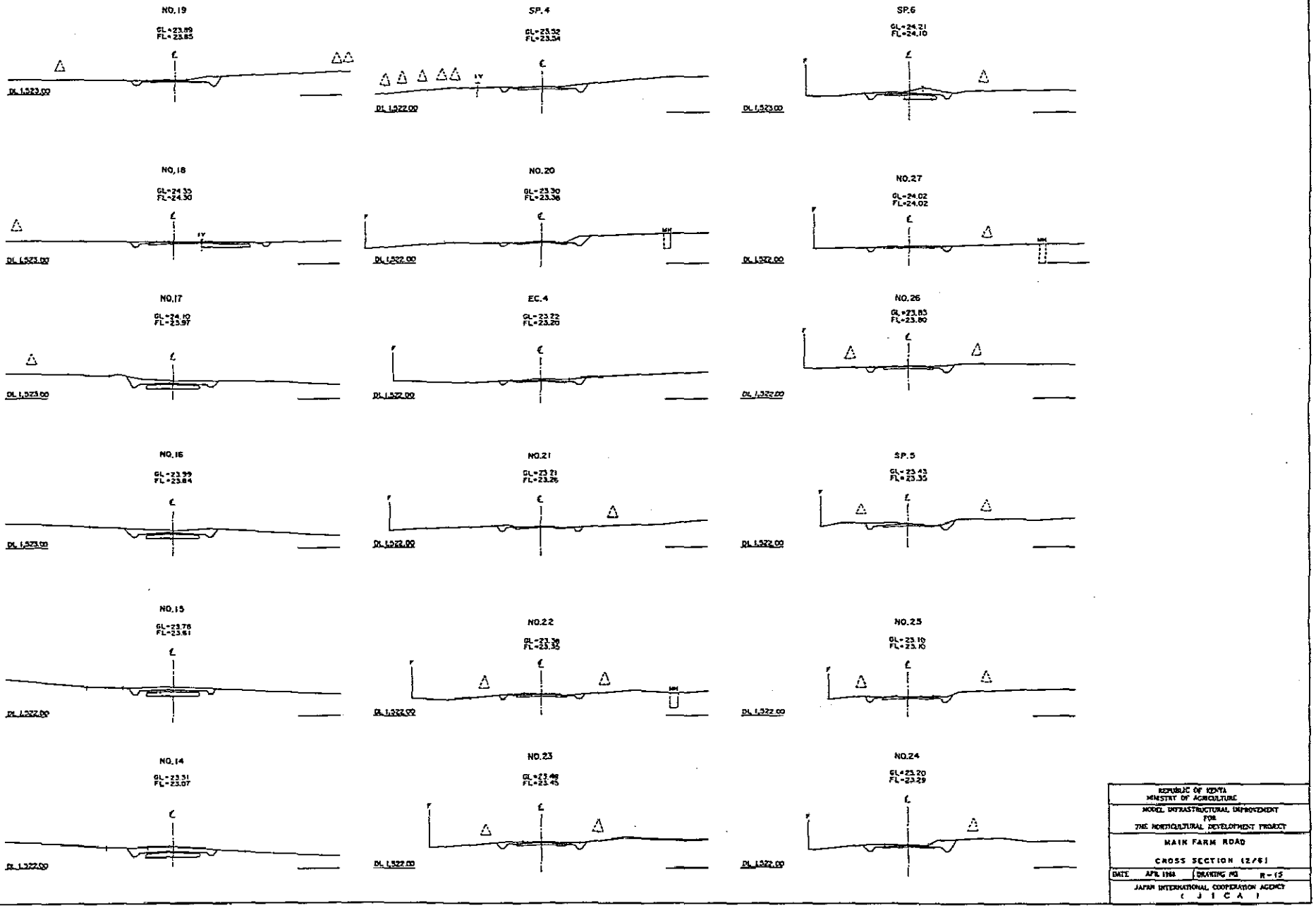
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT

MAIN FARM ROAD

CROSS SECTION (1/6)

DATE APR. 1988 | DRAWING NO. R-14

JAPAN INTERNATIONAL COOPERATION AGENCY
[J I C A]



REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE

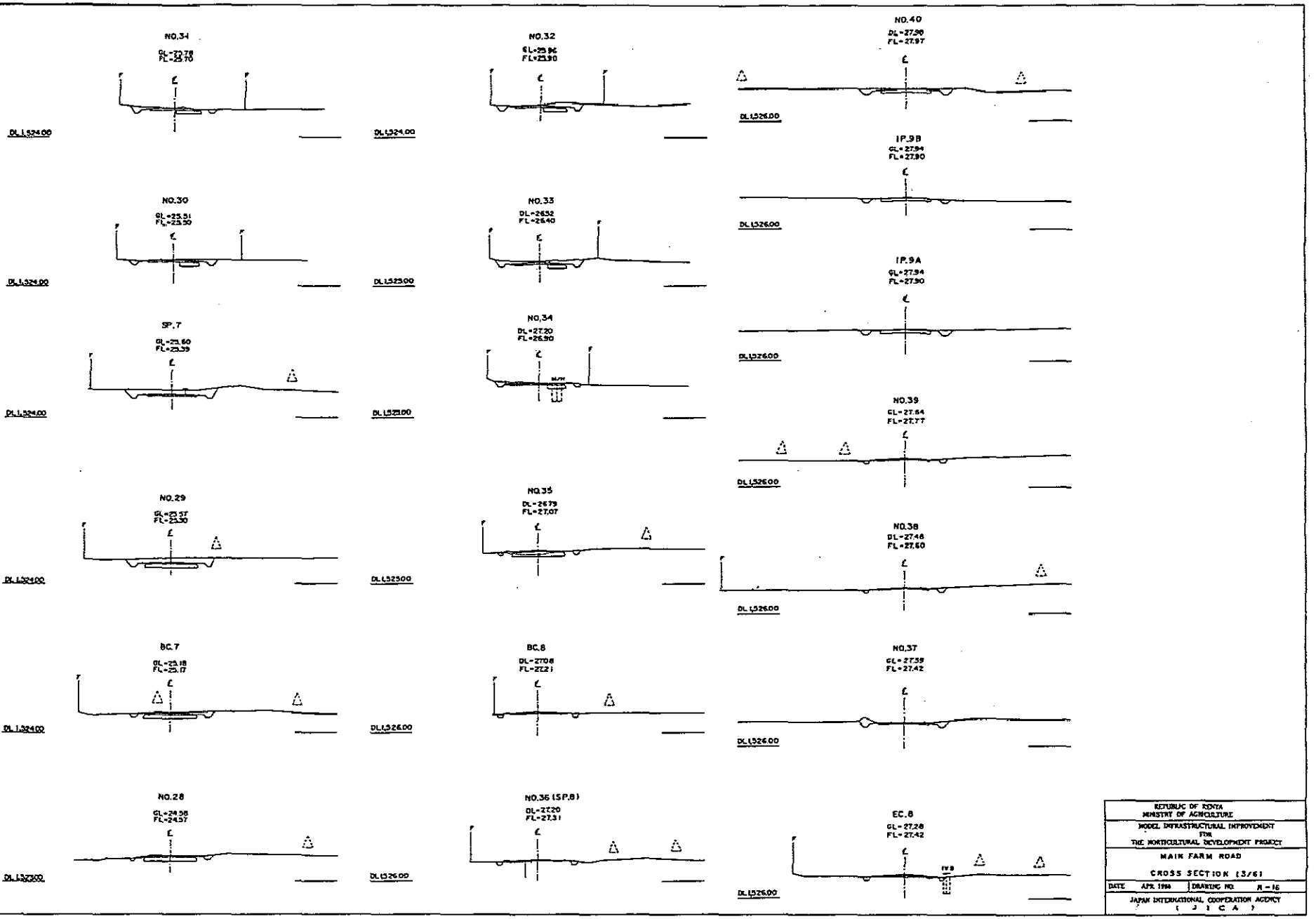
MODEL INFRASTRUCTURAL IMPROVEMENT
FOR
THE HORTICULTURAL DEVELOPMENT PROJECT

MAIN FARM ROAD

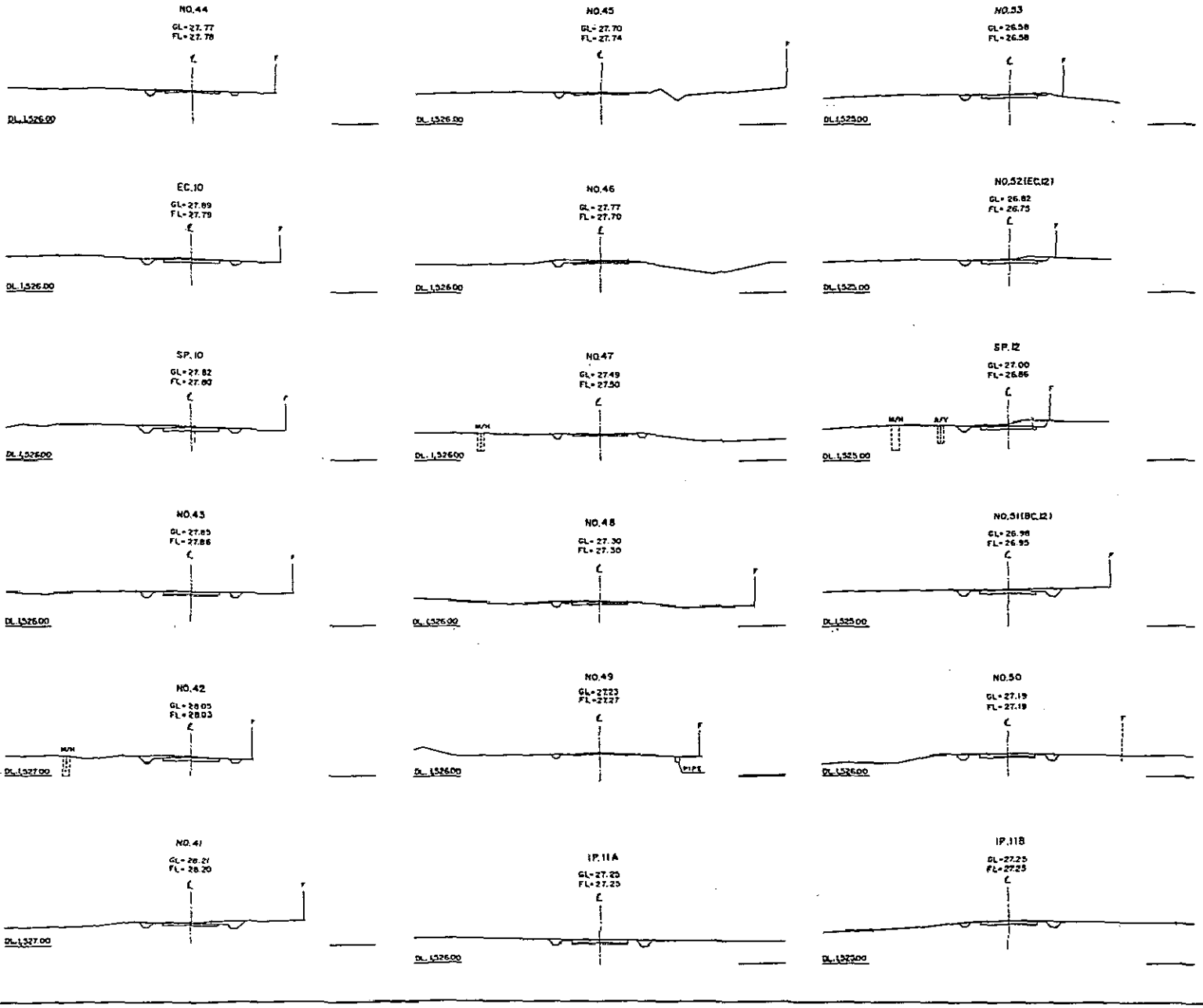
CROSS SECTION (2/6)

DATE APR. 1988 | DRAWING NO. R-15

JAPAN INTERNATIONAL COOPERATION AGENCY
(J I C A)



REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
MAIN FARM ROAD	
CROSS SECTION (3/6)	
DATE APR. 1990	DRAWING NO. A-16
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	



REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE

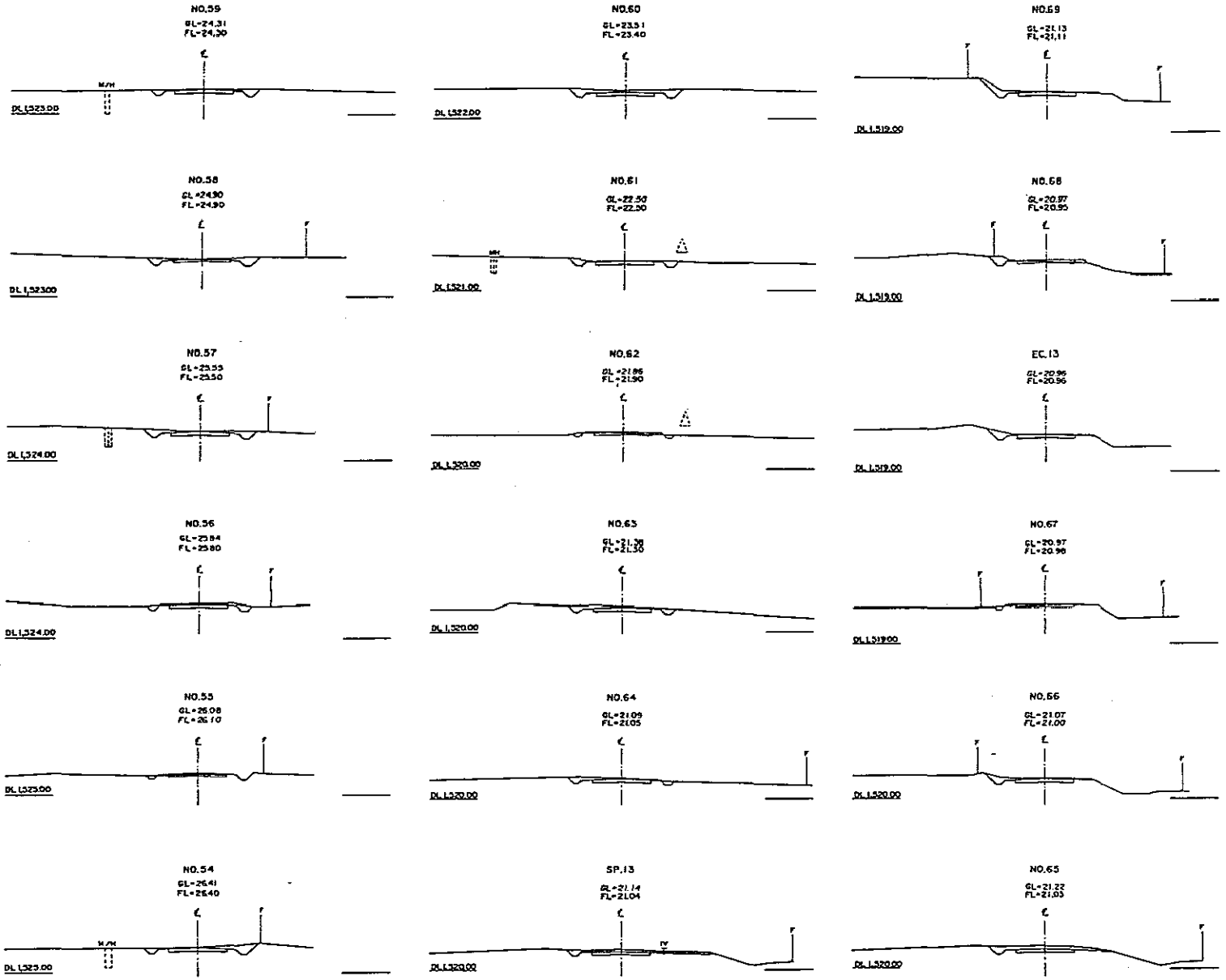
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT

MAIN FARM ROAD

CROSS SECTION (4/6)

DATE: APR. 1988 | DRAWING NO. R-17

JAPAN INTERNATIONAL COOPERATION AGENCY
(J I C A)



REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE

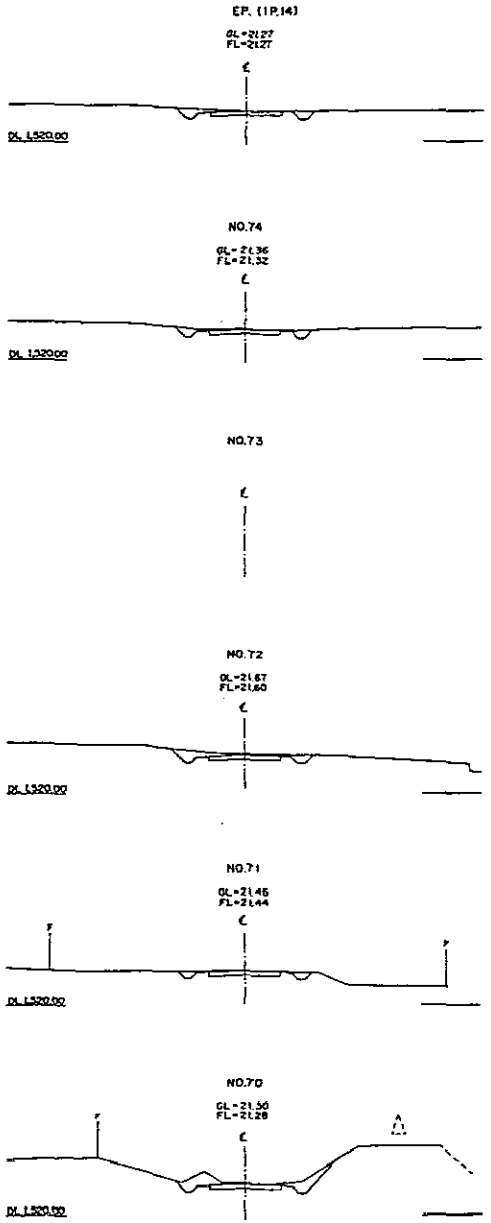
MODEL INFRASTRUCTURAL IMPROVEMENT
FOR
THE HORTICULTURAL DEVELOPMENT PROJECT

MAIN FARM ROAD

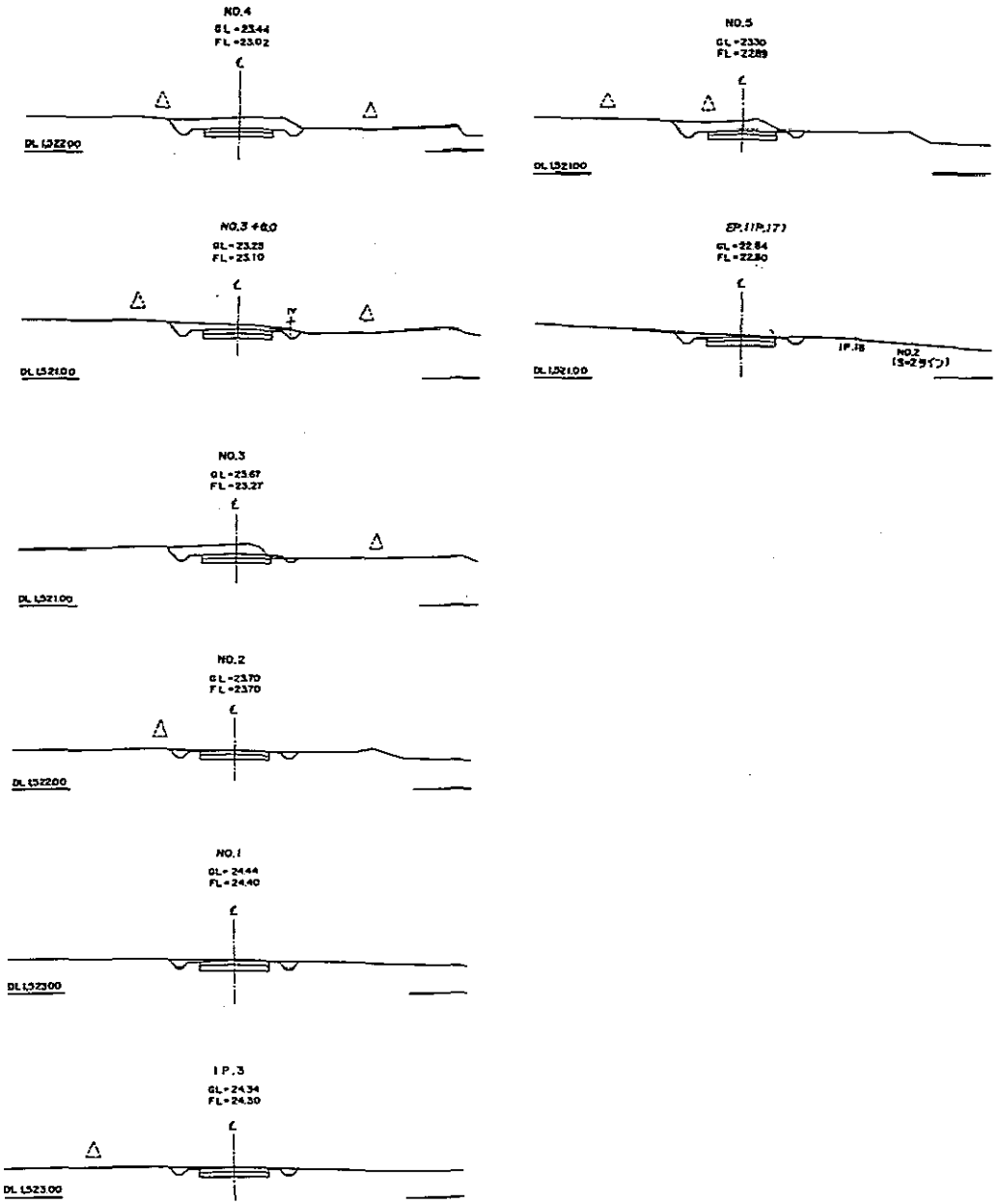
CROSS SECTION (5/6)

DATE APR. 1984 | DRAWING NO. R-18

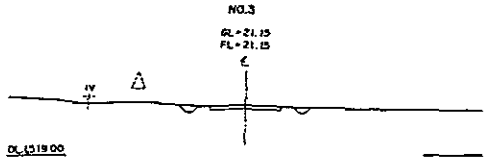
JAPAN INTERNATIONAL COOPERATION AGENCY
(J I C A)

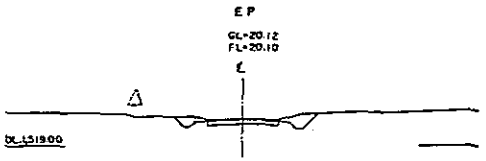


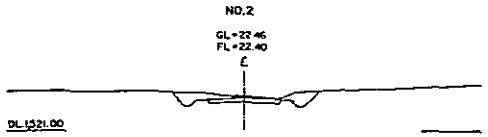
REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
MAIN FARM ROAD CROSS SECTION (6/6)	
DATE APR. 1988	DRAWING NO. R-15
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	

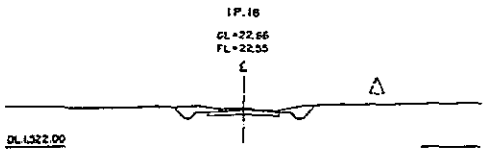


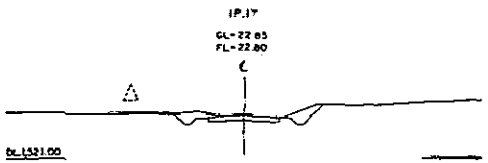
REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
S-1 SECONDARY FARM ROAD CROSS SECTION	
DATE APR. 1988	DRAWING NO. R-20
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	

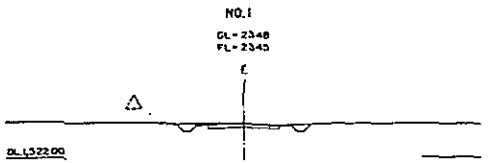


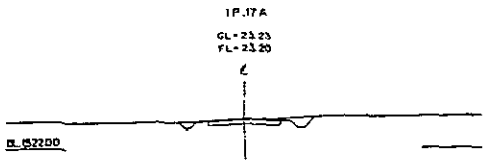












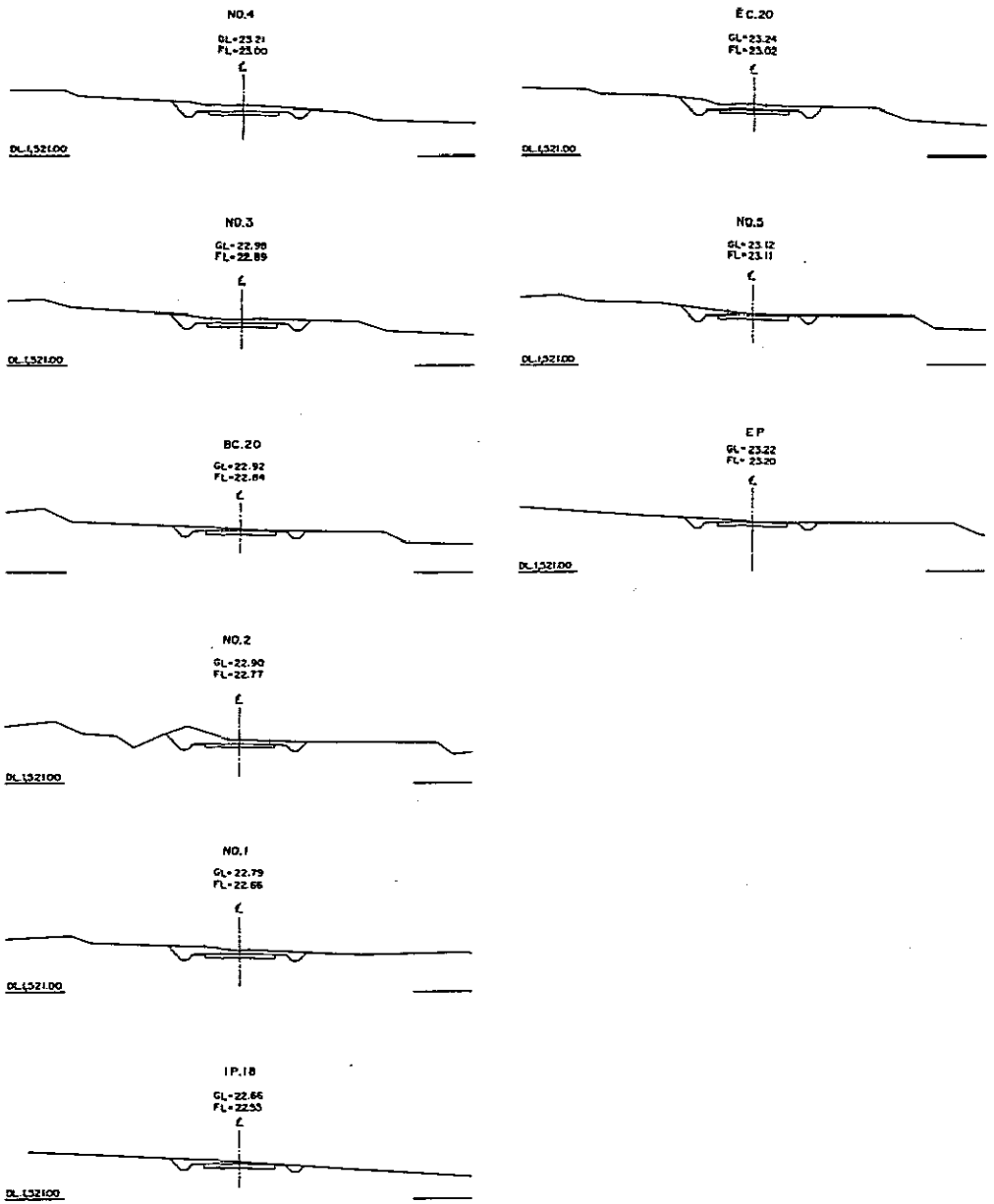
REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE

