REPUBLIC OF KENYA	NAVCDP	KAJIADO COUNTY GOVERNMENT

DEPARTMENT OF AGRICULTURE, LIVESTOCK, VETERINARY & FISHERIES
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

Request for Bids
Small Works

(One-Envelope Bidding Process)
Volume 1 of 4
Procurement of:

REHABILITATION WORKS FOR ISINET KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ESELENKEI WARD, KAJIADO SOUTH SUB COUNTY, KAJIADO COUNTY

RFB No: KE-Kajiado County-567787-CW-RFB

Project: *NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT (NAVCDP).*

Employer: DEPARTMENT OF AGRICULTURE, LIVESTOCK, VETERINARY & FISHERIES- KAJIADO COUNTY GOVERNMENT.

Country: KENYA.

Issued on: 15th September 2026.

Date of submission: 13th October 2026

Time:11.00am

Standard Procurement Document

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DEPARTMENT OF AGRICULTURE, LIVESTOCK, VETERINARY & FISHERIES- KAJIADO COUNTY GOVERNMENT

Specific Procurement Notice

Request for Bids
Small Works

(One-Envelope Bidding Process)

Country: KENYA

Name of Project: NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

Contract Title: REHABILITATION WORKS FOR ISINET KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ESELENKEI WARD, KAJIADO SOUTH SUB COUNTY, KAJIADO COUNTY

Loan No: 70640-KE

RFB Reference No.: KE-Kajiado County-567787-CW-RFB

1. The Government of Kenya (GoK) has received financing from the World Bank toward the cost of the National Agricultural Value Chain Development Project (NAVCDP), and intends to apply part of the proceeds toward payments under the contract for REHABILITATION WORKS FOR ISINET KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ESELENKEI WARD, KAJIADO SOUTH SUB COUNTY, KAJIADO COUNTY. For this contract, the Borrower shall process the payments using the Direct Payment disbursement method, as defined in the World Bank's Disbursement Guidelines for Investment Project Financing.

2. The **DEPARTMENT OF AGRICULTURE, LIVESTOCK, VETERINARY SERVICES & FISHERIES**, County Government of KAJIADO, now invites sealed Bids from eligible Bidders for REHABILITATION WORKS FOR ISINET KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ESELENKEI WARD, KAJIADO SOUTH SUB COUNTY, KAJIADO COUNTY that includes majorly rehabilitation of intake works, main secondary and distribution canals, construction of Division boxes, construction of ring culverts, construction of cattle troughs, construction of toilet blocks, the time for completion is 365 days.

3. Bidding will be conducted through National competitive procurement using a Request for Bids (RFB) as specified in the World Bank's "Procurement Regulations for IPF Borrowers" First Published July 2016 & Revised Fourth Edition November 2020

("Procurement Regulations"), and is open to all Bidders as defined in the Procurement Regulations.

4. Interested eligible Bidders may obtain further information from the County Government of Kajiado website www.kajiado.go.ke or **Email navcdpkajiado@gmail.com** and inspect the Bidding document during office hours *0800 to 1700 hours East African Time (EAT)* at the address given below:[1].

Chief Officer
Department of Agriculture and Fisheries
County Government of Kajiado
Email navcdpkajiado@gmail.com

Attention:

The County Project Coordinator
National Agricultural Value Chain Development Project (NAVCDP)

5. The bidding document in English may be viewed, inspected and obtained free of charge by interested eligible Bidders from the County Government of Kajiado website www.kajiado.go.ke or Public Procurement Information Portal (PPIP) Website https://tender.go.ke

6. Bids will be delivered at the tender box located at the livestock office, on the address below on or before **13th October 2026 at 1100 hours EAT**. Electronic Bidding will not be permitted. Late Bids will be rejected. Bids will be publicly opened in the presence of the Bidders' designated representatives and anyone who chooses to attend at the address below on **13th October 2026 at 1100 hours *East African Time* (EAT).**

7. All Bids must be accompanied by a Bid Security **KES. 1,496,641.80 (Kenya shilling one million four hundred ninety-six thousand six hundred and forty-one shillings and eighty cents only).**

8. There shall be a pre-tender site visit for the above tender on 29th September 2026 1100hours(EAT). Bidders to assemble at the at Isinet chief's office

9. Attention is drawn to the Procurement Regulations requiring the Borrower to disclose information on the successful bidder's beneficial ownership, as part of the Contract Award Notice, using the Beneficial Ownership Disclosure Form as included in the bidding document.

10. The address(es) referred to above is (are):

Chief Officer
Department of Agriculture and Fisheries

County Government of kajiado.

Email navcdpkajiado@gmail.com

Attention:

The County Project Coordinator
National Agricultural Value Chain Development Project

PART 1 – Bidding Procedures

Section I - Instructions to Bidders

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Section I - Instructions to Bidders

A. General

1. Scope of Bid

1.1 In connection with the Specific Procurement Notice - Request for Bids (RFB), specified in the Bid Data Sheet (BDS), the Employer, as specified in the BDS, issues this bidding document for the provision of Works as specified in Section VII, Works' Requirements. The name, identification and number of lots (contracts) of this RFB are specified in the BDS.

1.2 Throughout this bidding document:

(a) the term **"in writing"** means communicated in written form (e.g. by mail, e-mail, and fax, including if specified **in the BDS**, distributed or received through the electronic-procurement system used by the Employer) with proof of receipt;

(b) if the context so requires, **"singular"** means **"plural"** and vice versa;

(c) **"Day"** means calendar day, unless otherwise specified as **"Business Day".** A Business Day is any day that is an official working day of the Borrower. It excludes the Borrower's official public holidays;

(d) **"ES"** means environmental and social (including Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH));

(e) **"Sexual Exploitation and Abuse" "(SEA)"** means the following:

"Sexual Exploitation" is defined as any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another;

"Sexual Abuse" is defined as the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions;

(f) **"Sexual Harassment" "(SH)"** is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or

physical conduct of a sexual nature by the Contractor's Personnel with other Contractor's or Employer's Personnel;

(g) **"Contractor's Personnel"** is as defined in Sub- Clause 1 (ii) of the General Conditions of Contract; and

(h) **"Employer's personnel"** is as defined in GCC Sub-Clause 1 (nn) of the General Conditions of Contract.

A non-exhaustive list of (i) behaviors which constitute SEA and (ii) behaviors which constitute SH is attached to the Code of Conduct form in Section IV.

2. Source of Funds

2.1 The Borrower or Recipient (hereinafter called "Borrower") specified **in the BDS** has received or has applied for financing (hereinafter called "funds") from the International Bank for Reconstruction and Development or the International Development Association (hereinafter called "the Bank") in an amount specified **in the BDS**, toward the project named **in the BDS**. The Borrower intends to apply a portion of the funds to eligible payments under the contract(s) for which this bidding document is issued.

2.2 Payment by the Bank will be made only at the request of the Borrower and upon approval by the Bank, and will be subject, in all respects, to the terms and conditions of the Loan (or other financing) Agreement. The Loan (or other financing) Agreement prohibits a withdrawal from the loan account for the purpose of any payment to persons or entities, or for any import of goods, equipment, plant, or materials, if such payment or import is prohibited by a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations. No party other than the Borrower shall derive any rights from the Loan (or other financing) Agreement or have any claim to the proceeds of the Loan (or other financing).

3. Fraud and Corruption

3.1 The Bank requires compliance with the Bank's Anti-Corruption Guidelines and its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework, as set forth in Section VI.

3.2 In further pursuance of this policy, bidders shall permit and shall cause their agents (where declared or not), subcontractors, sub-consultants, service providers, suppliers, and personnel, to permit the Bank to inspect all accounts, records and other documents

relating to any initial selection process, prequalification process, bid submission, proposal submission, and contract performance (in the case of award), and to have them audited by auditors appointed by the Bank.

4. Eligible Bidders

4.1 A Bidder may be a firm that is a private entity, or a state-owned enterprise or institution, subject to ITB 4.6, or any combination of them in the form of a joint venture (JV), under an existing agreement, or with the intent to enter into such an agreement supported by a letter of intent. In the case of a joint venture, all members shall be jointly and severally liable for the execution of the entire Contract in accordance with the Contract terms. The JV shall nominate a Representative who shall have the authority to conduct all business for and on behalf of any and all the members of the JV during the Bidding process and, in the event the JV is awarded the Contract, during contract execution. Unless specified **in the BDS**, there is no limit on the number of members in a JV.

4.2 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest for the purpose of this Bidding process, if the Bidder:

(a) directly or indirectly controls, is controlled by or is under common control with another Bidder; or

(b) receives or has received any direct or indirect subsidy from another Bidder; or

(c) has the same legal representative as another Bidder; or

(d) has a relationship with another Bidder, directly or through common third parties, that puts it in a position to influence the Bid of another Bidder, or influence the decisions of the Employer regarding this bidding process; or

(e) or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the works that are the subject of the Bid; or

(f) or any of its affiliates has been hired (or is proposed to be hired) by the Employer or Borrower as Project Manager for the Contract implementation;

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(g) would be providing goods, works, or non-consulting services resulting from or directly related to consulting services for the preparation or implementation of the project specified in the BDS ITB 2.1 that it provided or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm;

(h) has a close business or family relationship with a professional staff of the Borrower (or of the project implementing agency, or of a recipient of a part of the loan) who: (i) are directly or indirectly involved in the preparation of the bidding document or specifications of the contract, and/or the Bid evaluation process of such contract; or (ii) would be involved in the implementation or supervision of such contract unless the conflict stemming from such relationship has been resolved in a manner acceptable to the Bank throughout the procurement process and execution of the contract.

4.3 A firm that is a Bidder (either individually or as a JV member) shall not participate in more than one Bid, except for permitted alternative Bids. This includes participation as a Subcontractor in other Bids. Such participation shall result in the disqualification of all Bids in which the firm is involved. A firm that is not a Bidder or a JV member may participate as a subcontractor in more than one Bid.

4.4 A Bidder may have the nationality of any country, subject to the restrictions pursuant to ITB 4.8. A Bidder shall be deemed to have the nationality of a country if the Bidder is constituted, incorporated or registered in and operates in conformity with the provisions of the laws of that country, as evidenced by its articles of incorporation (or equivalent documents of constitution or association) and its registration documents, as the case may be. This criterion also shall apply to the determination of the nationality of proposed subcontractors or sub-consultants for any part of the Contract including related Services.

4.5 A Bidder that has been sanctioned by the Bank, pursuant to the Bank's Anti-Corruption Guidelines, in accordance with its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework as described in Section VI paragraph 2.2 d., shall be ineligible to be prequalified for, initially selected for, bid for, propose for, or be awarded a Bank-financed contract or

benefit from a Bank-financed contract, financially or otherwise, during such period of time as the Bank shall have determined. The list of debarred firms and individuals is available at the electronic address specified in the BDS.

4.6 Bidders that are state-owned enterprises or institutions in the Employer's Country may be eligible to compete and be awarded a Contract(s) only if they can establish, in a manner acceptable to the Bank, that they (i) are legally and financially autonomous (ii) operate under commercial law, and (iii) are not under supervision of the Employer.

4.7 A Bidder shall not be under suspension from Bidding by the Employer as the result of the operation of a Bid–Securing or Proposal-Securing Declaration.

4.8 Firms and individuals may be ineligible if so indicated in Section V and (a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country, provided that the Bank is satisfied that such exclusion does not preclude effective competition for the supply of goods or the contracting of works or services required; or (b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's country prohibits any import of goods or contracting of works or services from that country, or any payments to any country, person, or entity in that country. When the Works are implemented across jurisdictional boundaries (and more than one country is a Borrower, and is involved in the procurement), then exclusion of a firm or individual on the basis of ITB 4.8 (a) above by any country may be applied to that procurement across other countries involved, if the Bank and the Borrowers involved in the procurement agree.

4.9 A Bidder shall provide such documentary evidence of eligibility satisfactory to the Employer, as the Employer shall reasonably request.

4.10 A firm that is under a sanction of debarment by the Borrower from being awarded a contract is eligible to participate in this procurement, unless the Bank, at the Borrower's request, is satisfied that the debarment;

(a) relates to fraud or corruption, and

(b) followed a judicial or administrative proceeding that afforded the firm adequate due process.

5. Eligible Materials, Equipment and Services

5.1 The materials, equipment and services to be supplied under the Contract and financed by the Bank may have their origin in any country subject to the restrictions specified in Section V, Eligible Countries, and all expenditures under the Contract will not contravene such restrictions. At the Employer's request, Bidders may be required to provide evidence of the origin of materials, equipment and services.

B. Contents of Bidding Document

6. Sections of Bidding Document

6.1 The bidding document consists of Parts 1, 2, and 3, which include all the sections specified below, and which should be read in conjunction with any Addenda issued in accordance with ITB 8.

PART 1 Bidding Procedures

- Section I - Instructions to Bidders (ITB)
- Section II - Bid Data Sheet (BDS)
- Section III - Evaluation and Qualification Criteria
- Section IV - Bidding Forms
- Section V - Eligible Countries
- Section VI - Fraud and Corruption

PART 2 Works' Requirements

- Section VII - Works' Requirements

PART 3 Conditions of Contract and Contract Forms

- Section VIII - General Conditions of Contract (GCC)
- Section IX - Particular Conditions of Contract (PCC)
- Section X - Contract Forms

6.2 The Specific Procurement Notice - Request for Bids (RFB) issued by the Employer is not part of this bidding document.

6.3 Unless obtained directly from the Employer, the Employer is not responsible for the completeness of the bidding document, responses to requests for clarification, the minutes of the pre-Bid

meeting (if any), or Addenda to the bidding document in accordance with ITB 8. In case of any contradiction, documents obtained directly from the Employer shall prevail.

6.4 The Bidder is expected to examine all instructions, forms, terms, and specifications in the bidding document and to furnish with its Bid all information and documentation as is required by the bidding document.

7. Clarification of Bidding Document, Site Visit, Pre-Bid Meeting

7.1 A Bidder requiring any clarification of the bidding document shall contact the Employer in writing at the Employer's address specified **in the BDS** or raise its inquiries during the pre-Bid meeting if provided for in accordance with ITB 7.4. The Employer will respond in writing to any request for clarification, provided that such request is received prior to the deadline for submission of Bids within a period specified **in the BDS**. The Employer shall forward copies of its response to all Bidders who have acquired the bidding document in accordance with ITB 6.3, including a description of the inquiry but without identifying its source. If so specified **in the BDS**, the Employer shall also promptly publish its response at the web page identified in the BDS. Should the clarification result in changes to the essential elements of the bidding document, the Employer shall amend the bidding document following the procedure under ITB 8 and ITB 22.2.

7.2 The Bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the Bidder's own expense.

7.3 The Bidder and any of its personnel or agents will be granted permission by the Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the Bidder, its personnel, and agents will release and indemnify the Employer and its personnel and agents from and against all liability in respect thereof, and will be responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.

7.4 If so specified **in the BDS**, the Bidder's designated representative is invited to attend a pre-Bid meeting and/or a Site of Works visit. The

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purpose of the meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

7.5 The Bidder is requested, to submit any questions in writing, to reach the Employer not later than one week before the meeting.

7.6 Minutes of the pre-Bid meeting, if applicable, including the text of the questions asked by Bidders, without identifying the source, and the responses given, together with any responses prepared after the meeting, will be transmitted promptly to all Bidders who have acquired the bidding document in accordance with ITB 6.3 Any modification to the bidding document that may become necessary as a result of the pre-Bid meeting shall be made by the Employer exclusively through the issue of an addendum pursuant to ITB 8 and not through the minutes of the pre-Bid meeting. Nonattendance at the pre-Bid meeting will not be a cause for disqualification of a Bidder.

8. Amendment of Bidding Document

8.1 At any time prior to the deadline for submission of bids, the Employer may amend the bidding document by issuing addenda.

8.2 Any addendum issued shall be part of the bidding document and shall be communicated in writing to all who have obtained the bidding document from the Employer in accordance with ITB 6. The Employer shall also promptly publish the addendum on the Employer's web page in accordance with ITB 7.1.

8.3 To give prospective Bidders reasonable time in which to take an addendum into account in preparing their Bids, the Employer may, at its discretion, extend the deadline for the submission of Bids, pursuant to ITB 22.2.

C. Preparation of Bids

9. Cost of Bidding

9.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the Bidding process.

10. Language of Bid

10.1 The Bid, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the Employer, shall be written in the language specified **in the BDS**. Supporting documents and printed literature that are part of the Bid may be in another language provided they are accompanied by an accurate translation of the relevant passages in the language specified **in the BDS**, in which case, for purposes of interpretation of the Bid, such translation shall govern.

11. Documents Comprising the Bid

11.1 The Bid shall comprise the following:

(a) **Letter of Bid** prepared in accordance with ITB 12;

(b) **Bill of Quantities or Activity Schedule**: completed in accordance with ITB 12 and ITB 14, as specified **in the BDS**;

(c) Bid Security **or Bid-Securing Declaration**, in accordance with ITB 19.1;

(d) Alternative **Bid**, if permissible, in accordance with ITB 13;

(e) Authorization**:** written confirmation authorizing the signatory of the Bid to commit the Bidder, in accordance with ITB 20.3;

(f) Bidder's **Eligibility:** documentary evidence in accordance with ITB 17 establishing the Bidder's eligibility to Bid;

(g) Qualifications: documentary evidence in accordance with ITB 17 establishing the Bidder's qualifications to perform the contract if its Bid is accepted;

(h) Conformity: a technical proposal in accordance with ITB 16;

(i) any other document required **in the BDS**.

11.2 In addition to the requirements under ITB 11.1, Bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all members and submitted with the Bid, together with a copy of the proposed Agreement.

11.3 The Bidder shall furnish in the Letter of Bid information on commissions and gratuities, if any, paid or to be paid to agents or any other party relating to this Bid.

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12. Letter of Bid and Schedules

12.1 The Letter of Bid and Schedules shall be prepared using the relevant forms furnished in Section IV, Bidding Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under ITB 20.3. All blank spaces shall be filled in with the information requested.

13. Alternative Bids

13.1 Unless otherwise specified **in the BDS**, alternative Bids shall not be considered.

13.2 When alternative times for completion are explicitly invited, a statement to that effect will be included **in the BDS** and the method of **evaluating** different alternative times for completion will be described in Section III, Evaluation and Qualification Criteria.

13.3 Except as provided under ITB 13.4 below, Bidders wishing to offer **technical** alternatives to the requirements of the bidding document must first price the Employer's design as described in the bidding document and shall further provide all information necessary for a complete evaluation of the alternative by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, and proposed construction methodology and other relevant details. Only the technical alternatives, if any, of the Bidder with the Most Advantageous Bid conforming to the basic technical requirements shall be considered by the Employer.

13.4 When specified **in the BDS**, Bidders are permitted to submit alternative technical solutions for specified parts of the Works. Such parts will be identified **in the BDS** and described in Section VII, Works' Requirements. The method for their evaluation will be stipulated in Section III, Evaluation and Qualification Criteria.

14. Bid Prices and Discounts

14.1 The prices and discounts quoted by the Bidder in the Letter of Bid and in the Activity **Schedule** or Bill of Quantities shall conform to the requirements specified below.

14.2 The Bidder shall submit a Bid for the whole of the Works described in ITB 1.1 by filling in prices for all items of the Works, as identified in Section IV. Bidding Forms. In case of admeasurement contracts, the Bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by the Bidder will not be paid for by the Employer

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when executed and shall be deemed covered by the rates for other items and prices in the Bill of Quantities.

14.3 The price to be quoted in the Letter of Bid, in accordance with ITB 12.1, shall be the total price of the Bid, excluding any discounts offered.

14.4 The Bidder shall quote any discounts and indicate the methodology for their application in the Letter of Bid in accordance with ITB 12.1.

14.5 Unless otherwise specified **in the BDS** and the Conditions of Contract, the **prices** quoted by the Bidder shall be fixed. If the prices quoted by the Bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract, the Bidder shall furnish the indices and weightings for the price adjustment formulae in the Schedule of Adjustment Data in Section IV- Bidding Forms and the Employer may require the Bidder to justify its proposed indices and weightings.

14.6 If so specified in ITB 1.1, Bids are invited for individual lots (contracts) or for any combination of lots (packages). Bidders wishing to offer discounts for the award of more than one Contract shall specify in their Bid the price reductions applicable to each package, or alternatively, to individual Contracts within the package. Discounts shall be submitted in accordance with ITB 14.4, provided the Bids for all lots (contracts) are opened at the same time.

14.7 All duties, taxes, and other levies payable by the Contractor under the Contract, **or** for any other cause, as of the date 28 days prior to the deadline for submission of Bids, shall be included in the rates and prices[1] and the total Bid price submitted by the Bidder.

15. Currencies of Bid and Payment

15.1 The currency(ies) **of** the Bid and the currency(ies) of payments shall be the same and shall be as specified **in the BDS**.

15.2 Bidders may be required by the Employer to justify, to the Employer's satisfaction, their local and foreign currency

[1] In lump sum contracts, delete "rates and prices and the."

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requirements, and to substantiate that the amounts included in the unit rates and prices and shown in the Schedule of Adjustment Data are reasonable[2], in which case a detailed breakdown of the foreign currency requirements shall be provided by Bidders.

16. Documents Comprising the Technical Proposal

16.1 The Bidder shall furnish a technical proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section IV, Bidding Forms, in sufficient detail to demonstrate the adequacy of the Bidders' proposal to meet the work's requirements and the completion time.

17. Documents Establishing the Eligibility and Qualifications of the Bidder

17.1 To establish Bidder's eligibility in accordance with ITB 4, Bidders shall complete the **Letter** of Bid, included in Section IV, Bidding Forms.

17.2 In accordance with Section III, Evaluation and Qualification Criteria, to establish its qualifications to perform the Contract, the Bidder shall provide the information requested in the corresponding information sheets included in Section IV, Bidding Forms.

17.3 If a margin of preference applies as specified in accordance with ITB 33.1, domestic **Bidders**, individually or in joint ventures, applying for eligibility for domestic preference shall supply all information required to satisfy the criteria for eligibility specified in accordance with ITB 33.1.

18. Period of Validity of Bids

18.1 Bids shall remain valid until the date specified **in the BDS** or any extended **date** if amended by the Employer in accordance with ITB 8. A Bid that is not valid until the date specified **in the BDS,** or any extended date if amended by the Employer in accordance with ITB 8, shall be rejected by the Employer as nonresponsive.

18.2 In exceptional **circumstances**, prior to the date of expiration of the Bid validity, the Employer may request Bidders to extend the period of validity of their Bids. The request and the responses shall be made in writing. If a Bid Security is requested in accordance with ITB 19, it shall also be extended for twenty-eight (28) days beyond the

[2] For lump sum contracts, delete "unit rates and prices and shown in the Schedule of Adjustment Data are reasonable" and replace with "Lump Sum."

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extended date for Bid validity. A Bidder may refuse the request without forfeiting its Bid Security. A Bidder granting the request shall not be required or permitted to modify its Bid, except as provided in ITB 18.3.

18.3 If the award is delayed by a period exceeding fifty-six (56) days beyond the date of expiry of the Bid validity specified in accordance with ITB 18.1, the Contract price shall be determined as follows:

(a) in the case of **fixed price** contracts, the Contract price shall be the Bid **price** adjusted by the factor specified **in the BDS;**

(a) in the case of **adjustable** price contracts, no adjustment shall be made; or

(b) in any case, Bid evaluation shall be based on the Bid price without taking into consideration the applicable correction from those indicated above.

19. Bid Security

19.1 The Bidder shall furnish as part of its Bid, either a Bid-Securing Declaration **or** a Bid Security as specified **in the BDS**, in original form and, in the case of a Bid Security, in the amount and currency specified **in the BDS**.

19.2 A Bid Securing Declaration shall use the form included in Section IV, Bidding Forms.

19.3 If a Bid Security is specified pursuant to ITB 19.1, the Bid Security shall be a demand guarantee in any of the following forms at the Bidder's option:

(a) an **unconditional** guarantee issued by a bank or non-bank financial institution (such as an insurance, bonding or surety company);

(b) an **irrevocable** letter of credit;

(c) a **cashier's** or certified check; or

(d) another **security** specified **in the BDS**,

from a reputable source from an eligible country. If an unconditional guarantee is issued by a non-bank financial institution located outside the Employer's Country, the issuing non-bank financial institution shall have a correspondent financial institution located in the Employer's Country to make it

enforceable, unless the Employer has agreed in writing, prior to Bid submission, that a correspondent financial institution is not required. In the case of a bank guarantee, the Bid Security shall be submitted either using the Bid Security Form included in Section IV, Bidding Forms, or in another substantially similar format approved by the Employer prior to Bid submission. The Bid Security shall be valid for twenty-eight (28) days beyond the original date of expiry of the Bid validity, or beyond any extended date if requested under ITB 18.2.

19.4 If a Bid Security or Bid Securing Declaration is specified pursuant to ITB 19.1, any Bid not accompanied by a substantially responsive Bid Security or Bid-**Securing** Declaration shall be rejected by the Employer as non-responsive.

19.5 If a Bid Security is specified pursuant to ITB 19.1, the Bid Security of unsuccessful Bidders shall be returned as promptly as possible upon the successful Bidder's signing the Contract and furnishing the **Performance** Security and if required in the BDS, the Environmental and Social (ES) Performance Security pursuant to ITB 48.

19.6 The Bid Security of the successful Bidder shall be returned as promptly as possible once the successful Bidder has signed the Contract and furnished the required Performance Security. and if required in the BDS, the Environmental and Social (ES) Performance Security.

19.7 The Bid **Security** may be forfeited:

(a) if a Bidder withdraws its Bid prior to the expiry date of the Bid validity specified by the Bidder on the Letter of Bid, or any extension thereto provided by the Bidder; or

(b) if the successful Bidder fails to:

(i) sign the Contract in accordance with ITB 47; or

(ii) furnish a Performance Security and if required in the BDS, the Environmental and Social (ES) Performance Security in accordance with ITB 48.

19.8 The Bid Security or the Bid-Securing Declaration of a JV shall be in the name of the JV that **submits** the Bid. If the JV has not been

constituted into a legally enforceable JV, at the time of Bidding, the Bid Security or the Bid-Securing Declaration shall be in the names of all future members as named in the letter of intent mentioned in ITB 4.1 and ITB 11.2.

19.9 If a Bid Security is not required **in the BDS**, pursuant to ITB 19.1, and;

(a) if a Bidder withdraws its Bid prior to the expiry date of the Bid validity specified by the Bidder on the Letter of Bid or any extended date provided by the Bidder; or

(b) if the successful Bidder fails to:

(i) sign the Contract in accordance with ITB 47; or

(ii) furnish a Performance Security and if required in the BDS, the Environmental and Social (ES) Performance Security in accordance with ITB 48,

the Borrower may**,** if provided for **in the BDS,** declare the Bidder ineligible to be awarded a contract by the Employer for a period of time stated **in the BDS**.

20. Format and Signing of Bid

20.1 The Bidder shall prepare one original of the documents comprising the Bid as described in ITB 11 and clearly mark it "ORIGINAL". Alternative Bids, if permitted in accordance with ITB 13, shall be clearly marked "ALTERNATIVE". In addition, the Bidder shall submit copies of the Bid in the number specified **in the BDS,** and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.

20.2 Bidders shall mark as "CONFIDENTIAL" information in their Bids which is confidential to their business. This may include **proprietary** information, trade secrets, or commercial or financially sensitive information.

20.3 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of **the** Bidder. This authorization shall consist of a written confirmation as specified **in the BDS** and shall be attached to the Bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All

pages of the Bid where entries or amendments have been made shall be signed or initialed by the person signing the Bid.

20.4 In case the Bidder is a JV, the Bid shall be signed by an authorized representative of the JV on behalf of the JV, and so as to be legally binding on all the members as evidenced by a power of attorney signed by their legally authorized representatives.

20.5 Any interlineations, **erasures**, or overwriting shall be valid only if they are signed or initialed by the person signing the Bid.

D. Submission and Opening of Bids

21. Sealing and Marking of Bids

21.1 The Bidder shall deliver the Bid in a single, sealed envelope (one-envelope Bidding process). Within the single envelope the Bidder shall place the following separate, sealed envelopes:

(a) in an envelope marked "ORIGINAL", all documents comprising the Bid, as described in ITB 11; and

(b) in an envelope marked "COPIES", all required copies of the Bid; and

(c) if alternative Bids are permitted in accordance with ITB 13, and if relevant:

(i) in an envelope marked "ORIGINAL - ALTERNATIVE BID", the alternative Bid; and

(ii) in the enveloped marked "COPIES – ALTERNATIVE BID" all required copies of the alternative Bid.

21.2 The inner and outer envelopes shall:

(a) bear the name and address of the Bidder;

(b) be addressed to the Employer in accordance with ITB 22.1;

(c) bear the specific identification of this Bidding process specified in accordance with BDS 1.1; and

(d) bear a warning not to open before the time and date for Bid opening.

21.3 If all envelopes are not sealed and marked as required, the Employer will assume no responsibility for the misplacement or premature opening of the Bid.

22. Deadline for Submission of Bids

22.1 Bids must be received by the Employer at the address and no later than the date and time specified **in the BDS**. When so specified **in the BDS**, Bidders shall have the option of submitting their Bids **electronically**. Bidders submitting Bids electronically shall follow the electronic bid submission procedures specified **in the BDS.**

22.2 The Employer may, at its discretion, extend the deadline for the **submission** of Bids by amending the bidding document in accordance with ITB 8, in which case all rights and obligations of the Employer and Bidders previously subject to the deadline shall thereafter be subject to the deadline as extended.

23. Late Bids

23.1 The Employer shall not consider any Bid that arrives after the deadline for submission of Bids, in accordance with ITB 22. Any Bid **received** by the Employer after the deadline for submission of Bids shall be declared late, rejected, and returned unopened to the Bidder.

24. Withdrawal, Substitution, and Modification of Bids

24.1 A Bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized **representative**, and shall include a copy of the authorization in accordance with ITB 20.3, (except that withdrawal notices do not require copies). The corresponding substitution or modification of the Bid must accompany the respective written notice. All notices must be:

(a) prepared and submitted in accordance with ITB 20 and ITB 21 (except that withdrawal notices do not require copies), and in addition, the respective envelopes shall be clearly marked "WITHDRAWAL," "SUBSTITUTION," "MODIFICATION"; and

(b) received by the Employer prior to the deadline prescribed for submission of Bids, in accordance with ITB 22.

24.2 Bids requested to be withdrawn in accordance with ITB 24.1 shall be returned **unopened** to the Bidders.

24.3 No Bid may be withdrawn, substituted, or modified in the interval between **the** deadline for submission of Bids and the date of expiry of the Bid validity specified by the Bidder on the Letter of Bid or any extended date thereof.

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25. Bid Opening

25.1 Except in the cases specified in ITB 23 and ITB 24.2, the Employer shall publicly open and read out in accordance with this ITB, all Bids received by the deadline, at the date, time and place specified **in the BDS**, in the **presence** of Bidders' designated representatives and anyone who chooses to attend. All Bidders, or their representatives and any interested party may attend a public opening. Any specific electronic Bid opening procedures required if electronic bidding is permitted in accordance with ITB 22.1, shall be as specified **in the BDS**.

25.2 First, envelopes marked "WITHDRAWAL" shall be opened and read out and the **envelope** with the corresponding Bid shall not be opened, but returned to the Bidder. No Bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at Bid opening.

25.3 Next, envelopes marked "SUBSTITUTION" shall be opened and read out and exchanged with the corresponding Bid being substituted, and the substituted Bid shall not be opened, but returned to the Bidder. No Bid substitution shall be permitted unless the corresponding substitution notice contains a valid authorization to request the substitution and is read out at Bid opening.

25.4 Next, envelopes marked "MODIFICATION" shall be opened and read out with the **corresponding** Bid. No Bid modification shall be permitted unless the corresponding modification notice contains a valid authorization to request the modification and is read out at bid opening.

25.5 Next, all remaining envelopes shall be opened one at a time, reading out: the name of the Bidder and whether there is a modification; the total Bid Price, per lot (contract) if applicable, including any discounts and alternative Bids; the presence or absence of a Bid Security, or Bid Securing Declaration, if required; and any other details as the Employer may consider appropriate.

25.6 Only Bids, alternative Bids and discounts that are opened and read out at Bid **opening** shall be considered further for evaluation. The Letter of Bid and the priced Schedules are to be initialed by representatives of the Employer attending Bid opening in the manner specified **in the BDS**.

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25.7 The Employer shall neither discuss the merits of any Bid nor reject any Bid (**except** for late Bids, in accordance with ITB 23.1).

25.8 The Employer shall prepare a **record** of the Bid opening that shall include, as a minimum:

(a) the name of the Bidder and whether there is a withdrawal, substitution, or modification;

(b) the Bid Price, per lot (contract) if applicable, including any discounts;

(c) the presence or absence of a Bid Security or Bid-Securing Declaration, if one was required; and

(d) any alternative Bids.

25.9 The Bidders' **representatives** who are present shall be requested to sign the record. The omission of a Bidder's signature on the record shall not invalidate the contents and effect of the record. A copy of the record shall be distributed to all Bidders.

E. Evaluation and Comparison of Bids

26. Confidentiality

26.1 Information relating to the evaluation of Bids and recommendation of contract award, shall not be disclosed to Bidders or any other persons not **officially** concerned with the Bidding process until information on Intention to Award the Contract is transmitted to all Bidders in accordance with ITB 43.

26.2 Any effort by a Bidder to influence the Employer in the evaluation of the Bids or Contract **award** decisions may result in the rejection of its Bid.

26.3 Notwithstanding ITB 26.2, from the time of Bid opening to the time of Contract award, if a Bidder wishes to contact the Employer on any matter related to the Bidding process, it shall do so in writing.

27. Clarification of Bids

27.1 To assist in the examination, evaluation, and comparison of the Bids, and qualification of the Bidders, the Employer may, at its discretion, ask any **Bidder** for a clarification of its Bid given a reasonable time for a response. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The Employer's request for clarification and the response shall be in writing. No change, including any voluntary

increase or decrease in the prices or substance of the Bid shall be sought, offered, or permitted, except to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids, in accordance with ITB 31.

27.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its Bid may be rejected.

28. Deviations, Reservations, and Omissions

28.1 During the **evaluation** of Bids, the following definitions apply:

(a) "Deviation" is a departure from the requirements specified in the bidding document;

(b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of the requirements specified in the bidding document; and

(c) "Omission" is the failure to submit part or all of the information or documentation required in the bidding document.

29. Determination of Responsiveness

29.1 The Employer's determination of a Bid's responsiveness is to be based on the contents of the Bid itself, as defined in ITB 11.

29.2 A substantially responsive Bid is one that meets the requirements of the bidding **document** without material deviation, reservation, or omission. A material deviation, reservation, or omission is one that:

(a) if accepted, would:

(i) affect in any substantial way the scope, quality, or performance of the Works specified in the Contract; or

(ii) limit in any substantial way, inconsistent with the bidding document, the Employer's rights or the Bidder's obligations under the proposed Contract; or

(b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.

29.3 The Employer shall examine the technical aspects of the Bid submitted in accordance with ITB 16, in particular, to confirm that

all requirements of Section VII, Works' Requirements have been met without any material deviation, reservation or omission.

29.4 If a Bid is not substantially responsive to the requirements of the bidding document, **it** shall be rejected by the Employer and may not subsequently be made responsive by correction of the material deviation, reservation, or omission.

30. Nonmaterial Nonconformities

30.1 Provided that a **Bid** is substantially responsive, the Employer may waive any nonconformities in the Bid.

30.2 Provided that a Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid related to documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

30.3 Provided that a Bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only **to** reflect the price of a missing or non-conforming item or component, by adding the average price of the item or component quoted by substantially responsive Bidders. If the price of the item or component cannot be derived from the price of other substantially responsive Bids, the Employer shall use its best estimate.

31. Correction of Arithmetical Errors

31.1 Provided that the Bid is **substantially** responsive, the Employer shall correct arithmetical errors on the following basis:

(a) only for admeasurement contracts, if there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected, unless in the opinion of the Employer there is an obvious misplacement of the decimal point in the unit price, in which case the total

price as quoted shall govern and the unit price shall be corrected;

(b) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and

(c) if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

31.2 Bidders shall be requested to accept correction of arithmetical errors. Failure to accept the correction in accordance with ITB 31.1, shall result in the rejection of the Bid.

32. Conversion to Single Currency

32.1 For evaluation and comparison purposes, the currency(ies) of the Bid shall be converted into a single currency as specified **in the BDS**.

33. Margin of Preference

33.1 Unless otherwise specified **in the BDS,** a margin of preference for domestic Bidders[3] shall not apply.

34. Subcontractors

34.1 Unless otherwise stated **in the BDS**, the Employer does not intend to execute any specific elements of the Works by subcontractors selected in advance by the Employer, Financial Parts

34.2 The subcontractor's qualifications shall not be used by the Bidder to qualify for the Works unless their specialized parts of the Works were previously designated by the Employer **in the BDS** as can be met by subcontractors referred to hereafter as 'Specialized Subcontractors', in which case, the qualifications of the Specialized Subcontractors proposed by the Bidder may be added to the qualifications.

34.3 Bidders may propose subcontracting up to the percentage of total value of contracts or the volume of works as specified **in the BDS**.

[3] An individual firm is considered a domestic Bidder for purposes of the margin of preference if it is registered in the country of the Employer, has more than 50 percent ownership by nationals of the country of the Employer, and if it does not subcontract more than 10 percent of the contract price, excluding provisional sums, to foreign contractors. JVs are considered as domestic Bidders and eligible for domestic preference only if the individual member firms are registered in the country of the Employer or have more than 50 percent ownership by nationals of the country of the Employer, and the JV shall be registered in the country of the Borrower. The JV shall not subcontract more than 10 percent of the contract price, excluding provisional sums, to foreign firms. JVs between foreign and national firms will not be eligible for domestic preference.

Subcontractors proposed by the Bidder shall be fully qualified for their parts of the Works.

35. Evaluation of Bids

35.1 The Employer shall use the criteria and methodologies listed in this ITB and Section III, Evaluation and Qualification criteria. No other evaluation criteria or methodologies shall be permitted. By applying the criteria and methodologies the Employer shall determine the Most Advantageous Bid. This is the Bid of the Bidder that meets the Qualification Criteria and whose Bid has been determined to be:

(a) substantially responsive to the bidding document; and

(b) the lowest evaluated cost.

35.2 To evaluate a Bid, the Employer shall consider the following:

(a) the Bid price, excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities[4] for admeasurement contracts, but including Daywork[5] items, where priced competitively;

(b) price adjustment for correction of arithmetic errors in accordance with ITB 31.1;

(c) price adjustment due to discounts offered in accordance with ITB 14.4;

(d) converting the amount resulting from applying (a) to (c) above, if relevant, to a single currency in accordance with ITB 32;

(e) price adjustment for nonconformities in accordance with ITB 30.3; and

(f) the additional evaluation factors are specified in Section III, Evaluation and Qualification Criteria.

35.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bid evaluation.

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4 In lump sum contracts, delete "Bill of Quantities" and replace with "Activity Schedule."

5 Daywork is work carried out following instructions of the Project Manager and paid for on the basis of time spent by workers, and the use of materials and the Contractor's equipment, at the rates quoted in the Bid. For Daywork to be priced competitively for Bid evaluation purposes, the Employer must list tentative quantities for individual items to be costed against Daywork (e.g., a specific number of tractor driver staff-days, or a specific tonnage of Portland cement), to be multiplied by the Bidders' quoted rates and included in the total Bid price.

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35.4 If this bidding document allows Bidders to quote separate prices for different lots (contracts), the methodology to determine the lowest evaluated cost of the contract combinations, including any discounts offered in the Letter of Bid, is specified in Section III, Evaluation and Qualification Criteria.

36. Comparison of Bids The Employer shall compare the evaluated costs of all substantially responsive Bids established in accordance with ITB 35.2 to determine the Bid that has the lowest evaluated cost.

37. Abnormally Low Bids

37.1 An Abnormally Low Bid is one where the Bid price, in combination with other constituent elements of the Bid, appears unreasonably low to the extent that the Bid price raises material concerns as to the capability of the Bidder to perform the Contract for the offered Bid price.

37.2 In the event of identification of a potentially Abnormally Low Bid, the Employer shall seek written clarifications from the Bidder, including detailed price analyses of its Bid price in relation to the subject matter of the contract, scope, proposed methodology, schedule, allocation of risks and responsibilities and any other requirements of the bidding document.

37.3 After evaluation of the price analyses, in the event that the Employer determines that the Bidder has failed to demonstrate its capability to perform the Contract for the offered Bid Price, the Employer shall reject the Bid.

38. Unbalanced or Front Loaded Bids

38.1 If the Bid for an admeasurement contract, which results in the lowest evaluated cost is, in the Employer's opinion, seriously unbalanced or, front loaded, the Employer may require the Bidder to provide written clarifications. Clarifications may include detailed price analyses to demonstrate the consistency of the Bid priceas with the scope of works, proposed methodology, schedule and any other requirements of the bidding document.

38.2 After the evaluation of the information and detailed price analyses presented by the Bidder, the Employer may as appropriate:

(a) accept the Bid; or

(b) require that the amount of the Performance Security be increased at the expense of the Bidder to a level not exceeding 20% of the Contract Price; or

(c) reject the Bid.

39. Qualification of the Bidder

39.1 The Employer shall determine to its satisfaction whether the eligible Bidder that is selected as having submitted the lowest evaluated cost and substantially responsive Bid meets the qualifying criteria specified in Section III, Evaluation and Qualification Criteria.

39.2 The determination shall be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 17. The determination shall not take into consideration the qualifications of other firms such as the Bidder's subsidiaries, parent entities, affiliates, subcontractors (other than Specialized Subcontractors if permitted in the bidding document), or any other firm(s) different from the Bidder.

39.3 Prior to Contract award, the Employer will verify that the successful Bidder (including each member of a JV) is not disqualified by the Bank due to noncompliance with contractual SEA/SH prevention and response obligations. The Employer will conduct the same verification for each subcontractor proposed by the successful Bidder. If any proposed subcontractor does not meet the requirement, the Employer will require the Bidder to propose a replacement subcontractor.

39.4 An affirmative determination of qualification shall be a prerequisite for award of the Contract to the Bidder. A negative determination shall result in disqualification of the Bid, in which event the Employer shall proceed to the substantially responsive Bid which offers the next lowest evaluated cost to make a similar determination of that Bidder's qualifications to perform satisfactorily.

40. Most Advantageous Bid

40.1 Having compared the evaluated costs of Bids, the Employer shall determine the Most Advantageous Bid. The Most Advantageous Bid is the Bid of the Bidder that meets the Qualification Criteria and whose Bid has been determined to be:

(a) substantially responsive to the bidding document; and

(b) the lowest evaluated cost.

41. Employer's Right to Accept Any Bid, and to Reject Any or All Bids

41.1 The Employer reserves the right to accept or reject any Bid, and to annul the Bidding process and reject all Bids at any time prior to Contract Award, without thereby incurring any liability to Bidders. In case of annulment, all Bids submitted and specifically, Bid securities, shall be promptly returned to the Bidders.

42. Standstill Period

42.1 The Contract shall not be awarded earlier than the expiry of the Standstill Period. The Standstill Period shall be ten (10) Business Days unless extended in accordance with ITB 46. The Standstill Period commences the day after the date the Employer has transmitted to each Bidder the Notification of Intention to Award the Contract. Where only one Bid is submitted, or if this contract is in response to an emergency situation recognized by the Bank, the Standstill Period shall not apply.

43. Notification of Intention to Award

43.1 The Employer shall send to each Bidder the Notification of Intention to Award the Contract to the successful Bidder. The Notification of Intention to Award shall contain, at a minimum, the following information:

(a) the name and address of the Bidder submitting the successful Bid;

(b) the Contract price of the successful Bid;

(c) the names of all Bidders who submitted Bids, and their Bid prices as readout, and as evaluated;

(d) a statement of the reason(s) the Bid (of the unsuccessful Bidder to whom the notification is addressed) was unsuccessful, unless the price information in c) above already reveals the reason;

(e) the expiry date of the Standstill Period;

(f) instructions on how to request a debriefing and/or submit a complaint during the standstill period.

F. Award of Contract

44. Award Criteria

44.1 Subject to ITB 41, the Employer shall award the Contract to the successful Bidder. This is the Bidder whose Bid has been determined to be the Most Advantageous Bid as specified in ITB 40.

45. Notification of Award

45.1 Prior to the expiration of the Bid validity, and upon expiry of the Standstill Period specified in ITB 42.1 or any extension thereof, and, upon satisfactorily addressing any complaint that has been filed within the Standstill Period, the Employer shall notify the successful Bidder, in writing, that its Bid has been accepted. The notification of award (hereinafter and in the Conditions of Contract and Contract Forms called the "Letter of Acceptance") shall specify the sum that the Employer will pay the Contractor in consideration of the execution of the contract (hereinafter and in the Conditions of Contract and Contract Forms called "the Contract Price").

45.2 Within ten (10) Business Days after the date of transmission of the Letter of Acceptance, the Employer shall publish the Contract Award Notice which shall contain, at a minimum, the following information:

(a) name and address of the Employer;

(b) name and reference number of the contract being awarded, and the selection method used;

(c) names of all Bidders that submitted Bids, and their Bid prices as read out at Bid opening, and as evaluated;

(d) names of all Bidders whose Bids were rejected either as nonresponsive or as not meeting qualification criteria, or were not evaluated, with the reasons therefor;

(e) the name of the successful Bidder, the final total contract price, the contract duration and a summary of its scope; and

(f) successful Bidder's Beneficial Ownership Disclosure Form, if specified in BDS ITB 47.1.

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45.3 The Contract Award Notice shall be published on the Employer's website with free access if available, or in at least one newspaper of national circulation in the Employer's Country, or in the official gazette. The Employer shall also publish the contract award notice in UNDB online.

45.4 Until a formal contract is prepared and executed, the Letter of Acceptance shall constitute a binding Contract.

46. Debriefing by the Employer

46.1 On receipt of the Employer's Notification of Intention to Award referred to in ITB 43.1, an unsuccessful Bidder has three (3) Business Days to make a written request to the Employer for a debriefing. The Employer shall provide a debriefing to all unsuccessful Bidders whose request is received within this deadline.

46.2 Where a request for debriefing is received within the deadline, the Employer shall provide a debriefing within five (5) Business Days, unless the Employer decides, for justifiable reasons, to provide the debriefing outside this timeframe. In that case, the standstill period shall automatically be extended until five (5) Business Days after such debriefing is provided. If more than one debriefing is so delayed, the standstill period shall not end earlier than five (5) Business Days after the last debriefing takes place. The Employer shall promptly inform, by the quickest means available, all Bidders of the extended standstill period

46.3 Where a request for debriefing is received by the Employer later than the three (3)-Business Day deadline, the Employer should provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of Public Notice of Award of contract. Requests for debriefing received outside the three (3)-day deadline shall not lead to extension of the standstill period.

46.4 Debriefings of unsuccessful Bidders may be done in writing or verbally. The Bidder shall bear their own costs of attending such a debriefing meeting.

47. Signing of Contract

47.1 The Employer shall send to the successful Bidder the Letter of Acceptance including the Contract Agreement, and, if specified in the BDS, a request to submit the Beneficial Ownership Disclosure

Form providing additional information on its beneficial ownership. The Beneficial Ownership Disclosure Form, if so requested, shall be submitted within eight (8) Business Days of receiving this request.

47.2 The successful Bidder shall sign, date and return to the Employer, the Contract Agreement within twenty-eight (28) days of its receipt.

48. Performance Security

48.1 Within twenty-eight (28) days of the receipt of the Letter of Acceptance from the Employer, the successful Bidder shall furnish the Performance Security and, if required in the BDS, the Environmental and Social (ES) Performance Security in accordance with the General Conditions of Contract, subject to ITB 38.2 (b), using for that purpose the Performance Security and ES Performance Security Forms included in Section X, Contract Forms, or another form acceptable to the Employer. If the Performance Security furnished by the successful Bidder is in the form of a bond, it shall be issued by a bonding or insurance company that has been determined by the successful Bidder to be acceptable to the Employer. A foreign institution providing a bond shall have a correspondent financial institution located in the Employer's Country, unless the Employer has agreed in writing that a correspondent financial institution is not required.

48.2 Failure of the successful Bidder to submit the above-mentioned Performance Security and, if required in the BDS, the Environmental and Social (ES) Performance Security, or to sign the Contract Agreement shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security. In that event the Employer may award the Contract to the Bidder offering the next Most Advantageous Bid.

49. Adjudicator

49.1 The Employer proposes the person named **in the BDS** to be appointed as Adjudicator under the Contract, at the hourly fee specified **in the BDS**, plus reimbursable expenses. If the Bidder disagrees with this proposal, the Bidder should so state in his Bid. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority designated in the Particular Conditions of Contract (PCC) pursuant to Clause 23.1 of the General Conditions of Contract (GCC), to appoint the Adjudicator.

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50. Procurement Related Complaint

50.1 The procedures for making a Procurement-related Complaint are as specified in the BDS.

Section II - Bid Data Sheet (BDS)

The following specific data for the Works to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

ITB Reference	A. General
ITB 1.1	The number of the Invitation for Bids is: **KE-Kajiado County-567787-CW-RFB** The Employer is: **Chief Officer, Department for Agriculture and Fisheries, County Government of Kajiado** The reference number of the Request for Bids (RFB) is: **KE-Kajiado County-567787-CW-RFB** The name of the RFB is: **REHABILITATION WORKS FOR ISINET KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ESELENKEI WARD, KAJIADO SOUTH SUB COUNTY, KAJIADO COUNTY** The number and identification of lots (contracts) comprising this RFB
ITB 2.1	The Borrower is: **The Republic of Kenya; and the Employer is Department for Agriculture, and Fisheries, County Government of Kajiado, a County Government within the Borrower's Country** Loan or Financing Agreement amount: ***US$ 250 million*** The name of the Project is: **National Agricultural Value Chain Development Project (NAVCDP)**
ITB 4.1	Maximum number of members in the Joint Venture (JV) shall be: **2 (Two)**
ITB 4.5	A list of debarred firms and individuals is available on the Bank's external website: http://www.worldbank.org/debarr.
	B. Contents of Bidding Document
ITB 7.1	For **Clarification of Bid purposes** only, the Employer's address is: Attention: Chief Officer Address: **P. O BOX 54 – 01100.** City: ***KAJIADO*** Country: **Kenya**

	Facsimile number: **N/A** Electronic mail address: **navcdpkajiado@gmail.com**
ITB 7.1	Requests for clarification should be received by the Employer no later than: **Fourteen (14) days before bid submission deadline.**
ITB 7.1	Web page: **www.kajiado.go.ke**
ITB 7.4	A Pre-Bid meeting shall not take place. If a Pre-Bid meeting will take place, it will be at the following date, time and place: **Not Applicable** A site visit conducted by the Employer **shall be** organized Venue of Site Visit: **Isinet Chief's office** Date Of Site Visit: **29th September 2026 at 1100 hours East African Time (EAT)**
C. Preparation of Bids	
ITB 10.1	The language of the Bid is: **English** All correspondence exchange shall be in **English** language. Language for translation of supporting documents and printed literature is **English**
ITB 11.1 (b)	The following schedules shall be submitted with the Bid: **The priced Bill of Quantities for admeasurement contracts**
ITB 11.1 (i)	The Bidder shall submit the following additional documents in its Bid: **1 Code of Conduct for Contractor's Personnel (ES)** The Bidder shall submit its Code of Conduct that will apply to Contractor's Personnel (as defined in Sub- Clause 1 (ii) of the General Conditions of Contract), to ensure compliance with the Contractor's Environmental and Social (ES) obligations under the Contract. The Bidder shall use for this purpose the Code of Conduct form provided in Section IV. No substantial modifications shall be made to this form, except that the Bidder may introduce additional requirements, including as necessary to take into account specific Contract issues/risks. **2 Management Strategies and Implementation Plans (MSIP) to manage the (ES) risks** The Bidder shall submit Management Strategies and Implementation Plans (MSIPs) to manage the following key Environmental and Social (ES) risks:

	(a) Sexual Exploitation, and Abuse (SEA) prevention and response action plan - The bidder shall prepare and implement a GBV/SEAH prevention and response action plan to prevent, mitigate, and address risks of gender- based violence and sexual exploitation, abuse, and harassment. The plan shall include awareness measures, reporting mechanisms, and referral procedures. **(b) Stakeholder Engagement Plan (SEP) and Information Disclosure –** The bidder shall prepare and implement a stakeholder Engagement plan to ensure timely, inclusive, and meaningful consultation with all relevant stakeholders. The plan is to also provide transparent information disclosure, a feedback mechanism, and documentation of stakeholder inputs. **(c) Occupational Health and Safety (OHS)Management Plan** – The bidder shall provide details of how they will manage occupational health and safety risks, your training proposals, and details of the persons who will be responsible for health and safety on site during the project, including details of their experience managing similar risks. As a minimum, the Health and Safety Management Plan should include the following details: o Site Details ▪ Site Location, Demarcation and Loss of Biodiversity Plan ▪ Site Induction Details ▪ Location of Health and Safety Kits ▪ Incident Reporting Details ▪ Welfare Provisions o Persons Responsible ▪ Nominated Health and Safety Manager (management team) ▪ Construction Management Plan ▪ Site Foreman ▪ Site First Aider(s) o The Health and Safety Management Manual and Pollution Prevention and Control. **(d) Community Health and Safety Plan** – The bidder shall provide details of how to assess and manage specific risks and impacts to the community arising from Project activities, including, inter alia, behavior of Project workers, risks of labor influx, response to emergency situations, and include mitigation measures. **(e) Labor Management Plan** – The bidder shall provide details of how to manage working conditions, workers' relationships, forced labor, grievance mechanisms for workers and grievance mechanisms for other stakeholders (including community level

	stakeholders), Labor compensation plans, and how you will ensure compliance from suppliers and subcontractors **(f) Traffic Management Plan** – The bidder shall provide details to ensure the safety of local communities from construction traffic]; **(g) Security Management Plan (SMP)** – The bidder shall provide details of how to assess and implement measures to manage the security risks of the Project, including the risks of engaging security personnel to safeguard project workers, sites, assets, and activities in the ESMP, in a manner satisfactory to World Bank, and guided by the principles of proportionality and GIIP, and by applicable law, in relation to hiring, rules of conduct, training, equipping, and monitoring of such personnel. **(h) Grievance Redress Mechanism (GRM)-**The bidder is required to provide a plan of how to handle grievances emanating from the project, including ensuring the Grievance log and the referral pathways. **(i) Pollution Prevention management plan-** The bidder is required to develop a plan that ensures pollution prevention and management, including air pollution, water pollution, and noise pollution **(j) Soil Compaction and soil Erosion-** The bidder to develop Soil and Water Conservation Strategies to prevent soil and water erosion. **(k) Damaging of Existing Infrastructure –** The bidder shall prepare and implement a detailed mitigation plan to prevent, manage, and promptly repair any damage to existing infrastructure arising during project implementation. **(l) Child Protection Strategy (CPS). –** The bidder shall prepare a child protection strategy during project implementation to prevent and respond to risks of abuse, exploitation, or harm to children and ensure no engagement of children below 18 years of age, including verification checks for workers. (Submit child labor policy). **(m)Waste Management Plan (WMP) -** The Bidder is required to provide a proper plan on how to manage the waste generated. **(n) Labor Influx Management Plans (LIMP)-** The Bidder is required to submit a Labor Influx Management Plan with the following elements: • Plans/proposals for tapping or maximizing the use of labor from the local workforce. • Proposals for workers' camp site locations and amenities to be provided to workers that reside within and outside camps, with the objectives of minimizing labor influx to the local community; • Provision for signing of worker code of conduct as part of employment contracts and including sanctions for noncompliance; • Plans/proposals for mandatory compliance with environmental, social, health and safety requirements including worker

	training/awareness on unacceptable conduct toward local community, specifically women, and national laws that make sexual harassment and gender-based violence a punishable offence that is prosecuted; • Plans for monitoring and supervision of issues related to labor influx and workers' camps. **(o) Quality Assurance Systems -** The Bidder shall provide details of the proposed quality assurance system intended to be used to ensure successful, safe and planned access to site; production; field operations; inspection, sampling and site testing; site trials and completion of the works. **(p) Chance Finds/ Cultural Heritage** – The bidder shall develop and implement Chance Finds procedures per ESS 8.
ITB 13.1	Alternative Bids **shall not be** considered.
ITB 13.2	Alternative times for completion **shall not be** permitted.
ITB 13.4	Alternative technical solutions shall be permitted for the following parts of the Works: **Not Applicable**
ITB 14.5	The prices quoted by the Bidder **shall not be** subject to adjustment during the performance of the Contract.
ITB 15.1	The price shall be quoted by the Bidder in: **Kenya Shillings (KES)** A Bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's Country (referred to as the "foreign currency requirements") and wishing to be paid accordingly, shall indicate up to three foreign currencies of their choice expressed as a percentage of the Bid price, together with the exchange rates used in the calculations in the appropriate form(s) included in Section IV, Bidding Forms.
ITB 18.1	*The Bid shall be valid until 11th September 2027*
ITB 18.3 (a)	The Bid price shall be adjusted by the following factor(s):The Bid price shall be adjusted by the following factor(s): **Not Applicable**
ITB 19.1	A Bid Security **shall be** required. A Bid-Securing Declaration **shall not be** required.

	If a Bid Security shall be required, the amount and currency of the Bid security shall be: **KES. 1,496,641.8** (Kenya shilling **one million four hundred ninety-six thousand six hundred and forty-one shillings and eighty cents only).**
ITB 19.3 (d)	Other types of acceptable securities: **Non**
ITB 20.1	In addition to the original of the Bid, the number of copies is**:** **ONE hard copy of the original of the Bid.** **ONE scanned/digital copy on flash disks in PDF format & BoQ in Microsoft Excel format, with the disks clearly labelled should also be submitted. In the event of any discrepancy between the original and the digital copies, the original hard copy shall prevail**
ITB 20.3	The written confirmation of authorization to sign on behalf of the Bidder shall consist of**: A Power of Attorney – to demonstrate the authority of the signatory to sign the Bid.**
D. Submission and Opening of Bids	
ITB 22.1	For **Bid submission purposes** only, the Employer's address is: Attention: **The County Project Coordinator (NAVCDP)** Address: **54-00100** City: **KAJIADO** Country: **KENYA** The deadline for Bid submission is: Date: **13th October 2026.** Time: **11:00hrs *East African Time* (EAT).** Bidders ***"shall not"*** have the option of submitting their Bids electronically. The electronic bidding submission procedures shall be: **Not applicable**
ITB 25.1	The Bid opening shall take place at: **Department of Livestock Production, Board Room.** Street Address: **54- 01100 Kajiado** City: **Kajiado Town** Country: **Kenya** Date: **13th October 2026.** Time: **11:00 hours *East African Time* (EAT).**

ITB 25.1	The electronic Bid opening procedures shall be: **Not applicable**
ITB 25.6	The Letter of Bid and Schedules shall be initialed by **ALL** representatives of the Employer conducting Bid opening. **Each Bid shall be initialed by all representatives and shall be numbered, any modification to the unit or total price shall be initialed by the Representative of the Employer**
E. Evaluation and Comparison of Bids	
ITB 32.1	The currency that shall be used for Bid evaluation and comparison purposes to convert at the selling exchange rate all Bid prices expressed in various currencies into a single currency is: **Kenya Shillings (KES)** The source of exchange rate shall be: **The Central Bank of Kenya** The date for the exchange rate shall be*:* **Deadline for submission of the Bids.**
ITB 33.1	A margin of domestic preference ***shall not*** apply.
ITB 34.1	At this time the Employer **does not intend** to execute certain specific parts of the Works by subcontractors selected in advance.
ITB 34.2	The parts of the Works for which the Employer Permits Bidders to propose Specialized Subcontractors are designated as follows: **Not Applicable** For the above-designated parts of the Works that may require Specialized Subcontractors, the relevant qualifications of the proposed Specialized Subcontractors will be added to the qualifications of the Bidder for the purpose of evaluation.
ITB 34.3	Contractor's proposed subcontracting: Maximum percentage of subcontracting permitted is: ***10%***. Bidders planning to subcontract more than 10% of total volume of work shall specify, in the Letter of Bid, the activity (ies) or parts of the Works to be subcontracted along with complete details of the subcontractors and their qualification and experience.
F. Award of Contract	
ITB 47.1	The successful Bidder **Shall** submit the Beneficial Ownership Disclosure Form.

ITB 49	The Adjudicator proposed by the Employer is**:** Mr. Evans Ochieng. The hourly fee for this proposed Adjudicator shall be: **KES. 25,000 per hour** The biographical data of the proposed Adjudicator is as follows: *Name***:** Evans Ochieng *Education*: • Masters of Law(LLM)-Strathmore University, • Postgraduate Diploma of law –Kenya School of Law and • Bachelor of Laws (LLB)- Kenyatta University *Professional Experience*: • Jul 2021- Present: Senior Associate- Sheikh & Company (4.6 years), • Feb 2018- Jul 2021: Associate Advocate – Rachier & Amollo Advocates (3.5 years), • Jun 2015 – Jan 2016: Legal Assistant J.M. Njenga & Advocates.
ITB 50.1	The procedures for making a Procurement-related Complaint are detailed in the "Procurement Regulations for IPF Borrowers (Annex III)." If a Bidder wishes to make a Procurement-related Complaint, the Bidder shall submit its complaint following these procedures, In Writing (by the quickest means available, such as by email or fax), to: **For the attention**: Philip Koitelel **Title/position**: County Project Coordinator **Employer**: Department of Agriculture and Fisheries- Kajiado County Government **Email address***: navcdpkajiado@gmail.com* In summary, a Procurement-related Complaint may challenge any of the following: **1.** the terms of the Bidding Documents; and **2.** the Employer's decision to award the contract.

Section III - Evaluation and Qualification Criteria

Wherever a Bidder is required to state a monetary amount, Bidders should indicate the USD equivalent using the rate of exchange determined as follows:

- for construction turnover or financial data required for each year - Exchange rate prevailing on the last day of the respective calendar year (in which the amounts for that year is to be converted) was originally established; or
- value of single contract - Exchange rate prevailing on the date of the contract.

Exchange rates shall be taken from the publicly available source identified in the ITB 32.1. Any error in determining the exchange rates in the Bid may be corrected by the Employer

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1. Margin of Preference (NOT APPLICABLE)

If BDS so specifies, the Employer will grant a margin of preference of 7.5% (seven and one-half percent) to domestic contractors, in accordance with, and subject to, the following provisions:

(a) Contractors applying for such preference shall be asked to provide, as part of the data for qualification, such information, including details of ownership, as shall be required to determine whether, according to the classification established by the Borrower and accepted by the Bank, a particular contractor or group of contractors qualifies for a domestic preference. The bidding document shall clearly indicate the preference and the method that will be followed in the evaluation and comparison of Bids to give effect to such preference.

(b) After Bids have been received and reviewed by the Employer, responsive Bids shall be classified into the following groups:

  (i) Group A: Bids offered by domestic contractors eligible for the preference.

  (ii) Group B: Bids offered by other contractors.

All evaluated Bids in each group shall, as a first evaluation step, be compared to determine the Bid with lowest evaluated cost, and the Bid with the lowest evaluated cost in each group shall be further compared with each other. If a result of this comparison, a Bid from Group A is the lowest, it shall be selected for the award as the Most Advantageous Bid, if the Bidder is qualified. If a Bid from Group B is the lowest, as a second evaluation step, all Bids from Group B shall then be further compared with the lowest evaluated cost from Group A. For the purpose of this further comparison only, an amount equal to 7.5% (seven and one-half percent) of the respective Bid price corrected for arithmetical errors, including unconditional discounts but excluding provisional sums and the cost of dayworks, if any, shall be added to the evaluated cost offered in each Bid from Group B. If the Bid from Group A is the lowest, it shall be selected for award. If not, the lowest evaluated cost from Group B based on the first evaluation step shall be selected.

The Employer shall use the criteria and methodologies listed in this Section to evaluate Bids. By applying these criteria and methodologies, the Employer shall determine the Most Advantageous Bid. This is the Bid that has been determined to be:

(a) substantially responsive to the bidding document, and

(b) the lowest evaluated cost.

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2. Evaluation

In addition to the criteria listed in ITB 35.2 (a) – (e) the following criteria shall apply:

2.1 Adequacy of Technical Proposal

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity to mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and fully in accordance with the requirements stipulated in Section VII, Works' Requirements.

2.2 Multiple Contracts (NOT APPLICABLE)

Pursuant to ITB 35.4 of the Instructions to Bidders, if Works are grouped in multiple contracts, evaluation will be as follows:

(a) Award Criteria for Multiple Contracts [ITB 35.4]:

Lots

Bidders have the option to Bid for any one or more lots. Bids will be evaluated lot-wise, taking into account discounts offered, if any, after considering all possible combination of lots. The contract(s) will be awarded to the Bidder or Bidders offering the lowest evaluated cost to the Employer for combined lots, subject to the selected Bidder(s) meeting the required qualification criteria for lot or combination of lots as the case may be.

Packages

Bidders have the option to Bid for any one or more packages and for any one or more lots within a package. Bids will be evaluated package-wise, taking into account discounts offered, if any, for combined packages and/or lots within a package. The contract(s) will be awarded to the Bidder or Bidders offering the lowest evaluated cost to the Employer for combined packages, subject to the selected Bidder(s) meeting the required qualification criteria for combination of packages and or lots as the case may be.

(b) Qualification Criteria for Multiple Contracts:

Section III describes criteria for qualification for each lot (contract) for multiple lots (contracts). The criteria for qualification is aggregate minimum requirement for respective lots as specified under items 3.1, 3.2, 4.2(a) and 4.2(b). However, with respect to the specific experience under item 4.2 (a) of Section III, the Employer will select any one or more of the options as identified below:

N is the minimum number of contracts

V is the minimum value of a single contract

(a) For one Contract:

Option 1:

(i) N contracts, each of minimum value V;

Or

Option 2:

(i) N contracts, each of minimum value V; or

(ii) Less than or equal to N contracts, each of minimum value V, but with total value of all contracts equal or more than N x V.

(b) For multiple Contracts

Option 1:

(i) Minimum requirements for combined contract(s) shall be the aggregate requirements for each contract for which the Bidder has submitted Bids as follows, and N1, N2, N3, etc. shall be different contracts:

Lot 1: N1 contracts, each of minimum value V1;

Lot 2: N2 contracts, each of minimum value V2;

Lot 3: N3 contracts, each of minimum value V3;

----etc.

or

Option 2:

(i) Minimum requirements for combined contract(s) shall be the aggregate requirements for each contract for which the Bidder has submitted Bids as follows, and N1, N2, N3, etc. shall be different contracts:

Lot 1: N1 contracts, each of minimum value V1;

Lot 2: N2 contracts, each of minimum value V2;

Lot 3: N3 contracts, each of minimum value V3;

----etc., **or**

(ii) Lot 1: N1 contracts, each of minimum value V1; or number of contracts less than or equal to N1, each of minimum value V1, but with total value of all contracts equal or more than N1 x V1.

Lot 2: N2 contracts, each of minimum value V2; or number of contracts less than or equal to N2, each of minimum value V2, but with total value of all contracts equal or more than N2 x V2.

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Lot 3: N3 contracts, each of minimum value V3; or number of contracts less than or equal to N3, each of minimum value V3, but with total value of all contracts equal or more than N3 x V3.

----etc.

Or

Option 3:

(i) Minimum requirements for combined contract(s) shall be the aggregate requirements for each contract for which the Bidder has bid for as follows, and N1, N2, N3, etc. shall be different contracts:

Lot 1: N1 contracts, each of minimum value V1;

Lot 2: N2 contracts, each of minimum value V2;

Lot 3: N3 contracts, each of minimum value V3;

----etc., **or**

(ii) Lot 1: N1 contracts, each of minimum value V1; or number of contracts less than or equal to N1, each of minimum value V1, but with total value of all contracts equal or more than N1 x V1.

Lot 2: N2 contracts, each of minimum value V2; or number of contracts less than or equal to N2, each of minimum value V2, but with total value of all contracts equal or more than N2 x V2.

Lot 3: N3 contracts, each of minimum value V3; or number of contracts less than or equal to N3, each of minimum value V3, but with total value of all contracts equal or more than N3 x V3.

----etc., or

(iii) Subject to compliance as per (ii) above with respect to minimum value of single contract for each lot, total number of contracts is equal or less than N1 + N2 + N3 +--but the total value of all such contracts is equal or more than N1 x V1 + N2 x V2 + N3 x V3 +---.

2.3 Alternative Completion Times <u>(NOT APPLICABLE)</u>

An alternative Completion Time, if permitted under ITB 13.2, will be evaluated as follows:

……
……
……

2.4 Sustainable procurement (NOT APPLICABLE)

……
……
……

2.5 Alternative Technical Solutions for specified parts of Works (NOT APPLICABLE)

The acceptability of alternative technical solutions of parts of the Works, if permitted under ITB 13.4, will be determined as follows:

……
……
……

2.6 Specialized Subcontractors (NOT APPLICABLE)

If permitted under ITB 34, only the specific experience of Subcontractors for specialized works permitted by the Employer will be considered. The general experience and financial resources of the Specialized Subcontractors shall not be added to those of the Bidder for purposes of qualification of the Bidder.

……
……

3. Qualification

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
1. Eligibility							
1.1	**Nationality**	Nationality in accordance with ITB 4.4	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
1.2	**Conflict of Interest**	No conflicts of interest in accordance with ITB 4.2	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.3	**Bank Eligibility**	Not having been declared ineligible by the Bank, as described in ITB 4.5.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
1.4	**State-owned enterprise or institution of the Borrower country**	Meets conditions of ITB 4.6	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments
1.5	**United Nations resolution or Borrower's country law**	Not having been excluded as a result of prohibition in the Borrower's country laws or official regulations against commercial relations with the Bidder's country, or by an act of compliance with UN Security Council resolution, both in accordance with ITB 4.8 and Section V.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Forms ELI – 1.1 and 1.2, with attachments

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
2. Historical Contract Non-Performance							
2.1	**History of Non-Performing Contracts**	Non-performance of a contract[1] did not occur as a result of contractor default since **1st January 2020.**	Must meet requirement[1] & 2	Must meet requirements	Must meet requirement[2]	N/A	Form CON-2
2.2	**Suspension Based on Execution of Bid /Proposal Securing Declaration by the Employer**	Not under suspension based on execution of a Bid/Proposal Securing Declaration pursuant to ITB 4.7 and ITB 19.9.	Must meet requirement	Must meet requirement	Must meet requirement	N/A	Letter of Bid
2.3	**Pending Litigation**	Bidder's financial position and prospective long term profitability sound according to criteria established in 3.1 below and assuming that all pending litigation will be resolved against the Bidder	Must meet requirement	N/A	Must meet requirement	N/A	Form CON – 2
2.4	**Litigation**	No consistent history of court/arbitral award decisions	Must meet	Must meet	Must meet	N/A	Form CON – 2

[1] Nonperformance, as decided by the Employer, shall include all contracts where (a) nonperformance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Nonperformance shall not include contracts where Employers decision was overruled by the dispute resolution mechanism. Nonperformance must be based on all information on fully settled disputes or litigation, i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.

[2] This requirement also applies to contracts executed by the Bidder as JV member.