MODEL INFRASTRUCTURAL IMPROVEMENT
FOR
THE HORTICULTURAL DEVELOPMENT PROJECT

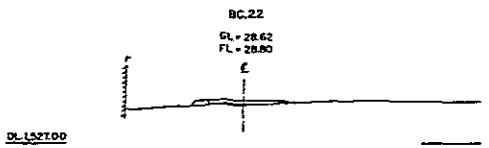
S-2 SECONDARY FARM ROAD
CROSS SECTION

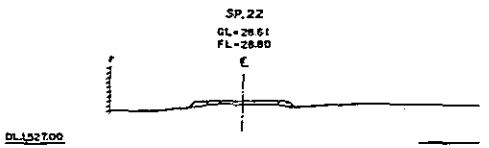
DATE APR. 1988 | DRAWING NO. K-21

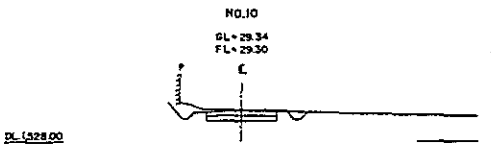
JAPAN INTERNATIONAL COOPERATION AGENCY
(J I C A)

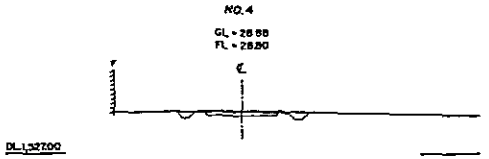


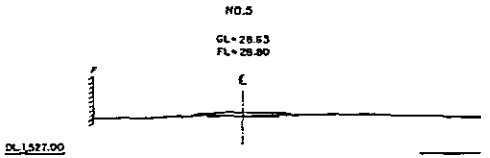
REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
S-3 SECONDARY FARM ROAD CROSS SECTION	
DATE APR. 1988	DRAWING NO. R-27
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	

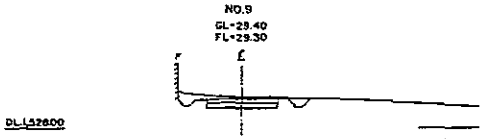


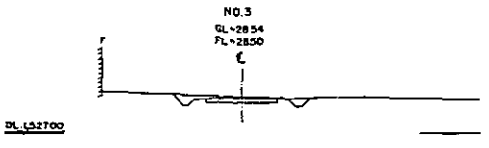


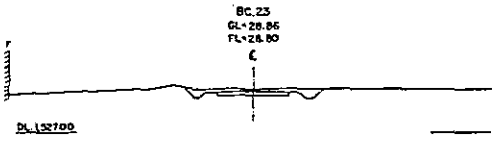


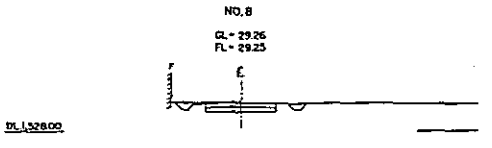


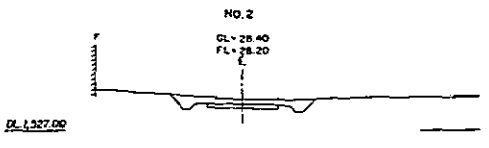


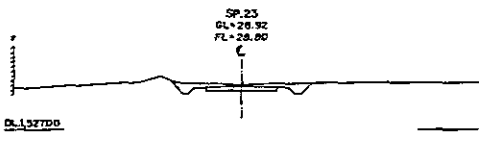


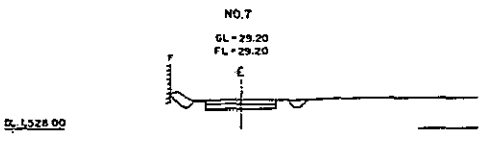


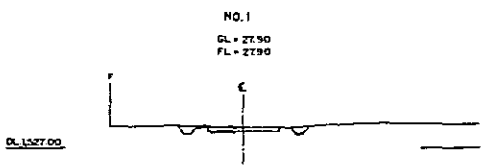


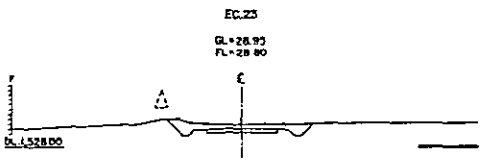


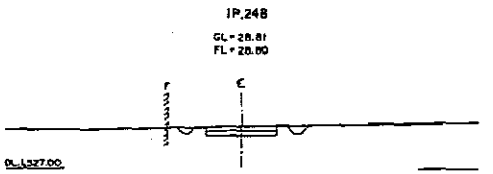


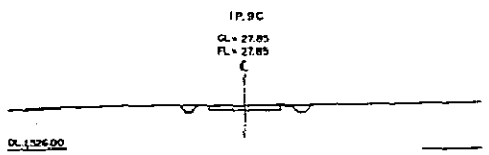


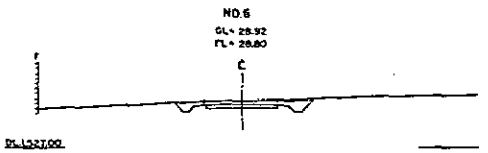


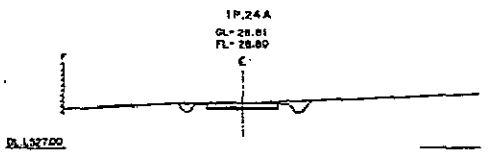












REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE

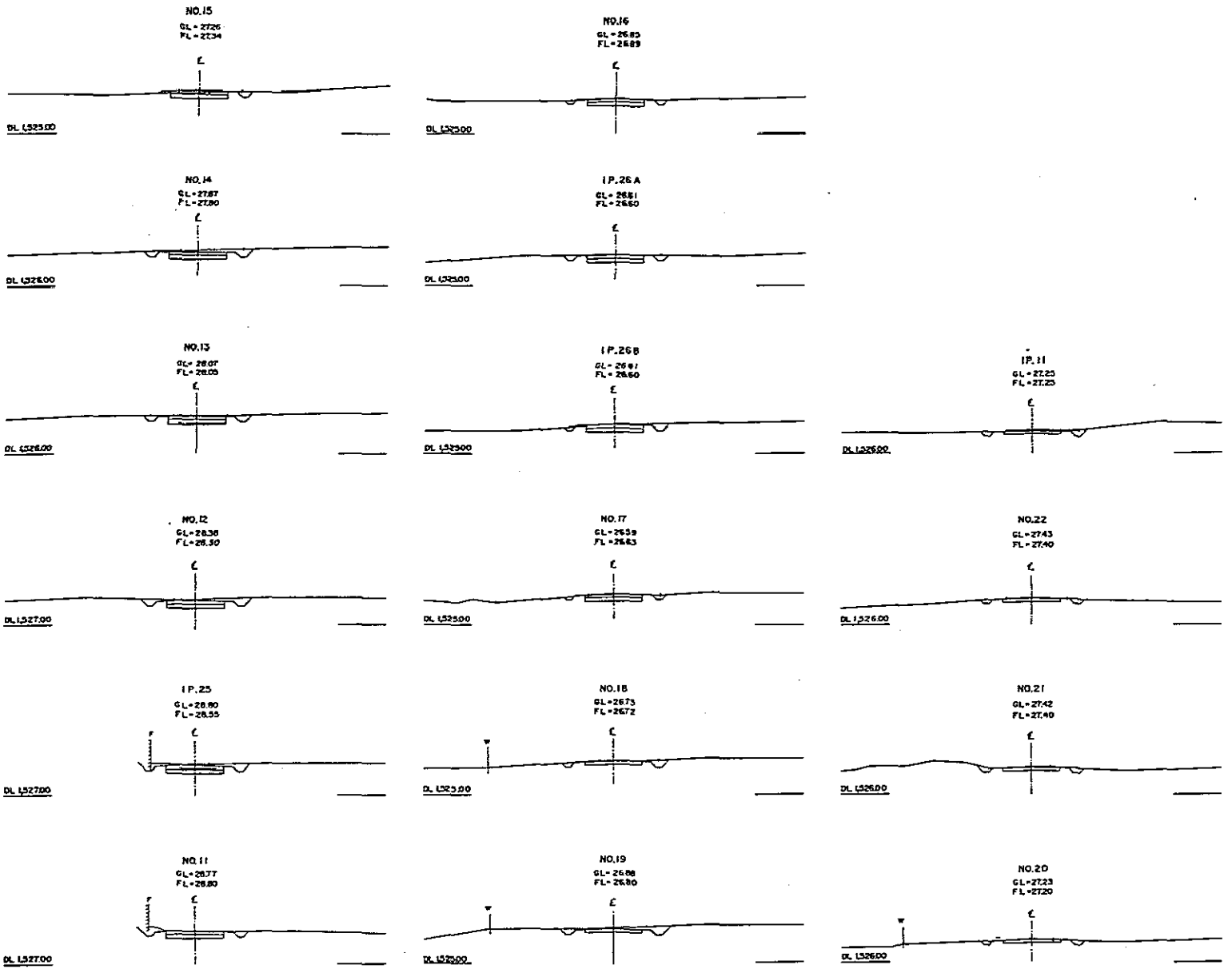
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT

S-4 SECONDARY FARM ROAD

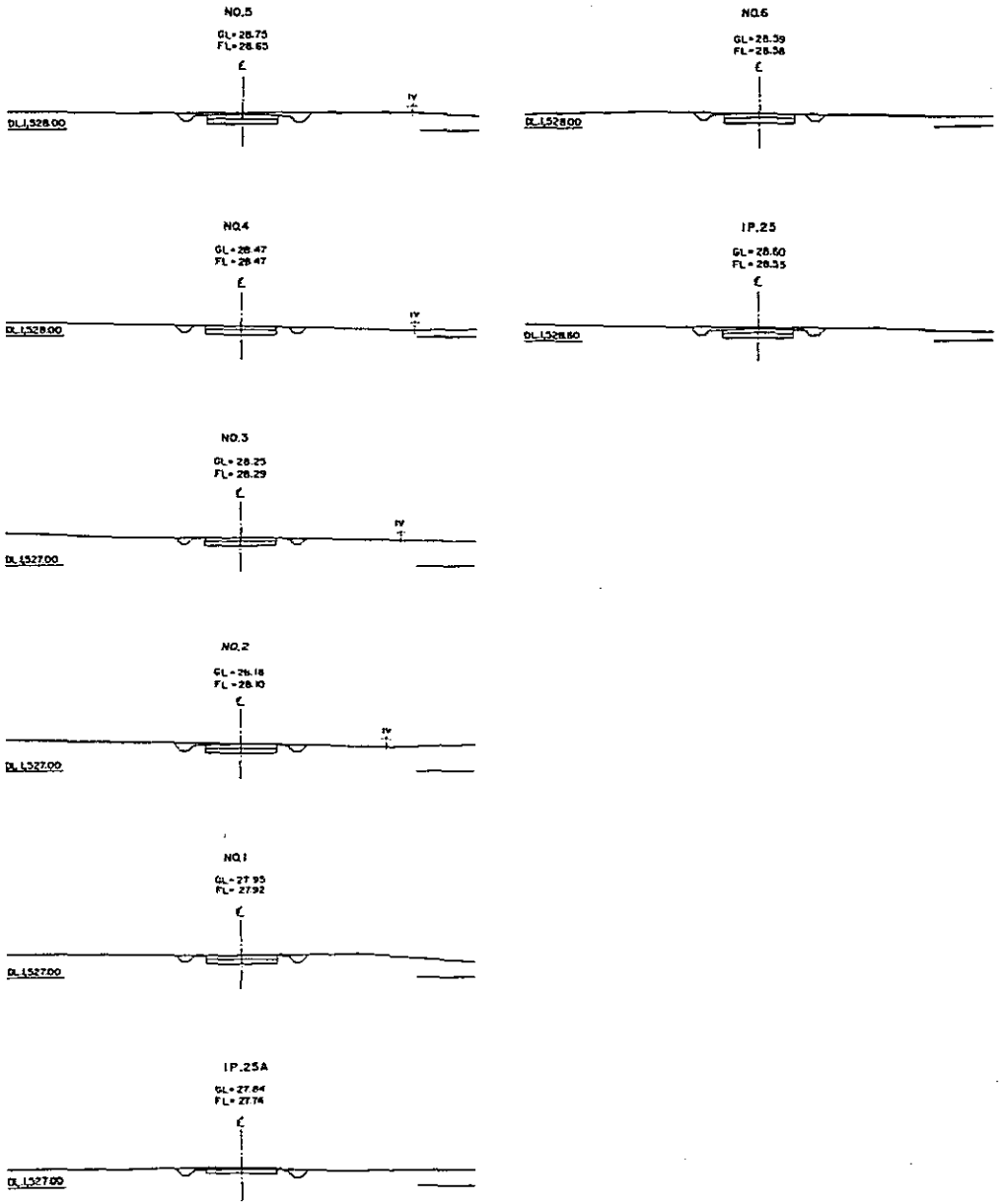
CROSS SECTION (1/2)

DATE APR. 1988 | DRAWING NO. R-23

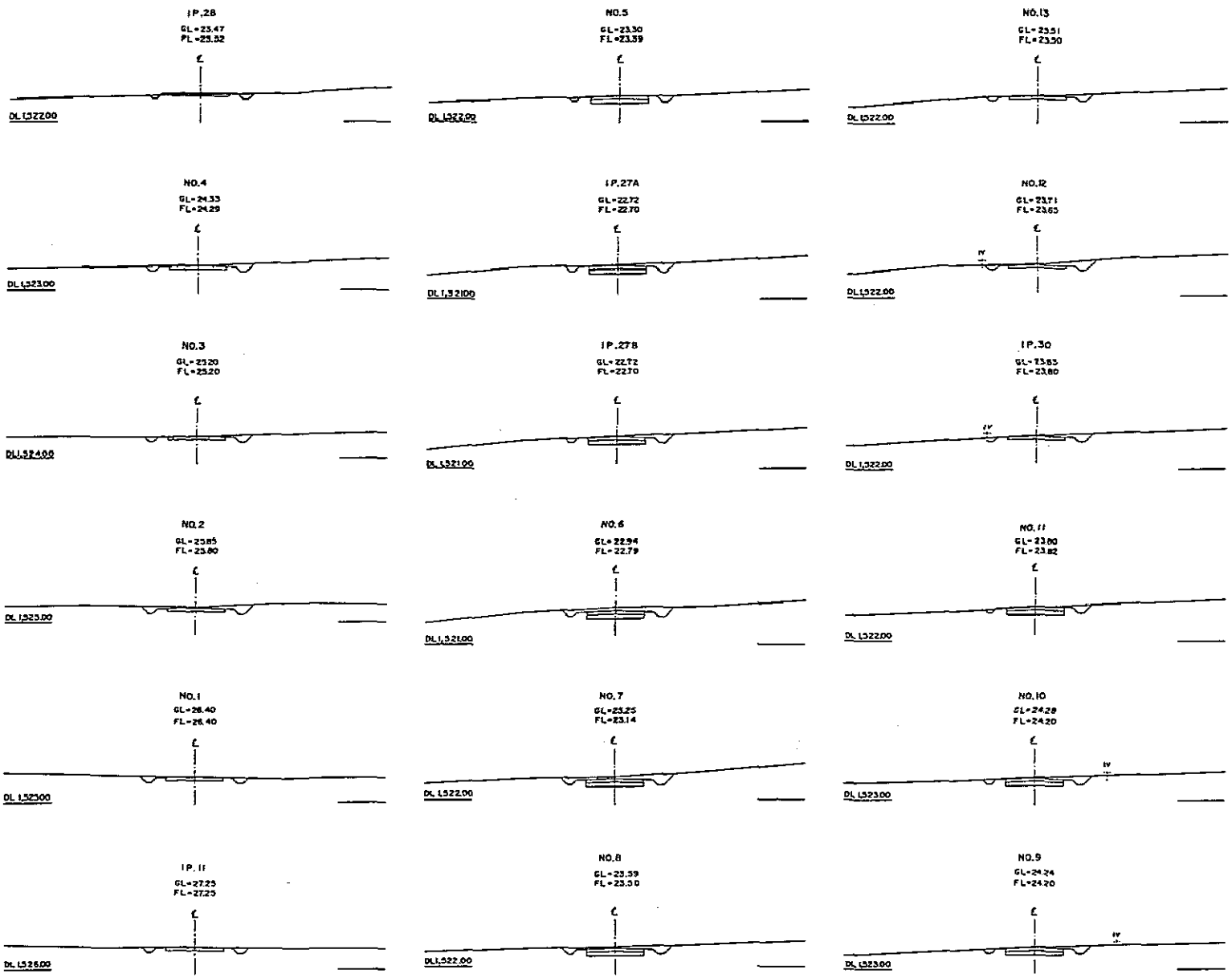
JAPAN INTERNATIONAL COOPERATION AGENCY
(J I C A)



REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
S-4 SECONDARY FARM ROAD CROSS SECTION (2/2)	
DATE APR. 1988	DRAWING NO. R-24
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	



REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
S-3 SECONDARY FARM ROAD CROSS SECTION	
DATE: APR. 1996	DRAWING NO. A-25
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	



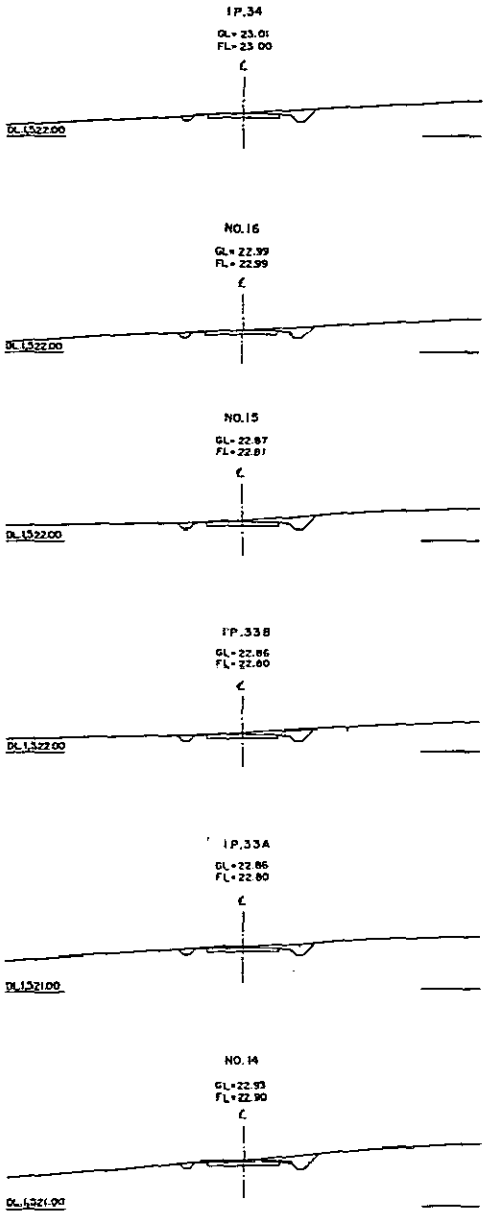
REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE

MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT

S-6 SECONDARY FARM ROAD
CROSS SECTION (1/2)

DATE APR. 1986 | DRAWING NO. R-26

JAPAN INTERNATIONAL COOPERATION AGENCY
(J I C A)



REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
S-5 SECONDARY FARM ROAD CROSS SECTION (2/2)	
DATE APR. 1988	DRAWING NO. R-27
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	