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
	History	against the Bidder[3] since **1st January 2020**	requirement	requirement	requirement		
2.5	**Declaration: Environmental and Social (ES) past performance**	Declare any civil work contracts that have been suspended or terminated and/or performance security called by an employer for breach of environmental or social (including Sexual Exploitation and Abuse) contractual obligations in the **past five (5) years**.[4]	Must make the declaration. Where there are Specialized Sub-contractor/s, the Specialized Sub-contractor/s must also make the declaration.	N/A	Each must make the declaration. Where there are Specialized Sub-contractor/s, the Specialized Sub-contractor/s must also make the declaration.	N/A	Form CON-3 ES Performance Declaration
2.6	**Bank's SEA and/or SH Disqualification**	At the time of Contract Award, not subject to disqualification by the Bank for non-compliance with SEA/ SH obligations	Must meet requirement (including each subcontractor proposed by the Bidder)	N/A	Must meet requirement (including each subcontractor proposed by the Bidder)	N/A	Letter of Bid, Form CON-4

[3] The Bidder shall provide accurate information on the Letter of Bid about any litigation or arbitration resulting from contracts completed or ongoing under its execution over the last five years. A consistent history of court/arbitral awards against the Bidder or any member of a joint venture may result in disqualifying the Bidder.

[4] The Employer may use this information to seek further information or clarifications in carrying out its due diligence.

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
		If the Bidder had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations, the Bidder shall either (i) provide evidence of an arbitral award on the disqualification made in its favour; or (ii) demonstrate that it has adequate capacity and commitment to comply with SEA/SH prevention and response obligations; or (iii) provide evidence that it has already demonstrated such capacity and commitment on another Bank financed works contract.	Must meet requirement (including each subcontractor proposed by the Bidder)	N/A	Must meet requirement (including each subcontractor proposed by the Bidder)	N/A	Letter of Bid, Form CON-4
3. Financial Situation and Performance							
3.1	**Financial Capabilities**	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet	Must meet requirement	Must meet Requirement	N/A	N/A	Form FIN – 3.1, with attachments

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
		the construction cash flow requirements estimated as **KES. 24,944,030 million** for the subject contract(s) net of the Bidder's other commitments					
		(ii) The Bidders shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.	Must meet requirement	Must meet requirement	N/A	N/A	
		(iii) The audited balance sheets or, if not required by the laws of the Bidder's country, other financial statements acceptable to the Employer, for the **last three (3) years** shall be submitted and must demonstrate the current soundness of the Bidder's financial position and indicate its prospective long-term profitability.	Must meet requirement	N/A	Must meet requirement	N/A	

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
3.2	**Average Annual Construction Turnover**	Minimum average annual construction turnover of **KES. 187,080,225 million** calculated as total certified payments received for contracts in progress and/or completed within the last **(three) 3 years**, divided by **(three) 3 years**	Must meet requirement	Must meet requirement	Must meet _*25*_____%, _____of the requirement	Must meet ____*60*_____%, _____of the requirement	Form FIN – 3.2
4. Experience							
4.1 (a)	**General Construction Experience**	Experience under construction contracts in the role of prime contractor, JV member, subcontractor, or management contractor for at least the last **five (5) years**, starting **1st January 2020.**	Must meet requirement	N/A	Must meet requirement	N/A	Form EXP – 4.1
4.2 (a)	**Specific Construction & Contract Management**	(i) A minimum number of **two (2)** similar contracts specified below that have been satisfactorily and	Must meet requirement	Must meet requirement[7]	N/A	N/A	Form EXP 4.2(a)

[7] In the case of JV, the value of contracts completed by its members shall not be aggregated to determine whether the requirement of the minimum value of a single contract has been met. Instead, each contract performed by each member shall satisfy the minimum value of a single contract as required for single entity. In determining whether the JV meets the requirement of total number of contracts, only the number of contracts completed by all members each of value equal or more than the minimum value required shall be aggregated.

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
	Experience	substantially[5] completed as a prime contractor, joint venture member[6], management contractor or sub-contractor[6] between **1st January 2020** and bid submission deadline: (i) **Two (2)** contracts, each of minimum value V; **KES ,59,865,672 million** Or (ii) contract, each of minimum value V; **KES. 119,731,344 million** The similarity of the contracts shall be based on the following: **(a) Intake works** **(b) Main Canal** **(c) Secondary Canals** **(d) Division Boxes** **(e) Ring Culverts**					

[5] Substantial completion shall be based on 80% or more works completed under the contract.
[6] For contracts under which the Bidder participated as a joint venture member or sub-contractor, only the Bidder's share, by value, shall be considered to meet this requirement.

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
		(f) Cattle troughs **(g) Toilet blocks**					
4.2 (b)		For the above and any other contracts [substantially completed and under implementation] as prime contractor, joint venture member, or sub-contractor between **1st January 2020** and Application submission deadline, a minimum construction experience in the following key activities successfully completed[8]: **(a) Intake works** **(b) Main Canal** **(c) Secondary Canals** **(d) Division Boxes** **(e) Ring Culverts** **(f) Cattle troughs** **(g) Toilet blocks**	Must meet requirements	Must meet requirements	N/A	*N/A*	Form EXP – 4.2 (b)

[8] Volume, number or rate of production of any key activity can be demonstrated in one or more contracts combined if executed during same time period.

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
4.2 (c)		For contracts [substantially completed and under implementation] as prime contractor, joint venture member, or Subcontractor between **1st January 2020** and Application submission deadline, experience in managing ES risks and impacts in the following aspects: **(a) Code of Conduct for Contractor's Personnel (ES)** **(b) -Sexual Exploitation, and Abuse (SEA) prevention and response action plan];** **(c) Stakeholder Engagement Plan (SEP) and Information Disclosure**	Must meet requirements	Must meet requirements	Must meet the following requirements: [*list key requirements to be met by each member otherwise state: "N/A"]*	Must meet the following requirements: *[list key requirements to be met by one member otherwise state: "N/A"]*	Form EXP – 4.2 (c)

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
		(d) Occupational Health and Safety (OHS)Management Plan **(e) Community Health and Safety Plan** **(f) Labor Management Plan** **(g) Traffic Management Plan** **(h) Security management plan** **(i) Gender based violence and sexual exploitation and abuse (GBV/SEA) prevention and response action plan** **(j) Grievance Redress Mechanism (GRM).** **(k) Child Protection Strategy (CPS).** **(l) Waste Management Plan (WMP)**					

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture (existing or intended)			Submission Requirements
				All members Combined	Each Member	At least one Member	
		(m) Site Specific Security Management Plan (SMP) **(n) Labor Influx Management Plans (LIMP)** (o) **Quality Assurance Systems**					

4. Key Personnel

The Bidder must demonstrate that it will have suitably qualified (and in adequate numbers) Key Personnel, as described in the Specification.

The Bidder shall provide details of the Key Personnel and such other Key Personnel that the Bidder considers appropriate to perform the Contract, together with their academic qualifications and work experience. The Bidder shall complete the relevant Forms in Section IV, Bidding Forms.

5. Equipment

The Bidder must demonstrate that it will have access to the key Contractor's equipment listed hereafter:

No.	Equipment Type and Characteristics	Minimum Number required
1.	Tipper Truck of 7 tonne capacity	1
2.	Pick-up of at least 1 tonne capacity	1
3.	Compressor of normal delivery rating of 6.0 – 7.5 m^3/min, complete with attachments	2
4.	Hydraulic dual purpose backhoe excavator/loader of minimum bucket capacity of 1.0 m^3	1
5.	Concrete Mixers – 0.5-1.0 m^3 capacity	2
6.	Concrete Poker Vibrator 25mm dia.	2
7.	Generator 15kVA capacity	1
8.	Total Survey Station	1
9.	Dumpers of 14 tonne capacity	1
10.	Dewatering Pump	2
11.	Plate Compactor of 1 tonne capacity	1

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Section IV - Bidding Forms

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Letter of Bid

INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE DOCUMENT

The Bidder must prepare this Letter of Bid on stationery with its letterhead clearly showing the Bidder's complete name and business address.

Note: All italicized text is to help Bidders in preparing this form.

Date of this Bid submission: [*insert date (as day, month and year) of Bid submission*]
RFB No.: [*insert number of RFB process*]
Alternative No.: [*insert identification No. if this is a Bid for an alternative*]

To: **[*insert complete name of Employer*]**

(a) **No reservations:** We have examined and have no reservations to the bidding document, including Addenda issued in accordance with ITB 8;

(b) **Eligibility**: We meet the eligibility requirements and have no conflict of interest in accordance with ITB 4;

(c) **Bid-Securing Declaration:** We have not been suspended nor declared ineligible by the Employer based on execution of a Bid-Securing Declaration or Proposal-Securing Declaration in the Employer's Country in accordance with ITB 4.7;

(d) **Exploitation and Abuse (SEA) and/or Sexual Harassment (SH):** [*select the appropriate option from (i) to (v) below and delete the others*].

We *[where JV, insert:* "including any of our JV members"*]*, and any of our subcontractors:

i. [have not been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations.]

ii. [are subject to disqualification by the Bank for non-compliance with SEA/ SH obligations.]

iii. [had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations. An arbitral award on the disqualification case has been made in our favor.]

iv. [had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations for a period of two years. We have subsequently provided and

demonstrated that we have adequate capacity and commitment to comply with SEA and SH prevention and response obligations.]

v. [had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations for a period of two years. We have attached documents demonstrating that we have adequate capacity and commitment to comply with SEA and SH prevention and response obligations.]

(e) **Conformity:** We offer to execute in conformity with the bidding document the following Works: **[***insert a brief description of the Works]*

(f) **Bid Price**: The total price of our Bid, excluding any discounts offered in item (f) below is: *[Insert one of the options below as appropriate]*

[Option 1, in case of one lot:] Total price is: [*insert the total price of the Bid in words and figures, indicating the various amounts and the respective currencies*];

Or

[Option 2, in case of multiple lots:] (a) Total price of each lot [*insert the total price of each lot in words and figures, indicating the various amounts and the respective currencies*]; and (b) Total price of all lots (sum of all lots) [*insert the total price of all lots in words and figures, indicating the various amounts and the respective currencies*];

(g) **Discounts:** The discounts offered and the methodology for their application are:

(i) The discounts offered are: [*Specify in detail each discount offered.*]

(ii) The exact method of calculations to determine the net price after application of discounts is shown below: [*Specify in detail the method that shall be used to apply the discounts*];

(h) **Bid Validity:** Our Bid shall be valid until *[insert day, month and year in accordance with ITB 18.1]*, and it shall remain binding upon us and may be accepted at any time on or before this date;

(i) **Performance Security:** If our Bid is accepted, we commit to obtain a performance security [*and an Environmental and Social (ES) Performance Security, **Delete if not applicable***] in accordance with the bidding document;

(j) **One Bid Per Bidder:** We are not submitting any other Bid(s) as an individual Bidder or as a subcontractor, and we are not participating in any other Bid(s) as a Joint Venture member, and meet the requirements of ITB 4.3, other than alternative Bids submitted in accordance with ITB 13;

(k) **Suspension and Debarment**: We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the World Bank Group or a debarment imposed by the World

Bank Group in accordance with the Agreement for Mutual Enforcement of Debarment Decisions between the World Bank and other development banks. Further, we are not ineligible under the Employer's Country laws or official regulations or pursuant to a decision of the United Nations Security Council;

(l) **State-owned enterprise or institution:** [*select the appropriate option and delete the other*] [*We are not a state-owned enterprise or institution*] / [*We are a state-owned enterprise or institution but meet the requirements of ITB 4.6*];

(m) **Commissions, gratuities and fees:** We have paid, or will pay the following commissions, gratuities, or fees with respect to the Bidding process or execution of the Contract: [*insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity*]

Name of Recipient	Address	Reason	Amount

(If none has been paid or is to be paid, indicate "none.")

(n) **Binding Contract**: We understand that this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;

(o) **Not Bound to Accept:** We understand that you are not bound to accept the lowest evaluated cost Bid, the Most Advantageous Bid or any other Bid that you may receive;

(p) **Fraud and Corruption:** We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf engages in any type of Fraud and Corruption; and

(q) **Adjudicator:** We accept the appointment of *[insert name proposed in Bid Data Sheet]* as the Adjudicator.

[or]

We do not accept the appointment of *[insert name proposed in Bid Data Sheet]* as the Adjudicator, and propose instead that *[insert name]* be appointed as Adjudicator, whose daily fees and biographical data are attached.

Name of the Bidder: *[*insert complete name of the Bidder*]

Name of the person duly authorized to sign the Bid on behalf of the Bidder: **[*insert complete name of person duly authorized to sign the Bid*]

Title of the person signing the Bid: [*insert complete title of the person signing the Bid*]

Signature of the person named above: [*insert signature of person whose name and capacity are shown above*]

Date signed [*insert date of signing*] **day of** [*insert month*], [*insert year*]

*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder
**: Person signing the Bid shall have the power of attorney given by the Bidder to be attached with the Bid

Schedules

Bill of Quantities

SUMMARY SHEET

NOTE: Complete bill of quantities are in Volume 2 of 4: Detailed Bill of Quantities

A. PREAMBLE

1. The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, General and Particular Conditions, Technical Specifications, and Drawings.

2. The quantities given in the Bill of Quantities are estimated and provisional and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices bid in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.

3. The rates and prices bid in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Constructional Plant, labour, supervision, materials, erection, maintenance, insurance, profit, taxes, implementation of ESMP and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.

4. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of Items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.

5. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

6. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities.

7. Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer In accordance with clause 23

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of the general conditions except with respect to adjudicator fees and expenses for which no instruction will be required from the Engineer.

8. The method of measurement of completed work for payment shall be Admeasurement in accordance with ICE Conditions of Contract measurement clauses.

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2. Schedule of Payment Currencies

For _____ *[insert name of Section of the Works]*

Separate tables may be required if the various sections of the Works (or of the Bill of Quantities) will have substantially different foreign and local currency requirements. The Employer should insert the names of each section of the Works.

	A	**B**	**C**	**D**
Name of Payment Currency	**Amount of Currency**	**Rate of Exchange to Local Currency**	**Local Currency Equivalent C = A x B**	**Percentage of Total Bid Price (TBP) 100xC / TBP**
Local currency _____		**1.00**		
Foreign Currency #1 _____				
Foreign Currency #2 _____				
Foreign Currency #3 _____				
Total Bid Price				**100.00**

Provisional Sums Expressed in Local Currency		**1.00**		
TOTAL BID PRICE (Including provisional sum)				

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Forms of Bid Security

Form of Bid Security - Bank Guarantee

[Guarantor letterhead or SWIFT identifier code]

Beneficiary:

[Insert name and address of the Employer*]*

Request for Bids No: *_[Insert reference number for the Request for Bids]*

Date: [*Insert date of issue]*

BID GUARANTEE No.: *[Insert guarantee reference number]*

Guarantor: *_[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *[insert name of the Bidder, which in the case of a joint venture shall be the name of the joint venture (whether legally constituted or prospective) or the names of all members thereof]* (hereinafter called "the Applicant") has submitted or will submit to the Beneficiary its Bid (hereinafter called "the Bid") for the execution of *[insert description of contract]* under Request for Bids No. [*insert number*] ("the RFB").

Furthermore, we understand that, according to the Beneficiary's conditions, Bids must be supported by a Bid guarantee.

At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in letters]* (*insert amount in numbers*) upon receipt by us of the Beneficiary's complying supported by the Beneficiary's statement, whether in the demand itself or a separate signed document accompanying or identifying the demand, stating either that the Applicant:

(a) has withdrawn its Bid prior to the Bid validity expiry date specified by the Applicant in the Letter of Bid, or any extended date provided by the Applicant; or

(b) having been notified of the acceptance of its Bid by the Beneficiary prior to the expiry date of the Bid validity or any extension thereto provided by the Applicant, (i) fails to execute the contract agreement or (ii) fails to furnish the performance security and, if required, the Environmental and Social (ES) Performance Security, in accordance with the Instructions to Bidders ("ITB") of the Beneficiary's bidding document.

This guarantee will expire: (a) if the Applicant is the successful Bidder, upon our receipt of copies of the contract agreement signed by the Applicant and the performance security and, if required, the Environmental and Social (ES) Performance Security, issued to the Beneficiary

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in relation to such contract agreement; and (b) if the Applicant is not the successful Bidder, upon the earlier of (i) our receipt of a copy of the Beneficiary's notification to the Applicant of the results of the Bidding process; or (ii) twenty-eight days after the expiry date of the Bid validity.

Consequently, any demand for payment under this guarantee must be received by us at the office indicated above on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758.

_____

[signature(s)]

Technical Proposal

Technical Proposal Forms

- **Key Personnel Schedule**
- **Equipment**
- **Site Organization**
- **Method Statement**
- **Mobilization Schedule**
- **Construction Schedule**
- **ES Management Strategies and Implementation Plans**
- **Code of Conduct (ES)**
- **Others**

FORM PER -1

Key Personnel Schedule

Bidders should provide the names and details of the suitably qualified Key Personnel to perform the Contract. The data on their experience should be supplied using the Form PER-2 below for each candidate.

Key Personnel

1.	**Title of position:**	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
2.	**Title of position:** *[Environmental Specialist]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
3.	**Title of position:** *[Health and Safety Specialist]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]

	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
4.	**Title of position:** *[Social Specialist]*	
	Name of candidate:	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
5.	**Title of position: Sexual Exploitation, Abuse and Harassment Expert** *[Where a Project SEA risks are assessed to be substantial or high, Key Personnel shall include an expert with relevant experience in addressing sexual exploitation, sexual abuse and sexual harassment cases]*	
	Name of candidate	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]
	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]
6.	**Title of position:** *[insert title]*	
	Name of candidate	
	Duration of appointment:	[*insert the whole period (start and end dates) for which this position will be engaged*]
	Time commitment: for this position:	[*insert the number of days/week/months/ that has been scheduled for this position*]

	Expected time schedule for this position:	[*insert the expected time schedule for this position (e.g. attach high level Gantt chart*]

Form PER-2:

Resume and Declaration

Key Personnel

Name of Bidder

Position [*#1*]: [*title of position from Form PER-1*]		
Personnel information	**Name:**	**Date of birth:**
	Address:	**E-mail:**
	Professional qualifications:	
	Academic qualifications:	
	Language proficiency: *[language and levels of speaking, reading and writing skills]*	
details		
	Address of employer:	
	Telephone:	**Contact (manager / personnel officer):**
	Fax:	
	Job title:	**Years with present employer:**

Summarize professional experience in reverse chronological order. Indicate particular technical and managerial experience relevant to the project.

Project	**Role**	**Duration of involvement**	**Relevant experience**

[main project details]	*[role and responsibilities on the project]*	*[time in role]*	*[describe the experience relevant to this position]*

Declaration

I, the undersigned Key Personnel, certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

I confirm that I am available as certified in the following table and throughout the expected time schedule for this position as provided in the Bid:

Commitment	**Details**
Commitment to duration of contract:	*[insert period (start and end dates) for which this Key Personnel is available to work on this contract]*
Time commitment:	*[insert the number of days/week/months/ that this Key Personnel will be engaged]*

I understand that any misrepresentation or omission in this Form may:

(a) be taken into consideration during Bid evaluation;

(b) my disqualification from participating in the Bid;

(c) my dismissal from the contract.

Name of Key Personnel: [*insert name*]

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Bidder:

Signature: _____

Date: (day month year): _____

Equipment

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section III (Evaluation and Qualification Criteria). A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder. The Bidder shall provide all the information requested below, to the extent possible. Fields with asterisk (*) shall be used for evaluation.

<table>
<tr><td colspan="3">Type of Equipment*</td></tr>
<tr><td rowspan="2">Equipment Information</td><td>Name of manufacturer,</td><td>Model and power rating</td></tr>
<tr><td>Capacity*</td><td>Year of manufacture*</td></tr>
<tr><td rowspan="2">Current Status</td><td colspan="2">Current location</td></tr>
<tr><td colspan="2">Details of current commitments</td></tr>
<tr><td>Source</td><td colspan="2">Indicate source of the equipment
・Owned ・Rented ・Leased ・Specially manufactured</td></tr>
</table>

The following information shall be provided only for equipment not owned by the Bidder.

Owner	**Name of owner**	
	Address of owner	
	Telephone	**Contact name and title**
	Fax	**Telex**
Agreements	**Details of rental / lease / manufacture agreements specific to the project**	

Site Organization

[insert Site Organization information]

Method Statement

[insert Method Statement]

Mobilization Schedule

[insert Mobilization Schedule]

Construction Schedule

[insert Construction Schedule]

ES Management Strategies and Implementation Plans

(ES-MSIP)

The Bidder shall submit comprehensive and concise Environmental and Social Management Strategies and Implementation Plans (ES-MSIP) as required by ITB 11.1 (i) of the Bid Data Sheet. These strategies and plans shall describe in detail the actions, materials, equipment, management processes etc. that will be implemented by the Contractor, and its subcontractors.

In developing these strategies and plans, the Bidder shall have regard to the ES provisions of the contract including those as may be more fully described in the Works Requirements in Section VII.

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Code of Conduct for Contractor's Personnel (ES) Form

***Note to the Employer**:*

***The following minimum requirements shall not be modified**. The Employer may add additional requirements to address identified issues, informed by relevant environmental and social assessment.*

The types of issues identified could include risks associated with: labor influx, spread of communicable diseases, and Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH) etc.

Delete this Box prior to issuance of the bidding documents.

Note to the Bidder:

The minimum content of the Code of Conduct form as set out by the Employer shall not be substantially modified. However, the Bidder may add requirements as appropriate, including to take into account Contract-specific issues/risks.

The Bidder shall initial and submit the Code of Conduct form as part of its bid.

CODE OF CONDUCT FOR CONTRACTOR'S PERSONNEL

We are the Contractor, [*enter name of Contractor*]. We have signed a contract with [*enter name of Employer*] for [*enter description of the Works*]. These Works will be carried out at [*enter the Site and other locations where the Works will be carried out*]. Our contract requires us to implement measures to address environmental and social risks related to the Works, including the risks of sexual exploitation, sexual abuse and sexual harassment.

This Code of Conduct is part of our measures to deal with environmental and social risks related to the Works. It applies to all our staff, laborers and other employees at the Works Site or other places where the Works are being carried out. It also applies to the personnel of each subcontractor and any other personnel assisting us in the execution of the Works. All such persons are referred to as "**Contractor's Personnel"** and are subject to this Code of Conduct.

This Code of Conduct identifies the behavior that we require from all Contractor's Personnel.

Our workplace is an environment where unsafe, offensive, abusive or violent behavior will not be tolerated and where all persons should feel comfortable raising issues or concerns without fear of retaliation.

REQUIRED CONDUCT

Contractor's Personnel shall:

1. carry out his/her duties competently and diligently;

2. comply with this Code of Conduct and all applicable laws, regulations and other requirements, including requirements to protect the health, safety and well-being of other Contractor's Personnel and any other person;
3. maintain a safe working environment including by:
    a. ensuring that workplaces, machinery, equipment and processes under each person's control are safe and without risk to health;
    b. wearing required personal protective equipment;
    c. using appropriate measures relating to chemical, physical and biological substances and agents; and
    d. following applicable emergency operating procedures.
4. report work situations that he/she believes are not safe or healthy and remove himself/herself from a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health;
5. treat other people with respect, and not discriminate against specific groups such as women, people with disabilities, migrant workers or children;
6. not engage in Sexual Harassment, which means unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature with other Contractor's or Employer's Personnel;
7. not engage in Sexual Exploitation, which means any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another;
8. not engage in Sexual Abuse, which means the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions;
9. not engage in any form of sexual activity with individuals under the age of 18, except in case of pre-existing marriage;
10. complete relevant training courses that will be provided related to the environmental and social aspects of the Contract, including on health and safety matters, and Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH);
11. report violations of this Code of Conduct; and
12. not retaliate against any person who reports violations of this Code of Conduct, whether to us or the Employer, or who makes use of the grievance mechanism for Contractor's Personnel or the project's Grievance Redress Mechanism.

RAISING CONCERNS

If any person observes behavior that he/she believes may represent a violation of this Code of Conduct, or that otherwise concerns him/her, he/she should raise the issue promptly. This can be done in either of the following ways:

1. Contact [*enter name of the Contractor's Social Expert with relevant experience in handling gender-based violence, or if such person is not required under the Contract,*

another individual designated by the Contractor to handle these matters] in writing at this address [ ] or by telephone at [ ] or in person at [ ]; or

2. Call [ ] to reach the Contractor's hotline *(if any)* and leave a message.

The person's identity will be kept confidential, unless reporting of allegations is mandated by the country law. Anonymous complaints or allegations may also be submitted and will be given all due and appropriate consideration. We take seriously all reports of possible misconduct and will investigate and take appropriate action. We will provide warm referrals to service providers that may help support the person who experienced the alleged incident, as appropriate.

There will be no retaliation against any person who raises a concern in good faith about any behavior prohibited by this Code of Conduct. Such retaliation would be a violation of this Code of Conduct.

CONSEQUENCES OF VIOLATING THE CODE OF CONDUCT

Any violation of this Code of Conduct by Contractor's Personnel may result in serious consequences, up to and including termination and possible referral to legal authorities.

FOR CONTRACTOR'S PERSONNEL:

I have received a copy of this Code of Conduct written in a language that I comprehend. I understand that if I have any questions about this Code of Conduct, I can contact [*enter name of Contractor's contact person with relevant experience*] requesting an explanation.

Name of Contractor's Personnel: [insert name]

Signature: _____

Date: (day month year): _____

Countersignature of authorized representative of the Contractor:

Signature: _____

Date: (day month year): _____

ATTACHMENT 1: Behaviors constituting Sexual Exploitation and Abuse (SEA) and behaviors constituting Sexual Harassment (SH)

ATTACHMENT 1 TO THE CODE OF CONDUCT FORM

BEHAVIORS CONSTITUTING SEXUAL EXPLOITATION AND ABUSE (SEA) AND BEHAVIORS CONSTITUTING SEXUAL HARASSMENT (SH)

The following non-exhaustive list is intended to illustrate types of prohibited behaviors:

(1) **Examples of sexual exploitation and abuse** include, but are not limited to:

- A Contractor's Personnel tells a member of the community that he/she can get them jobs related to the work site (e.g. cooking and cleaning) in exchange for sex.
- A Contractor's Personnel that is connecting electricity input to households says that he can connect women headed households to the grid in exchange for sex.
- A Contractor's Personnel rapes, or otherwise sexually assaults a member of the community.
- A Contractor's Personnel denies a person access to the Site unless he/she performs a sexual favor.
- A Contractor's Personnel tells a person applying for employment under the Contract that he/she will only hire him/her if he/she has sex with him/her.

(2) **Examples of sexual harassment in a work context**

- Contractor's Personnel comment on the appearance of another Contractor's Personnel (either positive or negative) and sexual desirability.
- When a Contractor's Personnel complains about comments made by another Contractor's Personnel on his/her appearance, the other Contractor's Personnel comment that he/she is "asking for it" because of how he/she dresses.
- Unwelcome touching of a Contractor's or Employer's Personnel by another Contractor's Personnel.
- A Contractor's Personnel tells another Contractor's Personnel that he/she will get him/her a salary raise, or promotion if he/she sends him/her naked photographs of himself/herself.

Others

Bidder's Qualification

To establish its qualifications to perform the contract in accordance with Section III (Evaluation and Qualification Criteria) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder

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Form ELI -1.1: Bidder Information Form

Date: _____
RFB No. and title: _____
Page _____of _____pages

Bidder's name
In case of Joint Venture (JV), name of each member:
Bidder's actual or intended country of registration: *[indicate country of Constitution]*
Bidder's actual or intended year of incorporation:
Bidder's legal address [in country of registration]:
Bidder's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of ・ Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above, in accordance with ITB 4.4. ・ In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 4.1. ・ In case of state-owned enterprise or institution, in accordance with ITB 4.6 documents establishing: • Legal and financial autonomy • Operation under commercial law • Establishing that the Bidder is not under the supervision of the Employer

2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership. *[If required under BDS ITB 47.1, the successful Bidder shall provide additional information on beneficial ownership, using the Beneficial Ownership Disclosure Form.]*

Form ELI -1.2: Information Form for JV Bidders

(to be completed for each member of Joint Venture)

Date: _____
RFB No. and title: _____
Page _____ of _____ pages

Bidder's Joint Venture name:
JV member's name:
JV member's country of registration:
JV member's year of constitution:
JV member's legal address in country of constitution:
JV member's authorized representative information Name: _____ Address: _____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents of • Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITB 4.4. • In case of a state-owned enterprise or institution, documents establishing legal and financial autonomy, operation in accordance with commercial law, and is not under the supervision of the Employer, in accordance with ITB 4.6. 2. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership. *[If required under BDS ITB 47.1, the successful Bidder shall provide additional information on beneficial ownership for each JV member using the Beneficial Ownership Disclosure Form.]*

Form CON – 2:
Historical Contract Non-Performance, Pending Litigation and Litigation History

Bidder's Name: _____
Date: _____
Joint Venture Member's Name_____
RFB No. and title: _____
Page _____of _____pages

Non-Performed Contracts in accordance with Section III, Evaluation and Qualification Criteria			
• Contract non-performance did not occur since 1st January *[insert year]* • Contract(s) not performed since 1st January *[insert year]*			
Year	**Non-performed portion of contract**	**Contract Identification**	**Total Contract Amount (current value, currency, exchange rate and US$ equivalent)**
[insert year]	*[insert amount and percentage]*	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Employer: *[insert full name]* Address of Employer: *[insert street/city/country]* Reason(s) for nonperformance: *[indicate main reason(s)]*	*[insert amount]*
Pending Litigation, in accordance with Section III, Evaluation and Qualification Criteria			
• No pending litigation • Pending litigation.			

Year of dispute	Amount in dispute (currency)	Contract Identification	Total Contract Amount (currency), USD Equivalent (exchange rate)
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in dispute: _____ Party who initiated the dispute: ____ Status of dispute: _____	
		Contract Identification: Name of Employer: Address of Employer: Matter in dispute: Party who initiated the dispute: Status of dispute:	

Litigation History in accordance with Section III, Evaluation and Qualification Criteria

- No Litigation History
- Litigation History

Year of award	Outcome as percentage of Net Worth	Contract Identification	Total Contract Amount (currency), USD Equivalent (exchange rate)

[insert year]	*[insert percentage]*	Contract Identification: [indicate complete contract name, number, and any other identification] Name of Employer: *[insert full name]* Address of Employer: *[insert street/city/country]* Matter in dispute: *[indicate main issues in dispute]* Party who initiated the dispute: *[indicate "Employer" or "Contractor"]* Reason(s) for Litigation and award decision *[indicate main reason(s)]*	*[insert amount]*

Form CON – 3
Environmental and Social Performance Declaration

[The following table shall be filled in for the Bidder, each member of a Joint Venture and each Specialized Subcontractor]

Bidder's Name: *[insert full name]*
Date: *[insert day, month, year]*
Joint Venture Member's or Specialized Subcontractor's Name: *[insert full name]*
RFB No. and title: *[insert RFB number and title]*
Page *[insert page number]* of *[insert total number]* pages

Environmental and Social Performance Declaration in accordance with Section III, Qualification Criteria, and Requirements
• **No suspension or termination of contract**: An employer has not suspended or terminated a contract and/or called the performance security for a contract for reasons related to Environmental, or Social (ES) performance since the date specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.5. • **Declaration of suspension or termination of contract**: The following contract(s) has/have been suspended or terminated and/or Performance Security called by an employer(s) for reasons related

to Environmental, or Social (ES)performance since the date specified in Section III, Evaluation and Qualification Criteria, Sub-Factor 2.5. Details are described below:			
Year	**Suspended or terminated portion of contract**	**Contract Identification**	**Total Contract Amount (current value, currency, exchange rate and US$ equivalent)**
[insert year]	*[insert amount and percentage]*	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Employer: *[insert full name]* Address of Employer: *[insert street/city/country]* Reason(s) for suspension or termination: *[indicate main reason(s) e.g. for gender-based violence; sexual exploitation or sexual abuse breaches]*	*[insert amount]*
[insert year]	*[insert amount and percentage]*	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Employer: *[insert full name]* Address of Employer: *[insert street/city/country]* Reason(s) for suspension or termination: *[indicate main reason(s)]*	*[insert amount]*
…	…	*[list all applicable contracts]*	…
Performance Security called by an employer(s) for reasons related to ES performance			
Year	Contract Identification		Total Contract Amount (current value, currency, exchange rate and US$ equivalent)
[insert year]	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Employer: *[insert full name]* Address of Employer: *[insert street/city/country]*		*[insert amount]*

	Reason(s) for calling of performance security: *[indicate main reason(s) e.g. for gender-based violence; sexual exploitation, or sexual abuse breaches]*	

Form CON – 4
Sexual Exploitation and Abuse (SEA) and/or Sexual Harassment Performance Declaration

[The following table shall be filled in by the Bidder, each member of a Joint Venture and each subcontractor proposed by the Bidder]

Bidder's Name: *[insert full name]*
Date: *[insert day, month, year]*
Joint Venture Member's or Subcontractor's Name: *[insert full name]*
RFB No. and title: *[insert RFB number and title]*
Page *[insert page number]* of *[insert total number]* pages

SEA and/or SH Declaration **in accordance with Section III,** Evaluation and Qualification Criteria
We: ☐ (a) have not been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations ☐ (b) are subject to disqualification by the Bank for non-compliance with SEA/ SH obligations ☐ (c) had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations. An arbitral award on the disqualification case has been made in our favor. ☐ (d) had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations for a period of two years. We have subsequently demonstrated that we have adequate capacity and commitment to comply with SEA/ SH obligations. ☐ (e) had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations for a period of two years. We have attached evidence demonstrating that we have adequate capacity and commitment to comply with SEA/ SH obligations.
[If (c) above is applicable, attach evidence of an arbitral award reversing the findings on the issues underlying the disqualification.]
[If (d) or (e) above are applicable, provide the following information:]
Period of disqualification: From: _____ To: _____
If previously provided on another Bank financed works contract, details of evidence that demonstrated adequate capacity and commitment to comply with SEA/ SH obligations (**as per (d) above)** Name of Employer: _____ Name of Project: _____ Contract description: _____

Brief summary of evidence provided: _____ _____ Contact Information: (Tel, email, name of contact person): _____ _____
As an alternative to the evidence under (d), other evidence demonstrating adequate capacity and commitment to comply with SEA/ SH obligations (**as per (e) above)** *[attach details as appropriate]*.

Form CCC: Current Contract Commitments / Works in Progress

Bidders and each member of a JV should provide information on their current commitments on all contracts that have been awarded, or for which a letter of intent or acceptance has been received, or for contracts approaching completion, but for which an unqualified, full completion certificate has yet to be issued.

Name of contract	Employer, contact address/tel/fax	Value of outstanding work (current US$ equivalent)	Estimated completion date	Average monthly invoicing over last six months (US$/month)
1.				
2.				
3.				
4.				
5.				
etc.				

Form FIN – 3.1: Financial Situation and Performance

Bidder's Name: _____
Date: _____
Joint Venture Member's Name_____
RFB No. and title: _____
Page _____of _____pages

1. Financial data

Type of Financial information in (currency)	**Historic information for previous** _____*years,* _____ **(amount in currency, currency, exchange rate, USD**				
	Year 1	Year 2	Year 3	Year4	Year 5
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

2. Sources of Finance

Specify sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments.

No.	Source of finance	Amount (US$ equivalent)
1		
2		
3		

3. Financial documents

The Bidder and its parties shall provide copies of financial statements for _____ years pursuant Section III, Evaluation and Qualifications Criteria, Sub-factor 3.2. The financial statements shall:

(a) reflect the financial situation of the Bidder or in case of JV member, and not an affiliated entity (such as parent company or group member).

(b) be independently audited or certified in accordance with local legislation.

(c) be complete, including all notes to the financial statements.

(d) correspond to accounting periods already completed and audited.

☐ Attached are copies of financial statements[1] for the _____years required above; and complying with the requirements

[1] If the most recent set of financial statements is for a period earlier than 12 months from the date of bid, the reason for this should be justified.

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Form FIN - 3.2: Average Annual Construction Turnover

Bidder's Name: _____
Date: _____
Joint Venture Member's Name_____
RFB No. and title: _____
Page _____of _____pages

	Annual turnover data (construction only)		
Year	**Amount** **Currency**	**Exchange rate**	**USD equivalent**
[indicate year]	*[insert amount and indicate currency]*		
Average Annual Construction Turnover *			

* See Section III, Evaluation and Qualification Criteria, Sub-Factor 3.2.

Form FIN - 3.3: Financial Resources

Specify proposed sources of financing, such as liquid assets, unencumbered real assets, lines of credit, and other financial means, net of current commitments, available to meet the total construction cash flow demands of the subject contract or contracts as specified in Section III, Evaluation and Qualification Criteria.

Source of financing	Amount (US$ equivalent)
1.	
2.	
3.	
4.	

Form EXP - 4.1: General Construction Experience

Bidder's Name: _____
Date: _____
Joint Venture Member's Name_____
RFB No. and title: _____
Page _____of _____pages

Starting	Ending Year	Contract Identification	Role of Bidder
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of Employer: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____	

		Name of Employer: _____ Address: _____	

Form EXP - 4.2(a): Specific Construction and Contract Management Experience

Bidder's Name: _____
Date: _____
Joint Venture Member's Name_____
RFB No. and title: _____
Page _____of _____pages

Similar Contract No.	**Information**			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor ·	Member in JV ·	Management Contractor ·	Sub-contractor ·
Total Contract Amount			US$ *	
If member in a JV or subcontractor, specify participation in total Contract amount			*	
Employer's Name:				
Address: Telephone/fax number E-mail:				

Form EXP - 4.2(a) (cont.)
Specific Construction and Contract Management Experience (cont.)

Similar Contract No.	Information
Description of the similarity in accordance with Sub-Factor 4.2(a) of Section III:	
1. Amount	
2. Physical size of required works items	
3. Complexity	
4. Methods/Technology	
5. Construction rate for key activities	
6. Other Characteristics	

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Form EXP - 4.2(b): Construction Experience in Key Activities

Bidder's Name: _____
Date: _____
Joint Venture Member's Name_____
Subcontractor's Name[2] (as per ITB 34.2 and 34.3): _____

RFB No. and title: _____
Page _____of _____pages

Subcontractor's Name (as per ITB 34.2 and 34.3): _____
All subcontractors for key activities must complete the information in this form as per ITB 34.2 and 34.3 and Section III, Qualification Criteria and Requirements, Sub-Factor 4.2.

1. Key Activity No One: _____

	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor .	Member in JV .	Management Contractor .	Sub-contractor .
Total Contract Amount			US$	

Quantity (Volume, number or rate of production, as applicable) performed under the contract per year or part of the year	Total quantity in the contract (i)	Percentage participation (ii)	Actual Quantity Performed (i) x (ii)
Year 1			
Year 2			
Year 3			

[2] If applicable.

Year 4			
Employer's Name:			
Address: Telephone/fax number E-mail:			

	Information
Employer's Name:	
Address: Telephone/fax number E-mail:	

	Information
Description of the key activities in accordance with Sub-Factor 4.2(b) of Section III:	

2. Activity No. Two

3. ……

Form EXP - 4.2(c): Specific Experience in Managing ES aspects

[The following table shall be filled in for contracts performed by the Bidder, and each member of a Joint Venture]

Bidder's Name: _____
Date: _____
Bidder's JV Member Name: _____
RFB No. and title: _____
Page _____ of _____ pages

1. Key Requirement no 1 in accordance with 4.2 (c): _____

Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor •	Member in JV •	Management Contractor •	Subcontractor •
Total Contract Amount			US$	
Details of relevant experience				

2. Key Requirement no 2 in accordance with 4.2 (c): _____
3. Key Requirement no 3 in accordance with 4.2 (c): _____
4. ...

Section V - Eligible Countries

Eligibility for the Provision of Goods, Works and Services in Bank-Financed Procurement

In reference to ITB 4.8, and 5.1, for the information of the Bidders, at the present time firms, goods and services from the following countries are excluded from this Bidding process:

Under ITB 4.8 (a) and 5.1 **NONE**

Under ITB 4.8 (b) and 5.1 **NONE**

Section VI - Fraud and Corruption

(Section VI shall not be modified)

1. Purpose

1.1 The Bank's Anti-Corruption Guidelines and this annex apply with respect to procurement under Bank Investment Project Financing operations.

2. Requirements

2.1 The Bank requires that Borrowers (including beneficiaries of Bank financing); bidders (applicants/proposers), consultants, contractors and suppliers; any sub-contractors, sub-consultants, service providers or suppliers; any agents (whether declared or not); and any of their personnel, observe the highest standard of ethics during the procurement process, selection and contract execution of Bank-financed contracts, and refrain from Fraud and Corruption.

2.2 To this end, the Bank:

a. Defines, for the purposes of this provision, the terms set forth below as follows:

i. "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

ii. "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;

iii. "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

iv. "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

v. "obstructive practice" is:

(a) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/or threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or

(b) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 2.2 e. below.

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b. Rejects a proposal for award if the Bank determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;

c. In addition to the legal remedies set out in the relevant Legal Agreement, may take other appropriate actions, including declaring misprocurement, if the Bank determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement process, selection and/or execution of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;

d. Pursuant to the Bank's Anti- Corruption Guidelines and in accordance with the Bank's prevailing sanctions policies and procedures, may sanction a firm or individual, either indefinitely or for a stated period of time, including by publicly declaring such firm or individual ineligible (i) to be awarded or otherwise benefit from a Bank-financed contract, financially or in any other manner;[1] (ii) to be a nominated[2] sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract; and (iii) to receive the proceeds of any loan made by the Bank or otherwise to participate further in the preparation or implementation of any Bank-financed project;

e. Requires that a clause be included in bidding/request for proposals documents and in contracts financed by a Bank loan, requiring (i) bidders (applicants/proposers), consultants, contractors, and suppliers, and their sub-contractors, sub-consultants, service providers, suppliers, agents personnel, permit the Bank to inspect[3] all accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have them audited by auditors appointed by the Bank.

[1] For the avoidance of doubt, a sanctioned party's ineligibility to be awarded a contract shall include, without limitation, (i) applying for pre-qualification, expressing interest in a consultancy, and bidding, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.

[2] A nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider (different names are used depending on the particular bidding document) is one which has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

[3] Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Bank or persons appointed by the Bank to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraud and Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm's or individual's financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of information.

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PART 2 – Works' Requirements

Section VII - Works' Requirements

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Specifications

Specification are separately provided in volume. 3 of 4 of detailed specifications.

Environmental and Social Requirements

Sub-Clause/Clause No.	Sub-Clause/Clause	Remarks
8.2	*Other Contractors*	The Contractor shall also, as stated in the Specification or as instructed by the Project Manager, cooperate with and allow appropriate opportunities for the Employer's or any other personnel, notified to the Contractor by the Employer or Project Manager, to conduct any environmental and social assessment.
9.4.1, 9.4.2, 9.4.7,	*Labor*	The Contractor shall provide and employ on the Site for the execution of the Works such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labor with appropriate qualifications and experience from sources within the Country. The Contractor shall provide the Contractor's Personnel information and documentation that are clear and understandable regarding their terms and conditions of employment. The information and documentation shall set out their rights under relevant labor laws applicable to the Contractor's Personnel (which will include any applicable collective agreements), including their rights related to hours of work, wages, overtime, compensation and benefits, as well as those arising from any requirements in the Specification. The Contractor's Personnel shall be informed when any material changes to their terms or conditions of employment occur. The Contractor shall inform the Contractor's Personnel about:

Sub-Clause/Clause No.	Sub-Clause/Clause	Remarks

(a) any deduction to their payment and the conditions of such deductions in accordance with the applicable laws or as stated in the Specification; and

(b) their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, allowances and any benefits as are subject to tax under the laws of the Country for the time being in force.

The Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such laws.

Where required by applicable laws or as stated in the Specification, the Contractor shall provide the Contractor's Personnel written notice of termination of employment and details of severance payments in a timely manner. The Contractor shall have paid the Contractor's Personnel (either directly or where appropriate for their benefit) all due wages and entitlements including, as applicable, social security benefits and pension contributions, on or before the end of their engagement/ employment.

The Contractor shall, in all dealings with the Contractor's Personnel, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labor. The Contractor shall provide the Contractor's Personnel annual holiday and sick, maternity and family leave, as required by applicable laws or as stated in the Specification.

Sub-Clause/Clause No.	Sub-Clause/Clause	Remarks
9.4.6	*Facilities for Staff and Labor*	The Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. The Contractor shall give access to or provide services that accommodate the physical, social and cultural needs of the Contractor's Personnel.
9.4.14	*Forced Labour*	The Contractor, including its Subcontractors, shall not employ or engage forced labor. Forced labor consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labor, such as indentured labor, bonded labor or similar labor-contracting arrangements. No persons shall be employed or engaged who have been subject to trafficking.
9.4.15	*Child Labour*	The Contractor, including its Subcontractors, shall not employ or engage a child under the age of 18 unless the national law specifies a higher age. The Contractor, including its Subcontractors, shall not employ or engage a child between the minimum age and the age of 18 in a manner that is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. The Contractor including its Subcontractors, shall only employ or engage children between the minimum age and the age of 18 after an appropriate risk assessment has been conducted by the Contractor with the Project Manager's approval. The Contractor shall be subject to regular monitoring by the Project Manager that includes

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Sub-Clause/Clause No.	Sub-Clause/Clause	Remarks
		monitoring of health, working conditions and hours of work. Work considered hazardous for children is work that, by its nature or the circumstances in which it is carried out, is likely to jeopardize the health, safety, or morals of children. Such work activities prohibited for children include work: (a) with exposure to physical, psychological or sexual abuse; (b) underground, underwater, working at heights or in confined spaces; (c) with dangerous machinery, equipment or tools, or involving handling or (d) transport of heavy loads; (e) in unhealthy environments exposing children to hazardous substances, agents, or processes, or to temperatures, noise or vibration damaging to health; or (f) under difficult conditions such as work for long hours, during the night or in confinement on the premises of the employer.
9.4.18	*Non-Discrimination and Equal Opportunity*	The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of

Sub-Clause/Clause No.	Sub-Clause/Clause	Remarks
		employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.
9.4.20	*Training of Contractor's Personnel*	The Contractor shall provide appropriate training to relevant Contractor's Personnel on ES aspects of the Contract, including appropriate sensitization on prohibition of SEA and SH, and health and safety training. As stated in the Specification or as instructed by the Project Manager, the Contractor shall also allow appropriate opportunities for the relevant Contractor's Personnel to be trained on ES aspects of the Contract by the Employer's Personnel. The Contractor shall provide training on SEA and SH, including its prevention, to any of its personnel who has a role to supervise other Contractor's Personnel.
15.2	*Contractor to Construct the Works*	Restriction of works to day time. The Contractor shall construct and install the Works in accordance with the Specification and Drawings. Provision of appropriate PPES
18.2	*Health and Safety Obligations*	-Comply with all applicable health and safety regulations and Laws; -Comply with all applicable health and safety obligations specified in the Contract; -Take care for the health and safety of all persons entitled to be on the Site and other places, if any, where the Works are being executed; - Keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons; Provide fencing, lighting, safe access, guarding and watching of the Works until the issue of the Contract Certificate of Completion;

Sub-Clause/Clause No.	Sub-Clause/Clause	Remarks
		Provide health and safety training of Contractor's Personnel as appropriate and maintain training records; Actively engage the Contractor's Personnel in promoting understanding, and methods for, implementation of health and safety requirements, as well as in providing information to Contractor's Personnel, training on occupational safety and health, and provision of personal protective equipment without expense to the Contractor's Personnel; Put in place workplace processes for Contractor's Personnel to report work situations that they believe are not safe or healthy, and to remove themselves from a work situation which they have reasonable justification to believe presents an imminent and serious danger to their life or health; Contractor's Personnel who remove themselves from such work situations shall not be required to return to work until necessary remedial action to correct the situation has been taken. Contractor's Personnel shall not be retaliated against or otherwise subject to reprisal or negative action for such reporting or removal; Where the Employer's Personnel, any other contractors employed by the Employer, and/or personnel of any legally constituted public authorities and private utility companies are employed in carrying out, on or near the site, of any work not included in the Contract, collaborate in applying the health and safety requirements, without prejudice to the responsibility of the relevant entities for the health and safety of their own personnel; and

Sub-Clause/Clause No.	Sub-Clause/Clause	Remarks

Establish and implement a system for regular (not less than six-monthly) review of health and safety performance and the working environment.

The Contractor shall submit to the Project Manager for its approval a health and safety manual which has been specifically prepared for the Works, the Site and other places (if any) where the Contractor intends to execute the Works.

The health and safety manual shall be in addition to any other similar document required under applicable health and safety regulations and laws.

The health and safety manual shall set out all the health and safety requirements under the Contract,

(a) which shall include at a minimum:

(i) the procedures to establish and maintain a safe working environment without risk to health at all workplaces, machinery, equipment and processes under the control of the Contractor, including control measures for chemical, physical and biological substances and agents;

(ii) details of the training to be provided, records to be kept;

(iii) the procedures for prevention, preparedness and response activities to be implemented in the case of an emergency event (i.e. an unanticipated incident, arising from both natural and man-made hazards, typically in the form of fire, explosions, leaks or spills, which may occur for a variety of different reasons including failure

Sub-Clause/Clause No.	Sub-Clause/Clause	Remarks
		to implement operating procedures that are designed to prevent their occurrence, extreme weather or lack of early warning); (iv) remedies for adverse impacts such as occupational injuries, deaths, disability and disease; (v) the measures to be taken to avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases, (vi) the measures to be implemented to avoid or minimize the spread of communicable diseases (including transfer of Sexually Transmitted Diseases or Infections (STDs), such as HIV virus) and non-communicable diseases associated with the execution of the Works, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups. This includes taking measures to avoid or minimize the transmission of communicable diseases that may be associated with the influx of temporary or permanent Contract-related labor;
18.3	*Protection of the Environment*	The Contractor shall take all necessary measures to: protect the environment (both on and off the Site); and Limit damage and nuisance to people and property resulting from pollution, noise and other

Sub-Clause/Clause No.	Sub-Clause/Clause	Remarks
		results of the Contractor′s operations and/ or activities. The Contractor shall ensure that emissions, surface discharges, effluent and any other pollutants from the Contractor′s activities shall exceed neither the values indicated in the Specification, nor those prescribed by applicable laws. In the event of damage to the environment, property and/or nuisance to people, on or off Site as a result of the Contractor′s operations, the Contractor shall agree with the Project Manager the appropriate actions and time scale to remedy, as practicable, the damaged environment to its former condition. The Contractor shall implement such remedies at its cost to the satisfaction of the Project Manager.
19.1	*Archeological and Geological Findings*	All fossils, coins, articles of value or antiquity, structures, groups of structures, and other remains or items of geological, archaeological, paleontological, historical, architectural or religious interest found on the Site shall be placed under the care and custody of the Employer. The Contractor shall: - Take all reasonable precautions, including fencing-off the area or site of the finding, to avoid further disturbance and prevent Contractor′s Personnel or other persons from removing or damaging any of these findings; - Train relevant Contractor′s Personnel on appropriate actions to be taken in the event of such findings; and - Implement any other action consistent with the requirements of the Specification and relevant laws. The Contractor shall, as soon as practicable after discovery of any such finding, notify the Project

Sub-Clause/Clause No.	Sub-Clause/Clause	Remarks
		Manager of such discoveries and carry out the Project Manager′s instructions for dealing with them.
26.1	*Stakeholder Engagement*	The Contractor shall provide relevant contract-related information, as the Employer and/or Project Manager may reasonably request to conduct Stakeholder engagements. "Stakeholder" refers to individuals or groups who: (i) are affected or likely to be affected by the Contract; and (ii) may have an interest in the Contract. The Contractor may also directly participate in Stakeholder engagements, as the Employer and/or Project Manager may reasonably request.
29.1	*Security of the Site*	The Contractor shall be responsible for the security of the Site, and: for keeping unauthorized persons off the Site; Authorized persons shall be limited to the Contractor′s Personnel, the Employer′s Personnel, and to any other personnel identified as authorized personnel (including the Employer′s other contractors on the Site), by a notice from the Employer or the Project Manager to the Contractor. The Contractor shall submit for the Project Manager′s No-objection a security management plan that sets out the security arrangements for the Site. The Contractor shall (i) conduct appropriate background checks on any personnel retained to provide security; (ii) train the security personnel adequately (or determine that they are properly trained) in the use of force (and where applicable, firearms), and appropriate conduct towards

Sub-Clause/Clause No.	Sub-Clause/Clause	Remarks
		Contractor′s Personnel, Employer′s Personnel and affected communities; and (iii) require the security personnel to act within the applicable Laws and any requirements set out in the Specification. The Contractor shall not permit any use of force by security personnel in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat.

PAYMENT FOR ES REQUIREMENTS

The Employer's ES and procurement specialists should consider how the Contractor will cost the delivery of the ES requirements. In the majority of cases, the payment for the delivery of ES requirements shall be a subsidiary obligation of the Contractor covered under the prices quoted for other Bill of Quantity items or activities. For example, normally the cost of implementing workplace safe systems of work, including the measures necessary for ensuring traffic safety, shall be covered by the Bidder's rates for the relevant works. Alternatively, provisional sums could be set aside for discrete activities for example for HIV counselling service, and, GBV/SEA awareness and sensitization or to encourage the contractor to deliver additional ES outcomes beyond the requirement of the Contract.

Key Personnel

Item No.	Position/specialization	Relevant academic qualifications	Minimum years of relevant work experience
1	Contractor's Representative	BSc. Agricultural Engineering or equivalent Registered with ERB or equivalent	*(Five) 5*
2	Environmental Health and safety expert	(a) A minimum of diploma in health and safety or related field from an institution recognized in Kenya	*(Three) 3*
3	Site Supervisor/General Foreman	(a) A minimum of diploma in in Architect, Civil Engineering or relevant field from an institution recognized in Kenya (b) Professional registration with valid membership and valid annual practicing license from National Construction Authority (NCA) or equivalent professional body recognized in Kenya.	*(Five) 5*
4	Sexual Exploitation, Abuse and Harassment	*Higher National Diploma in* relevant field from an institution recognized in Kenya or equivalent	*(Three)3*

5	Surveyor	Bsc. In Survey and photogrammatory or its equivalent and registered with the relevant professional body	*(Three) 3*
6	Site Agent	Bsc Civil/Agricultural engineering and registered with EBK	*(Three) 3*
7	Concrete foreman	Higher National Diploma in relevant field from an institution recognized in Kenya or equivalent	*(Three) 3*

Drawings

The book of drawings are separately provided in volume 4 of 4.

Supplementary Information (NON)

PART 3 – Conditions of Contract and Contract Forms

Section VIII - General Conditions of Contract

These General Conditions of Contract (GCC), read in conjunction with the Particular Conditions of Contract (PCC) and other documents listed therein, should be a complete document expressing fairly the rights and obligations of both parties.

These General Conditions of Contract have been developed on the basis of considerable international experience in the drafting and management of contracts, bearing in mind a trend in the construction industry towards simpler, more straightforward language.

The GCC can be used for both smaller admeasurement contracts and lump sum contracts.

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General Conditions of Contract

A. General

1. Definitions Boldface type is used to identify defined terms.

(a) The **Accepted Contract Amount** means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects.

(b) The **Activity Schedule** is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump-sum contract. It includes a lump-sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events.

(c) The **Adjudicator** is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in GCC 23.

(d) **Bank** means the financing institution **named in the PCC**.

(e) **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid.

(f) **Compensation Events** are those defined in GCC Clause 42 hereunder.

(g) The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC Sub-Clause 57.1.

(h) The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC Sub-Clause 2.3 below.

(i) The **Contractor** is the party whose Bid to carry out the Works has been accepted by the Employer.

(j) The **Contractor's Bid** is the completed bidding document submitted by the Contractor to the Employer.

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(k) The **Contract Price** is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract.

(l) **Days** are calendar days; months are calendar months.

(m) **Dayworks** are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.

(n) A **Defect** is any part of the Works not completed in accordance with the Contract.

(o) The **Defects Liability Certificate** is the certificate issued by Project Manager upon correction of defects by the Contractor.

(p) The **Defects Liability Period** is the period **named in the PCC** pursuant to GCC Sub-Clause 38.1 and calculated from the Completion Date.

(q) **Drawings** means the drawings of the Works, as included in the Contract, and any additional and modified drawings issued by (or on behalf of) the Employer in accordance with the Contract, include calculations and other information provided or approved by the Project Manager for the execution of the Contract.

(r) The **Employer** is the party who employs the Contractor to carry out the Works, **as specified in the PCC**.

(s) **Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

(t) "**In writing"** or "**written"** means hand-written, type-written, printed or electronically made, and resulting in a permanent record;

(u) The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.

(v) The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The **Intended Completion Date** is specified in the PCC. The **Intended Completion Date** may be revised only by

the Project Manager by issuing an extension of time or an acceleration order.

(w) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works.

(x) **Plant** is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.

(y) The **Project Manager** is the person named in the PCC (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract.

(z) **PCC** means Particular Conditions of Contract.

(aa) The **Site** is the area defined as such in the PCC.

(bb) **Site Investigation Reports** are those that were included in the bidding document and are factual and interpretative reports about the surface and subsurface conditions at the Site.

(cc) **Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.

(dd) The **Start Date** is **given in the PCC**. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.

(ee) A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site.

(ff) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.

(gg) A **Variation** is an instruction given by the Project Manager which varies the Works.

(hh) The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the PCC.

(ii) "**Contractor's Personnel**" refers to all personnel whom the Contractor utilizes on the Site or other places where the Works are carried out, including the staff, labor and other employees of each Subcontractor.

(jj) **"Key Personnel"** means the positions (if any) of the Contractor's personnel that are stated in the Specification.

(kk) **"ES"** means Environmental and Social (including Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH));

(ll) **"Sexual Exploitation and Abuse" "(SEA)"** means the following:

Sexual Exploitation is defined as any actual or attempted abuse of position of vulnerability, differential power or trust, for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another. In Bank financed operations/projects, sexual exploitation occurs when access to or benefit from a Bank Financed Goods, Works, Non-consulting Services or Consulting Services is used to extract sexual gain;

Sexual Abuse is defined as the actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions;

(mm) **"Sexual Harassment" "(SH)"** is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature by the Contractor's Personnel with other Contractor's or Employer's Personnel; and

(nn) **"Employer's Personnel"** refers to the Project Manager and all other staff, labor and other employees (if any) of the Project Manager and of the Employer engaged in fulfilling the Employer's obligations under the Contract; and any other personnel identified as Employer's

Personnel, by a notice from the Employer or the Project Manager to the Contractor.

2. Interpretation

2.1 In interpreting these GCC, words indicating one gender include all genders. Words indicating the singular also include the plural and words indicating the plural also include the singular. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC.

2.2 If sectional completion is **specified in the PCC**, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).

2.3 The documents forming the Contract shall be interpreted in the following order of priority:

(a) Agreement,

(b) Letter of Acceptance,

(c) Contractor's Bid,

(d) Particular Conditions of Contract,

(e) General Conditions of Contract, including Appendices,

(f) Specification,

(g) Drawings,

(h) Bill of Quantities,[1] and

(i) any other document **listed in the PCC** as forming part of the Contract.

3. Language and Law

3.1 The language of the Contract and the law governing the Contract are **stated in the PCC**.

3.2 Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Employer's country when

[1] In lump-sum contracts, delete "Bill of Quantities" and replace with "Activity Schedule."

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(a) as a matter of law or official regulations, the Borrower's country prohibits commercial relations with that country; or

(b) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's Country prohibits any import of goods from that country or any payments to any country, person, or entity in that country.

4. Contract Manager's Decisions

4.1 Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.

5. Delegation

5.1 Unless otherwise **specified in the PCC,** the Project Manager may delegate any of his duties and responsibilities to other people, except to the Adjudicator, after notifying the Contractor, and may revoke any delegation after notifying the Contractor.

6. Communications

6.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.

7. Subcontracting

7.1 The Contractor may subcontract with the approval of the Project Manager but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations. The Contractor shall require that its Subcontractors execute the Works in accordance with the Contract, including complying with the relevant ES requirements and the obligations set out in Sub-Clause 28.1.

7.2 Submission by the Contractor for approval of the Project Manager, addition of any Subcontractor not named in the Contract, shall also include the Subcontractor's declaration in accordance with Appendix C- Sexual exploitation and Abuse (SEA) and/or Sexual Harassment (SH) Performance Declaration

8. Other Contractors

8.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, as **referred to in the PCC.** The Contractor shall also provide facilities and services for them as described in the Schedule. The

Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification.

8.2 The Contractor shall also, as stated in the Specification or as instructed by the Project Manager, cooperate with and allow appropriate opportunities for the Employer's or any other personnel, notified to the Contractor by the Employer or Project Manager, to conduct any environmental and social assessment.

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9. Personnel and Equipment

9.1 The Contractor shall employ the Key Personnel and use the Equipment identified in its Bid, to carry out the Works or other personnel and Equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of Key Personnel and Equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid.

9.2 The Project Manager may require the Contractor to remove (or cause to be removed) any person employed on the Site or Works, including the Key Personnel (if any), who:

(a) persists in any misconduct or lack of care;

(b) carries out duties incompetently or negligently;

(c) fails to comply with any provision of the Contract;

(d) persists in any conduct which is prejudicial to safety, health, or the protection of the environment;

(e) based on reasonable evidence, is determined to have engaged in Fraud and Corruption during the execution of the Works;

(f) has been recruited from the Employer's Personnel;

(g) undertakes behavior which breaches the Code of Conduct for Contractor's Personnel (ES).

If appropriate, the Contractor shall then promptly appoint (or cause to be appointed) a suitable replacement with equivalent skills and experience.

Notwithstanding any requirement from the Project Manager to remove or cause to remove any person, the Contractor shall take immediate action as appropriate in response to any violation of (a) through (g) above. Such immediate action shall include removing (or causing to be removed) from the Site or other places where the Works are being carried out, any Contractor's Personnel who engages in (a), (b), (c), (d), (e) or (g) above or has been recruited as stated in (f) above.

9.3 The Contractor shall take all necessary safety measures to avoid the occurrence of incidents and injuries to any third party, associated with the use of, if any, Equipment on public roads or other public infrastructure. The Contractor shall monitor road safety incidents and accidents to identify negative safety issues,

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and establish and implement necessary measures to resolve them.

9.4 Labor

9.4.1 *Engagement of Staff and Labor.* The Contractor shall provide and employ on the Site for the execution of the Works such skilled, semi-skilled and unskilled labor as is necessary for the proper and timely execution of the Contract. The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labor with appropriate qualifications and experience from sources within the Country.

Unless otherwise provided in the Contract, the Contractor shall be responsible for the recruitment, transportation, accommodation and welfare facilities in accordance with GCC Sub-Clause 9.4.6, of the Contractor's Personnel, and for all payments in connection therewith.

The Contractor shall provide the Contractor's Personnel information and documentation that are clear and understandable regarding their terms and conditions of employment. The information and documentation shall set out their rights under relevant labor laws applicable to the Contractor's Personnel (which will include any applicable collective agreements), including their rights related to hours of work, wages, overtime, compensation and benefits, as well as those arising from any requirements in the Specification. The Contractor's Personnel shall be informed when any material changes to their terms or conditions of employment occur.

9.4.2 *Conditions of Labor.* The Contractor shall inform the Contractor's Personnel about:

(c) any deduction to their payment and the conditions of such deductions in accordance with the applicable laws or as stated in the Specification; and

(d) their liability to pay personal income taxes in the Country in respect of such of their salaries, wages, allowances and any benefits as are subject to tax under the laws of the Country for the time being in force.

The Contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such laws.

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Where required by applicable laws or as stated in the Specification, the Contractor shall provide the Contractor's Personnel written notice of termination of employment and details of severance payments in a timely manner. The Contractor shall have paid the Contractor's Personnel (either directly or where appropriate for their benefit) all due wages and entitlements including, as applicable, social security benefits and pension contributions, on or before the end of their engagement/ employment.

9.4.3 The Contractor may bring into the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use its best endeavors in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor′s personnel.

9.4.4 The Contractor shall at its own expense provide the means of repatriation to and the Contractor's Personnel employed on the Contract at the Site to their various home countries. It shall also provide suitable temporary maintenance of all such persons from the cessation of their employment on the Contract to the date programmed for their departure. In the event that the Contractor defaults in providing such means of transportation and temporary maintenance, the Employer may provide the same to such personnel and recover the cost of doing so from the Contractor.

9.4.5 *Disorderly conduct.* The Contractor shall at all times during the progress of the Contract use its best endeavors to prevent any unlawful, riotous or disorderly conduct or behavior by or amongst the Contractor's Personnel.

9.4.6 *Facilities for Staff and Labor.* Except as otherwise stated in the Specification, the Contractor shall provide and maintain all necessary accommodation and welfare facilities for the Contractor's Personnel. If stated in the Specification, the Contractor shall give access to or provide services that accommodate the physical, social and cultural needs of the

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Contractor's Personnel. The Contractor shall also provide similar facilities for the Employer's Personnel if stated in the Specification.

9.4.7 The Contractor shall, in all dealings with the Contractor's Personnel, pay due regard to all recognized festivals, official holidays, religious or other customs and all local laws and regulations pertaining to the employment of labor. The Contractor shall provide the Contractor's Personnel annual holiday and sick, maternity and family leave, as required by applicable laws or as stated in the Specification.

9.4.8 *Supply of Foodstuff*s. The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract.

9.4.9 *Supply of Water*. The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.

9.4.10 *Measures against Insect and Pest Nuisance.* The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.

9.4.11 *Alcoholic Liquor or Drugs*. The Contractor shall not, otherwise than in accordance with the laws of the Country, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor's Personnel.

9.4.12 *Arms and Ammunition*. The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.

9.4.13 *Funeral Arrangements.* The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.

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9.4.14 *Forced Labor.* The Contractor, including its Subcontractors, shall not employ or engage forced labor. Forced labor consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labor, such as indentured labor, bonded labor or similar labor-contracting arrangements.

No persons shall be employed or engaged who have been subject to trafficking. Trafficking in persons is defined as the recruitment, transportation, transfer, harboring or receipt of persons by means of the threat or use of force or other forms of coercion, abduction, fraud, deception, abuse of power, or of a position of vulnerability, or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purposes of exploitation.

9.4.15 *Child Labor*. The Contractor, including its Subcontractors, shall not employ or engage a child under the age of 14 unless the national law specifies a higher age (the minimum age).

The Contractor, including its Subcontractors, shall not employ or engage a child between the minimum age and the age of 18 in a manner that is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development.

The Contractor including its Subcontractors, shall only employ or engage children between the minimum age and the age of 18 after an appropriate risk assessment has been conducted by the Contractor with the Project Manager's approval. The Contractor shall be subject to regular monitoring by the Project Manager that includes monitoring of health, working conditions and hours of work.

Work considered hazardous for children is work that, by its nature or the circumstances in which it is carried out, is likely to jeopardize the health, safety, or morals of children. Such work activities prohibited for children include work:

(g) with exposure to physical, psychological or sexual abuse;

(h) underground, underwater, working at heights or in confined spaces;

(i) with dangerous machinery, equipment or tools, or involving handling or

(j) transport of heavy loads;

(k) in unhealthy environments exposing children to hazardous substances, agents, or processes, or to temperatures, noise or vibration damaging to health; or

(l) under difficult conditions such as work for long hours, during the night or in confinement on the premises of the employer.

9.4.16 *Employment Records of Workers.* The Contractor shall keep complete and accurate records of the employment of labor at the Site. The records shall include the names, ages, genders, hours worked, and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the project Manager.

9.4.17 *Workers' Organizations*. In countries where the relevant labor laws recognize workers' rights to form and to join workers' organizations of their choosing and to bargain collectively without interference, the Contractor shall comply with such laws. In such circumstances, the role of legally established workers' organizations and legitimate workers' representatives will be respected, and they will be provided with information needed for meaningful negotiation in a timely manner. Where the relevant labor laws substantially restrict workers' organizations, the Contractor shall enable alternative means for the Contractor's Personnel to express their grievances and protect their rights regarding working conditions and terms of employment. The Contractor shall not seek to influence or control these alternative means. The Contractor shall not discriminate or retaliate against the Contractor's Personnel who participate, or seek to participate, in such organizations and collective bargaining or alternative mechanisms. Workers' organizations are expected to fairly represent the workers in the workforce.

9.4.18 *Non-Discrimination and Equal Opportunity.* The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The

Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.

Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Contractor shall provide protection and assistance as necessary to ensure non-discrimination and equal opportunity, including for specific groups such as women, people with disabilities, migrant workers and children (of working age in accordance with GCC Sub-Clause 9.4.15).

9.4.19 *Contractor's Personnel Grievance Mechanism.* The Contractor shall have a grievance mechanism for Contractor's Personnel, and where relevant the workers' organizations stated in GCC Sub-Clause 9.4.17, to raise workplace concerns. The grievance mechanism shall be proportionate to the nature, scale, risks and impacts of the Contract. The mechanism shall address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned in a language they understand, without any retribution, and shall operate in an independent and objective manner.

The Contractor's Personnel shall be informed of the grievance mechanism at the time of engagement for the Contract, and the measures put in place to protect them against any reprisal for its use. Measures will be put in place to make the grievance mechanism easily accessible to all Contractor's Personnel.

The grievance mechanism shall not impede access to other judicial or administrative remedies that might be available, or substitute for grievance mechanisms provided through collective agreements.

The grievance mechanism may utilize existing grievance mechanisms, providing that they are properly designed and

implemented, address concerns promptly, and are readily accessible to Contractor's Personnel. Existing grievance mechanisms may be supplemented as needed with Contract-specific arrangements.

9.4.20 *Training of Contractor's Personnel.* The Contractor shall provide appropriate training to relevant Contractor's Personnel on ES aspects of the Contract, including appropriate sensitization on prohibition of SEA and SH, and health and safety training referred to in GCC Sub-Clause 18.2.

As stated in the Specification or as instructed by the Project Manager, the Contractor shall also allow appropriate opportunities for the relevant Contractor's Personnel to be trained on ES aspects of the Contract by the Employer's Personnel.

The Contractor shall provide training on SEA and SH, including its prevention, to any of its personnel who has a role to supervise other Contractor's Personnel.

10. Employer's and Contractor's Risks

10.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.

11. Employer's Risks

11.1 From the Start Date until the Defects Liability Certificate has been issued, the following are Employer's risks:

(a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to

(i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works or

(ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor.

(b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, or due to war or

radioactive contamination directly affecting the country where the Works are to be executed.

11.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage due to

(a) a Defect which existed on the Completion Date,

(b) an event occurring before the Completion Date, which was not itself an Employer's risk, or

(c) the activities of the Contractor on the Site after the Completion Date.

12. Contractor's Risks

12.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks are Contractor's risks.

13. Insurance

13.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles **stated in the PCC** for the following events which are due to the Contractor's risks:

(a) loss of or damage to the Works, Plant, and Materials;

(b) loss of or damage to Equipment;

(c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and

(d) personal injury or death.

13.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance which the Contractor should have provided and recover the

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premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of an insurance shall not be made without the approval of the Project Manager.

13.5 Both parties shall comply with any conditions of the insurance policies.

14. Site Data

14.1 The Contractor shall be deemed to have examined any Site Data **referred to in the PCC**, supplemented by any information available to the Contractor.

15. Contractor to Construct the Works

15.1 The Contractor shall construct and install the Works in accordance with the Specification and Drawings.

15.2 If the Contract specifies that the Contractor shall design any part of the permanent Works, the Contractor shall take into the Employer's requirements which may include, if stated in the Specification:

(a) designing structural elements of the Works taking into account climate change considerations;

(b) applying the concept of universal access (the concept of universal access means unimpeded access for people of all ages and abilities in different situations and under various circumstances; and

(c) considering the incremental risks of the public′s potential exposure to operational accidents or natural hazards, including extreme weather events.

16. The Works to Be Completed by the Intended Completion Date

16.1 The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Program submitted by the Contractor, as updated with the approval of the Project Manager, and complete them by the Intended Completion Date.