S-7 SECONDARY FARM ROAD

IP.29
GL=22.88
FL=22.80
DL L522.00

NO.4
GL=22.31
FL=22.30
DL L521.00

NO.3
GL=22.81
FL=22.61
DL L522.00

NO.2
GL=23.09
FL=22.91
DL L522.00

NO.1
GL=23.06
FL=23.22
DL L522.00

IP.28
GL=23.46
FL=23.52
DL L523.00

S-8 SECONDARY FARM ROAD

IP.32
GL=23.39
FL=23.35
DL L523.00

NO.1
GL=23.63
23.78
DL L525.00

NO.2
GL=23.53
FL=23.30
DL L524.00

NO.3
GL=24.33
FL=24.30
DL L523.00

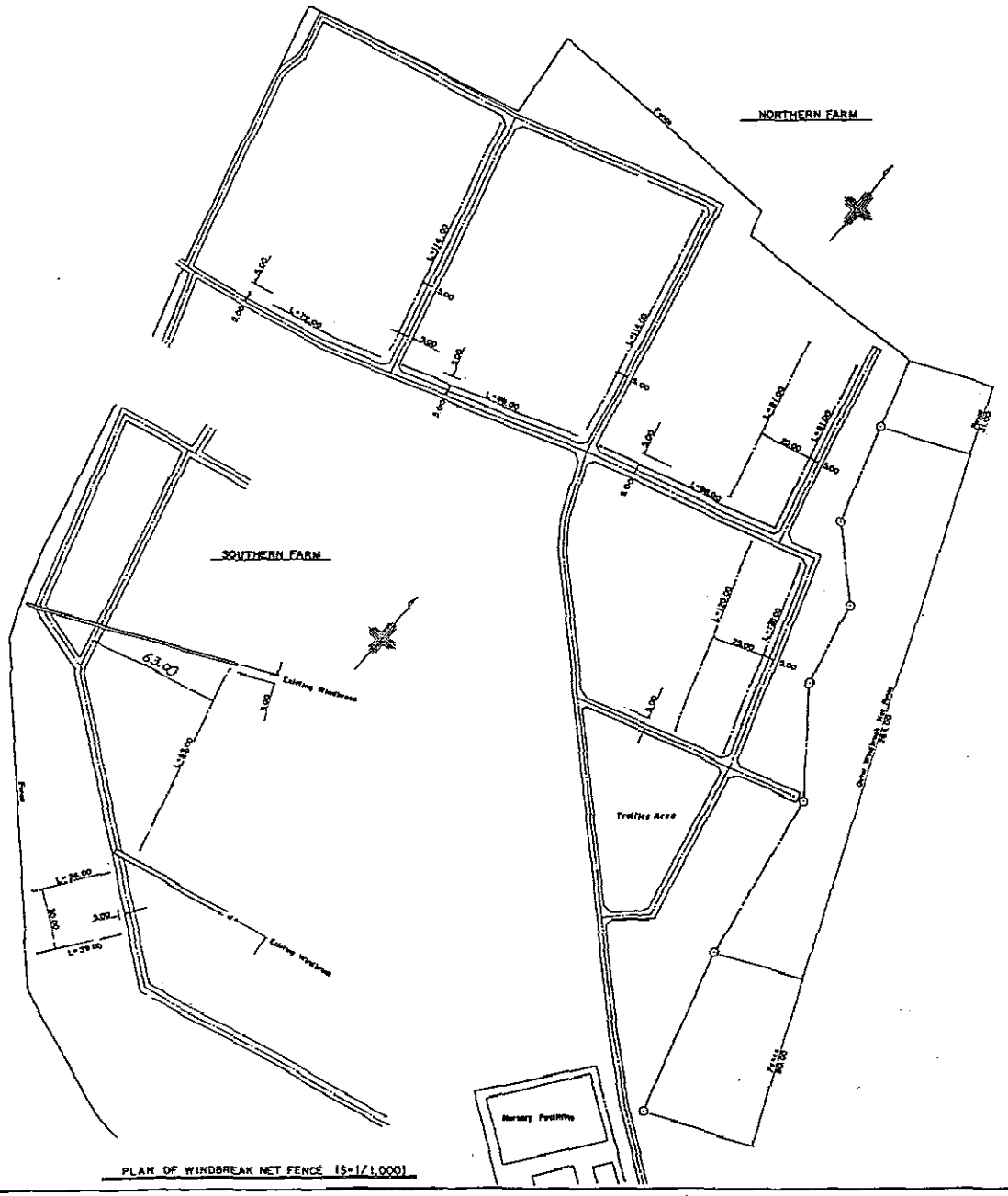
IP.30
GL=23.82
FL=23.80
DL L523.00

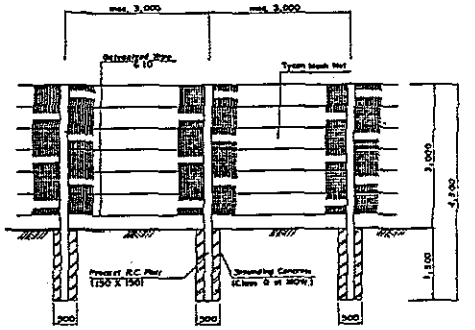
NO.4
GL=23.72
FL=23.64
DL L523.00

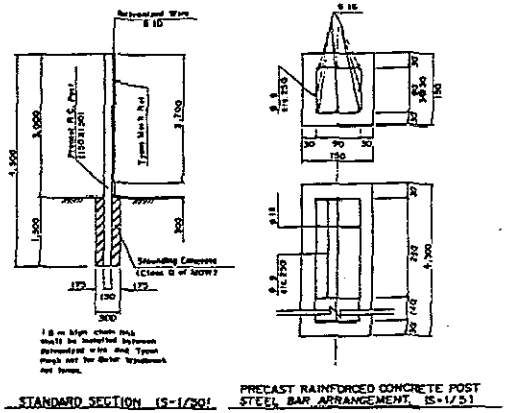
IP.31
GL=21.21
FL=21.20
DL L520.00

NO.5
GL=22.49
FL=22.44
DL L522.00

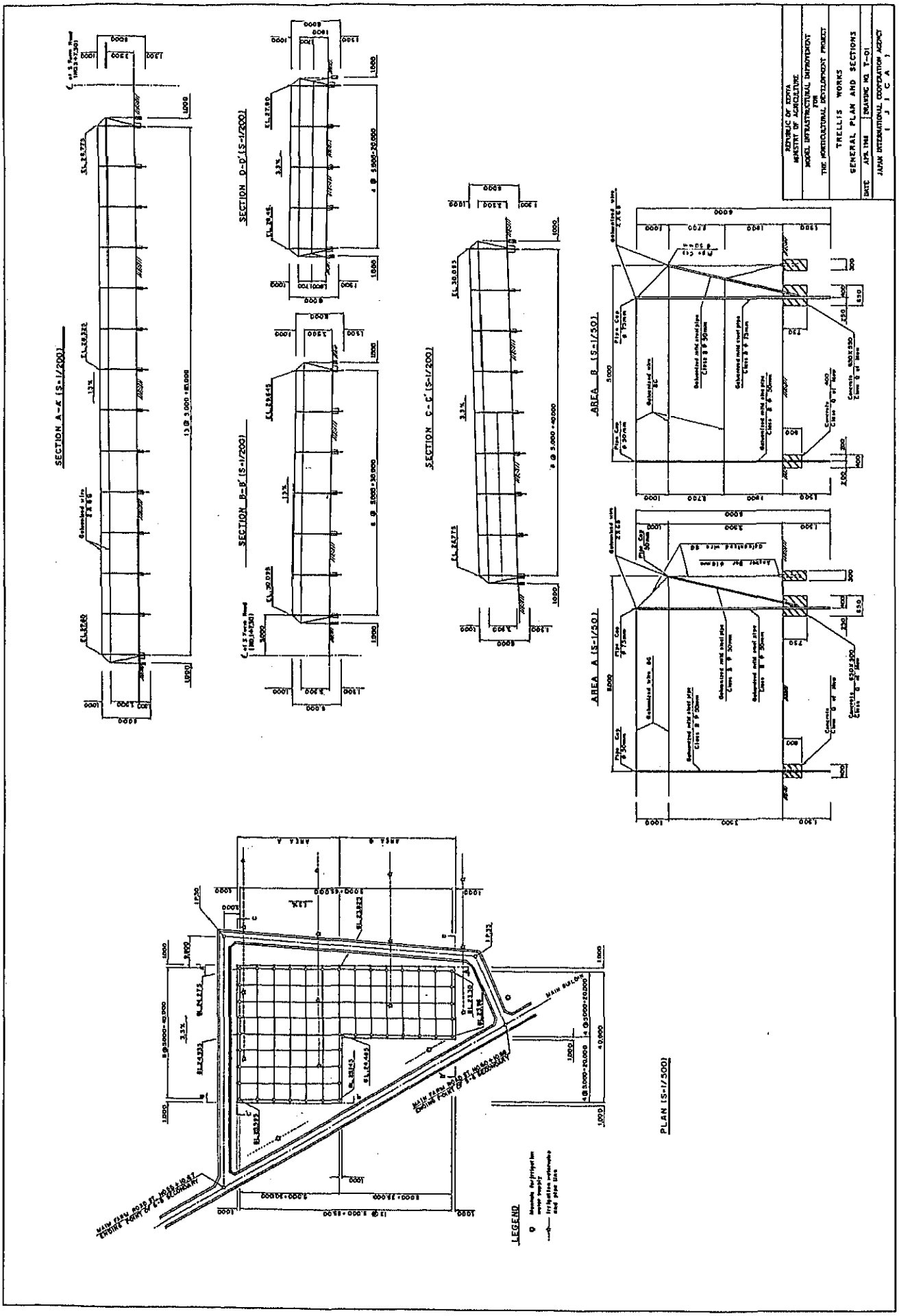
REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
S7 AND S-8 SECONDARY FARM ROAD CROSS SECTION	
DATE: APR. 1986	DRAWING NO. A-28
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	







REPUBLIC OF KENYA MINISTRY OF AGRICULTURE	
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT	
WINDBREAK WORKS PLAN AND SECTION.	
DATE: APR. 1988	DRAWING NO. W-01
JAPAN INTERNATIONAL COOPERATION AGENCY (J I C A)	


REPUBLIC OF KENYA
MINISTRY OF AGRICULTURE
MODEL INFRASTRUCTURAL IMPROVEMENT FOR THE HORTICULTURAL DEVELOPMENT PROJECT
TRELLIS WORKS
GENERAL PLAN AND SECTIONS
DATE APR. 1988
DRAWING NO. T-01
JAPAN INTERNATIONAL COOPERATION AGENCY
(J I C A)
SECTION A-K (S=1/200)
SECTION D-D' (S=1/200)
SECTION B-B' (S=1/200)
SECTION C-C' (S=1/200)
AREA B (S=1/50)
AREA A (S=1/50)
PLAN (S=1/3000)
LEGEND

A.3.1 Team Leader's Letter

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)
DETAIL DESIGN SURVEY TEAM
FOR
THE HORTICULTURAL DEVELOPMENT PROJECT
IN
THE REPUBLIC OF KENYA

16th March, 1988

The Permanent Secretary
Ministry of Agriculture
P.O. Box 30028
NAIROBI.

ATTENTION: DIRECTOR OF AGRICULTURE

Dear Sir,

RE: The infrastructure improvement program for the Horticultural Development Project in the Republic of Kenya

We, the Detail Design Survey Team, have been organized by JICA for the purpose of promoting infrastructure improvement program which is as stipulated in the clause IV of the Attached Document to the Record of Discussions between the Japanese Implementation Survey Team and the Authorities concerned of the government of the Republic of Kenya on the Japanese Technical Cooperation for the Horticultural Development Project in the Republic of Kenya signed on 4th December, 1985.

The team has, so far, made a series of site reconnaissances and discussions with your staff concerned in order to fix and determine the scales and sizes of expected facilities.

We would like to hereby confirm the matters which were mutually understood and agreed through discussions and site reconnaissances as per the attachment.

In accordance with above confirmed items, we will proceed with your staff to further field surveys and investigations at the site and to make the detail design on the basis of the result of those surveys. After the completion of detail design and assessment of its costs estimated by JICA, you will be informed its result through the JICA Kenya Office.

Further, for the timely commencement of the construction we would like to request you to take the necessary action and procedure for implementation in due consultation with the Japanese experts and JICA Kenya Office.

...../2

Lastly, we would like to appreciate for kind cooperation of your staff during our stay.

Yours sincerely,

Kazuo Nagai
Team Leader
Detail Design
Survey Team
JICA

c.c. Director of Research
Ministry of Agriculture
KARI Secretariat
Kenya Huse
P.O. Box 57811
NAIROBI.

Mr. N. Horie
Embassy of Japan
P.O. Box 60202
NAIROBI.

Mr. K. Kumagishi
Resident Representative
JICA, Kenya Office
NAIROBI.

The Director
National Horticultural Research
Station (NHRS)
P.O. Box 220
THIKA.

Mr. Shoji Hirama
Japanese Team Leader
Horticultural Development Project
P.O. Box 220
THIKA.

Mr. K.M.S. Kigen
Ministry of Finance
P.O. Box 30007
NAIROBI.

The Permanent Secretary
Ministry of Foreign Affairs
P.O. Box 30511
..... NAIROBI.

Att: Mr. F.K. Mwangi

ATTACHMENT 1

MODEL INFRASTRUCTURE WORKS
FOR
HORTICULTURE DEVELOPMENT PROJECT

1. Fence and Gates

In order to protect the entrance of animals into Horticultural Development Project, the existing fence around Horticultural Development Project will be improved by the following specifications;

Type: 1.8 m-high chainlink fencing along with 150-mm x 100-mm concrete post at an interval of 2.5 m.

Length: A total of approx. 1,700 meters.

2. Farm roads

Farm roads in the center have no permanent facilities, i.e., gravel or asphalt roads, except the access road to the main building from the highway.
The farm road is divided into two categories and they will be constructed by the following specifications;

(1) Main Farm Road

It starts from the west end of the main building through the orchard and comes back to the front of the hostel totalling approx. 1,550 meters.

Pavement: 4-meter-width gravel pavement with thickness 150 mm and 50 cm-shoulder on both sides of pavement.

Side ditch: Side ditch on both sides of farm road are provided.

Road crossing drain: Pipe culverts will be provided if they are required from road drain view points.

Asphalt pavement: About 300-m around the embankment and steep portion, and about 200-m along the nursery facilities portion are recommended to the asphalt paved if finacial allows. This is to provide the

stability of road and to prevent dust which affect the nursery works.

(2) Secondary Farm Road

Farm roads in each experimental field will be constructed to provide the smooth research works. They are totalling approx. 1,450 meters by the following specifications;

Pavement:	3-meter-width gravel pavement with 150-mm thick. 50-cm-shoulder and side ditch on both sides are provided.

3. Windbreak

Windbreak forests are being established by the Government of the Republic of Kenya, but they are still young to protect the young macadamian trees, therefore windbreak fence will be constructed by the following specifications;

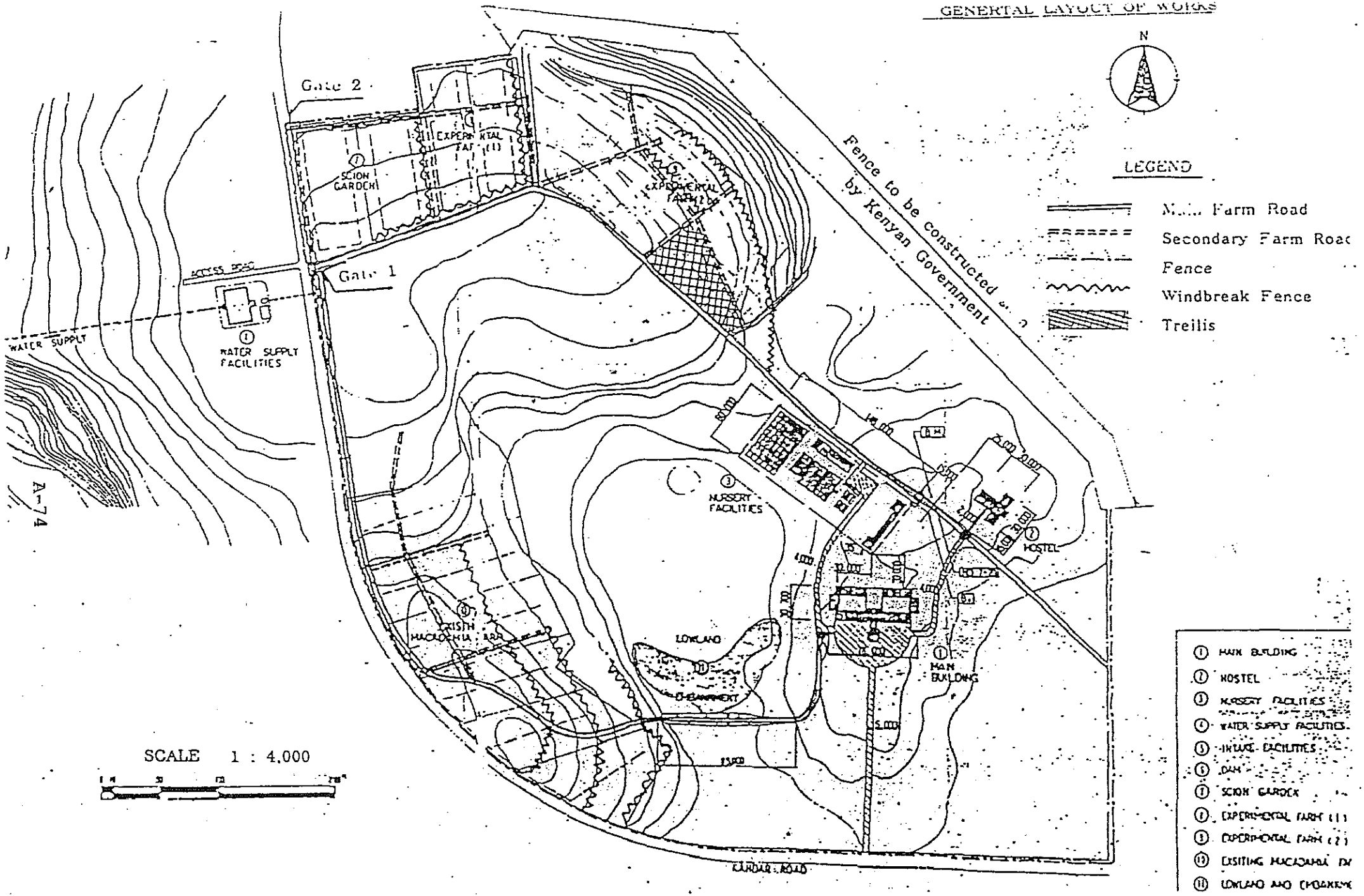
Type of fence:	Concrete post and covered with double fishers-nets.
Height:	2.0 meters
Intervals:	40 meters max.
Construction Length:	1,460 meters

Note: north-east end windbreak line is expected to be installed with fishers-net on the chainlink wire mesh.