16.2 The Contractor shall not carry out mobilization to the Site unless the Project Manager gives approval, an approval that shall not be unreasonably delayed, to the measures the Contractor proposes to address environmental and social risks and impacts, which at a minimum shall include applying the Management Strategies and

Implementation Plans (MSIPs) and Code of Conduct for Contractor′s Personnel submitted as part of the Bid and agreed as part of the Contract.

The Contractor shall submit, to the Project Manager for its approval any additional MSIPs as are necessary to manage the ES risks and impacts of ongoing Works. These MSIPs collectively comprise the Contractor′s Environmental and Social Management Plan (C-ESMP). The Contractor shall review the C-ESMP, periodically (but not less than every six (6) months), and update it as required to ensure that it contains measures appropriate to the Works. The updated C-ESMP shall be submitted to the Project Manager for its approval.

17. Approval by the Project Manager

17.1 The Contractor shall submit Specification and Drawings showing the proposed Temporary Works to the Project Manager, for his approval.

17.2 The Contractor shall be responsible for design of Temporary Works.

17.3 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

17.4 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.

17.5 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before this use.

18.

18.1 The Contractor shall be responsible for the safety of all activities on the Site.

18.2 The Contractor shall:

(a) comply with all applicable health and safety regulations and Laws;

(b) comply with all applicable health and safety obligations specified in the Contract;

(c) take care for the health and safety of all persons entitled to be on the Site and other places, if any, where the Works are being executed;

(d) keep the Site and Works clear of unnecessary obstruction so as to avoid danger to these persons;

(e) provide fencing, lighting, safe access, guarding and watching of the Works until the issue of the Contract Certificate of Completion;

(f) provide any Temporary Works (including roadways, footways, guards and fences) which may be necessary, because of the execution of the Works, for the use and protection of the public and of owners and occupiers of adjacent land;

(g) provide health and safety training of Contractor's Personnel as appropriate and maintain training records;

(h) actively engage the Contractor's Personnel in promoting understanding, and methods for, implementation of health and safety requirements, as well as in providing information to Contractor's Personnel, training on occupational safety and health, and provision of personal protective equipment without expense to the Contractor's Personnel;

(i) put in place workplace processes for Contractor's Personnel to report work situations that they believe are not safe or healthy, and to remove themselves from a work situation which they have reasonable justification to believe presents an imminent and serious danger to their life or health;

(j) Contractor's Personnel who remove themselves from such work situations shall not be required to return to work until necessary remedial action to correct the situation has been taken. Contractor's Personnel shall not be retaliated against or otherwise subject to reprisal or negative action for such reporting or removal;

(k) where the Employer's Personnel, any other contractors employed by the Employer, and/or personnel of any legally constituted public authorities and private utility companies are employed in carrying out, on or near the site, of any work not included in the Contract, collaborate in applying the health and safety requirements, without prejudice to the

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responsibility of the relevant entities for the health and safety of their own personnel; and

(l) establish and implement a system for regular (not less than six-monthly) review of health and safety performance and the working environment.

Subject to GCC Sub-Clause 16.2, the Contractor shall submit to the Project Manager for its approval a health and safety manual which has been specifically prepared for the Works, the Site and other places (if any) where the Contractor intends to execute the Works.

The health and safety manual shall be in addition to any other similar document required under applicable health and safety regulations and laws.

The health and safety manual shall set out all the health and safety requirements under the Contract,

(b) which shall include at a minimum:

(vii) the procedures to establish and maintain a safe working environment without risk to health at all workplaces, machinery, equipment and processes under the control of the Contractor, including control measures for chemical, physical and biological substances and agents;

(viii) details of the training to be provided, records to be kept;

(ix) the procedures for prevention, preparedness and response activities to be implemented in the case of an emergency event (i.e. an unanticipated incident, arising from both natural and man-made hazards, typically in the form of fire, explosions, leaks or spills, which may occur for a variety of different reasons including failure to implement operating procedures that are designed to prevent their occurrence, extreme weather or lack of early warning);

(x) remedies for adverse impacts such as occupational injuries, deaths, disability and disease;

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(xi) the measures to be taken to avoid or minimize the potential for community exposure to water-borne, water-based, water-related, and vector-borne diseases,

(xii) the measures to be implemented to avoid or minimize the spread of communicable diseases (including transfer of Sexually Transmitted Diseases or Infections (STDs), such as HIV virus) and non-communicable diseases associated with the execution of the Works, taking into consideration differentiated exposure to and higher sensitivity of vulnerable groups. This includes taking measures to avoid or minimize the transmission of communicable diseases that may be associated with the influx of temporary or permanent Contract-related labor;

(xiii) the policies and procedures on the management and quality of accommodation and welfare facilities if such accommodation and welfare facilities are provided by the Contractor in accordance with GCC Sub-Clause 9.4.6; and

(c) any other requirements stated in the Specification.

18.3 Protection of the environment

(a) The Contractor shall take all necessary measures to: protect the environment (both on and off the Site); and

(b) limit damage and nuisance to people and property resulting from pollution, noise and other results of the Contractor′s operations and/ or activities.

The Contractor shall ensure that emissions, surface discharges, effluent and any other pollutants from the Contractor′s activities shall exceed neither the values indicated in the Specification, nor those prescribed by applicable laws.

In the event of damage to the environment, property and/or nuisance to people, on or off Site as a result of the Contractor′s operations, the Contractor shall agree with the Project Manager the appropriate actions and time scale to remedy, as practicable, the damaged environment to its former condition. The

Contractor shall implement such remedies at its cost to the satisfaction of the Project Manager.

19. Archaeological and Geological Findings

19.1 All fossils, coins, articles of value or antiquity, structures, groups of structures, and other remains or items of geological, archaeological, paleontological, historical, architectural or religious interest found on the Site shall be placed under the care and custody of the Employer. The Contractor shall:

(a) take all reasonable precautions, including fencing-off the area or site of the finding, to avoid further disturbance and prevent Contractor′s Personnel or other persons from removing or damaging any of these findings;

(b) train relevant Contractor′s Personnel on appropriate actions to be taken in the event of such findings; and

(c) implement any other action consistent with the requirements of the Specification and relevant laws.

The Contractor shall, as soon as practicable after discovery of any such finding, notify the Project Manager of such discoveries and carry out the Project Manager′s instructions for dealing with them.

20. Possession of the Site

20.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date **stated in the PCC,** the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.

21. Access to the Site

21.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager (including the Bank staff or consultants acting on the Bank′s behalf, stakeholders and third parties, such as independent experts, local communities, or non-governmental organizations), including to carry out environmental and social audit, as appropriate, access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

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22. Instructions, Inspections and Audits

22.1 The Contractor shall carry out all instructions of the Project Manager which comply with the applicable laws where the Site is located.

22.2 The Contractor shall keep, and shall make all reasonable efforts to cause its Subcontractors and sub-consultants to keep, accurate and systematic accounts and records in respect of the Works in such form and details as will clearly identify relevant time changes and costs.

22.3 Inspections & Audit by the Bank

Pursuant to paragraph 2.2 e. of Appendix A to the GCC- Fraud and Corruption, the Contractor shall permit and shall cause its agents (where declared or not), subcontractors, sub-consultants, service providers, suppliers, and personnel, to permit, the Bank and/or persons appointed by the Bank to inspect the site and/or the accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have such accounts, records and other documents audited by auditors appointed by the Bank. The Contractor's and its Subcontractors' and sub-consultants' attention is drawn to GCC Sub-Clause 25.1 (Fraud and Corruption) which provides, inter alia, that acts intended to materially impede the exercise of the Bank's inspection and audit rights constitute a prohibited practice subject to contract termination (as well as to a determination of ineligibility pursuant to the Bank's prevailing sanctions procedures).

23. Appointment of the Adjudicator

23.1 The Adjudicator shall be appointed jointly by the Employer and the Contractor, at the time of the Employer's issuance of the Letter of Acceptance. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority **designated in the PCC**, to appoint the Adjudicator within 14 days of receipt of such request.

23.2 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and

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the Contractor, within 30 days, the Adjudicator shall be designated by the Appointing Authority **designated in the PCC** at the request of either party, within 14 days of receipt of such request.

24. Procedure for Disputes

24.1 If the Contractor believes that a decision taken by the Project Manager was either outside the authority given to the Project Manager by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within 14 days of the notification of the Project Manager's decision.

24.2 The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.

24.3 The Adjudicator shall be paid by the hour at the **rate specified in the PCC,** together with reimbursable expenses of the types **specified in the PCC**, and the cost shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Adjudicator. Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator's written decision. If neither party refers the dispute to arbitration within the above 28 days, the Adjudicator's decision shall be final and binding.

24.4 The arbitration shall be conducted in accordance with the arbitration procedures published by the institution named and in the place **specified in the PCC.**

25. Fraud and Corruption

25.1 The Bank requires compliance with the Bank's Anti-Corruption Guidelines and its prevailing sanctions policies and procedures as set forth in the WBG's Sanctions Framework, as set forth in Appendix A to the GCC.

25.2 The Employer requires the Contractor to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the bidding process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.

26. Stakeholder Engagement

26.1 The Contractor shall provide relevant contract-related information, as the Employer and/or Project Manager may

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reasonably request to conduct Stakeholder engagements. "Stakeholder" refers to individuals or groups who:

(iii) are affected or likely to be affected by the Contract; and

(iv) may have an interest in the Contract.

The Contractor may also directly participate in Stakeholder engagements, as the Employer and/or Project Manager may reasonably request.

27. Suppliers (other than Subcontractors)

27.1 Forced Labor: The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage forced labor including trafficked persons as described in GCC Sub-Clause 9.4.14. If forced labor/trafficking cases are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.

27.2 *Child Labor:* The Contractor shall take measures to require its suppliers (other than Subcontractors) not to employ or engage child labor as described in GCC Sub-Clause 9.4.15. If child labor cases are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.

27.3 *Serious Safety Issues:* The Contractor, including its Subcontractors, shall comply with all applicable safety obligations, including as stated in GCC Sub-Clause 18.2. The Contractor shall also take measures to require its suppliers (other than Subcontractors) to adopt procedures and mitigation measures adequate to address safety issues related to their personnel. If serious safety issues are identified, the Contractor shall take measures to require the suppliers to take appropriate steps to remedy them. Where the supplier does not remedy the situation, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to manage such risks.

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27.4 *Obtaining natural resource materials in relation to supplier:* The Contractor shall obtain natural resource *materials* from suppliers that can demonstrate, through compliance with the applicable verification and/ or certification requirements, that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats such as unsustainably harvested wood products, gravel or sand extraction from river beds or beaches.

If a supplier cannot continue to demonstrate that obtaining such materials is not contributing to the risk of significant conversion or significant degradation of natural or critical habitats, the Contractor shall within a reasonable period substitute the supplier with a supplier that is able to demonstrate that they are not significantly adversely impacting the habitats.

28. Code of Conduct

28.1 The Contractor shall have a Code of Conduct for the Contractor's Personnel.

The Contractor shall take all necessary measures to ensure that each Contractor's Personnel is made aware of the Code of Conduct including specific behaviors that are prohibited, and understands the consequences of engaging in such prohibited behaviors.

These measures include providing instructions and documentation that can be understood by the Contractor's Personnel and seeking to obtain that person's signature acknowledging receipt of such instructions and/or documentation, as appropriate.

The Contractor shall also ensure that the Code of Conduct is visibly displayed in multiple locations on the Site and any other place where the Works will be carried out, as well as in areas outside the Site accessible to the local community and project affected people. The posted Code of Conduct shall be provided in languages comprehensible to Contractor's Personnel, Employer's Personnel and the local community.

The Contractor's Management Strategy and Implementation Plans shall include appropriate processes for the Contractor to verify compliance with these obligations.

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29. Security of the Site

29.1 The Contractor shall be responsible for the security of the Site, and:

(a) for keeping unauthorized persons off the Site;

(b) authorized persons shall be limited to the Contractor′s Personnel, the Employer′s Personnel, and to any other personnel identified as authorized personnel (including the Employer′s other contractors on the Site), by a notice from the Employer or the Project Manager to the Contractor.

Subject to GCC Sub-Clause 16.2, the Contractor shall submit for the Project Manager′s No-objection a security management plan that sets out the security arrangements for the Site.

The Contractor shall (i) conduct appropriate background checks on any personnel retained to provide security; (ii) train the security personnel adequately (or determine that they are properly trained) in the use of force (and where applicable, firearms), and appropriate conduct towards Contractor′s Personnel, Employer′s Personnel and affected communities; and (iii) require the security personnel to act within the applicable Laws and any requirements set out in the Specification.

The Contractor shall not permit any use of force by security personnel in providing security except when used for preventive and defensive purposes in proportion to the nature and extent of the threat.

In making security arrangements, the Contractor shall also comply with any additional requirements stated in the Specifications

B. Time Control

30. Program and Progress Reports

30.1 Within the time **stated in the PCC**, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump-sum contract, the activities in the

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Program shall be consistent with those in the Activity Schedule. The Project Manager's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and Compensation Events.

30.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.

30.3 The Contractor shall monitor progress of the Works and submit to the Project manager progress report and any updated Program showing the actual progress achieved and the effect of the progress achieved on the timing of the remaining Works, including any changes to the sequence of the activities, at intervals no longer than the periods **stated in the PCC.** If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount **stated in the PCC** from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted. In the case of lump-sum Contract, the Contractor shall provide an updated Activity Schedule within 14 days of being instructed to by the Project Manager.

30.4 Unless otherwise stated in the Specification, each progress report shall include the Environmental and Social (ES) metrics set out in Appendix B.

30.5 In addition to the progress reports, the Contractor shall inform the Project Manager immediately of any allegation, incident or accident in the Site, which has or is likely to have a significant adverse effect on the environment, the affected communities, the public, Employer′s Personnel or Contractor′s Personnel. This includes, but is not limited to, any incident or accident causing fatality or serious injury; significant adverse effects or damage to private property; or any allegation of SEA and/or SH. In case of SEA and/or SH, while maintaining confidentiality as appropriate, the type of allegation (sexual exploitation, sexual abuse or sexual

harassment), gender and age of the person who experienced the alleged incident should be included in the information.

The Contractor, upon becoming aware of the allegation, incident or accident, shall also immediately inform the Project Manager of any such incident or accident on the Subcontractors′ or suppliers′ premises relating to the Works which has or is likely to have a significant adverse effect on the environment, the affected communities, the public, Employer′s Personnel, or Contractor′s, its Subcontractors′ and suppliers′ personnel. The notification shall provide sufficient detail regarding such incidents or accidents. The Contractor shall provide full details of such incidents or accidents to the Project Manager within the timeframe agreed with the Project Manager.

The Contractor shall require its Subcontractors and suppliers (other than Subcontractors) to immediately notify the Contractor of any incidents or accidents referred to in this Sub-clause.

31. Extension of the Intended Completion Date

31.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.

31.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

32. Acceleration

32.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the Employer accepts these proposals, the

Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor.

32.2 If the Contractor's priced proposals for an acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.

33. Delays Ordered by the Project Manager

33.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.

34. Management Meetings

34.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

34.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

35. Early Warning

35.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.

35.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.

C. Quality Control

36. Identifying Defects

36.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such

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checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.

37. Tests

37.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.

38. Correction of Defects

38.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is **defined in the PCC.** The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

38.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.

39. Uncorrected Defects

39.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount.

D. Cost Control

40. Contract Price[2]

40.1 The Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item.

[2] In lump-sum contracts, replace GCC Sub-Clause 40.1 as follows:

40.1 The Contractor shall provide updated Activity Schedules within 14 days of being instructed to by the Project Manager. The Activity Schedule shall contain the priced activities for the Works to be performed by the Contractor. The Activity Schedule is used to monitor and control the performance of activities on which basis the Contractor will be paid. If payment for materials on site shall be made separately, the Contractor shall show delivery of Materials to the Site separately on the Activity Schedule.

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41. Changes in the Contract Price[3]

41.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change. The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Employer.

41.2 If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.

42. Variations

42.1 All Variations shall be included in updated Programs[4] produced by the Contractor.

42.2 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Contractor shall also provide information of any ES risks and impacts of the Variation. The Project Manager shall assess the quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.

42.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.

42.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

42.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.

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[3] In lump-sum contracts, replace entire GCC Clause 41 with new GCC Sub-Clause 41.1, as follows:
41.1 The Activity Schedule shall be amended by the Contractor to accommodate changes of Program or method of working made at the Contractor's own discretion. Prices in the Activity Schedule shall not be altered when the Contractor makes such changes to the Activity Schedule.

[4] In lump-sum contracts, add "and Activity Schedules" after "Programs."

42.6 If the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in GCC Sub-Clause 41.1 or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work. [5]

42.7 Value Engineering: The Contractor may prepare, at its own cost, a value engineering proposal at any time during the performance of the contract. The value engineering proposal shall, at a minimum, include the following;

(a) the proposed change(s), and a description of the difference to the existing contract requirements;

(b) a full cost/benefit analysis of the proposed change(s) including a description and estimate of costs (including life cycle cost) the Employer may incur in implementing the value engineering proposal;

(c) a description of any effect(s) of the change on performance/functionality; and

(d) a description of the proposed work to be performed, a program for its execution and sufficient ES information to enable an evaluation of ES risks and impacts.

The Employer may accept the value engineering proposal if the proposal demonstrates benefits that:

(a) accelerates the contract completion period; or

(b) reduces the Contract Price or the life cycle costs to the Employer; or

(c) improves the quality, efficiency, safety or sustainability of the Facilities; or

(d) yields any other benefits to the Employer,

without compromising the functionality of the Works.

[5] In lump-sum contracts, delete this paragraph.

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If the value engineering proposal is approved by the Employer and results in:

(a) a reduction of the Contract Price; the amount to be paid to the Contractor shall be the **percentage specified in the PCC** of the reduction in the Contract Price; or

(b) an increase in the Contract Price; but results in a reduction in life cycle costs due to any benefit described in (a) to (d) above, the amount to be paid to the Contractor shall be the full increase in the Contract Price.

43. Cash Flow Forecasts

43.1 When the Program,[6] is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall include different currencies, as defined in the Contract, converted as necessary using the Contract exchange rates.

44. Payment Certificates

44.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.

44.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor.

44.3 The value of work executed shall be determined by the Project Manager.

44.4 The value of work executed shall comprise the value of the quantities of work in the Bill of Quantities that have been completed.[7]

44.5 The value of work executed shall include the valuation of Variations and Compensation Events.

44.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

44.7 If the Contractor was, or is, failing to perform any ES obligations or work under the Contract, the value of this work or obligation, as determined by the Project Manager, may be

6 In lump-sum contracts, add "or Activity Schedule" after "Program."

7 In lump-sum contracts, replace this paragraph with the following: "The value of work executed shall comprise the value of completed activities in the Activity Schedule."

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withheld until the work or obligation has been performed, and/or the cost of rectification or replacement, as determined by the Project Manager, may be withheld until rectification or replacement has been completed. Failure to perform includes, but is not limited to the following:

(a) failure to comply with any ES obligations or work described in the Works' Requirements which may include: working outside site boundaries, excessive dust, failure to keep public roads in a safe usable condition, damage to offsite vegetation, pollution of water courses from oils or sedimentation, contamination of land e.g. from oils, human waste, damage to archeology or cultural heritage features, air pollution as a result of unauthorized and/or inefficient combustion;

(b) failure to regularly review C-ESMP and/or update it in a timely manner to address emerging ES issues, or anticipated risks or impacts;

(c) failure to implement the C-ESMP e.g. failure to provide required training or sensitization;

(d) failing to have appropriate consents/permits prior to undertaking Works or related activities;

(e) failure to submit ES report/s (as described in Appendix B), or failure to submit such reports in a timely manner;

(f) failure to implement remediation as instructed by the Project Manager within the specified timeframe (e.g. remediation addressing non-compliance/s).

45. Payments

45.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of interest for commercial borrowing for each of the currencies in which payments are made.

45.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

45.3 Unless otherwise stated, all payments and deductions shall be paid or charged in the proportions of currencies comprising the Contract Price.

45.4 Items of the Works for which no rate or price has been entered in shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

46. Compensation Events

46.1 The following shall be Compensation Events:

(a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC Sub-Clause 20.1.

(b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.

(c) The Project Manager orders a delay or does not issue Drawings, Specification, or instructions required for execution of the Works on time.

(d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.

(e) The Project Manager unreasonably does not approve a subcontract to be let.

(f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.

(g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.

(h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.

(i) The advance payment is delayed.

(j) The effects on the Contractor of any of the Employer's Risks.

(k) The Project Manager unreasonably delays issuing a Certificate of Completion.

46.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

46.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event.

46.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.

47. Tax

47.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 days before the submission of bids for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC Clause 49.

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48. Currencies

48.1 Where payments are made in currencies other than the currency of the Employer's country **specified in the PCC,** the exchange rates used for calculating the amounts to be paid shall be the exchange rates stated in the Contractor's Bid.

49. Price Adjustment

49.1 Prices shall be adjusted for fluctuations in the cost of inputs only if **provided for in the PCC.** If so provided, the amounts certified in each payment certificate, before deducting for Advance Payment, shall be adjusted by applying the respective price adjustment factor to the payment amounts due in each currency. A separate formula of the type specified below applies to each Contract currency:

$$\mathbf{P_c = A_c + B_c\ Imc/Ioc}$$

where:

P_c is the adjustment factor for the portion of the Contract Price payable in a specific currency "c."

A_c and B_c are coefficients[8] **specified in the PCC,** representing the nonadjustable and adjustable portions, respectively, of the Contract Price payable in that specific currency "c;" and

Imc is the index prevailing at the end of the month being invoiced and Ioc is the index prevailing 28 days before Bid opening for inputs payable; both in the specific currency "c."

49.2 If the value of the index is changed after it has been used in a calculation, the calculation shall be corrected and an adjustment made in the next payment certificate. The index value shall be deemed to take account of all changes in cost due to fluctuations in costs.

50. Retention

50.1 The Employer shall retain from each payment due to the Contractor the proportion **stated in the PCC** until Completion of the whole of the Works.

[8] The sum of the two coefficients A_c and B_c should be 1 (one) in the formula for each currency. Normally, both coefficients shall be the same in the formulae for all currencies, since coefficient A, for the nonadjustable portion of the payments, is a very approximate figure (usually 0.15) to take account of fixed cost elements or other nonadjustable components. The sum of the adjustments for each currency are added to the Contract Price.

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50.2 Upon the issue of a Certificate of Completion of the Works by the Project Manager, in accordance with GCC Sub-Clause 57.1, half the total amount retained shall be repaid to the Contractor and half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected. The Contractor may substitute retention money with an "on demand" Bank guarantee.

51. Liquidated Damages

51.1 The Contractor shall pay liquidated damages to the Employer at the rate per day **stated in the PCC** for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount **defined in the PCC.** The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.

51.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC Sub-Clause 45.1.

52. Bonus

52.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day **stated in the PCC** for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.

53. Advance Payment

53.1 The Employer shall make advance payment to the Contractor of the amounts **stated in the PCC** by the date **stated in the PCC,** against provision by the Contractor of an Unconditional Bank Guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The Guarantee shall remain effective until the advance payment has been repaid, but the amount of the Guarantee shall be

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progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment.

53.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.

53.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.

54. Securities

54.1 The Performance Security, and if so **specified in the PCC** an environmental and social (ES) performance security, shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in an amount **specified in the PCC,** by a bank or surety acceptable to the Employer, and denominated in the types and proportions of the currencies in which the Contract Price is payable. The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a Bank Guarantee, and until one year from the date of issue of the Certificate of Completion in the case of a Performance Bond.

55. Dayworks

55.1 If applicable, the Dayworks rates in the Contractor's Bid shall be used only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.

55.2 All work to be paid for as Dayworks shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within two days of the work being done.

55.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.

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56. Cost of Repairs

56.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. Finishing the Contract

57. Completion

57.1 The Contractor shall request the Project Manager to issue a Certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the whole of the Works is completed.

58. Taking Over

58.1 The Employer shall take over the Site and the Works within seven days of the Project Manager's issuing a Certificate of Completion.

59. Final Account

59.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.

60. Operating and Maintenance Manuals

60.1 If "as built" Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates **stated in the PCC.**

60.2 If the Contractor does not supply the Drawings and/or manuals by the dates **stated in the PCC** pursuant to GCC Sub-Clause 60.1**,** or they do not receive the Project Manager's approval, the Project Manager shall withhold the amount **stated in the PCC** from payments due to the Contractor.

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61. Termination

61.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

61.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:

(a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager;

(b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 days;

(c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;

(d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 84 days of the date of the Project Manager's certificate;

(e) the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;

(f) the Contractor does not maintain a Security, which is required;

(g) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as **defined in the PCC**; or

(h) if the Contractor, in the judgment of the Employer has engaged in Fraud and Corruption, as defined in paragraph 2.2 a of the Appendix A to the GCC, in competing for or in executing the Contract, then the Employer may, after giving fourteen (14) days written notice to the Contractor, terminate the Contract and expel him from the Site.

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61.3 Notwithstanding the above, the Employer may terminate the Contract for convenience.

61.4 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

61.5 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under GCC Sub-Clause 61.2 above, the Project Manager shall decide whether the breach is fundamental or not.

62. Payment upon Termination

62.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed, as **specified in the PCC.** Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.

62.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.

63. Property

63.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.

64. Release from Performance

64.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving

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this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which a commitment was made.

65. Suspension of Bank Loan or Credit

65.1 In the event that the Bank suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made:

(a) The Employer is obligated to notify the Contractor of such suspension within 7 days of having received the Bank's suspension notice.

(b) If the Contractor has not received sums due to it within the 28 days for payment provided for in GCC Sub-Clause 45.1, the Contractor may immediately issue a 14-day termination notice.

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APPENDIX A
TO GENERAL CONDITIONS

Fraud and Corruption

(Text in this Appendix shall not be modified)

1. Purpose

1.1 The Bank's Anti-Corruption Guidelines and this annex apply with respect to procurement under Bank Investment Project Financing operations.

2. Requirements

2.1 The Bank requires that Borrowers (including beneficiaries of Bank financing); bidders (applicants/proposers), consultants, contractors and suppliers; any sub-contractors, sub-consultants, service providers or suppliers; any agents (whether declared or not); and any of their personnel, observe the highest standard of ethics during the procurement process, selection and contract execution of Bank-financed contracts, and refrain from Fraud and Corruption.

2.2 To this end, the Bank:

a. Defines, for the purposes of this provision, the terms set forth below as follows:

i. "corrupt practice" is the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence improperly the actions of another party;

ii. "fraudulent practice" is any act or omission, including misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain financial or other benefit or to avoid an obligation;

iii. "collusive practice" is an arrangement between two or more parties designed to achieve an improper purpose, including to influence improperly the actions of another party;

iv. "coercive practice" is impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;

v. "obstructive practice" is:

(a) deliberately destroying, falsifying, altering, or concealing of evidence material to the investigation or making false statements to investigators in order to materially impede a Bank investigation into allegations of a corrupt, fraudulent, coercive, or collusive practice; and/or threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation; or

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(b) acts intended to materially impede the exercise of the Bank's inspection and audit rights provided for under paragraph 2.2 e. below.

b. Rejects a proposal for award if the Bank determines that the firm or individual recommended for award, any of its personnel, or its agents, or its sub-consultants, sub-contractors, service providers, suppliers and/ or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract in question;

c. In addition to the legal remedies set out in the relevant Legal Agreement, may take other appropriate actions, including declaring misprocurement, if the Bank determines at any time that representatives of the Borrower or of a recipient of any part of the proceeds of the loan engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices during the procurement process, selection and/or execution of the contract in question, without the Borrower having taken timely and appropriate action satisfactory to the Bank to address such practices when they occur, including by failing to inform the Bank in a timely manner at the time they knew of the practices;

d. Pursuant to the Bank's Anti- Corruption Guidelines and in accordance with the Bank's prevailing sanctions policies and procedures, may sanction a firm or individual, either indefinitely or for a stated period of time, including by publicly declaring such firm or individual ineligible (i) to be awarded or otherwise benefit from a Bank-financed contract, financially or in any other manner;1 (ii) to be a nominated2 sub-contractor, consultant, manufacturer or supplier, or service provider of an otherwise eligible firm being awarded a Bank-financed contract; and (iii) to receive the proceeds of any loan made by the Bank or otherwise to participate further in the preparation or implementation of any Bank-financed project;

e. Requires that a clause be included in bidding/request for proposals documents and in contracts financed by a Bank loan, requiring (i) bidders(applicants/proposers), consultants, contractors, and suppliers, and their sub-contractors, sub-consultants, service providers, suppliers, agents personnel, permit the Bank to inspect[3] all accounts, records and other documents relating to the procurement process, selection and/or contract execution, and to have them audited by auditors appointed by the Bank.

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1 For the avoidance of doubt, a sanctioned party's ineligibility to be awarded a contract shall include, without limitation, (i) applying for pre-qualification, expressing interest in a consultancy, and bidding, either directly or as a nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider, in respect of such contract, and (ii) entering into an addendum or amendment introducing a material modification to any existing contract.

2 A nominated sub-contractor, nominated consultant, nominated manufacturer or supplier, or nominated service provider (different names are used depending on the particular bidding document) is one which has been: (i) included by the bidder in its pre-qualification application or bid because it brings specific and critical experience and know-how that allow the bidder to meet the qualification requirements for the particular bid; or (ii) appointed by the Borrower.

3 Inspections in this context usually are investigative (i.e., forensic) in nature. They involve fact-finding activities undertaken by the Bank or persons appointed by the Bank to address specific matters related to investigations/audits, such as evaluating the veracity of an allegation of possible Fraud and Corruption, through the appropriate mechanisms. Such activity includes but is not limited to: accessing and examining a firm's or individual's financial records and information, and making copies thereof as relevant; accessing and examining any other documents, data and information (whether in hard copy or electronic format) deemed relevant for the investigation/audit, and making copies thereof as relevant; interviewing staff and other relevant individuals; performing physical inspections and site visits; and obtaining third party verification of information.

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APPENDIX B

Environmental and Social (ES)

Metrics for Progress Reports

[Note to Employer: the following metrics may be amended to reflect the specifics of the Contract. The Employer shall ensure that the metrics provided are appropriate for the Works and impacts/key issues identified in the environmental and social assessment]

Metrics for regular reporting:

a. environmental incidents or non-compliances with contract requirements, including contamination, pollution or damage to ground or water supplies;

b. health and safety incidents, accidents, injuries that require treatment and all fatalities;

c. interactions with regulators: identify agency, dates, subjects, outcomes (report the negative if none);

d. status of all permits and agreements:

i. work permits: number required, number received, actions taken for those not received;

ii. status of permits and consents:

- list areas/facilities with permits required (quarries, asphalt & batch plants), dates of application, dates issued (actions to follow up if not issued), dates submitted to resident engineer (or equivalent), status of area (waiting for permits, working, abandoned without reclamation, decommissioning plan being implemented, etc.);
- list areas with landowner agreements required (borrow and spoil areas, camp sites), dates of agreements, dates submitted to resident engineer (or equivalent);
- identify major activities undertaken in each area in the reporting period and highlights of environmental and social protection (land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation);
- for quarries: status of relocation and compensation (completed, or details of activities and current status in the reporting period).

e. health and safety supervision:

i. safety officer: number days worked, number of full inspections & partial inspections, reports to construction/project management;

ii. number of workers, work hours, metric of PPE use (percentage of workers with full personal protection equipment (PPE), partial, etc.), worker violations observed (by type of violation, PPE or otherwise), warnings given, repeat warnings given, follow-up actions taken (if any);

f. worker accommodations:

i. number of expats housed in accommodations, number of locals;

ii. date of last inspection, and highlights of inspection including status of accommodations' compliance with national and local law and good practice, including sanitation, space, etc.;

iii. actions taken to recommend/require improved conditions, or to improve conditions.

g. Health services: provider of health services, information and/or training, location of clinic, number of non-safety disease or illness treatments and diagnoses (no names to be provided);

h. gender (for expats and locals separately): number of female workers, percentage of workforce, gender issues raised and dealt with (cross-reference grievances or other sections as needed);

i. training:

i. number of new workers, number receiving induction training, dates of induction training;

ii. number and dates of toolbox talks, number of workers receiving Occupational Health and Safety (OHS), environmental and social training;

iii. number and dates of communicable diseases (including STDs) sensitization and/or training, no. workers receiving training (in the reporting period and in the past); same questions for gender sensitization, flag person training.

iv. number and date of SEA and SH prevention sensitization and/or training events, including number of workers receiving training on Code of Conduct for Contractor's Personnel (in the reporting period and in the past), etc.

j. environmental and social supervision:

i. environmentalist: days worked, areas inspected and numbers of inspections of each (road section, work camp, accommodations, quarries, borrow areas, spoil areas, swamps, forest crossings, etc.), highlights of activities/findings (including

violations of environmental and/or social best practices, actions taken), reports to environmental and/or social specialist/construction/site management;

ii. sociologist: days worked, number of partial and full site inspections (by area: road section, work camp, accommodations, quarries, borrow areas, spoil areas, clinic, HIV/AIDS centre, community centres, etc.), highlights of activities (including violations of environmental and/or social requirements observed, actions taken), reports to environmental and/or social specialist/construction/site management; and

iii. community liaison person(s): days worked (hours community centre open), number of people met, highlights of activities (issues raised, etc.), reports to environmental and/or social specialist /construction/site management.

k. *Grievances*: list new grievances (e.g. number of allegations of SEA and SH) received in the reporting period and number of unresolved past grievances by date received, complainant's age and sex, how received, to whom referred to for action, resolution and date (if completed), data resolution reported to complainant, any required follow-up (Cross-reference other sections as needed):

i. Worker grievances;

ii. Community grievances

l. *Traffic, road safety and vehicles/equipment:*

i. traffic and road safety incidents and accidents involving project vehicles & equipment: provide date, location, damage, cause, follow-up;

ii. traffic and road safety incidents and accidents involving non-project vehicles or property (also reported under immediate metrics): provide date, location, damage, cause, follow-up;

iii. overall condition of vehicles/equipment (subjective judgment by environmentalist); non-routine repairs and maintenance needed to improve safety and/or environmental performance (to control smoke, etc.).

m. *Environmental mitigations and issues (what has been done):*

i. dust: number of working bowsers, number of watering/day, number of complaints, warnings given by environmentalist, actions taken to resolve; highlights of quarry dust control (covers, sprays, operational status); % of rock/ spoil lorries with covers, actions taken for uncovered vehicles;

ii. erosion control: controls implemented by location, status of water crossings, environmentalist inspections and results, actions taken to resolve issues, emergency repairs needed to control erosion/sedimentation;

iii. quarries, borrow areas, spoil areas, asphalt plants, batch plants: identify major activities undertaken in the reporting period at each, and highlights of environmental and social protection: land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, decommissioning implementation;

iv. blasting: number of blasts (and locations), status of implementation of blasting plan (including notices, evacuations, etc.), incidents of off-site damage or complaints (cross-reference other sections as needed);

v. spill clean-ups, if any: material spilled, location, amount, actions taken, material disposal (report all spills that result in water or soil contamination;

vi. waste management: types and quantities generated and managed, including amount taken offsite (and by whom) or reused/recycled/disposed on-site;

vii. details of tree plantings and other mitigations required undertaken in the reporting period;

viii. details of water and swamp protection mitigations required undertaken in the reporting period.

n. compliance:

i. compliance status for conditions of all relevant consents/permits, for the Work, including quarries, etc.): statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance;

ii. compliance status of C-ESMP/ESIP requirements: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance

iii. compliance status of SEA and SH prevention and response action plan: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance

iv. compliance status of Health and Safety Management Plan re: statement of compliance or listing of issues and actions taken (or to be taken) to reach compliance

v. other unresolved issues from previous reporting periods related to environmental and social: continued violations, continued failure of equipment, continued lack of vehicle covers, spills not dealt with, continued compensation or blasting issues, etc. Cross-reference other sections as needed.