4. Trellis

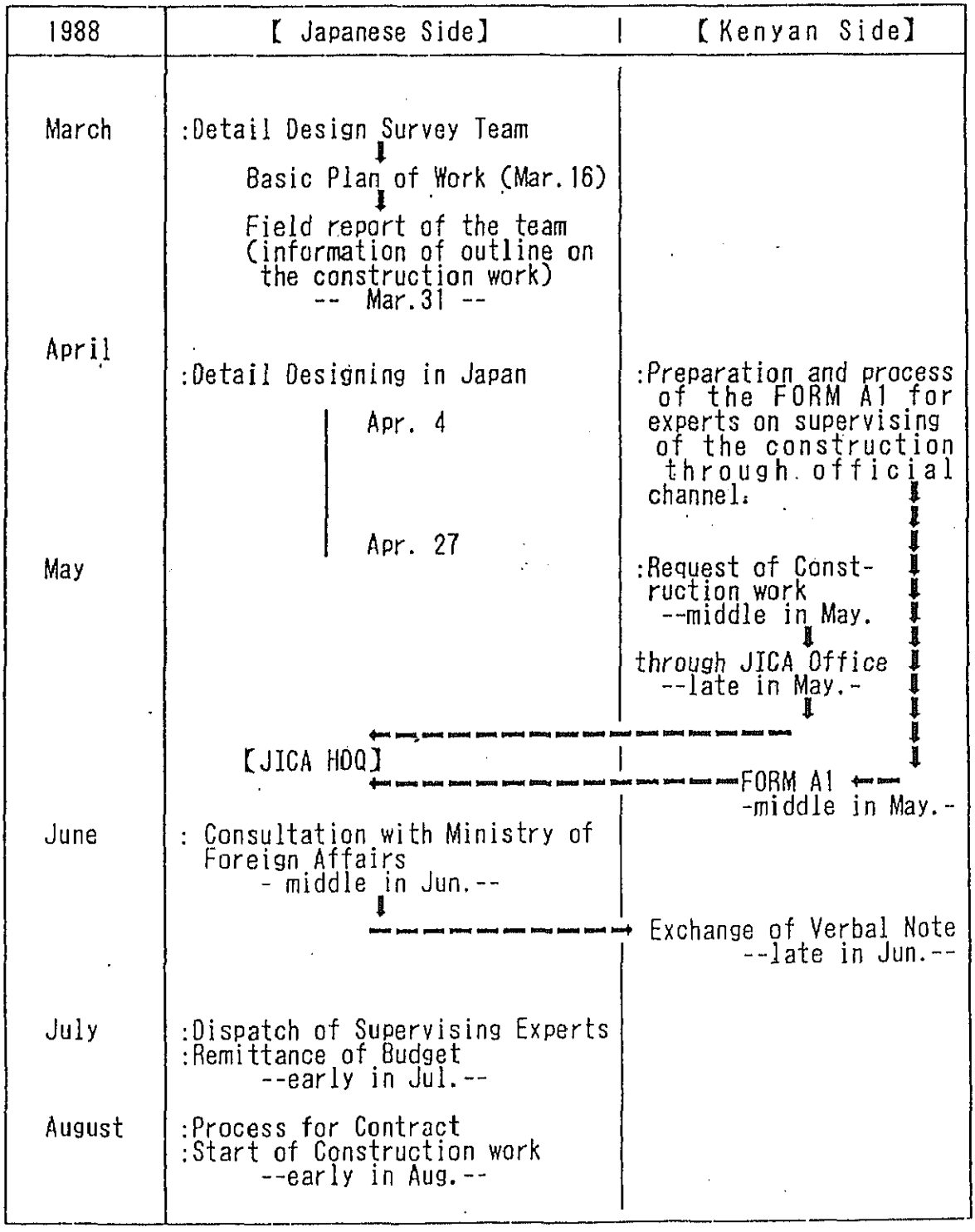
About 0.3 ha of trellis will be constructed to conduct breeding works and variety trails for macademia nut and newly introduced temperate fruit trees. whole trellis will be covered completely with net to protect trees from animals, wind and strong sunshine.

Trellis are constructed by galvanized steel pipe with an interval of 5 meters and they are jointed by galvanized wire with a height of 4.5-5.0 meters.


GENERTAL LAYOUT OF WORKS
N
LEGEND
Main Farm Road
Secondary Farm Road
Fence
Windbreak Fence
Treilis
Gate 2
Gate 1
Fence to be constructed by Kenyan Government
SCION GARDEN
EXPERIMENTAL FARM (1)
EXPERIMENTAL FARM (2)
ACCESS ROAD
WATER SUPPLY
WATER SUPPLY FACILITIES
NURSERY FACILITIES
HOSTEL
MAIN BUILDING
LOWLAND
ESCARPMENT
EXISTING MACADAMIA FARM
KARDAR ROAD
A-74
SCALE 1 : 4,000
1 MAIN BUILDING
2 HOSTEL
3 NURSERY FACILITIES
4 WATER SUPPLY FACILITIES
5 INTAKE FACILITIES
6 DAM
7 SCION GARDEN
8 EXPERIMENTAL FARM (1)
9 EXPERIMENTAL FARM (2)
10 EXISTING MACADAMIA FARM
11 LOWLAND AND ESCARPMENT

ATTACHMENT 2

OUTLINE OF THE SCHEDULE ON WORK OF INFRASTRUCTURE IMPROVEMENT PROGRAM



A.3.2 Request of Recommendation of Contractor

Ref: No. 62-1550

JAPAN INTERNATIONAL
COOPERATION AGENCY (JICA)
KENYA OFFICE
P. O. BOX 50572 NAIROBI, KENYA.
TELEPHONE 724121/2/3/4/877
TELEX 22145
FAX No - 724878

DATE 23rd March, 1988

Permanent Secretary
Ministry of Works Housing
& Physical Planning
P.O. Box 30260
NAIROBI.

Dear Sir,

RE: REQUEST FOR RECOMMENDATION OF CONTRACTORS FOR THE SHORT-LISTED TENDERING FOR MODEL INFRASTRUCTURE IMPROVEMENT WORKS ON HORTICULTURE DEVELOPMENT PROJECT

Based on the official request from the Government of the Republic of Kenya (hereinafter referred to as "the GOK"), The Government of Japan through Japan International Cooperation Agency (hereinafter referred to as "th JICA) decided to conduct the Model Infrastructure Improvement Works on the Horticulture Development Project (hereinafter referred to as "the Work").

The site of the Work is located in the Macadamia Unit of National Horticultural Research Station, Thika.

The scope of work is shown in ATTACHMENT and it is preliminarily estimated at 2,500,000 Kshs, with 3 months construction period.

The work shall be constructed by a Local Contractor with a short-listed tendering. And the employer of the Works is the JICA represented by Mr. Kenji KUMAGISHI and supervised by Japanese experts.

We would like to request you to recommend approximately five (5) Local Contractors who are able to perform the Work within the short construction period and have enough technical and financial background.

The most important factor for the selection of the Contractor is that it complete the Work on schedule which is tightly governed by the fisical year of the Japanese Government.

...../2

Until now we unofficially contacted the following three contractors:-

1. Dien Builders Limited: who constructed small library building in the Work site and showed a good performance.

2. Sumitomo Construction Co. Ltd.: who has similar project in Kenya and constructed main facilities of the Project which was financed by Japanese Grant Aid.

3. Karuri Civil Engineering Ltd. : who has many construction works which are similar to the Work and now is working in the National Youth Service Construction Work.

They show their interest on the Work and they are expecting to be listed on your recommendation list if they are judged to have enough ability to perform the Work.

I appreciate your early recommendation on the above mentioned matter.

Yours sincerely,

K. Kumagishi

Kenji Kumagishi
Resident Representative
JICA, Kenya Office

c.c. Mr. K. Matsumoto
Ag. Leader of Model Infrastructure
Improvement Study Team
NAIROBI.

Mr. S. Hirama
Japanese Team Leader
HDP
THIKA.

ATTACHMENT

MODEL INFRASTRUCTURE WORKS
FOR
HORTICULTURE DEVELOPMENT PROJECT

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Road crossing drain: Pipe culverts will be provided if they are required from road drain view points.

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Type of fence:	Concrete post and covered with double fishers-nets.
Height:	2.0 meters
Intervals:	40 meters max.
Construction Length:	1,460 meters

Note: north-east end windbreak line is expected to be installed with fishers-net on the chainlink wire mesh.

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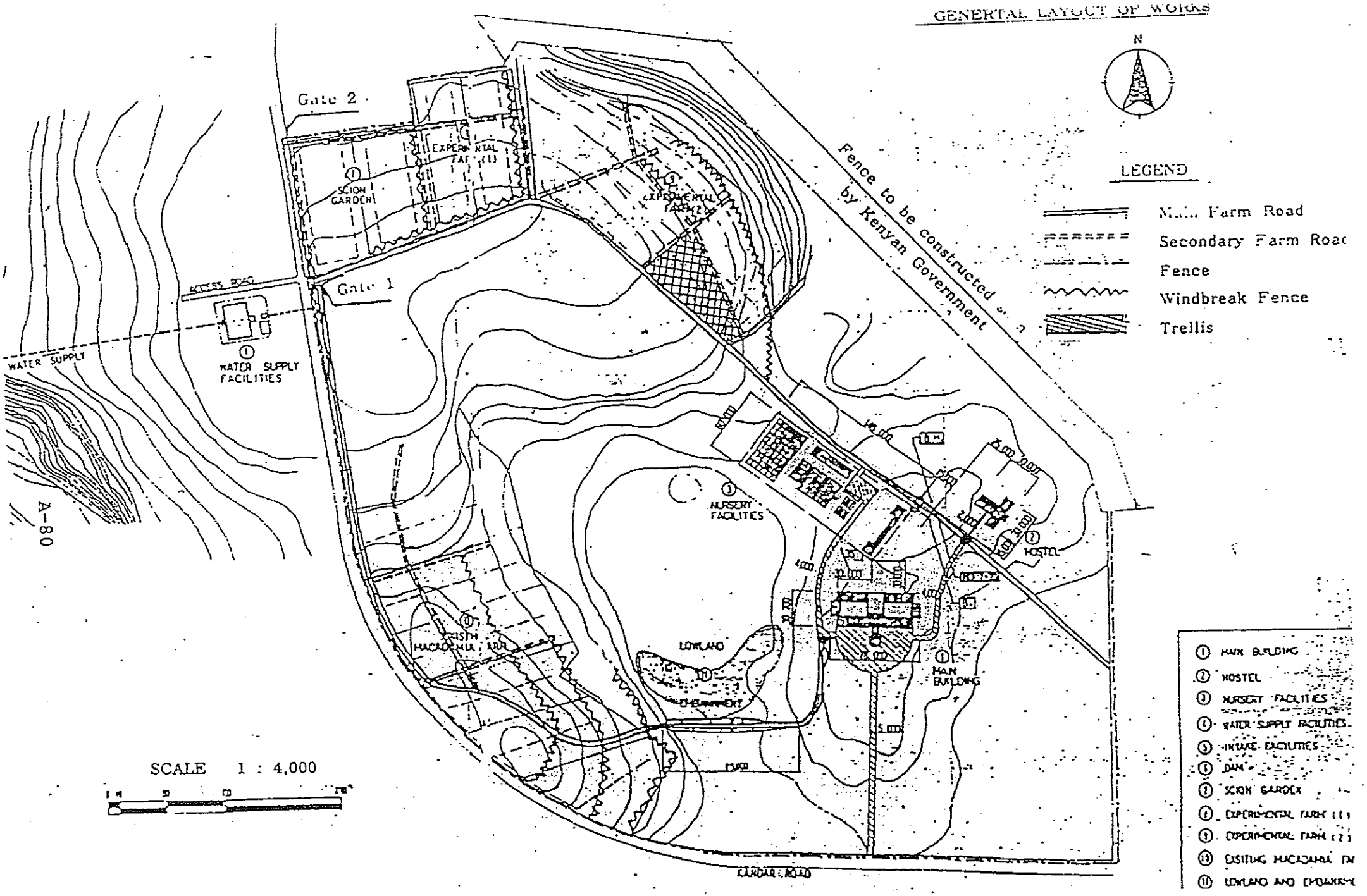
GENERAL LAYOUT OF WORKS
N
LEGEND
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Windbreak Fence
Trellis
Gate 2
Gate 1
SCION GARDEN
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EXPERIMENTAL FARM (2)
ACCESS ROAD
WATER SUPPLY
WATER SUPPLY FACILITIES
Fence to be constructed by Kenyan Government
NURSERY FACILITIES
HOSTEL
MAIN BUILDING
LOWLAND
EXISTING MACADAMIA FARM
KANDARA ROAD
A-80
SCALE 1 : 4,000
① MAIN BUILDING
② HOSTEL
③ NURSERY FACILITIES
④ WATER SUPPLY FACILITIES
⑤ INTAKE FACILITIES
⑥ DAM
⑦ SCION GARDEN
⑧ EXPERIMENTAL FARM (1)
⑨ EXPERIMENTAL FARM (2)
⑩ EXISTING MACADAMIA FARM
⑪ LOWLAND AND EMBANKMENT

A.3.3 Recommendation of Contractors

MINISTRY OF WORKS, HOUSING AND PHYSICAL PLANNING

Telegrams: "MINWORKS", Nairobi
Telephone: Nairobi 723101
If calling or telephoning ask for
.....
When replying please quote
Ref. No. Q29/035/(108)
and date

QUANTITIES AND CONTRACTS BRANCH
HEAD OFFICE
P.O. Box 30260
NAIROBI

.....29th March,..... 1988.

M/s JIKA Kenya Office,
P. O. Box 50572,
NAIROBI.

Dear Sirs,

MODEL INFRASTRUCTURE IMPROVEMENT WORKS AT NATIONAL HORTICULTURAL RESEARCH STATION - THIKA

Reference is made to your letter reference 62-1550 of 23/3/88 requesting for recommendation of contractors to be invited to tender for the above works.

We would recommend that the following firms be invited to tende for the works.

The first three being the firms unofficially contacted by yourselves and for whom we would have no objection.

1. M/S Dien Builders
2. M/s Sumitomo Construction Co. Ltd.,
3. M/s Karuri Civil Engineering Co. Ltd.
4. M/s Miharati Investments.
5. M/s Njama Limited.

Yours faithfully,

(FRED MWAURA)
FOR: CHIEF QUANTITY SURVEYOR
FOR: PERMANENT SECRETARY

FIELD REPORT
ON
MODEL INFRASTRUCTURE IMPROVEMENT STUDY
FOR
THE HORTICULTURAL DEVELOPMENT PROJECT
IN
KENYA

31st MARCH, 1988

JAPAN INTERNATIONAL COOPERATION AGENCY
(J I C A)

TABLE OF CONTENTS

1. INTRODUCTION

In response to the official request from the Government of the Republic of Kenya (hereinafter referred to as "GOK"), the JICA Detail Design Survey Team (hereinafter referred to as "the Team") was arrived in Kenya on 7th March, 1988. The Team members are as follows:

Name	Assignment	Assignment period
K.Nagai	Team Leader	5/March/1988~20/March/1988
K.Matsumoto	Facilities Design	5/March/1988~3/April/1988
S.Hasegawa	Road Design	5/March/1988~3/April/1988

After the arrival of the Team at Nairobi, series of site reconnaissancies, and discussions with the staff concerned were made. Then the scale and size of the expected facilities were determined and they were reported to the GOK by the Team Leader of the Team on 16th March, 1988.