APPENDIX C
Sexual Exploitation and Abuse (SEA) and/or Sexual Harassment (SH) Performance Declaration for Subcontractors

[The following table shall be filled in by each subcontractor proposed by the Contractor, that was not named in the Contract]

Subcontractor's Name: *[insert full name]*
Date: *[insert day, month, year]*

Contract reference *[insert contract reference]*
Page *[insert page number]* of *[insert total number]* pages

SEA and/or SH Declaration
We: ☐ (a) have not been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations. ☐ (b) are subject to disqualification by the Bank for non-compliance with SEA/ SH obligations. ☐ (c) had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations. An arbitral award on the disqualification case has been made in our favor. ☐ (d) had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations for a period of two years. We have subsequently demonstrated that we have adequate capacity and commitment to comply with SEA /SH obligations. ☐ (e) had been subject to disqualification by the Bank for non-compliance with SEA/ SH obligations for a period of two years. We have attached specific evidence demonstrating that we have adequate capacity and commitment to comply with SEA and SH obligations.
[*If (c) above is applicable, attach evidence of an arbitral award reversing the findings on the issues underlying the disqualification.]*
[If (d) or (e) above are applicable, provide the following information:]
Period of disqualification: From: _____ To: _____
If previously provided on another Bank financed works contract, details of evidence that demonstrated adequate capacity and commitment to comply with SEA/SH obligations (**as per (d) above)** Name of Employer: _____

Name of Project: _____ Contract description: _____ Brief summary of evidence provided: _____ _____ Contact Information: (Tel, email, name of contact person): _____ _____
As an alternative to the evidence under (d), other evidence demonstrating adequate capacity and commitment to comply with SEA/SH obligations (**as per (e) above)** *[attach details as appropriate]*. _____ _____

Name of the Subcontractor_____

Name of the person duly authorized to sign on behalf of the Subcontractor_____

Title of the person signing on behalf of the Subcontractor_____

Signature of the person named above_____

Date signed _____ day of _____, _____

Countersignature of authorized representative of the Contractor:

Signature: _____

Section IX - Particular Conditions of Contract

Except where otherwise specified, all Particular Conditions of Contract should be filled in by the Employer prior to issuance of the bidding document. Schedules and reports to be provided by the Employer should be annexed.

A. General	
GCC 1.1 (d)	The financing institution is: **World Bank**
GCC 1.1 (r)	The Employer is **Chief officer** **County Government of Kajiado** **Department of Agriculture and Fisheries** **P. O Box 54-01100 Kajiado**
GCC 1.1 (v)	The Intended Completion Date for the whole of the Works shall be **365days from the date of commencement**
GCC 1.1 (y)	The Project Manager is **Eng Wilfred Onchoke,**
GCC 1.1 (aa)	The Site is located at **Imbirikani/Eselenkei ward, Isinet location**
GCC 1.1 (dd)	The Start Date shall be **SHALL BE ADVISED BY EMPLOYER.**
GCC 1.1 (hh)	The Works consist of Preliminary and General Works, Intake Works, Main Canal, Secondary Canals, Division Boxes, Ring Culverts, Cattle Troughs and Toilet Blocks.
GCC 2.2	Sectional Completions are: **Not Applicable**
GCC 2.3(i)	The following documents also form part of the Contract: **Not Applicable**
GCC 3.1	The language of the contract is **English.** The law that applies to the Contract is the law of **Republic of Kenya**.
GCC 5.1	The Project manager **May** delegate any of his duties and responsibilities.
GCC 8.1	Schedule of other contractors: **Not Applicable**

GCC 13.1	The minimum insurance amounts and deductibles shall be: (a) for loss or damage to the Works, Plant and Materials: **100% Contract Sum.** (b) For loss or damage to Equipment:**100% Contract Sum.** (c) for loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract **as per the existing government policies, laws and regulations** (d) for personal injury or death: (i) of the Contractor's employees: **as per the medical assessment report, existing government policy, laws and regulation and court ruling** (ii) of other people: **as per the medical assessment report, existing government policy laws and regulation and court ruling**
GCC 14.1	Site Data are: the scheme is situated about 24km from Loitoktok town,and the canal intake is immediately off the Loitoktok-Emali tarmac road opposite Enkongu/IsinetRiver bridge and 400m from Isinet town centre, Generally the area adulating slopy area with well drained soils.
GCC 20.1	The Site Possession Date(s) shall be: **IMMEDIATELY AFTER COMMENCMENT DATE**
GCC 23.1 & **GCC 23.2**	Appointing Authority for the Adjudicator: **Charted institute of Arbitrators (**(CIArb) KENYA Chapter) Kilimani Mediation Center P.O Box 2312-00100 Nairobi Kilimani Nairobi Kenya info@kilimanimediationcenter.co.ke
GCC 24.3	Hourly rate and types of reimbursable expenses to be paid to the Adjudicator: ***Kshs. 25,000/-***.
GCC 24.4	Institution whose arbitration procedures shall be used: **Charted institute of Arbitrators(CIArb) Kenya Chapter**
B. Time Control	

GCC 30.1	The Contractor shall submit for approval a Program for the Works within ***14*** days from the date of the Letter of Acceptance.
GCC 30.3	The period between Program updates is ***28*** days. The amount to be withheld for late submission of an updated Program is **5% of interim payment certificate**. The period for submission of progress reports is **28** days.
C. Quality Control	
GCC 38.1	The Defects Liability Period is: ***182*** days.
D. Cost Control	
GCC 42.7	If the value engineering proposal is approved by the Employer the amount to be paid to the Contractor shall be **Not Appropriate** of the reduction in the Contract Price.
GCC 48.1	The currency of the Employer's Country is: **Kenya Shillings**
GCC 49.1	The Contract **is no**t subject to price adjustment in accordance with GCC Clause 45, and the following information regarding coefficients **does not**. The coefficients for adjustment of prices are: (a) For currency **Not Applicable**: (i) **Not Applicable** percent non adjustable element (coefficient A). (ii) **Not Applicable** percent adjustable element (coefficient B). (b) For currency **Not Applicable**: (i) **Not Applicable** percent non adjustable element (coefficient A). (ii) **Not Applicable** percent adjustable element (coefficient B). The Index I for local currency shall be **Not Applicable.** The Index I for the specified international currency shall be *Not Applicable* The Index I for currencies other than the local currency and the specified international currency shall be **Not Applicable.**

GCC 50.1	The proportion of payments retained is: **ten percent (10%)**
GCC 51.1	The liquidated damages for the whole of the Works are **0.166 %** per day. The maximum amount of liquidated damages for the whole of the Works is **ten percent (10%)** of the final Contract Price.
GCC 52.1	The Bonus for the whole of the Works is **Not Applicable** per day. The maximum amount of Bonus for the whole of the Works is ***Not Applicable*** of the final Contract Price.
GCC 53.1	The Advance Payments shall be: **twenty percent (20%) of accepted contract sum** and shall be paid to the Contractor no later than **28 days**.
GCC 54.1	The Performance Security will be in the form of a **Demand guarantee** in the amount(s) of **10%** percent of the Accepted Contract Amount and in the same currency (ies) of the Accepted Contract Amount.
E. Finishing the Contract	
GCC 60.1	The date by which operating and maintenance manuals are required is **within seven days of the project managers issuing a completion certificate**. The date by which "as built" drawings are required is **within seven days of the project managers issuing a completion certificate**.
GCC 60.2	The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required in GCC Sub-Clause 60.1 is ***3,741,605.5***.
GCC 61.2 (g)	The maximum number of days is: **365days**.
GCC 62.1	The percentage to apply to the value of the work not completed, representing the Employer's additional cost for completing the Works, is **115%**.

Section X - Contract Forms

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Notification of Intention to Award

[*This Notification of Intention to Award shall be sent to each Bidder that submitted a Bid.*]

[*Send this Notification to the Bidder's Authorized Representative named in the Bidder Information Form*]
For the attention of Bidder's Authorized Representative
Name: *[insert Authorized Representative's name]*
Address: *[insert Authorized Representative's Address]*
Telephone/Fax numbers: *[insert Authorized Representative's telephone/fax numbers]*
Email Address: *[insert Authorized Representative's email address]*

[IMPORTANT: insert the date that this Notification is transmitted to Bidders. The Notification must be sent to all Bidders simultaneously. This means on the same date and as close to the same time as possible.]
DATE OF TRANSMISSION: This Notification is sent by: [*email/fax*] on [*date*] (local time)

Notification of Intention to Award

Employer: *[insert the name of the Employer]*
Project: *[insert name of project]*
Contract title: *[insert the name of the contract]*
Country: *[insert country where RFB is issued]*
Loan No. /Credit No. / Grant No.: *[insert reference number for loan/credit/grant]*
RFB No: *[insert RFB reference number from Procurement Plan]*

This Notification of Intention to Award (Notification) notifies you of our decision to award the above contract. The transmission of this Notification begins the Standstill Period. During the Standstill Period, you may:

a) request a debriefing in relation to the evaluation of your Bid, and/or

b) submit a Procurement-related Complaint in relation to the decision to award the contract.

1. The successful Bidder

Name:	[*insert name of successful Bidder*]
Address:	[*insert address of the successful Bidder*]
Contract price:	[*insert contract price of the successful Bid*]

2. Other Bidders ***[INSTRUCTIONS: insert names of all Bidders that submitted a Bid. If the Bid's price was evaluated include the evaluated price as well as the Bid price as read out.]***

Name of Bidder	Bid price	Evaluated Bid price (if applicable)
[*insert name*]	[*insert Bid price*]	[*insert evaluated price*]
[*insert name*]	[*insert Bid price*]	[*insert evaluated price*]
[*insert name*]	[*insert Bid price*]	[*insert evaluated price*]
[*insert name*]	[*insert Bid price*]	[*insert evaluated price*]
[*insert name*]	[*insert Bid price*]	[*insert evaluated price*]

3. Reason/s why your Bid was unsuccessful

[INSTRUCTIONS: State the reason/s why <u>this</u> Bidder's Bid was unsuccessful. Do NOT include: (a) a point by point comparison with another Bidder's Bid or (b) information that is marked confidential by the Bidder in its Bid.]

4. How to request a debriefing

DEADLINE: The deadline to request a debriefing expires at midnight on [*insert date*] (local time).

You may request a debriefing in relation to the results of the evaluation of your Bid. If you decide to request a debriefing your written request must be made within three (3) Business Days of receipt of this Notification of Intention to Award.

Provide the contract name, reference number, name of the Bidder, contact details; and address the request for debriefing as follows:

Attention: [*insert full name of person, if applicable*]

Title/position: [*insert title/position*]

Agency: [*insert name of Employer*]

Email address: [*insert email address*]

Fax number: [*insert fax number*] ***delete if not used***

If your request for a debriefing is received within the 3 Business Days deadline, we will provide the debriefing within five (5) Business Days of receipt of your request. If we are

unable to provide the debriefing within this period, the Standstill Period shall be extended by five (5) Business Days after the date that the debriefing is provided. If this happens, we will notify you and confirm the date that the extended Standstill Period will end.

The debriefing may be in writing, by phone, video conference call or in person. We shall promptly advise you in writing how the debriefing will take place and confirm the date and time.

If the deadline to request a debriefing has expired, you may still request a debriefing. In this case, we will provide the debriefing as soon as practicable, and normally no later than fifteen (15) Business Days from the date of publication of the Contract Award Notice.

5. How to make a complaint

Period: Procurement-related Complaint challenging the decision to award shall be submitted by midnight, [*insert date*] (local time).

Provide the contract name, reference number, name of the Bidder, contact details; and address the Procurement-related Complaint as follows:

Attention: [*insert full name of person, if applicable*]

Title/position: [*insert title/position*]

Agency: [*insert name of Employer*]

Email address: [*insert email address*]

Fax number: [*insert fax number*] ***delete if not used***

At this point in the procurement process, you may submit a Procurement-related Complaint challenging the decision to award the contract. You do not need to have requested, or received, a debriefing before making this complaint. Your complaint must be submitted within the Standstill Period and received by us before the Standstill Period ends.

Further information:

For more information see the Procurement Regulations for IPF Borrowers (Procurement Regulations)[https://policies.worldbank.org/sites/ppf3/PPFDocuments/Forms/DispPage.aspx?docid=4005] (Annex III). You should read these provisions before preparing and submitting your complaint. In addition, the World Bank's Guidance "How to make a Procurement-related Complaint" [http://www.worldbank.org/en/projects-operations/products-and-services/brief/procurement-new-framework#framework] provides a useful explanation of the process, as well as a sample letter of complaint.

In summary, there are four essential requirements:

1. You must be an 'interested party'. In this case, that means a Bidder who submitted a Bid in this bidding process, and is the recipient of a Notification of Intention to Award.
2. The complaint can only challenge the decision to award the contract.
3. You must submit the complaint within the period stated above.
4. You must include, in your complaint, all of the information required by the Procurement Regulations (as described in Annex III).

6. Standstill Period

DEADLINE: The Standstill Period is due to end at midnight on [*insert date*] (local time).

The Standstill Period lasts ten (10) Business Days after the date of transmission of this Notification of Intention to Award.

The Standstill Period may be extended as stated in Section 4 above.

If you have any questions regarding this Notification, please do not hesitate to contact us.

On behalf of the Employer:

Signature: _____

Name: _____

Title/position: _____

Telephone: _____

Email: _____

Beneficial Ownership Disclosure Form

INSTRUCTIONS TO BIDDERS: DELETE THIS BOX ONCE YOU HAVE COMPLETED THE FORM

This Beneficial Ownership Disclosure Form ("Form") is to be completed by the successful Bidder. In case of joint venture, the Bidder must submit a separate Form for each member. The beneficial ownership information to be submitted in this Form shall be current as of the date of its submission.

For the purposes of this Form, a Beneficial Owner of a Bidder is any natural person who ultimately owns or controls the Bidder by meeting one or more of the following conditions:

- *directly or indirectly holding 25% or more of the shares*
- *directly or indirectly holding 25% or more of the voting rights*
- *directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Bidder*

RFB No.: [*insert number of RFB process*]
Request for Bid No.: [*insert identification*]

To: **[*insert complete name of Employer*]**

In response to your request in the Letter of Acceptance *dated [insert date of letter of Acceptance]* to furnish additional information on beneficial ownership: *[select one option as applicable and delete the options that are not applicable]*

(i) we hereby provide the following beneficial ownership information.

Details of beneficial ownership

Identity of Beneficial Owner	Directly or indirectly holding 25% or more of the shares (Yes / No)	Directly or indirectly holding 25 % or more of the Voting Rights (Yes / No)	Directly or indirectly having the right to appoint a majority of the board of the directors or an equivalent governing body of the Bidder (Yes / No)
[include full name (last, middle, first),			

nationality, country of residence]			

OR

(ii) *We declare that there is no Beneficial Owner meeting one or more of the following conditions:*

- directly or indirectly holding 25% or more of the shares
- directly or indirectly holding 25% or more of the voting rights
- directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Bidder

OR

(iii) We declare that we are unable to identify any Beneficial Owner meeting one or more of the following conditions. [If this option is selected, the Bidder shall provide explanation on why it is unable to identify any Beneficial Owner]

- directly or indirectly holding 25% or more of the shares
- directly or indirectly holding 25% or more of the voting rights
- directly or indirectly having the right to appoint a majority of the board of directors or equivalent governing body of the Bidder]"

Name of the Bidder: *[*insert complete name of the Bidder*]_____

Name of the person duly authorized to sign the Bid on behalf of the Bidder: **[*insert complete name of person duly authorized to sign the Bid*]_____

Title of the person signing the Bid: [*insert complete title of the person signing the Bid*]_____

Signature of the person named above: [*insert signature of person whose name and capacity are shown above*]_____

Date signed [*insert date of signing*] **day of** [*insert month*], [*insert year*]_____

[*] In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder. In the event that the Bidder is a joint venture, each reference to "Bidder" in the Beneficial Ownership Disclosure Form (including this Introduction thereto) shall be read to refer to the joint venture member.

[**] Person signing the Bid shall have the power of attorney given by the Bidder. The power of attorney shall be attached with the Bid Schedules.

Letter of Acceptance

[on letterhead paper of the Employer***]***

. . . . . ***[date]***. . . . . .

To: . . . . . ***[name and address of the Contractor]*** . . . . . .

Subject: . . . . . ***[Notification of Award Contract No]***. . . . . .

This is to notify you that your Bid dated . . . ***[insert date]*** . . . for execution of the . . . . . ***.[insert name of the contract and identification number, as given in the PCC]*** . . . . . for the Accepted Contract Amount of . . . . . ***.[insert amount in numbers and words and name of currency]***, as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish (i) the Performance Security and an Environmental and Social (ES) Performance Security ***[Delete ES Performance Security if it is not required under the contract]*** within 28 days in accordance with the Conditions of Contract, using for that purpose the of the Performance Security Form and the ES Performance Security Form, ***[Delete reference to the ES Performance Security Form if it is not required under the contract]*** and (ii) the additional information on beneficial ownership in accordance with BDS ITB 47.1, within eight (8) Business days using the Beneficial Ownership Disclosure Form, included in Section X - Contract Forms, of the bidding document.
[Choose one of the following statements:]

We accept that _____***[insert the name of Adjudicator proposed by the Bidder]*** be appointed as the Adjudicator.

[or]

We do not accept that _____***[insert the name of the Adjudicator proposed by the Bidder]*** be appointed as the Adjudicator, and by sending a copy of this Letter of Acceptance to _____***[insert name of the Appointing Authority]***, the Appointing Authority, we are hereby requesting such Authority to appoint the Adjudicator in accordance with ITB 48.1 and GCC Sub-Clause 23.1.

Authorized Signature: .....

Name and Title of Signatory: .....

Name of Agency: .....

Attachment: Contract Agreement

Contract Agreement

THIS AGREEMENT made the . . . . . .day of . . . . . ., ..., between . . . . . ***[name of the*** Employer***]***. . . . . (hereinafter "the Employer"), of the one part, and . . . . . ***[name of the Contractor]***. . . . .(hereinafter "the Contractor"), of the other part:

WHEREAS the Employer desires that the Works known as . . . . . ***[name of the Contract]***. . . . .should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution and completion of these Works and the remedying of any defects therein,

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.

(a) the Letter of Acceptance

(b) the Letter of Bid

(c) the addenda Nos _____(if any)

(d) the Particular Conditions

(e) the General Conditions of Contract, including appendix;

(f) the Specification

(g) the Drawings

(h) Bill of Quantities; [1] and

(i) any other document listed in the PCC as forming part of the Contract, but not limited to;

i. the ES Management Strategies and Implementation Plans**;** and

ii. Code of Conduct for Contractor's Personnel (ES).

3. In consideration of the payments to be made by the Employer to the Contractor as specified in this Agreement, the Contractor hereby covenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

[1] In lump sum contracts, delete "Bill of Quantities" and replace with "Activity Schedule."

4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Agreement to be executed in accordance with the laws of . . . . . ***[name of the borrowing country]***. . . . .on the day, month and year specified above.

Signed by:	Signed by:
for and on behalf of the Employer	for and on behalf the Contractor
in the presence of:	in the presence of:
Witness, Name, Signature, Address, Date	Witness, Name, Signature, Address, Date

Performance Security

Option 2: Performance Bond

By this Bond *[insert name of Principal]* as Principal (hereinafter called "the Contractor") and *[insert name of Surety]* as Surety (hereinafter called "the Surety"), are held and firmly bound unto *[insert name of Employer]* as Obligee (hereinafter called "the Employer") in the amount of *[insert amount in words and figures]*, for the payment of which sum well and truly to be made in the types and proportions of currencies in which the Contract Price is payable, the Contractor and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS the Contractor has entered into a written Agreement with the Employer dated the _____ day of _____, 20 ____, for *[name of contract and brief description of Works]* in accordance with the documents, plans, specifications, and amendments thereto, which to the extent herein provided for, are by reference made part hereof and are hereinafter referred to as the Contract.

NOW, THEREFORE, the Condition of this Obligation is such that, if the Contractor shall promptly and faithfully perform the said Contract (including any amendments thereto), then this obligation shall be null and void; otherwise, it shall remain in full force and effect. Whenever the Contractor shall be, and declared by the Employer to be, in default under the Contract, the Employer having performed the Employer's obligations thereunder, the Surety may promptly remedy the default, or shall promptly:

(1) complete the Contract in accordance with its terms and conditions; or

(2) obtain a Bid or Bids from qualified Bidders for submission to the Employer for completing the Contract in accordance with its terms and conditions, and upon determination by the Employer and the Surety of the lowest responsive Bidder, arrange for a Contract between such Bidder and Employer and make available as work progresses (even though there should be a default or a succession of defaults under the Contract or Contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the Balance of the Contract Price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "Balance of the Contract Price," as used in this paragraph, shall mean the total amount payable by Employer to Contractor under the Contract, less the amount properly paid by Employer to Contractor; or

(3) pay the Employer the amount required by Employer to complete the Contract in accordance with its terms and conditions up to a total not exceeding the amount of this Bond.

The Surety shall not be liable for a greater sum than the specified penalty of this Bond.

Any suit under this Bond must be instituted before the expiration of one year from the date of issue of the Certificate of Completion.

No right of action shall accrue on this Bond to or for the use of any person or corporation other than the Employer named herein or the heirs, executors, administrators, successors, and assigns of the Employer.

In testimony whereof, the Contractor has hereunto set his hand and affixed his seal, and the Surety has caused these presents to be sealed with his corporate seal duly attested by the signature of his legal representative, this _____ day of _____ 20 _____.

SIGNED ON _____ on behalf of _____

By _____ in the capacity of _____

In the presence of _____

SIGNED ON _____ on behalf of _____

By _____ in the capacity of _____

In the presence of _____

Advance Payment Security

Demand Guarantee

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: *[Insert name and Address of* Employer*]*

Date: *[Insert date of issue]*

ADVANCE PAYMENT GUARANTEE No.: *[Insert guarantee reference number]*

Guarantor: *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that *[insert name of Contractor, which in the case of a joint venture shall be the name of the joint venture]* (hereinafter called "the Applicant") has entered into Contract No. *[insert reference number of the contract]* dated *[insert date]* with the Beneficiary, for the execution of *[insert name of contract and brief description of* Works*]* (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum *[insert amount in figures]* () *[insert amount in words]* is to be made against an advance payment guarantee.

At the request of the Applicant, we as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of *[insert amount in figures]* (_____) *[insert amount in words]*[1] upon receipt by us of the Beneficiary's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating either that the Applicant:

(a) has used the advance payment for purposes other than the costs of mobilization in respect of the Works; or

(b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Applicant has failed to repay.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Beneficiary's bank stating that the advance payment referred to above

[1] *The Guarantor shall insert an amount representing the amount of the advance payment and denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer.*

has been credited to the Applicant on its account number *[insert number]* at *[insert name and address of Applicant's bank]*..

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Applicant as specified in copies of interim statements or payment certificates which shall be presented to us. This guarantee shall expire, at the latest, upon our receipt of a copy of the interim payment certificate indicating that ninety (90) percent of the Accepted Contract Amount, less provisional sums, has been certified for payment, or on the *[insert day]* day of *[insert month]*, 2 *[insert year]*,[2] whichever is earlier. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

This guarantee is subject to the Uniform Rules for Demand Guarantees (URDG) 2010 Revision, ICC Publication No. 758, except that the supporting statement under Article 15(a) is hereby excluded.

_____

[signature(s)]

Note: All italicized text (including footnotes) is for use in preparing this form and shall be deleted from the final product.

[2] *Insert the expected completion date as described in GCC Sub- Clause 57.1. The Employer should note that in the event of an extension of the expected completion date of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: "The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Beneficiary's written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee."*

REPUBLIC OF KENYA

NAVCDP

KAJIADO COUNTY GOVERNMENT

DEPARTMENT OF AGRICULTURE, LIVESTOCK, VETERINARY & FISHERIES
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

BILLS OF QUANTITIES

REHABILITATION WORKS FOR ISINET KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ESELENKEI WARD, KAJIADO SOUTH SUB COUNTY, KAJIADO COUNTY

FUNDED BY

THE WORLD BANK, THE GOVERNMENT OF KENYA
AND

THE COUNTY GOVERNMENT OF KAJIADO

Volume 2 of 4

Jun-26

A PREAMBLE

1.The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, General and Particular Conditions, Technical Specifications, and Drawings.

2.The quantities given in the Bill of Quantities are estimated and provisional and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices bid in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.

3.The rates and prices bid in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Constructional Plant, labour, supervision, materials, erection, maintenance, insurance, profit, taxes, implementation of ESMP and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.

4. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of Items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.

5. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.

6 General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities.

7 Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer in accordance with Sub-Clauses 13.4 and 13.5 of the General Conditions except with respect to DAAB Fees and Expenses for which no instruction will be required from the Engineer.

8 The method of measurement of completed work for payment shall be Admeasurement in accordance with ICE Conditions of Contract measurement clauses.



BILLS SUMMARY

Bill No.	Description	Contract Amount (KShs)
1	Preliminaries and General (P&G))	
2	Intake Works	
3	Main Canal	
4	Secondary Canals	
5	Distribution Canals	
6	Division Boxes	
7	Ring Culverts	
8	Cattle Troughs	
9	Toilet Blocks	
	Sub-Total	
	Contingencies (5% of Sub-total)	
	GRAND SUMMARY	

GRAND SUMMARY



Bill No .1- PRELIMINARY AND GENERALS						
ITEM	**DESCRIPTION**	**UNIT**	**QUANTITY**	**RATE (Kshs)**	**AMOUNT (Kshs)**	***Technical Specification Reference***
1.1	**Contractor's Camp & Canal Inspection Access**					
1.1.1	Provide for establishment, mobilisation and demobilisation of the Contractor's camp together with all the required equipments	LS	1			*Spec-1.13,1.14*
1.2	**Concrete Strength Tests**					
1.2.1	Concrete Strength tests (six cubes / test) in accordance with the Specifications.	Lump Sum	6			Spec-3.2.3
1.3	**Signboards**					
1.3.1	Provision, erection and maintenance of project signboards in accordance with the Specifications.	No.	3			*Spec-1.17.8*
1.4	**Testing of the completed works**					
1.4.1	Provide for testing of the irrigation system upon completion of the works	Days	14			*Spec-1.17.13*
1.5	**Adjudication services**					
1.5.1	Allow for a provisional sum for Adjudication services	P.C Sum	1			*Spec 1.17.14*
	TOTAL CARRIED OVER TO SUMMARY					
Bill No. 2 - INTAKE WORKS						
ITEM	**DESCRIPTION**	**UNIT**	**QUANTITY**	**RATE (KSh)**	**AMOUNT(KSh)**	
2.1	**INTAKE WORK WEIR**					
	Site Clearance and setting Out					
2.1.1	Clear site of all trees (less than 500 mm diameter), bushes, shrubs, etc and dispose in accordance with specifications.	m^2	200			*Spec-2.2*
2.2	**River Diversion**					
2.2.1	Provide for River Diversion using Coffer Dam, canals etc. The coffer dam to be filled with appropriate compacted fill	LS	1			*spec-8.3,8.4*
2.3	**EXCAVATION**					
	To include for all trimming to levels, backfilling with approved selected soil, compacting, disposal of surplus material and reinstatement for sedimentation basin, drainage chambers, overflow chamber, sluive valve chamber, washout structure and water meter chamber.					*Spec-2.2*
2.3.1	In normal soil (material) to a depth not exceeding 1.0 m	m^3	90			*spec-2.6,2.7*
2.3.2	In loose rock to a depth not exceeeding 2.0 m	m^3	45			*spec-2.7,2.8*
2.3.3	E.O. for Items 2.1.2 & 2.1.3 for excavation in rock to a depth not exceeding 3.0 m (provisional)	m^3	18.00			*Spec-2.7*

2.4	**CONCRETE WORKS**					*spec-3.0*
	Provide and place the following concrete including all form work for weir structure, intake chamber and foot slab.					*Spec-3.2 ,3.3, 3.4*
2.4.1	Blinding concrete grade 15/40 - 75 mm t	m^3	5			*spec-3.5*
2.4.2	Reinforced concrete grade 25/20 as sho	m^3	95.00			*spec-3.3*
2.5	**REINFORCEMENT**					
	Provide support and fix the following reinforcement, including all cutting, bending and supports.					*Spec-3.3*
2.5.1	High yield bars	kg	3971			*spec-3.3.1*
2.6	**Weir and Intake chamber Accessories**					
2.6.1	Supply and fix in place GMS trashrack with plates spaced at 150 c/c	No.	1			*spec-3.3.2*
2.6.2	Supply and fix GMS slide/sluice gates as shown in drawings, for scouring through the weir body and for intake chamber.	LS	3			*spec-3.32*
2.6.3	Supply and fix 38mm dia. G.S. pipe for double guardrails as shown in the drawings. Include for all standards: bends, angles and fixing bolts.	m	30			*spec-3.32*
2.6.4	Supply and build in concrete wall galvanised iron steps irons staggered at 300mm centres.	LS	1			*spec-3.32*
	Inlet Chamber pipework					*spec-4.1*
	(Epoxy coated and cement lined steel pipes)					
	The rates inserted should cover supplying of fittings including all jointing accessories, handling, fixing, jointing and testing.					
2.6.5	100 mm dia double flanged GI pipe piece 500mm long with paddle flange welded 150mm from plain end.	No.	2			*Spec-4.7*
2.6.6	DN 100 epoxy coated, cement lined steel pipe with socket and spigot	m	20			*spec-4.8*
2.6.7	DN 100 mm dia sluice valve with detachable spindle and handwheel	No.	1			*spec-4.8*
	Intake Chamber Scour Pipework					
2.6.8	DN50 mm double flanged 500mm long steel spigot with puddle flange welded 150mm	No.	1			*spec-4.8*
2.6.9	50 mm dia double flanged 6.6m long steel spigot with puddle flange welded.	No.	1			*spec-4.8*
2.6.10	DN50 mm scour sluice valve with long detachable spindle and handwheel	No.	1			*spec-4.8*
2.7	**WATER METER WORKS**					
2.7.1	Provide, handle, install and test double flanged water meter to fit 100 mm steel pipe.	No.	1			Spec-8.9
2.8	**PROTECTION WORKS**					
2.8.1	Provide all materials, lay and place grouted rip rap (mortared stone pitching) 250mm thick on sloping sides of river bank.	m^3	100			Spec-8.7



2.9	**PIPE OUTLET STRUCTURE**					
	Earthworks					
	To include for all trimming to levels, Supply and transport of approved soil for backfilling, compacting, disposal of surplus material and reinstatement.					*Spec-2.2*
2.9.1	Excavation in soft materails for Structure	m^3	10.00			*spec-2.6*
	Concrete Works					
	Provide and place the following concrete including all form work for pipe outlet structure.					*spec-3.4*
2.9.2	Blinding concrete grade 15/40 - 50 mm thick	m^3	0.5			*spec-3.2*
2.9.3	Reinforced concrete grade 25/20 as shown on drawings	m^3	1.5			*Spec-3.5*
	Reinforcement					
	Provide support and fix the following reinforcement, including all cutting, bending and supports.					*Spec-3.3*
2.9.4	Reinforcing Mesh A142	kg	50			*spec-3.3*
	TOTAL CARRIED OVER TO GRAND SUMMARY					
BILL NO. 3 - MAIN CANAL						
ITEM	**DESCRIPTION**	**UNIT**	**QUANTITY**	**RATE (KSh)**	**AMOUNT(KSh)**	
3.1	**Site clearance and Stripping**					
3.1.1	Clear site from all undergrowth shrubs and trees to a depth of not more than 150mm from ground surface. This should include grubbing up roots and removal of all deleterious material from site; from chainage 6+500 to 7+899	m^2	1,400.00			*Spec-2.2*
3.2	**Canal inspection access road**					
3.2.1	construction of canal inspection access road along canals as shall be directed by the Engineer	LS	1			*Spec-1.9*
3.3	**Earthworks**					
	Excavation and Filling					
	To include for all trimming to levels, backfillng with approved selected spoil, compacting, disposal of surplus material and reinstatement.					*Spec-2.6, 2.7*
3.3.1	Excavation for canal and backfilling in normal soil n.e. 1m from chainage 6+500 to 7+899	m^3	784.00			*spec-2.15*
3.3.2	In soft rock materials to depth not exceeding 1m from chainage 6+500 to 7+899	m^3	39.20			*spec-2.6*
3.3.3	Earth fill to canal bed with approved borrow materials- 150 mm thick from within a radius of 30 km from chainage 6+500 to 7+899	m^3	168.00			*spec-2.15*

3.4	***Concrete works***					
	Provide and place the following concrete including all formworks and tests					*spec-3.4*
3.4.1	50mm thick concrete class 15/40 blinding from chainage 6+500 to 7+899	m^3	56.00			*spec-3.5*
3.4.2	Mass concrete Class 20/20 - 150 mm thick to canal bed from chainage 6+500 to 7+899 m	m^3	147.00			*spec-3.5*
3.4.3	Mass concrete Class 20/20 - 150 mm thick to walls from chainage 0+000 to 3+000 m	m^3	360.00			*spec-3.5*
3.4.4	Provide and install plaster works: Plaster 15mm thick 2No. Coat work; 12mm first coat of cement sand (1:3); 3mm second coat of cement and lime (1:9): steel trowelled to canal inner walls and bed as directed by the engineer	m^2	3894.00			*spec-6.6*
3.5	**Expansion Joints**					
3.5.1	Provide all materials and form expansion joints at every 15m interval for the lined sections and as per specifications from Chainage 0+000 to 2+000 m	No.	200.00			*spec-6.5*
3.6	**Protection Works**					
	Excavation and Filling					
	To include for all trimming to levels, backfillng with approved selected spoil, compacting, disposal of surplus material and reinstatement.					*spec-2.14,2.15*
3.6.1	Excavation in normal soil along canal banks with protruding black-cotton soil n.e. 1m depth and 1.5m width from chainage 4+850 to 5+300	m^3	675.00			*spec-2.6*
3.6.2	Earth fill to canal bed with approved borrow materials from within a radius of 30 km from chainage 4+850 to 5+300	m^3	405.00			*spec-2.6,2.7*
3.7	**Pedestrain Crossing**					
	Construct 15 No. foot/pedestrian-crossings at chainages as directed by the Resident Engineer as shown in in the drawings.					*specc-7.11*
	Provide and place the following concrete including all formworks and tests					
3.7.1	50mm thick concrete class 15/40 blindin	m^3	7.50			*spec-3.2.2*
3.7.2	Reinforced concrete Class 25/20	m^3	15.00			*spec-3.3*
3.7.3	Provide, cut and fix steel reinforcement Y bars	Kg	1,275.00			*spec-3.3*
3.8	**PUMP PROVISION STRUCTURE**					
	79 No. Standard Pump Provision Structures on Main Canal (Refer to Drawings and specifications)					Spec 8.10



	Earthworks					
	To include for all trimming to levels, Supply and transport of approved soil for backfillng, compacting, disposal of surplus material and reinstatement.					
3.8.1	Excavation in soft materails for Structure	m^3	651.75			Spec-2.2
	Concrete Works					
	Provide and place the following concrete including all form work for pipe outlet structure.					Spec-3.3
3.8.2	Blinding concrete grade 15/40 - 50 mm thick	m^3	33.6			spec-3.2.1
3.8.3	Reinforced concrete grade 25/20 as shown on drawings	m^3	119			spec-3.2.1
	Reinforcement					
	Provide support and fix the following reinforcement, including all cutting, bending and supports.					
3.8.4	Reinforcing Mesh A142	kg	3160			Spec-3.3.2
	TOTAL CARRIED OVER TO SUMMARY					
BILL No. 4 Secondary Canals						
ITEM	**DESCRIPTION**	**UNIT**	**QUANTITY**	**RATE (KSh)**	**AMOUNT (KSh)**	
4.1	**SECONDARY CANAL 1. Length = 577m**					
4.1.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m^2	461.60			*Spec-2.2*
4.1.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.2*
4.1.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	222.15			*spec-2.6*
4.1.2.2	In soft rock materials to depth as specified in the Drawings	m^3	6.66			*spec-2.6*
4.1.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	51.93			*spec-2.14*
4.1.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.3,3.4*
4.1.3.1	50mm thick concrete class 15/40 blindin	m^3	17.31			*spec-3.2,3.5*
4.1.3.2	Mass concrete class 20/20 for canal base from chainage 0+000 to 0+577	m^3	51.93			*spec 3.5*