Facilities to be constructed by the Project are the following four(4);

- Gates and Fencing : to protect the entrance of animals into the Horticultural Development Project Area. The exsisting fence and gates are required to be replaced by the permanent fence and gates.

- Farm road : to provide the smooth field research works, the existing temporary farm road is required to improve to the permanent road.

- Windbreak : untill the planted windbreak trees grow up, the net type windbreak is required to be installed.

- Trellis : to conduct breeding works and variety trails of trees, the installation of the trellis is required.

Based on the determined scale and size of the expected facilities, the Team prepared the detailed field survey untill 30th March, 1988. The specific layout of facilities and problems for the installation of the proposed facilities are discussed and confirmed

between the staff concerned and the Team on the site. These field survey results will be carefully studies, and based on these results, the detailed design and other documents for the construction will be prepared in Japan by the end of April, 1988.

2. BASIC CONCEPT OF FACILITIES

- Basic concept of facilities to be prepared for the detailed design and to be constructed by the Project are described in this section.

2-1 Gates and fences

The existing fences around the boundary of the Project site except the portion which is going to be nearlly installed by the GOK will be replaced by the new concrete posted permanent fences. And a gate at the entrance from the water supply facility and the national highway, and a gate at the north-west corner of the Project site will be installed by the Project.

- Type of the fence and gate is similar to which was installed around the nursery facility.
- Alignment of the fences and gates shall be same as the existing alignment.
- Existing chainlink of the fence shall be removed carefully and they will be reused for another area of the Horticultural Development Project by the GOK later.
- As a result of the detailed field survey, the total length is estimated 1,730 meters.

2-2 Farm road

The farm road is divided into two categories by its function.

Main Farm Road : linked road to travel around the Project Area, which starts from and comes back to the main building of the Project.

Secondary Farm Road : farm road divered from the main farm road or other secondary road and to be provided for research works in each experimental field.

① Pavement width of farm road is 3.0 meters and paved by gravel with thickness of 100 ㎜.

② A 0.5-meter-width shoulder is installed on both sides of pavement.

③ Based on the drainage condition, side ditch and road crossing drain culvert will be provided, if they are required.

④ Radius of curve at turning and junction points shall be determined based on the topographic condition and planted trees, it shall be more than 30 meters. If the minimum radius of curve can not be adopted, an appropriate widened road shall be provided for the smooth traffic turning.

⑤ Western edge of the fence surrounding the grape experimental field can be shifted inside 1 meter, if it is required.

⑥ Farm road which is aligned on the existing road shall be cleared, leveled and compacted before pavement, after that new gravel pavement shall be installed.

⑦ Farm road which is newly planned in the experimental field and has no installation of gravel previously, the murran which is available adjacent as a base course above this gravel pavement shall be installed.

⑧ About 300 meters around the embankment and a steep portion, and about 200 meters along the nursery facilities portion of the main farm road are recommended to be asphalt paved road if the finance of the Project allows.

According to the detailed field survey results, the length of the main farm road is estimated 1,490 meters, and the secondary farm road has eight(8) lines and the total length is estimated 1,430 meters.

2-3 Windbreak

Net fence type windbreak which is similar to the chainlink fencing with concrete posts in concrete surround shall be installed, but chainlink is replaced by tygan netting mesh and concrete post is straight as shown in ATTACHMENT 2.

- windbreak shall be 2-meter-high and be provided with 20-meter-interval of their line.

- planted trees shall not be on or near the windbreak line.

- in the outer line of windbreak at north-east experimental field, the windbreak shall be also functioned as a fence to protect the entrance of small animals.

According to the detailed field survey results it has 12 lines and about 1,580 meters in length.

2-4 Trellis

Trellis shall be installed in the north-east experimental field with about 0.3 ha.

- trellis will be constructed by galvanaized steel pipes with an interval of 5 meters and they are jointed by anchored galvanized wire. The height is 4.5 meters and whole trellis will be covered completely by the fishnet 210/4 ply with mesh size of 10 mm

3. FURTHER STUDIES BEFORE CONSTRUCTION

Based on the detailed field survey results and basic concept of facilities as described previous section, the detail design and report including required tender documents for the construction will be prepared in Japan. And the final report will be send to the GOK through JICA Kenya Office in May, 1988.

4. TENDERING AND CONSTRUCTION

4-1 JICA expert for tendering and construction

In order to assist JICA Kenya Office for tendering and contracting, also superivising the construction works, a JICA expert will be required to assign. His assignment period is estimated five(5) months from July to December, 1988. Therefore the GOK requires to prepare the FORM A1 for his assignment.

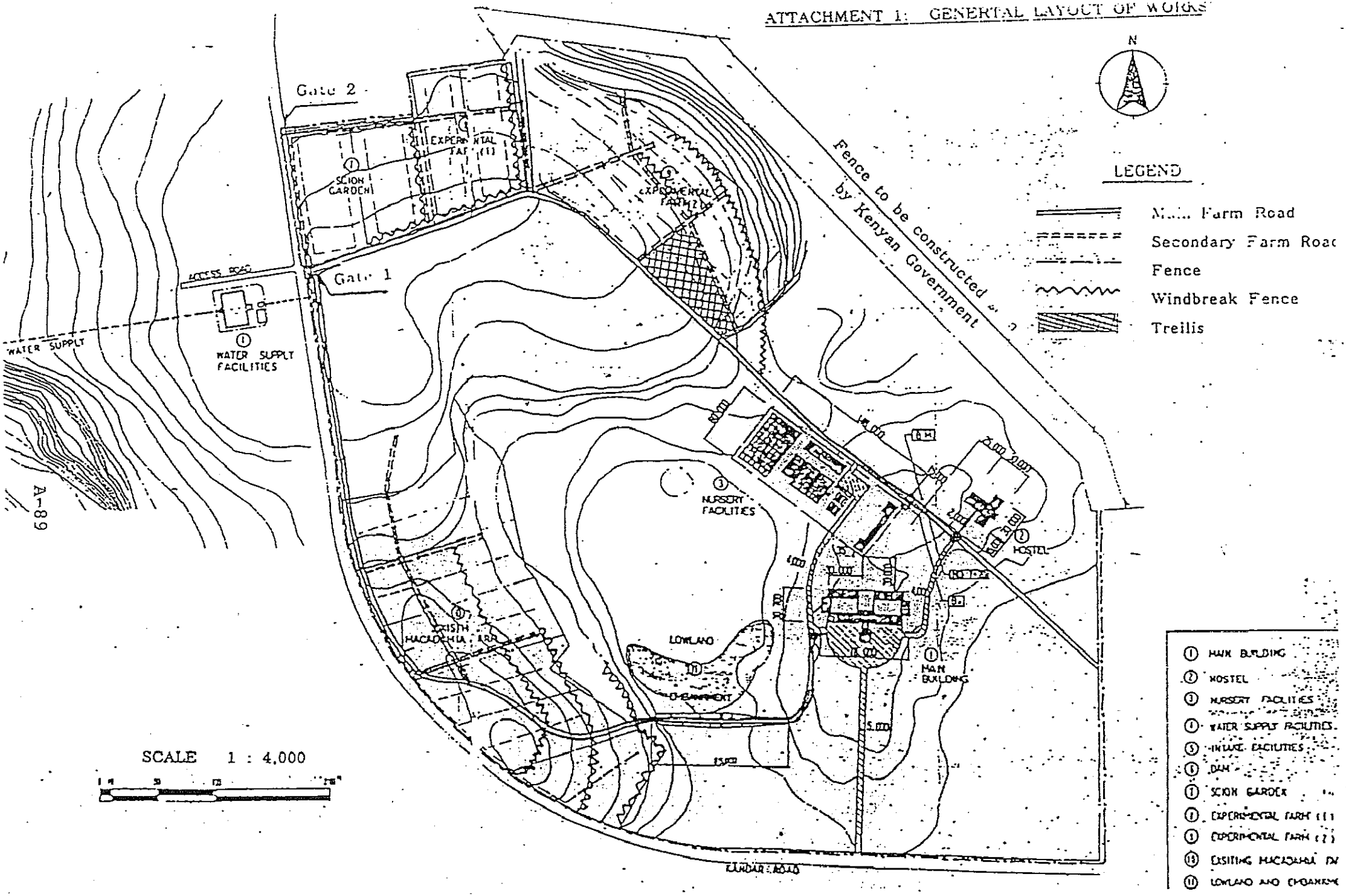
4-2 Tendering and Contracting for the Construction Works

The owner of the contract is JICA Kenya Office represented by Mr. Kenji Kumagishi, and the contractor will be selected by local tendering among the short-listed contractors. Recommended contractors' list through the Ministry of Works, Housing and Physical Planning, totalling five(5) contractors, was recieved by the Team on 29th March, 1988. Invitation of tendering to these contractors will be conducted after an arrival of JICA Expert for the tendering and construction supervisory works, and it expected in the begining of July, 1988.

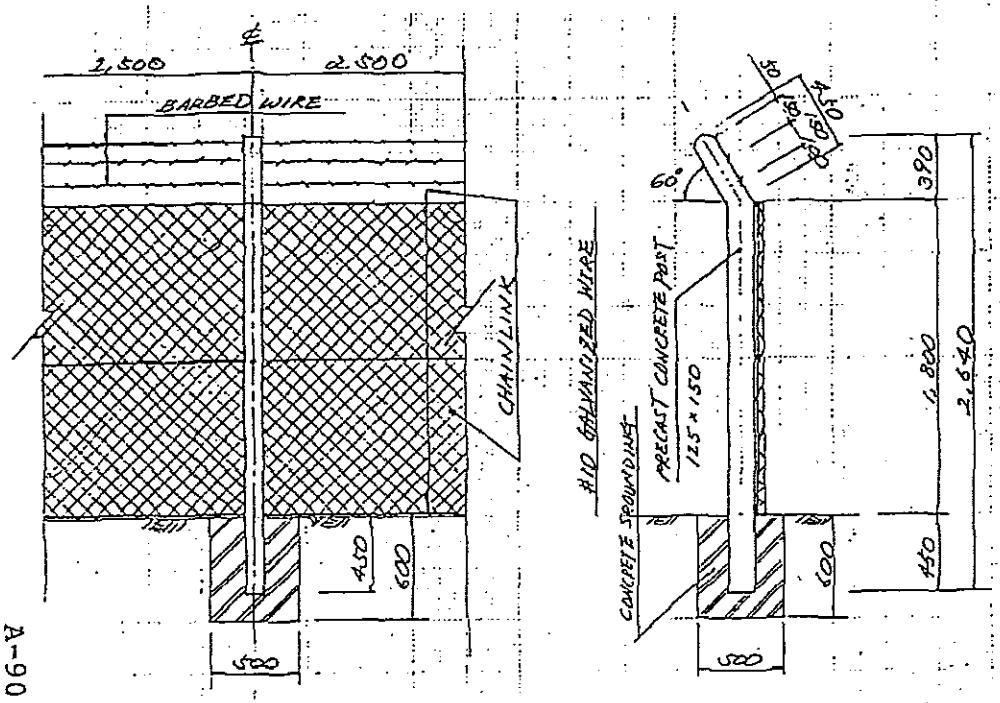
4-3 Construction Schedule

The construction period of the works is expected about four(4) months including mobilization and demobilization after the sign of the contract.