4.1.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal and on the offtaking canal as shown in the drawings	No.	8.00			*spec-8.8*
4.1.5	**Protection Works**					
4.1.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	15.96			*spec-6.5*
4.1.5.2	Approved selected gravel to foundation	m^3	1.20			*spec-2.3*
4.2	**SECONDARY CANAL 2. Length = 565m**					
4.2.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m²	452.00			*Spec-2.2*
4.2.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					
4.2.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	217.53			*spec. 2.6*
4.2.2.2	In soft rock materials to depth as specified in the Drawings	m^3	6.53			*spec-2.6*
4.2.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	50.85			*spec-2.15*
4.2.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.2*
4.2.3.1	50mm thick concrete class 15/40 blindin	m^3	16.95			*spec-3*
4.2.3.2	Mass concrete class 20/20 for canal bas	m^3	50.85			*spec-6.5*
4.2.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	8.00			*spec-8.8*
4.2.5	**Protection Works**					
4.2.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	15.96			*spec-8.7*
4.2.5.2	Approved selected gravel to foundation	m^3	1.20			*spec-3.2.6*



4.2.6	**Land Leveling**					
	Cutting and excavation of existing earth for raised ground/slopes upto a depth of 6.4 m along the canal from chainage 0+100 to 0+565 m, including dressing of sides and bottom, breaking clods, loading excavated material, transporting excavated earth within the site premise, and stacking/backfilling at designated locations, to achieve suitable ground and or reduced levels, as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	4,547.68			*spec-2.14,2.15,2.28*
4.3	**SECONDARY CANAL 3. Length = 322m**					
4.3.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m^2	257.60			*Spec-2.2*
4.3.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.15*
4.3.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	123.97			*spec-2.6*
4.3.2.2	In soft rock materials to depth as specified in the Drawings	m^3	3.72			*spec-2.7*
4.3.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	28.98			*spec-2.15*
4.3.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					
4.3.3.1	50mm thick concrete class 15/40 blindin	m^3	9.66			*spec-3.0*
4.3.3.2	Mass concrete class 20/20 for canal bas	m^3	28.98			*spec-3.2.1*
4.3.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	8.00			*spec-8.8*
4.3.5	**Protection Works**					
4.3.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	15.96			*spec-6.5*
4.3.5.2	Approved selected gravel to foundation	m^3	1.20			*spec-2.3*
4.4	**SECONDARY CANAL 4. Length = 423m**					
4.4.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m^2	338.40			*Spec-2.2*

4.4.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.2*
4.4.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	162.86			*spec-2.6*
4.4.2.2	In soft rock materials to depth as specified in the Drawings	m^3	4.89			*spec-2,7*
4.4.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	38.07			*spec-2.15*
4.4.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.0*
4.4.3.1	50mm thick concrete class 15/40 blindin	m^3	12.69			*spec-3.2.1*
4.4.3.2	Mass concrete class 20/20 for canal bas	m^3	38.07			*spec-3.2.2*
4.4.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	8.00			*spec-8.8*
4.4.5	**Protection Works**					
4.4.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	15.96			*spec-6.5*
4.4.5.2	Approved selected gravel to foundation	m^3	1.20			*spec-3.2.6*
4.5	**SECONDARY CANAL 5. Length = 374m**					
4.5.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m^2	299.20			*Spec-2.2*
4.5.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.6,2.15*
4.5.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	143.99			*spec-2.6*
4.5.2.2	In soft rock materials to depth as specified in the Drawings	m^3	4.32			*spec-2.6*
4.5.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	33.66			*spec-2.7*
4.5.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.0*
4.5.3.1	50mm thick concrete class 15/40 blindin	m^3	11.22			*spec-3.2.1*
4.5.3.2	Mass concrete class 20/20 for canal bas	m^3	33.66			*spec-3.2.1, 3.2.2*
4.5.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	8.00			*spec-8.8*
4.5.5	**Protection Works**					

4.5.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	15.96			*spec-2.30,6.5*
4.5.5.2	Approved selected gravel to foundation	m^3	1.20			*spec-2.30*
4.6	**SECONDARY CANAL 6. Length = 206m**					
4.6.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m²	164.80			*Spec-2.2*
4.6.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.6,2.15*
4.6.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	79.31			*spec-2.6*
4.6.2.2	In soft rock materials to depth as specified in the Drawings	m^3	2.38			*spec-2.6*
4.6.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	18.54			*spec-2.7*
4.6.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.2.1*
4.6.3.1	50mm thick concrete class 15/40 blindin	m^3	6.18			*spec-3.2.1,3.2.2*
4.6.3.2	Mass concrete class 20/20 for canal bas	m^3	18.54			*spec-3.2.2,3.2.2*
4.6.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	8.00			*spec-8.8*
4.6.5	**Protection Works**					
4.6.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	15.96			*spec-2.3,6.5*
4.6.5.2	Approved selected gravel to foundation	m^3	1.20			*spec-3.2.6*
4.7	**SECONDARY CANAL 7. Length = 314m**					
4.7.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m²	251.20			*Spec-2.2*
4.7.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.6,2.15*
4.7.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	120.89			*spec-2.6*
4.7.2.2	In soft rock materials to depth as specified in the Drawings	m^3	3.63			*spec-2.6*
4.7.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	28.26			*spec-2.7*
4.7.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.0*
4.7.3.1	50mm thick concrete class 15/40 blindin	m^3	9.42			*spec-3.2.1*

4.7.3.2	Mass concrete class 20/20 for canal bas	m^3	28.26			*spec-3.2.2*
4.7.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	8.00			*spec-8.8*
4.7.5	**Protection Works**					
4.7.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	15.96			*spec-2.3,6.5*
4.7.5.2	Approved selected gravel to foundation	m^3	1.20			*spec-3.2.6*
4.8	**SECONDARY CANAL 8. Length = 375m**					
4.8.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m^2	300.00			*Spec-2.2*
4.8.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.6,2.15*
4.8.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	144.38			*spec-2.6*
4.8.2.2	In soft rock materials to depth as specified in the Drawings	m^3	4.33			*spec-2.6*
4.8.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	33.75			*spec-2.7*



4.8.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.0*
4.8.3.1	50mm thick concrete class 15/40 blindin	m^3	11.25			*spec-3.2.1*
4.8.3.2	Mass concrete class 20/20 for canal bas	m^3	33.75			*spec-3.2.2*
4.8.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	14.00			*spec-8.8*
4.8.5	**Protection Works**					
4.8.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	9.31			*spec-2.3,6.5*
4.8.5.2	Approved selected gravel to foundation	m^3	0.70			*spec-3.2.6*
4.9	**SECONDARY CANAL 9. Length = 461m**					
4.9.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m^2	368.80			*Spec-2.2*
4.9.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.6,2.15*
4.9.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	177.49			*spec-2.6*
4.9.2.2	In soft rock materials to depth as specified in the Drawings	m^3	5.32			*spec-2.6*
4.9.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	41.49			*spec-2.7*
4.9.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.0*
4.9.3.1	50mm thick concrete class 15/40 blindin	m^3	13.83			*spec-3.2.1*
4.9.3.2	Mass concrete class 20/20 for canal bas	m^3	41.49			*spec-3.2.2*
4.9.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	8.00			*spec-8.8*
4.9.5	**Protection Works**					
4.9.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	5.32			*spec-2.3,6.5*
4.9.5.2	Approved selected gravel to foundation	m^3	0.40			*spec-3.2.6*



4.10	**SECONDARY CANAL 10. Length = 306m**					
4.10.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m²	244.80			*Spec-2.2*
4.10.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.6,2.15*
4.10.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	117.81			*spec-2.6*
4.10.2.2	In soft rock materials to depth as specified in the Drawings	m^3	3.53			*spec-2.6*
4.10.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	27.54			*spec-2.7*
4.10.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.0*
4.10.3.1	50mm thick concrete class 15/40 blindin	m^3	9.18			*spec-3.2.1*
4.10.3.2	Mass concrete class 20/20 for canal bas	m^3	27.54			*spec-3.2.2*
4.10.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	8.00			*spec-8.8*
4.10.5	**Protection Works**					
4.10.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	5.32			*spec-2.3,6.5*
4.10.5.2	Approved selected gravel to foundation	m^3	0.40			*spec-3.2.6*
4.10.6	**Slope stabilization**					
4.10.6.1	Excavate to depths not exceeding 2.3m for chainage 0+040 to 0+180m, and create slopes of 1:1.5.	m^3	758.55			*Spec-2.2*
4.10.6.2	Provide mortared (1:3 cement/sand) stone pitching protection 250-300mm to slopes from chainage 0+040 to 0+180m	m^2	987.20			*spec-2.6,2.15,2.30*
4.11	**SECONDARY CANAL 11. Length = 594m**					
4.11.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m²	475.20			*spec-2.6*

4.11.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.6,2.7*
4.11.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	228.69			*spec-2.7,2.15*
4.11.2.2	In soft rock materials to depth as specified in the Drawings	m^3	6.86			*spec-2.6*
4.11.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	53.46			*spec-2.15*
4.11.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.0*
4.11.3.1	50mm thick concrete class 15/40 blindin	m^3	17.82			*spec-3.2.1*
4.11.3.2	Mass concrete class 20/20 for canal bas	m^3	53.46			*spec-3.2.2*
4.11.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	16.00			*spec-8.8*
4.11.5	**Protection Works**					
4.11.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	10.64			*spec-6.5*
4.11.5.2	Approved selected gravel to foundation	m^3	0.80			*spec-2.30*
4.11.6	**Land Leveling**					
4.11.6.1	Cutting and excavation of existing earth for raised ground/slopes upto a depth of 2.21 m along the canal from chainage 0+260 to 0+400 m, including dressing of sides and bottom, breaking clods, loading excavated material, transporting excavated earth within the site premise, and stacking/backfilling at designated locations, to achieve suitable ground and or reduced levels, as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	7700.40			*Spec-2.2*
4.11.6.2	Filling in low lying areas and depressions within the site, and along the canal from chainage 0+040 to 0+260 m and 0+400 to 0+594 m, with excavated earth, spreading in layers not exceeding 200mm loose thickness, breaking clods, and lifting upto 2.224m, to achieve suitable ground and or reduced levels as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	9126.56			*spec-2.15,2.6*

4.12	**SECONDARY CANAL 12. Length = 379m**					
4.12.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m²	303.20			*spec-2.2*
4.12.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					
4.12.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m³	145.92			*spec-2.15,2.6*
4.12.2.2	In soft rock materials to depth as specified in the Drawings	m³	4.38			*spec-2.7*
4.12.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m³	34.11			*spec-2.17*
4.12.3	**Concrete works**					*spec-3*
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					
4.12.3.1	50mm thick concrete class 15/40 blindin	m³	11.37			*spec-3.2.1*
4.12.3.2	Mass concrete class 20/20 for canal bas	m³	34.11			*spec-3.2.1*
4.12.4	**Hydraulic Structures**					*spec-2.30*
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	10.00			*spec-8.8*
4.12.5	**Protection Works**					
4.12.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m²	6.65			*spec-6.5*
4.12.5.2	Approved selected gravel to foundation	m³	0.50			*spec-2.30*
4.12.6	**Slope stabilization**					
4.12.6.1	Excavate to depths not exceeding 3.334m for chainage 0+040 to 0+220m, and create slopes of 1:1.5.	m³	1382.83			*spec-2.2*
4.12.6.2	Provide mortared (1:3 cement/sand) stone pitching protection 250-300mm to slopes from chainage 0+040 to 0+220m	m²	1243.20			*spec-6.5*
4.13	**SECONDARY CANAL 13. Length = 275m**					
4.13.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m²	220.00			*spec-2.2*
4.13.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					
4.13.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m³	105.88			*spec-2.6*
4.13.2.2	In soft rock materials to depth as specified in the Drawings	m³	3.18			*spec-2.7*
4.13.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m³	24.75			*spec-2.15*
4.13.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.2.1*



4.13.3.1	50mm thick concrete class 15/40 blindin	m^3	8.25			*spec-3.2.2*
4.13.3.2	Mass concrete class 20/20 for canal bas	m^3	24.75			*spec-3.2.2*
4.13.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	10.00			*spec-8.8*
4.13.5	**Protection Works**					
4.13.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	6.65			*spec-6.5*
4.13.5.2	Approved selected gravel to foundation	m^3	0.50			*spec-2.30*
4.14	**SECONDARY CANAL 14. Length = 743m**					
4.14.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m²	594.40			*spec-2.2*
4.14.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					
4.14.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	286.06			*spec-2.6*
4.14.2.2	In soft rock materials to depth as specified in the Drawings	m^3	8.58			*spec-2.7*
4.14.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	66.87			*spec-2.15*
4.14.3	**Concrete works**					*spec-3.0*
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					
4.14.3.1	50mm thick concrete class 15/40 blindin	m^3	22.29			*spec-3.2.1*
4.14.3.2	Mass concrete class 20/20 for canal bas	m^3	66.87			*spec-3.2.2*
4.14.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 450 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	34.00			*spec-8.8*
4.14.5	**Protection Works**					
4.14.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	22.61			*spec-6.5*
4.14.5.2	Approved selected gravel to foundation	m^3	1.70			*spec-3.2.6*

4.15	**SECONDARY CANAL 15. Length = 979m**					
4.15.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m²	783.20			*spec-2.2*
4.15.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.2*
4.15.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	376.92			*spec-2.6*
4.15.2.2	In soft rock materials to depth as specified in the Drawings	m^3	11.31			*spec-2.7*
4.15.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	88.11			*spec-2.15*
4.15.3	**Concrete works**					
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					*spec-3.0*
4.15.3.1	50mm thick concrete class 15/40 blindin	m^3	29.37			*spec-3.2.1*
4.15.3.2	Mass concrete class 20/20 for canal bas	m^3	88.11			*spec-3.2.1*
4.15.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 450 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	30.00			*spec-8.8*
4.15.5	**Protection Works**					
4.15.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	19.95			*spec-6.5*
4.15.5.2	Approved selected gravel to foundation	m^3	1.50			*spec-3.2.6*
4.15.6	**Land Leveling**					
4.15.6.1	Cutting and excavation of existing earth for raised ground/slopes upto a depth of 2.441 m along the canal from chainage 0+420 to 0+540 m and 0+860 to 960 m, including dressing of sides and bottom, breaking clods, loading excavated material, transporting excavated earth within the site premise, and stacking/backfilling at designated locations, to achieve suitable ground and or reduced levels, as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	7185.90			*spec-2.6,2.15*
4.15.6.2	Filling in low lying areas and depressions within the site, and along the canal from chainage 0+040 to 0+160 m, 0+200 to 0+380, and 0+560 to 0+840 m, with excavated earth, spreading in layers not exceeding 200mm loose thickness, breaking clods, and lifting upto 1.969m, to achieve suitable ground and or reduced levels as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	8788.20			*spec-2.15,2.6*
4.16	**SECONDARY CANAL 16. Length = 480m**					
4.16.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m²	384.00			*spec-2.2*
4.16.2	**Earthworks**					

	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					*spec-2.6,2.7*
4.16.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	184.80			*spec-2.6*
4.16.2.2	In soft rock materials to depth as specified in the Drawings	m^3	5.54			*spec-2.7*
4.16.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	43.20			*spec 2.15,2.7*
4.16.3	**Concrete works**					*spec-3.0*
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					
4.16.3.1	50mm thick concrete class 15/40 blindin	m^3	14.40			*spec-3.2.1*
4.16.3.2	Mass concrete class 20/20 for canal bas	m^3	43.20			*spec-3.2.2*
4.16.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	18.00			*spec-8.8*
4.16.5	**Protection Works**					
4.16.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	11.97			*spec-6.5*
4.16.5.2	Approved selected gravel to foundation	m^3	0.90			*spec-3.2.6*
4.17	**SECONDARY CANAL 17. Length = 1360m**					
4.17.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m^2	1088.00			*spec-2.2*
4.17.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					
4.17.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	523.60			*spec-2.6*
4.17.2.2	In soft rock materials to depth as specified in the Drawings	m^3	15.71			*spec-2.7*
4.17.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	122.40			*spec-2.15,2.17*
4.17.3	**Concrete works**					*spec-3.0*
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					
						spec-3.2.1
4.17.3.1	50mm thick concrete class 15/40 blindin	m^3	40.80			

4.17.3.2	Mass concrete class 20/20 for canal bas	m^3	122.40			*spec-3.2.2*
4.17.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 500 x 350 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	44.00			*spec-8.8*
4.17.5	**Protection Works**					
4.17.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	29.26			*spec-6.5*
4.17.5.2	Approved selected gravel to foundation	m^3	2.20			*spec-3.2.6*
4.17.6	**Land Leveling**					
4.17.6.1	Cutting and excavation of existing earth for raised ground/slopes upto a depth of 2.143 m along the canal from chainage 0+760 to 0+860 m, including dressing of sides and bottom, breaking clods, loading excavated material, transporting excavated earth within the site premise, and stacking/backfilling at designated locations, to achieve suitable ground and or reduced levels, as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	3214.50			*spec-2.7,2.15*
4.17.6.2	Filling in low lying areas and depressions within the site, and along the canal from chainage 0+580 to 0+740 m, and 1+140 to 1+240 m, with excavated earth, spreading in layers not exceeding 200mm loose thickness, breaking clods, and lifting upto 1.673m, to achieve suitable ground and or reduced levels as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	4033.80			*spec-2.15*
4.18	**SECONDARY CANAL 18. Length = 745m**					
4.18.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m^2	596.00			*spec-2.2*
4.18.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					
4.18.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	286.83			*spec-2.6*
4.18.2.2	In soft rock materials to depth as specified in the Drawings	m^3	8.60			*spec-2.7*
4.18.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	67.05			*spec-2.15*
4.18.3	**Concrete works**					*spec-3.0*
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					
4.18.3.1	50mm thick concrete class 15/40 blindin	m^3	22.35			*spec-3.2*
4.18.3.2	Mass concrete class 20/20 for canal bas	m^3	67.05			*spec-3.2*

4.18.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 450 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	28.00			*spec-8.8*
4.18.5	**Protection Works**					
4.18.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	18.62			*spec-6.5*
4.18.5.2	Approved selected gravel to foundation	m^3	1.40			*spec-3.2.6*
4.18.6	**Land Leveling**					
4.18.6.1	Cutting and excavation of existing earth for raised ground/slopes upto a depth of 1.47 m along the canal from chainage 0+360 to 0+500 m, including dressing of sides and bottom, breaking clods, loading excavated material, transporting excavated earth within the site premise, and stacking/backfilling at designated locations, to achieve suitable ground and or reduced levels, as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	3087.00			*spec-2.6,2.7,2.15*
4.18.6.2	Filling in low lying areas and depressions within the site, and along the canal from chainage 0+040 to 0+240 m, with excavated earth, spreading in layers not exceeding 200mm loose thickness, breaking clods, and lifting upto 1.476m, to achieve suitable ground and or reduced levels as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	2952.00			*spec-2.6,2.7,2.15*
4.19	**SECONDARY CANAL 19. Length = 466m**					
4.19.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m^2	372.80			*spec-2.2*
4.19.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					
4.19.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	179.41			*spec-2.6*
4.19.2.2	In soft rock materials to depth as specified in the Drawings	m^3	5.38			*spec-2.7*
4.19.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	41.94			*spec-2.15*
4.19.3	**Concrete works**					*spec-3.0*
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					
4.19.3.1	50mm thick concrete class 15/40 blindin	m^3	13.98			*spec-3.2.1*
4.19.3.2	Mass concrete class 20/20 for canal bas	m^3	41.94			*spec-3.2.2*
4.19.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	10.00			*spec-8.8*

4.19.5	**Protection Works**					
4.19.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	6.65			*spec-6.5*
4.19.5.2	Approved selected gravel to foundation	m^3	0.50			*spec-3.2.6*
4.19.6	**Slope stabilization**					
4.19.6.1	Excavate to depths not exceeding 1.96 m for chainage 0+080 to 0+340m, and 0+360 to 0+466 m, and create slopes of 1:1.5.	m^3	814.07			*spec-2.6*
4.19.6.2	Provide mortared (1:3 cement/sand) stone pitching protection 250-300mm to slopes from chainage 0+080 to 0+340 m, and 0+360 to 0+466m.	m^2	1358.84			*spec-6.5*
4.20	**SECONDARY CANAL 20. Length = 657m**					
4.20.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m²	525.60			*spec-2.2*
4.20.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					
4.20.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	252.95			*spec-2.6*
4.20.2.2	In soft rock materials to depth as specified in the Drawings	m^3	7.59			*spec-2.7*
4.20.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	59.13			*spec- 2.15*
4.20.3	**Concrete works**					*spec-3.0*
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					
4.20.3.1	50mm thick concrete class 15/40 blindin	m^3	19.71			*spec-3.2*
4.20.3.2	Mass concrete class 20/20 for canal bas	m^3	59.13			*spec-3.2.1*
4.20.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	20.00			*spec-8.8*
4.20.5	**Protection Works**					
4.20.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	13.30			*spec-6.5*
4.20.5.2	Approved selected gravel to foundation	m^3	1.00			*spec-3.2.6*
4.20.6	**Land Leveling**					
4.20.6.1	Filling in low lying areas and depressions within the site, and along the canal from chainage 0+420 to 0+640 m, with excavated earth, spreading in layers not exceeding 200mm loose thickness, breaking clods, and lifting upto 4.784m, to achieve suitable ground and or reduced levels as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	10,524.80			*spec-2.15*
4.21	**Pedestrain Crossing**					
	Construct 20 No. foot/pedestrian-crossings, for each Secondary Canal, at chainages as directed by the Resident Engineer as shown in in the drawings					*spec-7.11*
	Provide and place the following concrete including all formworks and tests					



4.21.1	50mm thick concrete class 15/40 blindin	m^3	10.00			*spec.3.2*
4.21.2	Reinforced concrete Class 25/20	m^3	16.00			*spec-3.2*
4.21.3	Provide, cut and fix steel reinforcement Y bars	Kg	1,280.00			*spec-3.3.1*
	TOTAL BILL CARRIED OVER TO SUMMARY					
BILL No. 5- Distribution Canals						
ITEM	**DESCRIPTION**	**UNIT**	**QUANTITY**	**RATE (KSh)**	**AMOUNT (KSh)**	
5.1	**SECONDARY CANAL 13-1. Length = 463m**					
5.1.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m^2	370.40			*spec-2.2*
5.1.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					
5.1.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	178.26			*spec-2.6*
5.1.2.2	In soft rock materials to depth as specified in the Drawings	m^3	5.35			*spec-2.7*
5.1.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	41.67			*spec-2.15*
5.1.3	**Concrete works**					*spec-3.0*
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					
5.1.3.1	50mm thick concrete class 15/40 blindin	m^3	13.89			*spec-3.2*
5.1.3.2	Mass concrete class 20/20 for canal bas	m^3	41.67			*spec-3.2*
5.1.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 400 x 300 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	8.00			*spec-8.8*

5.1.5	**Protection Works**					
5.1.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	5.32			*spec-6.5*
5.1.5.2	Approved selected gravel to foundation	m^3	0.40			*spec-3.2.6*
5.1.6	**Land Leveling**					
5.1.6.1	Filling in low lying areas and depressions within the site, and along the canal from chainage 0+020 to 0+140 m, with excavated earth, spreading in layers not exceeding 200mm loose thickness, breaking clods, and lifting upto 1.284m, to achieve suitable ground and or reduced levels as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	1,540.80			*spec-2.6,2.7,2.15*
5.2	**SECONDARY CANAL 17-1. Length = 1753m**					
5.2.1	**Clearance**					
	Clear site including removal and disposal of all debris, clearance of all growths, bushes and hedges, trees and stumps and grubbing up roots	m^2	1402.40			*spec-2.2*
5.2.2	**Earthworks**					
	Rate to include desilting, excavations, backfilling with approved selected spoil,compacting, trimming to shape , disposal of surplus material and reinstatement					
5.2.2.1	Excavation for canal and backfilling in normal soil n.e. 1m	m^3	674.91			*spec-2.6*
5.2.2.2	In soft rock materials to depth as specified in the Drawings	m^3	20.25			*spec-2.7*
5.2.2.3	Earth fill to canal bed and walls with approved borrow materials- 150 mm thick from within a radius of 30 km	m^3	157.77			*spec-2.15*
5.2.3	**Concrete works**					*spec-3.0*
	Provide and place the following concrete mixes. Rate to include material provision, labour and all formwork					
5.2.3.1	50mm thick concrete class 15/40 blindin	m^3	52.59			*spec-3.2*
5.2.3.2	Mass concrete class 20/20 for canal bas	m^3	157.77			*spec-3.2*
5.2.4	**Hydraulic Structures**					
	Supply and install galvanised steel slide gates size 500 x 350 mm (Hor. x Vert.) and accessories along the parent canal downstream of offtake and on the offtaking canal as shown in the drawings	No.	62.00			*spec-8.8*
5.2.5	**Protection Works**					
5.2.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to farm outlet protection works as shown in the drawings	m^2	41.23			*spec-6.5*
5.2.5.2	Approved selected gravel to foundation	m^3	3.10			*spec-3.2.6*

5.2.6	**Land Leveling**					
5.2.6.1	Filling in low lying areas and depressions within the site, and along the canal from chainage 0+180 to 0+280 m, 0+640 to 0+780 m, 0+960 to 1+100 m, and 1+460 to 1+600 m, with excavated earth, spreading in layers not exceeding 200mm loose thickness, breaking clods, and lifting upto 1.351 m, to achieve suitable ground and or reduced levels as directed by the Engineer, complete in all respects as per specifications and drawings;	m^3	6,047.20			*spec-2.6,2.7,2.15*
5.3	**Pedestrain Crossing**					
	Construct 2 No. foot/pedestrian-crossings, for each Distribution Canal, at chainages as directed by the Resident Engineer as shown in in the drawings.					
	Provide and place the following concrete including all formworks and tests					*spec-7.11*
5.3.1	50mm thick concrete class 15/40 blindin	m^3	1.00			*spec.3.2*
5.3.2	Reinforced concrete Class 25/20	m^3	2.00			*spec-3.2*
5.3.3	Provide, cut and fix steel reinforcement Y bars	Kg	170.00			*spec-3.3.1*
	TOTAL BILL CARRIED OVER TO SUMMARY					
BILL NO. 6 - Division Boxes						
ITEM	**DESCRIPTION**	**UNIT**	**QUANTITY**	**RATE (KSh)**	**AMOUNT (KSh)**	
	22 No. Standard Division Box Type DB1 Standard Division Box Structures on Main Canal and Secondary Canals 13 & 17 (Refer to Drawings and specifications)					*spec-6.7,spec-3.2, 3.3*
6.1	**Earthworks**					
	To include for all trimming to levels, Supply and transport of approved soil for backfillng, compacting, disposal of surplus material and reinstatement.					
6.1.1	Excavation in soft materails for Structure	m^3	24.20			*spec-2.6*
6.2	**Concrete works**					
	Provide and place the following concrete including all formworks and test					
6.2.1	Reinforced Concrete (25/20)	m^3	22.00			*spec-3.2.1*
6.2.3	Mass concrete Class 20/20	m^3	24.20			*spec-3.2.2*
6.3	**Steel works**					
	To include supply, cutting, bending and fixing as per specification					
6.3.1	Reinforcing Mesh A142	kg	110.00			*spec3.3*
						-
6.3.2	Supply and install galvanised steel slide gates size 800 x 600 mm (Hor. x Vert.) and accessories for the parent canals as shown in the drawings	No.	21			*spec-8.8*
						-
6.3.3	Supply and install galvanised steel slide gates size 700 x 600 mm (Hor. x Vert.) and accessories for the parents canal as shown in the drawings	No.	1			*spec-8.8*
						-
6.3.4	Supply and install galvanised steel slide gates size 700 x 600 mm (Hor. x Vert.) and accessories for the offtaking canals as shown in the drawings	No.	17			*spec-8.8*
6.3.5	Supply and install galvanised steel slide gates size 750 x 600 mm (Hor. x Vert.) and accessories for the offtaking canals as shown in the drawings	No.	3			*spec-8.8*
						-

6.3.6	Supply and install galvanised steel slide gates size 800 x 600 mm (Hor. x Vert.) and accessories for the offtaking canals as shown in the drawings	No.	2			*spec-8.8*
6.3.7	Supply and install a calibrated galvanized steel staff (head) gauge at the water distribution structures	No.	22			*Spec-8.11*
	TOTAL CARRIED OVER TO SUMMARY					
Bill No. 7: Ring Culverts						
ITEM	**DESCRIPTION**	**UNIT**	**QUANTITY**	**RATE (KSh)**	**AMOUNT (KSh)**	
	Construct 2 No.ring culverts at road crossings at chainage 4+830 on the Main Canal and chainage 0+503 on Sec. Canal 14 in accordance with the specifications and drawings.					*spec-2.11*
7.1	**Earthworks**					
	Earthworks and filling					
	To include all trimming to levels, backfilling with approved selected spoil, compacting, disposal, of surplus materials and reinstatement					*spec-2.6*
7.1.1	Excavation in normal soil n.e. 1m from chainage 4+830 to 4+845	m^3	27.00			*spec-2.7*
7.1.2	In reinforced concrete materials to depth not exceeding 0.2m from chainage 4+830 to 4+845	m^3	3.60			*spec-3.0*
7.1.3	Ramp up road to culvert level on approaches	m^3	22.50			*spec-7.8.3,7.11*
7.1.4	Transport and compacted murram layers of 250mm thick upto to 500mm over culvert and approaches as shown in the drawings.	m^3	15.00			*spec-7.11.1*
7.2	**Concrete works**					
	Provide and place the following concrete including all formworks and tests					
7.2.1	Mass concrete Class 20/20 of minimum 150mm thickness	m^3	5.58			*spec-3.2*
7.2.2	Reinforced concrete Class 30/20 for box culvert as shown in the drawings	m^3	10.31			*spec-3.3*
7.3	**Reinforcement**					
	Provide support and fix the steel reinforcement bars, including all cutting, bending and supports as shown in the drawings					
7.3.1	High-tensile steel bars	kg	618.30			*spec-3.3.1*
7.4	**Precast Culvert Rings**					*spec-6.11*
	Rate to include for supply of culvert rings, preparation and placing to required levels					
7.4.1	Provide all materails and install precast 450mm dia culvert rings in accordance with the drawing	m	20.00			*spec-6.11*
7.5	**Protection Works**					
7.5.1	Mortared (1:3 cement/sand) stone pitching protection 250 - 300mm to outlet protection works as shown in the drawings	m^2	20.00			*spec-6.5*
7.5.2	Approved selected gravel to foundation	m^3	2.00			*spec-2.30*
	TOTAL CARRIED OVER TO SUMMARY					
Bill No. 8: Cattle Trough Structures						
ITEM	**DESCRIPTION**	**UNIT**	**QUANTITY**	**RATE (KSh)**	**AMOUNT (KSh)**	
	Construct cattle trough, of dimension 20 m x 2.9 m, on Main Canal at Chainages as directed by Resident Engineer in accordance with specifications and Drawing					*spec-3.1, spec-3.2,spec-3.3*



8.1	**SITE CLEARANCE**					
8.1.1	*Clear site of all overgrowth grass, trees (less than 500 mm diameter), bushes, shrubs, etc. and any deleterious material, stripping to a depth of not more than 150mm, stockpile and dispose as specified.*	m^2	216.00			*spec-2.2*
8.2	**EARTHWORKS**					
	Excavation and filling					
	To include for all excavations, trimming to levels, backfilling with approved selected soil, compacting, disposal of surplus material and reinstatement.					
8.2.1	Excavation in normal soils n.e 1.0 m	m^3	60.55			*spec-2.6*
8.2.2	Backfilling to structure	m^3	29.00			*spec-2.15*
8.3	**HARDCORE MATERIAL**					
8.3.1	Hardcore Filling: 300 mm thick hand-packed approved hardcore filling, leveled and compacted, to base and perimeter of trough as shown in drawings;	m^3	60.55			*spec-2.3*
8.3.2	50mm layer of murram blinding to hardcore	m^2	10.09			*spec-7.11.1*
8.4	**CONCRETE WORKS**					
	Provide and place the following concrete including all formworks and test					*spec-3.2*
8.4.1	Blinding concrete Class 15/40, 50 mm thickness	m^3	3.36			*spec-3.2*
8.4.2	Mass concrete Class 20/20 for cattle trough and inlet structure	m^3	13.47			*spec-3.2*
8.5	**STONE MASONRY**					
	To include supply of stones masonry from approve sources and laying with 1:6 cment:sand mortor as specified					*spec-6.4*
8.5.1	Mortared (1:3 cement/sand) Stone pitching protection 250 - 300mm for the canal part	m^2	9.00			*spec-6.5*
8.5.2	300 mm thick stone masonry in 1:6 cement mortar to cattle trough	m^2	60.00			*spec-6.4*
8.6	**Reinforcement**					
8.6.1	Provide wire mesh reinforcement Type A142 for cattle trough floor.	m^2	58.00			*spec-3.3.1*
8.6.2	2no. 8mm deformed reinforcement bars longitudinally laid between the courses including binding wire in central wall	kg	94.80			
8.7	**METAL WORKS**					
	Supply and fix the following slide gates, complete with all related accessories as shown in the drawings and as per Specifications					
8.7.1	Supply and install galvanised gate size 380 mm x 380 mm as shown in the drawings.	No.	1.00			*spec-7.10.17*
	TOTAL for 1 No. CATTLE TROUGH					
	TOTAL FOR 7 No. CATTLE TROUGHS CARRIED OVER TO SUMMARY					
BILL NO.9: Toilet Blocks						
ITEM NO	**DESCRIPTION**	**UNIT**	**QUANTITY**	**RATE (KSHS**	**AMOUNT (KSH)**	
	SUB -STRUCTURE (All Provissional)					
	Note:					
	The following Items are fro 2 No. Toilet Blocks.					