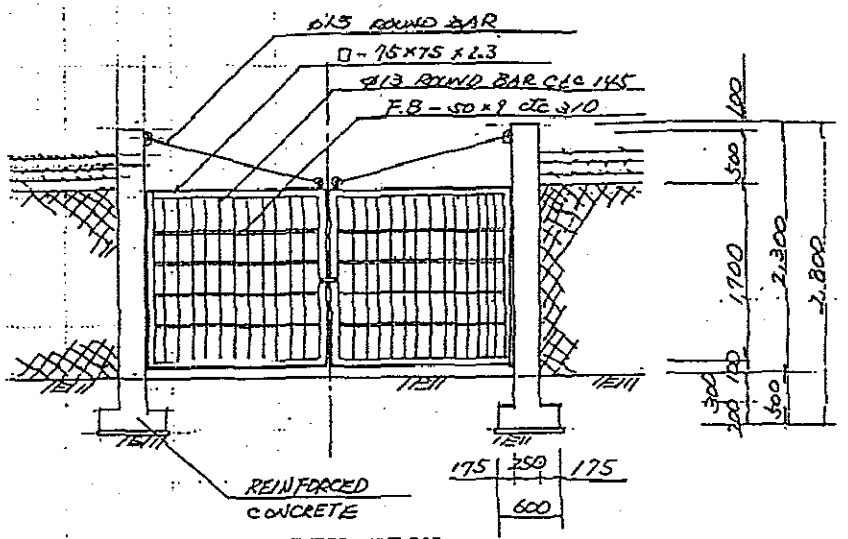
ATTACHMENT 1: GENERAL LAYOUT OF WORKS



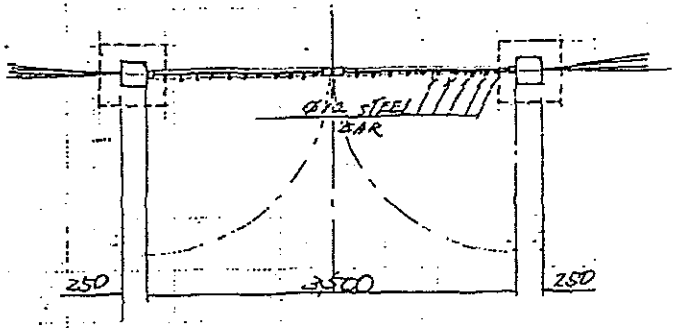
STANDARD DRAWING OF FENCE



STANDARD DRAWING OF GATE

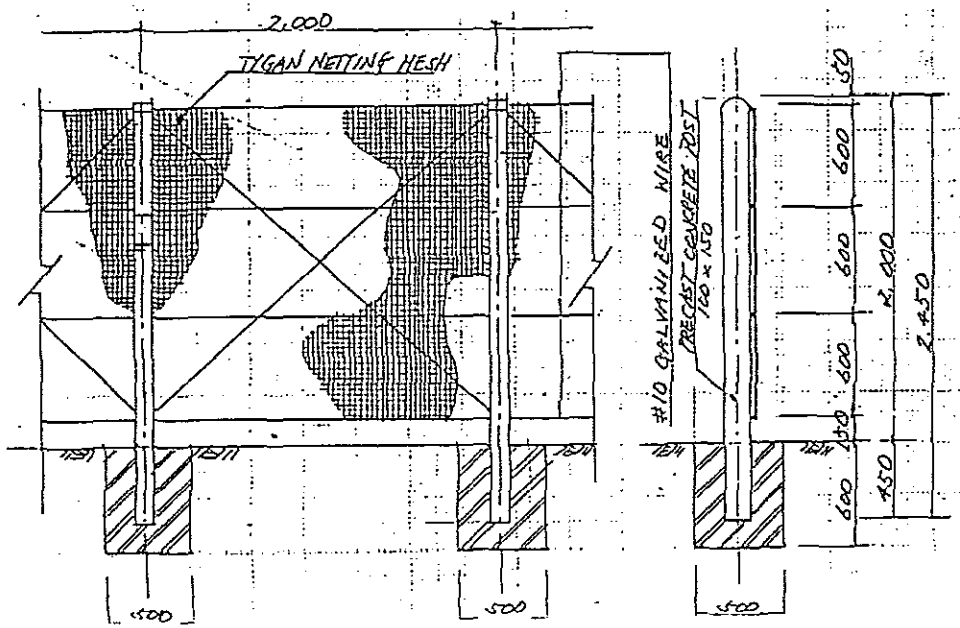


ELEVATION



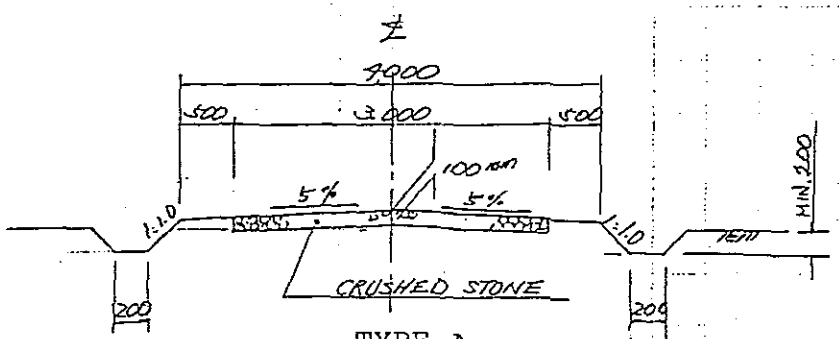
PLAN

STANDARD DRAWING OF WINDBREAK

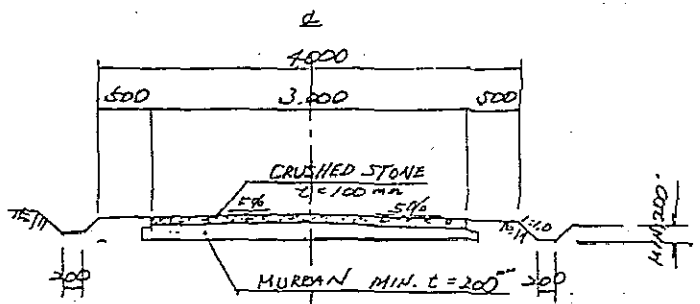


ATTACHMENT 2 : STANDARD DRAWING OF FENCING AND WINDBREAK

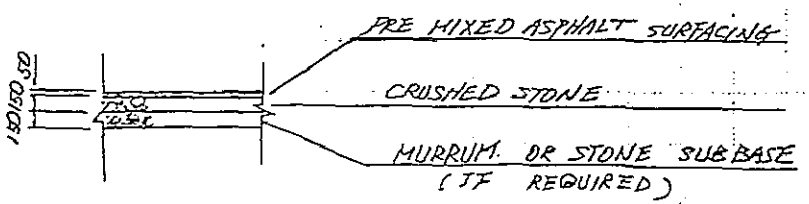
STANDARD CROSS SECTION OF FARM ROAD



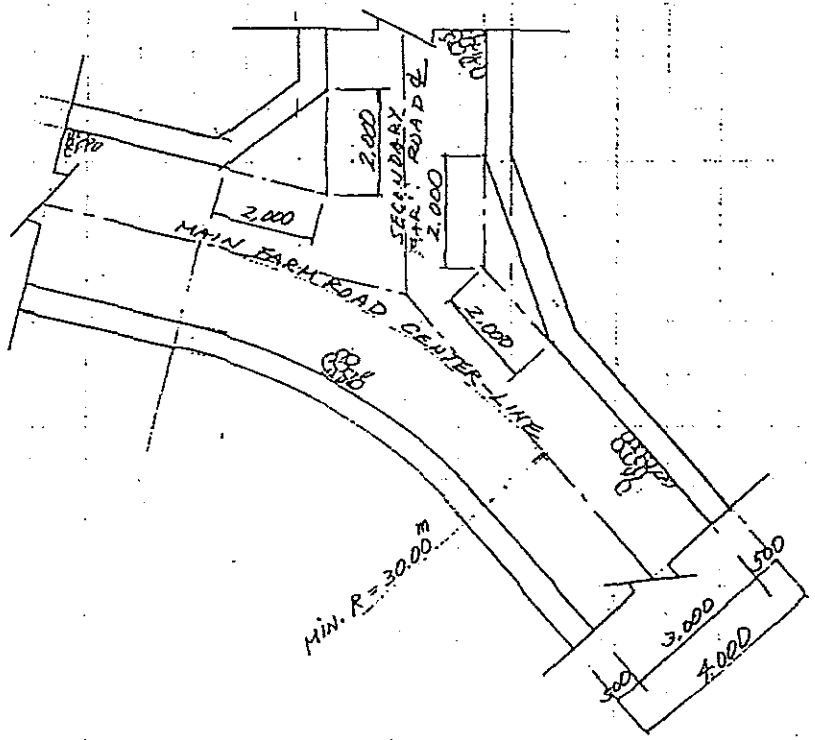
TYPE A



TYPE B

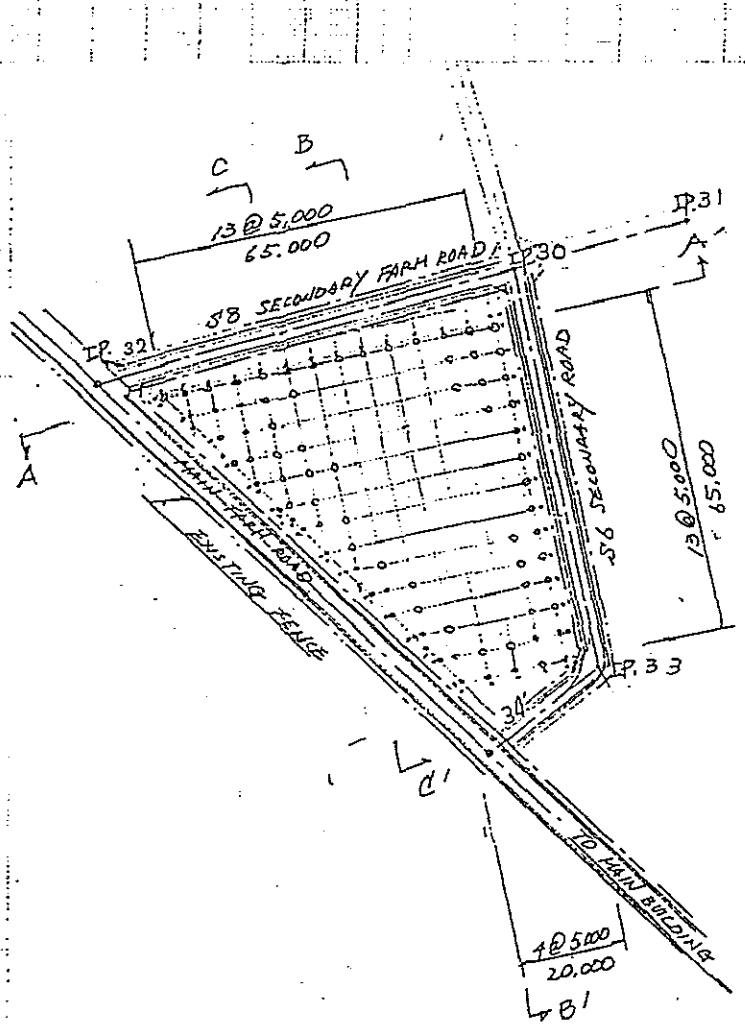


ASPHALT PAVEMENT

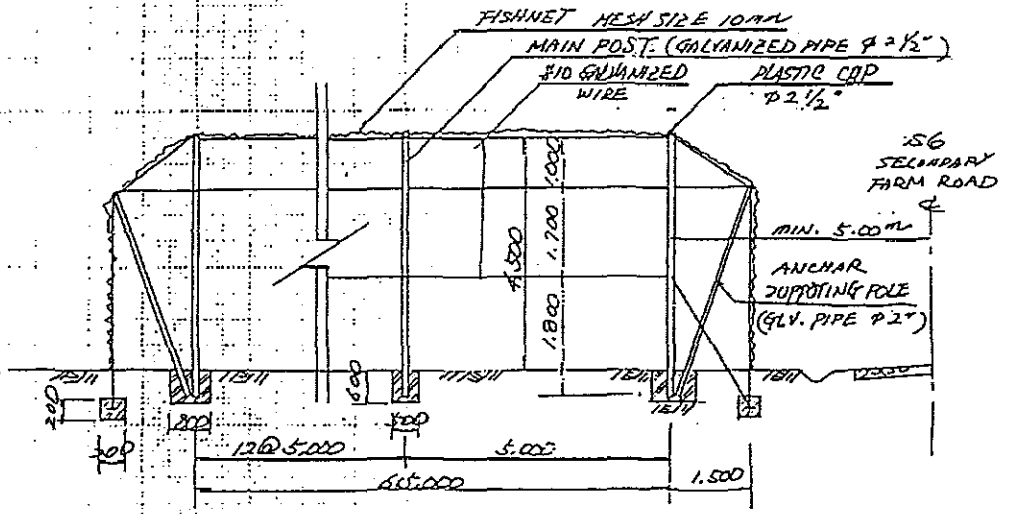


ENLARGEMENT OF ROAD AT CONJUNCTION POINT

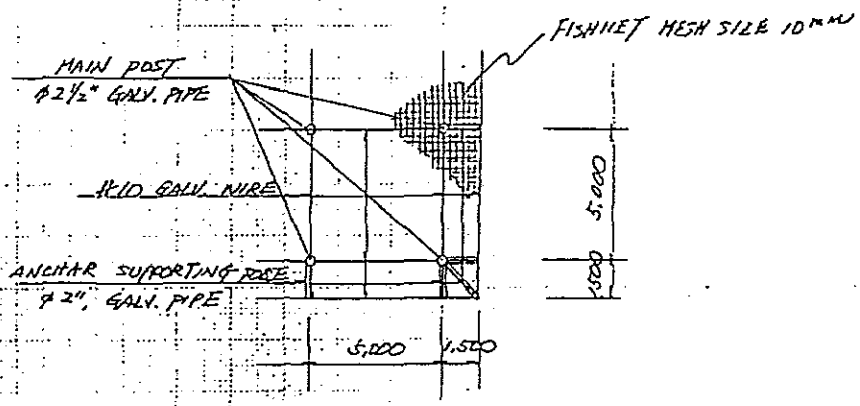
ATTACHMENT 3 : STANDARD CROSS SECTION OF FARM ROAD



GENERAL PLAN OF TRELLIS



SECTION A-A'



PLAN AT CORNER

ATTACHMENT 4 : STANDARD DRAWING OF TRELLIS

ATTACHMENT 5: TANTATIVE PROJECT IMPLEMENTATION SCHEDULE

ITEM	1988										
	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Remarks
Field Survey	▬										
Basic Plan of Works	△										
- Field Report		△									
Preparation of Detailed Design		▬									
- Final Report on Detailed Design			△								
Official Request of Construction by GOK			△								
			JICA/KNY								
			JICA/HQ								
Consultation with MOF of GOJ				△							
Submission of FORM A1 by GOK			△								For requiring JICA experts
Exchange of Verbal Note				△							
JICA expert for Construction Supervision					▬	▬	▬	▬	▬		
Tendering & Contracting					▬						
Construction						▬	▬	▬	▬		
- Farm roads						▬	▬	▬			
- Fencing							▬	▬			
- Trellis								▬	▬		
- Windbreak								▬	▬		

Notes, GOK : Government of the Republic of Kenya
GOJ : Government of Japan
MOF : Ministry of Foreign Affairs
JICA/KNY : JICA Kenya Office
JICA/HQ : JICA Headquater, Tokyo

JICA