	All excavations shall be measured net and no allowance shall be made for working space as per SMM D5(g)					
	Excavations include trimming sides and bottoms of excavations; spoil heaping on site; double handling of excavated materials; maintaining and supporting sides; and keeping free from water, mud and fallen material; with and including destruction of termites nests within site of works,take out and destroy queens, impregnate holes and tunnels with insecticide and fill voids with approved material					*spec-2.6*
9.1	**Site Clearance**					
	Clear the site of trees,shrubs and all vegetation;cut away as directed	m^2	12.00			*Spec-2.2*
9.2	**Oversite excavation**					
	Excavate oversite to remove top soil average 200mm deep and keep on site for later re-use for landscapping	m^2	12.00			*spc-2.6*
9.3	**Excavation**					
9.3.1	Excavate for strip footing not exceeding 1.50m deep.	m^3	12.00			*spec-2.6*
9.3.2	Excavate for pit latrine not exceeding 1.50m deep.	m^3	8.00			*spec-2.7*
9.3.3	Ditto 1.5 - 3.0m	m^3	8.00			*spec-2.7*
9.3.4	Ditto 3.0 - 4.5m	m^3	8.00			*spec-2.7*
9.3.5	Extra over excavation for excavating in rock	m^3	4.00			*spec-2.7*
9.3.6	Remove and cut away surplus excavated materials.	m^3	40.00			*spec-2.15*
9.4	**Disposal of water**					
	Keeping all excavations free from all water including spring or running water	LS	1.00			*spec-2.11*
9.5	**Planking and strutting**					
	Uphold the sides of all excavations	LS	1.00			*spec-3.4.1,3.4.2*
9.6	**Filling**					
9.6.1	Hardcore filling in making up levels compacted in layers of 150mm maximum thickness	m^3	4.00			*spec-2.30*
9.6.2	50mm (Average) thick quarry dust blinding to surfaces of hardcore	m^2	6.00			*spec-2.30,7.11.1*
9.7	**Anti-termite treatment**					
	Premise 200 SC` or other equal and approved anti-termite insecticide treatment with ten years guarantee applied strictly in accordance with manufacturer's instructions, to tops of fill and foundation walls	m^2	6.00			*specc-6.6(b)*
9.8	**Concrete**					
	Insitu concrete; reinforced;class 20/(20mm); vibrated					
9.8.1	Foundations in trenches irrespective of thickness	m^3	4.00			*spec-3.0*
9.8.2	Ground floor beams	m^3	2.00			*spec-3.2.1,3.3.1*
9.8.3	125mm thick slab	m^3	2.00			*spec-3.2.1,3.3.1*
9.9	**Reinforcement**					
	Bars;high yield steel;cold worked to B.S .4461 including bends,hooks,tying wire and					*spec-3.3.1*
9.9.1	10 mm ditto	Kg	100.00			*spec-3.3.1*
9.9.2	8 mm ditto	Kg	120.00			*spec-3.3.1*
9.10	**Fabric; B.S. 4483**					

	Reference A142 mesh 200x200 mm, weight 2.22 kgs per square meter(measured net-no allowance made for laps including bends, tying wire and distance blocks	m²	20.00			*spec-3.3.1*
9.11	**Sawn formwork to insitu concrete as described:-**					
9.11.1	Sides and Soffits of beams	m²	20.00			*spec-3.4*
9.11.2	Horizontal soffits of Suspended slab	m²	10.00			*spec-3.4*
9.12	**Walling**					
9.12.1	150mm thick approved natural stone;local;roughly squared to foundation walling;bedding and jointing in cement: sand (1:3) mortar	m²	10.00			*spec-6.4*
9.12.2	Ditto 150mm superstructure walling	m²	30.00			*spec-6.4*
9.13	**ROOFING**					
	Sawn seasoned and well Treated Cypress					*spec-7.10.6*
9.13.1	75x50mm purlins	m	12.00			*7.10.6*
9.13.2	100 x 50mm rafters	m	16.00			*7.10.6*
9.13.3	100 x 50mm wall plate	m	8.00			*spec-7.10.2*
	Wrought Treated Cypress					
9.13.4	200mm x75mm Fascia or barge board	m	20.00			*spec-7.10.6*
	Roof Covering 28 Gauge Corrugated 'Resincot' Iron Sheeting and Accessories as Manufactured by Gal sheet K Ltd or equal and approved					*spec-7.10.11*
9.13.5	30 gauge Box profile roofing sheets on timber purlins (m/s) on timber roof construction (m/s) with and including manufacturer's approved bolts	m²	18.00			*spec-7.10.11*
9.14	**FINISHES**					
	Vent Pipes					
9.14.1	100 mm Diameter Upvc Pipe class B	m	8.00			*spec-4.1*
	Door					
9.14.2	Single door; 50 mm thick ; 900 x 2100 mm high including 4" frame	No.	2.00			*spec-7.10.8*
	Floor					
	Cement and sand (1:4) paving: steel trowelled: on concrete					
9.14.3	40mm thick to floors	m²	6.00			*spec-7.10.5*
	Window					
9.14.4	Ms Casement window complete with stainless steel 304 #8.035 wire mesh	m²	2.00			*7.10.12*
						-
	TOTAL BILL CARRIED TO SUMMARY					

1.1 NAVCDP COMPONENT TWO

TECHNICAL SPECIFICATIONS

FOR

REHABILITATION WORKS FOR ISINET KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ESELENKEI WARD, KAJIADO SOUTH SUB COUNTY, KAJIADO COUNTY

FUNDED BY

THE WORLD BANK, THE GOVERNMENT OF KENYA AND THE COUNTY GOVERNMENT OF KAJIADO

@2026

2 Technical Specification

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3 TECHNICAL SPECIFICATION

SECTION 1.

1. GENERAL REQUIREMENTS

1.1. Quality and Approvals

The materials and workmanship shall be the best of their respective kinds and to the approval of the Engineer. The words "to the approval of the Engineer" shall be deemed to be included in the description of all items relating to design, construction, installation and materials and workmanship for the due execution of the Works.

The Contractor shall submit all data, details and samples as necessary and as reasonably requested by the Engineer of all materials that the Contractor proposes to use in the Works. Method statements which adequately demonstrate the Contractor's proposed method of working, methods of maintaining safety and compliance with the programme shall be submitted for the Engineer's approval prior to the commencement of work on any area of the Site.

Where the Contractor is responsible for the preparation of Construction Documents to describe the permanent works such Construction, the Documents shall be approved prior to the procurement of any materials or commencement of any work to which the documents relate. No materials, Plant or equipment shall be procured for the Contract and no work, permanent or temporary, shall commence without first obtaining the Engineer's approval. All materials, Plant and equipment supplied shall be designed for operation under the above described conditions.

1.2. Construction Documents

Drawings and Documents which are to be submitted by the Contractor to describe the Permanent Works shall become Construction Documents upon their approval.

All drawings, technical specifications, bill of quantities, schedules, cost estimates; programme and other information to be submitted by the contractor shall be in English and shall be submitted for approval in triplicate. Following approval, the contractor shall supply a further five copies to the Engineer. Construction Documents shall not be departed from without the approval of the Engineer.

All drawings and documents submitted by the Contractor shall have been checked,

signed and be ready for issue and shall bear:

- Title of the drawing or document;
- Scale;
- Date;
- Work item reference number complying with an approved numbering system;
- Name and references of the Contractor;
- Names of the employer and the Engineer;
- Date of approval by the Contractor and the signature of the person responsible for approval.

Drawings and documents submitted for approval shall be delivered to the Engineer's office as designated by the Engineer.

Unless otherwise specified the Contractor shall allow a minimum of 21 days, after the date of receipt by the Engineer for approval of drawings and documents by the Engineer.

1.3. Level Datum

Before the commencement of construction work, the Contractor shall establish, in a position to the approval of the Engineer, steel datum pegs which shall be securely concreted in. The level of these pegs shall be established and agreed with the Engineer and all levels used in the construction of the Works shall be referred to these established datum points. The correctness of this datum shall be checked at regular intervals during the construction period as agreed with the Engineer.

Where possible construction drawings and all levels used for construction shall be referred to the national height datum as defined by the Survey of Kenya. The Contractor shall be responsible for obtaining the location and values of the permanent bench marks. In cases where such bench marks do not exist, the site datum shall be agreed with the Engineer.

1.4. Setting Out of the Works

The site layout drawings show indicative site layouts. Prior to commencing construction, the Engineer will agree with the Contractor the basic information supplementary to that

shown on the Drawings such as the position of manholes, chambers, centre-lines and base-lines sufficient for the Contractor to locate the Works.

The Contactor shall prepare detailed setting out drawings and data sheets as necessary and submit them to the Engineer in triplicate for approval. Any modifications to the setting out drawings or data sheets required by the Engineer shall be made by the Contractor and resubmitted for final approval. Should it be necessary during setting out or during construction for the approved setting out details to be amended, the Contractor shall amend the drawings or data sheets or make new ones for approval as required by the Engineer.

For pipelines, the Contractor shall in the presence of the Engineer set-out the pipeline alignments in accordance with the indicative alignments shown on the drawings taking into account physical features on the ground, any existing services, any requirements of relevant Authorities and any changes deemed necessary by the Engineer, confirming the locations of all valves, air valves, washouts, hydrants and bends.

The Contractor shall prepare and submit to the Engineer, at an approved scale, plans of the pipeline route and profiles of ground levels after any initial clearing of the way leave or easement showing the proposed pipe invert levels and precise chainages for all valves and fittings for approval. Following approval, the Contractor shall submit to the Engineer two copies of the agreed alignment and profiles.

1.5. Boundaries of Works

The Employer shall provide the Site upon which the Permanent Works are to be constructed. Where a drain or pipeline is to be within an existing road or track reservation or is otherwise located in land designated Public Domain the Site width will be restricted to the limit of the public land. The existing boundary fences and walls shall not be disturbed without prior approval of the Engineer and, unless road diversions and closure notices are approved and posted, carriageways shall be left available for the safe passage of traffic.

The Contractor shall not enter upon or occupy with men, tools, equipment or materials any land other than the site without the written consent of the owner of such land.

On occupation of the Site or other land the Contractor shall provide such fencing, as required.

1.6. Work through Private Land

In order that the necessary parts of the Site which are on private land may be obtained the Contractor shall supply the Engineer with full information of his programme sufficiently in advance of the dates upon which the Contractor proposes to enter upon each areas of the Site. The Contractor shall where required, in consultation with the Engineer, Programme the Works to designate the areas of the Site to which the Contractor is to be given possession and the sequence of taking possession.

The Contractor shall obtain written approval before entering upon any private land or cutting through ditch, bank, hedge, wall, fence or any other form of boundary marking and he shall carry out all reasonable requirements as approved by the Engineer in the matter of reinstatement.

1.7. Public Utility Mains and Services

Where the Contract indicates the positions of existing services or apparatus the positions shown are believed to be correct, but no warranty is given as to the accuracy or completeness of the information.

It shall be the responsibility of the Contractor to obtain all information available from the Public Utility Authorities regarding the position of existing mains and services and he shall copy this information to the Engineer as soon as he obtains it.

The Contractor shall carry out excavation works in a manner which safeguards any existing services, including hand excavation as necessary and shall be responsible for the cost of any repair work necessitated by damage caused by him to any main or service and for any costs arising from the disruption.

The Contractor shall obtain all information and assistance from the Public Utility Authorities for the locating of the mains and services and shall agree with the Engineer

any trial excavation which may be necessary to confirm or establish these locations.

The Contractor shall be responsible for locating all existing services, whether known to the Public Utility Authorities or not, and shall conduct his own survey as necessary to accurately locate all services. All efforts to identify these existing services shall be carried out in advance of excavating the permanent works.

Any temporary or permanent diversion of mains and services shall be agreed with the appropriate Authority.

1.8. Safeguards to Existing Pipes, Cables, Structures

It shall be the Contractor's responsibility to safeguard by means of temporary or permanent supports or otherwise all existing sewers, pipes, cables, structures or other things which would be liable to suffer damage if such precautionary measures were not taken.

Safeguards shall be to the approval of the Engineer and of the undertaker or owner concerned.

1.9. Record Drawings

At all sites and any locations where the Contractor executes work under the Contract, including locations where the Contractor undertakes repair or rehabilitation work, the Contractor shall record the location and nature of all water supply and wastewater works including their ancillaries and any associated services.

Where instructed by the Engineer for the purpose of producing Record Drawings, the Contractor shall undertake such surveys and investigations to determine the location of existing services. Such surveys and investigations shall be additional to those surveys and investigations undertaken by the Contractor for the purpose of determining the location of services prior to excavation.

The Contractor shall where necessary utilize appropriate equipment and where instructed by the Engineer excavate trial pits to confirm the location and determine the size and nature of the buried services.

For sites where the Contractor undertakes permanent works Record Drawings shall be submitted to the Engineer, for approval, in the form of As Built Drawings. In the case of repairs and rehabilitation the Record Drawings shall be submitted for approval within a period of 21 days following execution of the work.

Record Drawings shall be prepared to an approved format, and scale in line with the construction drawing.

1.10. Connections to Existing Pipes, Cables and Equipment

The Contractor shall be responsible for joining up and making connections between pipes and cables laid by him and existing pipes and cables. The Contractor shall submit to the Engineer a drawing showing the details of the connection and shall state the date on which the particular connection is required, and the work shall not proceed until the Engineer's approval has been given.

The Contractor shall be responsible for ensuring the compatibility of new pipes and cables with existing pipe work, cables, tubing and equipment.

1.11. Lighting, Watching and Traffic Control

Where necessary for safety of the public or where required by the Engineer, the Works shall be properly fenced and signed. In addition, the Works shall be lighted from half an hour before sunset until half-an-hour after sunrise and at other times when visibility is poor. The position and number of the lamps shall be such that the extent and position of the Works are clearly defined. Each Site shall be provided with watchmen as required.

1.12. Contractor's Offices

The Contractor shall provide and maintain offices for the use of his representative and staff to which written instructions by the Engineer can be delivered. Any instructions delivered to such offices shall be deemed to have been delivered to the Contractor.

Offices shall be located to give convenient access to the Works and shall be subject to the approval of the Engineer. The Contractor shall be responsible for obtaining the land on which to establish any temporary site offices.

1.13. Contractor's Yards, Stores and Accommodation for Workmen

The Contractor shall be responsible for obtaining the land and for the provision of all temporary yards, stores, workshops, offices, mess rooms, shelters and for all services in connection therewith. The location of all such facilities shall be agreed beforehand with the Engineer and shall be such as to avoid obstruction and nuisance to the public.

The Contractor shall construct secure storage compounds and storage building where he shall store at his own risk all equipment and Plant awaiting erection. The Contractor shall also provide secure covered storage for all samples submitted to the Engineer for approval. Storage building shall be weatherproof and shall be of sufficient size to accommodate all items requiring covered storage.

The Contractor shall provide and maintain suitable and sufficient shelters and mess rooms for his workmen and supervisory staff as are customary and necessary. The Contractor shall provide sufficient closets or latrines to the satisfaction of the relevant authority. They shall be properly screened and maintained in a clean and sanitary state at all times. The Contractor shall be responsible for making all arrangements for the proper disposal of waste.

1.14. Water and Electricity Supplies

The Contractor shall make all arrangements for and provide adequate supply of potable water to each site as necessary for the execution and testing of the Works and for use by his workmen. The Contractor shall make arrangements for and provide any electricity supply required for the execution of the Works, including the Tests on Completion.

1.15. Contractor's Staff and Workmen

The Contractor shall agree to employ Kenyan workers to the maximum extent possible. The Contractor shall provide a competent Site Agent to the approval of the Engineer to be in charge of the work who shall not be changed except with the consent of the Engineer.

The Contractor agrees that his workmen and employees shall be considered for all purposes in his direct pay and employ and under his supervision and control. He shall be directly and personally responsible for discharging all obligations, financial or other, which may be or becoming owing to any such workman or employee or to his successors, assignees or personal representatives. There shall be no contractual or legal relations of any kind whatsoever between the Employer and any such workman, employee or any person employed in the performance of the Contractor's obligations under this Contract.

The Engineer may request and the Contractor agrees to accept the request for the immediate removal from the site of any employee or worker of the Contractor adjudged by the Engineer to be incompetent, disorderly, unreliable or of bad character. Such employee shall not again be employed on the Works.

1.16. Training of Employers Workmen

The Contractor shall make provision for the on-site training of up to 3 of the Employer's staff. The Contractor shall provide and maintain all insurance policies required under the Contract for the protection of the Employer, the Engineer, the Contractor,

subcontractors, personnel, the Works, plant, equipment and third parties. No construction activities shall commence until evidence of the required insurance has been submitted and approved.

1.17. Project Management

1.17.1. Project Control

The Contractor shall provide within his site organization a project management capability to advice and be directly responsible to the Site Agent. (Contractor's chief site representative) The duties of the section shall include the following:

a) Planning and programme preparation particularly in relation to the requirements of the Employer and the public authorities, and the requirements to maintain water supply and waste water disposal services where careful detailed arrangements have to be made and adhered to.
b) Planning the execution of the Works in a manner which minimizes disruption to the water supply system and will permit the efficient and effective commissioning of the water supply system and their respective components.
c) Ensuring adequate potable water supplies and wastewater disposal services are maintained to all consumers.
d) Continuous surveillance of progress and anticipation of factors likely to affect the timely performance of the Contract.
e) Making proposal for modification to forward planning and to the programme at an early stage in the light of factors resulting from (d) above.
f) Continuous appraisal of the Contractor's methods and routines particularly as to their effect on the community and property.
g) Forward planning for resource requirements taking due account of possible shortages and delays in the arrival on site of materials, equipment, plant and personnel and their mobilization for effective usage.
h) Acquisition and process of up-to-date information for progress meetings with the Engineer. The preparation of monthly progress reports including an update of

   the detailed Programme and cash flow forecast which shall include progress photographs as directed by the Engineer.

The Contractor's project management staff shall be of adequate ability and experience. Programmes shall be based upon Critical Path Management (CPM) networks in

precedence format and shall be prepared using a suitable PC-based project management software package approved by the Engineer.

Reporting shall be in a manner compatible with the Employers project management procedures and shall use the Earned Value (EV) Technique and shall monitor the actual gross value of work completed against the predicted value.

1.17.2. Monthly Statements and Certificates

Monthly statements and certificates shall be submitted in an approved manner and format. In addition to the statements submitted in hard copy the Contractor shall submit a computer copy using data base software as prescribed by the Engineer. The statements and certificates shall detail the measured value of the work completed on each item of the Works in such detail that the Engineer can identify location and measurement of each item. A location shall constitute a single structure such as a reservoir, pump station or section of a pipeline or a component of a system such as a pipeline valve complex.

Each item shall be uniquely identified in accordance with the numbering system as instructed by the Engineer.

1.17.3. Progress Meetings

The Contractor shall provide a suitable venue, near the vicinity of the Site, and arrange progress review meetings to be chaired by the Engineer at monthly intervals to coincide with submission of monthly progress submissions. The Contractor shall allow for attendance by the Engineer and up to 4 representatives of the Engineer's or Employer. The meetings shall be attended by the Contractor's senior representatives, Site Agent and other members of his senior staff as may be deemed necessary.

1.17.4. Equipment for the Employer

The Contractor shall hand over to the Employer on completion of the Works a complete set of tools and equipment together with spare parts and fittings to facilitate the maintenance and operation of the installed works.

1.17.5. Facilities for Survey and Inspection by the Engineer

The Contractor shall make available technicians and such labour, materials and safety equipment as the Engineer may require for inspections and survey work in connection

with the Works. The Contractor shall provide all necessary tackle, test equipment, access, labour, staff and any other thing the Engineer may reasonably require in order that he may safely, conveniently and quickly carry out such inspections as he deems necessary at any time during the execution of the Works and during the Defects Liability Period. The Engineer, his representative and assistants, shall not inspect any area of the Works where they deem the safety provision to be inadequate and the Contractor shall undertake any work required by the Engineer in order to make it safe.

1.17.6. Inspections by the Engineer during Defects Liability Period

The Engineer will give the Contractor due notice of his intention to carry out any inspections during the Defects Liability Period and the Contractor shall thereupon arrange for a responsible representative to be present at the times and dates named by the Engineer. This representative shall render all necessary assistance and shall record all matters and things to which his attention is directed by the Engineer.

1.17.7. Protective Clothing and Safety Equipment

The Contractor shall provide for the Engineer, his Representative and assistants any additional protective clothing and safety equipment necessary for the proper discharge of their duties on the Site.

The Contractor shall provide any necessary protective clothing and safety equipment for the use of authorized visitors to the site including the Employer and his staff and representatives and those of any relevant authority who have reason to visit the Site.

1.17.8. Notice Boards

The Contractor shall provide and erect sign boards at the Sites where works are being executed, giving information to the public on the Project and the Employer and further details as will be prescribed by the Employer. The location of the sign boards at the sites will be indicated by the Engineer. The Contractor shall maintain, alter, move or adapt the sign boards from time to time as may be instructed by the Engineer. The display of any named Sub-contractors or any other information associated with the Works shall be to the approval of the Engineer.

1.17.9. Language of Correspondence and Records

All communications from the Contractor to the Engineer shall be in the English language. All books, timesheets, records, notes, drawings, documents, specifications and manufacturers' literature shall be in the English language. If any of the aforementioned is in another language a certified translation in English shall be submitted to the Engineer.

1.17.10. Standards and Regulations

Each and every part of the Works shall be designed, constructed, manufactured, tested and installed in accordance with an internationally recognized standard, Code of Practice, or Regulation applicable to that part of the Works.

Such standards and codes shall include:

a) British Standard Specification last published.
b) International Electromechanical Commission, where available (IEC).
c) International Organization for Standardization (ISO).

The Contractor shall provide and keep permanently on site copies of such standards as may be directed by the Engineer and shall make them available to the Engineer as required.

1.17.11. Equivalency of Standards and Codes

Wherever reference is made in the Contract, including Specifications, Drawings and Bill of Quantities, to specific standards and codes to be met by the goods and materials to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise stated in the Contract. Where such standards and codes are national, or relate to a particular country or region, other authoritative standards that ensure a substantially equal or higher quality than the standards and codes specified will be accepted subject to the Engineer's prior review and written consent. In the event the Engineer determines that such proposed deviations do not ensure substantially equal or higher quality, the Contractor shall comply with the standards specified in the Contract.

1.17.12. Quality Control

The Contractor shall be responsible for his own quality control and shall provide

sufficient competent personnel for supervising the Works, taking and preparing samples and for carrying out all necessary tests.

1.17.13. Testing of Completed Construction Works

Completed canal works shall be inspected, tested and commissioned to verify compliance with the contract drawings, specifications and design requirements. The Contractor shall provide all labour, equipment and calibrated instruments necessary for testing and shall submit a testing programme and certified test reports for approval.

The testing shall include visual inspection of workmanship, dimensional surveys, hydraulic performance tests, leakage and watertightness tests, structural integrity assessments, operational testing of gates and control structures, and verification of concrete quality where required. The completed works shall also be inspected for safety, environmental compliance and proper restoration of disturbed areas.

Any defects identified during testing shall be repaired and the affected works retested until they meet the specified standards. Final acceptance shall only be granted after satisfactory completion of all tests, submission of the required documentation, and approval by the Engineer.

1.17.14. Adjudication over any disparities and disputes

The Contractor shall comply with the adjudication provisions contained in the Contract for the prompt and impartial resolution of any disputes arising during the execution of the Works. Any dispute shall be referred to adjudication in accordance with the Conditions of Contract, and an independent adjudicator shall be appointed as provided therein. The Contractor and the Employer shall each submit all relevant information, records, and supporting evidence required for the adjudicator to make an informed determination and shall be afforded a fair opportunity to present their respective cases. The adjudicator shall issue a written decision within the period specified in the Contract, and the parties shall comply promptly with the decision, which shall remain binding unless and until it is revised through arbitration, litigation, or mutual agreement in accordance with the Contract.

4 SECTION 2 –

2. EARTHWORKS, BACKFILLING AND RESTORATION

2.1. Conditions of Site

Before carrying out work on any Site, the Site shall be inspected by the Contractor in conjunction with the Engineer to establish its general condition which shall be agreed and recorded in writing and by means of digital photography.

Details recorded shall include the location of all boundary and survey beacons, the condition of buildings, surface, terracing (if any), ditches, watercourses, roads, tracks, fences and other information relating to the Site and elsewhere which may be affected by the works.

In the case of way leaves for pipelines the boundaries of the way leave will be defined by the Employer and the contractor shall where directed provide erect and maintain in position, from commencement to the final completion of the Works, in every section substantial timber stakes or similar approved markers not less than 1.5 m high indicating the position of the boundary at 100m or other such intervals as the Engineer may direct. In the event of any boundary or survey mark established for the purpose of land title being disturbed or displaced the Contractor shall forthwith replace the beacon. Where necessary the Contactor shall employ the services of an approved licensed surveyor for the purpose of setting out boundaries.

2.2. Site Clearance and Topsoil Removal

Site clearance shall be carried out over the areas to be occupied by the Permanent Works before beginning excavation or filling or other work, and shall include the clearance of all trees, stumps, bushes and other vegetation and the removal of all boulders between 0.01 and 0.2m^3 volumes. Boulders located within 1m of any pipe centerline shall be removed where directed by the Engineer.

Before beginning clearance in any area the Contractor shall give seven days' written notice of his intention to the Engineer who will determine the extent and limits of such clearance.

Topsoil shall mean the surface layer of soil which by its humus content supports vegetation and is unsuitable, as a formation to roads and concrete structures or as a backfill or bedding material. The extent and depth of topsoil that needs removal shall be agreed with the Engineer. Topsoil shall be set aside for re-use or disposal as directed by the Engineer.

Trees to be removed shall be uprooted or cut down as near to the ground level as possible. Bushes, undergrowth, small trees stumps and tree roots shall, where directed by the Engineer, be grubbed out. All holes left by the stumps or roots shall be backfilled with suitable material in a manner approved by the Engineer.

The Engineer may require that individual trees, shrubs and hedges are preserved; the Contractor shall take all necessary precautions to prevent their damage.

In the case of way leaves for pipelines and the like, the Contractor shall preserve as far as practicable all grass and other vegetation outside the limits of trenches and permanent works and shall not necessarily destroy crops or any vegetation whose removal would not be essential to his operations.

2.3. Erosion

The Contractor shall take care at all times to prevent erosion on every site and elsewhere on land which may be affected by his operations and the Engineer may impose such reasonable limitations and restrictions upon the method of clearance and upon the timing and season of the year when clearance is carried out as the circumstances warrant.

2.4. Ground Levels

Before commencement of any earthworks or demolition the sites shall be surveyed, as necessary, in conjunction with the Engineer to establish existing ground levels. These agreed ground levels shall form the basis for the calculation of any subsequent excavation and filling.

2.5. Trial Holes

The Contractor shall excavate refill and restore in advance of his Programme such trial holes as he may require for determining the nature of the subsoil and the location of existing underground services and obstructions.

2.6. Excavation Generally

Excavations shall be made in open cutting unless tunneling or heading is specified or approved by the Engineer and shall be taken out as nearly as possible to exact dimensions

and levels so that minimum of infilling will afterwards be necessary. The Contractor shall ensure the stability and safety of excavations and shall take all measures necessary to ensure that no collapse or subsidence occurs.

Except where described in the Contract or permitted under the Contract excavation shall not be battered. The sides of all excavations shall be kept true and shall where necessary be adequately supported by means of timber, steel or other type struts, walling, poling boards, sheeting, bracing and the like.

Excavations shall be kept free from water and it shall be the Contractor's responsibility to construct and maintain temporary diversion and drainage works and to carry out pumping and to take all measures necessary to comply with this requirement.

In the event of soft or otherwise unsuitable ground being encountered at formation level or if the formation is damaged or allowed to deteriorate the Contractor shall forthwith inform the Engineer, shall excavate to such extra depth and refill with compacted granular or other approved fill or C15 concrete (minimum compressor strength 15N/mm2) as the Engineer may require. With respect to the side face of any excavation against which concrete or other work will be in contact the Engineer may require that the net dimensions of the work be increased. The Contractor shall be responsible for the disposal of Surplus excavated material off site, which shall be to a location approved by the Engineer. No excavated material suitable for re- use shall be removed without the approval of the Engineer.

The Contractor shall not deposit excavated materials on public or private land except where directed by the Engineer or with the consent in writing of the relevant authority or of the owner or responsible representative of the owner of such land and only then in those places and under such conditions as the relevant authority, owner or responsible representative may prescribe.

2.7. Excavation in Excess

If any part of any excavation is in error excavated deeper and/or wider than is required, the extra depth and/or width shall be filled with Grade C15P concrete or compacted granular or other approved fill to the original formation level and/or dimensions as the Engineer directs. In pipe trenches where the pipe is not bedded on or surrounded with concrete, excess excavation shall be filled with compacted granular material.

Excess excavation in rock trenches shall be filled with concrete (15N/mm2 compressive strength) up to 150mm below the pipe invert.

2.8. Mechanical Excavation

Mechanical excavation shall be employed only if the subsoil is suitable and only in such manner which will allow adequate support of the excavations. The Contractor shall ensure that there are no pipes, cables, mains or other services or property which may be disturbed or damaged by its use.

2.9. Excavation for Pipe laying

The width of trench excavation shall be the minimum required for efficient working after allowance has been made for any timbering and strutting and shall not exceed the widths described in the Contract. At any one spread the maximum length of open trench shall not, without the prior approval of the Engineer, exceed 100 meters.

Trenches in rock for pipes up to 100mm bore shall be excavated to provide a minimum clearance of 100 mm and a maximum of 300 mm around the outside of the pipe and joints. For pipes exceeding 100mm bore the minimum clearance shall be increased to 150mm and a maximum of 400mm.

Where the trench is in rock or rocky ground the Contractor shall excavate the pipe trench to a depth of 150mm below the invert of the pipe and refill with compacted granular fill.

The materials for re-use excavated from trenches shall be stockpiled at the sides of the trench except where this would obstruct any road or footpath and prevent the passage of traffic or pedestrians. In such cases the Contractor shall excavate the trench in such lengths and stockpile the excavated materials at such places as the Engineer may require.

Where excavation for pipe laying is carried out behind thrust blocks on existing pipelines the Contractor shall provide adequate support arrangements to transfer thrusts to the surrounding ground.

2.10. Headings

Excavation for pipes in heading shall be carried out to the approval of the Engineer and to dimensions which will permit a proper inspection to be made. The heading shall be properly and securely timbered. The pipe shall be laid on a minimum thickness of 150mm of concrete. After the pipe has been laid, jointed and tested the heading shall be filled in short lengths not exceeding 1 meter with Grade C15P concrete or as directed.

The heading shall be completely filled with concrete and hard filling shall then be rammed into the concrete at the crown of the heading.

Special precautions shall be taken to prevent a slump in the concrete and to ensure that no slips or falls of the heading or in the ground above or in the shafts can take place.

2.11. Excavation for Foundations of Structures

The Contractor shall give sufficient notice to the Engineer to enable him to inspect and approve foundations in advance of placement of the permanent works. The Engineer may withdraw his approval if work is not commenced within 48 hours or the formation is subsequently allowed to deteriorate.

If the Engineer directs a bottom layer of excavation of not less than 75mm thickness shall be left undisturbed and subsequently taken out by hand immediately before concrete or other work is placed.

Formations which are to receive concrete blinding, or a drainage layer shall be covered with such blinding or layer immediately the excavation has been completed, inspected and approved by the Engineer.

Surfaces against which permanent works are to be placed shall be kept free of oil, water, mud or any material.

No concrete or other materials shall be placed until formations have been approved. Adequate notice shall be given to the Engineer to enable him to examine the formation.

2.12. Rock Surfaces under Concrete Structures

2.12.1. Concrete Placed Directly on Rock

Rock under concrete structures shall be prepared by picking, barring and wedging or other methods which will leave the rock in as sound a condition as may reasonably be expected according to the rock quality.

Rock surfaces shall be thoroughly cleaned by compressed air and water jet or such means as the Engineer my direct before concrete is placed.

2.12.2. Concrete Placed on Capping Layer

Where instructed the rock excavation shall be taken down to a depth of 1.0m below the underside of the structure and the excavation backfilled with capping materials to the required formation level. Capping material shall be granular material. The material shall

be compacted in 150mm layers to achieve a density of not less than 95% maximum dry density

at optimum moisture content + 5% to 2% as determined by the BS heavy compaction tests to BS 1377.

2.13. Explosives

The Contractor shall at all times take every possible precaution and comply with the Explosives Laws of Kenya and regulations relating to the handling, transportation, storage and use of explosives and shall at all times when engaged in blasting operations post sufficient warning flagmen to the full satisfaction of the Engineer's Representative.

The Contractor shall also provide a special proper store for explosives in accordance with local regulations and shall provide experienced men with valid blasting licenses, for handling explosives to the satisfaction of the Engineer and the authorities concerned.

The Contractor shall at all times make full liaison with and inform well in advance and obtain such supervision and permission as is required from the Police and all Government Authorities, public bodies and private parties whosoever concerned or affected by blasting operations.

Blasting shall only be carried out on those sections of the Works for which permission in writing shall have been given by the Engineer and the relevant authorities and shall be restricted to such hours and conditions as may be prescribed. Blasting within 10 meters of existing water mains will not be permitted.

Blasting shall be carried out so as not to weaken existing structures or the foundations or ground adjacent to the existing and proposed works. The Contractor shall take all necessary precautions to prevent loss, injury or accident to persons or property and shall be entirely liable for any accident or damage that may result from the use of explosives.

The Contractor shall submit to the Engineer for his approval a method statement including details of the intended drilling patterns, depths of holes, the amounts of explosives at each location and the method or sequence of setting off that he proposes to use.

2.14. Excavated Materials Suitable for Re-use

In so far as they are suitable and comply with the Specification, materials arising from excavations shall be re-used in the Works.

During excavation, the Contractor shall ensure that all material suitable for re-use are kept separate and set aside and protected as necessary to prevent loss or deterioration.

The materials forming the surface and foundations of roads, road verges, tracks and footways shall when excavated, and if required for further use, be carefully separated. All hard materials shall be kept free from soil or other excavated materials.

During excavation of pipe trenches the Contractor shall ensure that all granular or other approved material suitable for filling around and over pipes shall be kept separate and re- used for this purpose.

Paving slabs, bricks and similar surfaces shall be carefully removed and stacked. Prior to the commencement of excavation, the number of badly broken and unsuitable paving slabs, bricks etc. on the line of the excavations shall be agreed with the Engineer.

In verges and other grass surfaces the grass and top soil shall be stripped and separately stacked.

2.15. Backfilling of Excavations

Backfilling shall be thoroughly compacted in layers not exceeding 150mm compacted thickness and by means which will not damage the Works.

Backfilling of reinforced concrete structures shall be with suitable material approved by the Engineer.

"Granular material" as backfill is defined as unconsolidated quarry dust, gravel, sand or similar in which the clay or silt content is not predominant. The use of angular crushed stone shall not be permitted.

2.16. Pipe Beddings

Unless otherwise specified granular material for beddings shall consist of aggregate to

BS EN 12620 and shall conform to the following grading.

Pipe Nominal Diameter (mm)	Max Size (mm)	Grading (mm)
<50	Sand	N/A
50	10	10 single-size
80	10	10 single-size

100	10	10 single-size
150	15	10 or 14 single-size or 14 to 5 graded
200 to500	20	10, 14 or 20 single- sized or 14 to 5 graded or 20 to 5 graded
<500	40	10,14 20 or single-size crushed rock or 14 to 5 graded or 20 to 5 graded or 40 to 5 graded

Granular bedding material where specified shall have a Compaction Fraction not greater than 0.3 as ascertained by the test method described below.

Aggregates for flexible pipes shall consist of sub-rounded or rounded material which will not cause damage to or penetrate the pipe material.

Sand bedding material shall consist of approved local sand which material shall have a Compaction Fraction ascertained by the test method described below of not greater than 0.3. Class A bedding shall consist of Grade C15P concrete bed and surround.

Class A1 bedding shall comprise a 120 degrees' cradle of Grade C15P in situ unreinforced concrete under the pipe with selected backfill material to a depth of 300mm above the crown of the pipe.

Class B bedding shall comprise a 180 degrees bed of single-size granular material in accordance with the above table, with selected backfill material to a depth of 300mm above the crown of the pipe.

Class S bedding shall comprise a complete surround of granular material in accordance with the above table to a depth of 150mm above the crown of the pipe.

Class D bedding shall comprise a hand-trimmed natural bottom to the trench with

selected backfill material placed around and over the pipe to a depth of 300mm above the crown of the pipe.

Granular bedding and selected backfill material, placed around and to a thickness of 300mm above the crown of the pipes shall be placed simultaneously on both sides of the pipe in

layers not exceeding 150mm thickness and compacted by the use of hand rammers taking particular care to compact the material under barrel of the pipe and around joints.

In trenches where there is a continuous accumulation of groundwater, the trench shall after obtaining the approval of the Engineer, be over-excavated by 150mm and shall be backfilled using compacted granular material in accordance with the above table.

If the quantity of suitable material which can be obtained from the excavations is insufficient, the Contractor shall either screen the excavated material or transport suitable material from other excavated or borrow pits on the Site. In cases where insufficient material exists on the Site, the Contractor shall import suitable material after obtaining the written approval of the Engineer.

2.17. Compaction Fraction Test

2.17.1. Apparatus required:

i. Open-ended cylinder 250 mm long and 150mm ± 5mm internal diameter (150mm diameter pipe is suitable); ii. Metal hammer with striking face 38 mm diameter and weighing 1 kg. iii. Rule.

2.17.2. Method

Obtain a representative sample, more than sufficient to fill the cylinder (viz. about 10kg). It is important that the moisture content of the sample should not differ from that of the main body of material at the time of its use in the trench.

Place the cylinder on a firm flat surface and gently pour the sample material into it, loosely and without tamping. Strike off the top surface level with the top of the cylinder and remove all surplus material. Lift the cylinder up clear of its contents and place on a fresh area of flat surface. Place about one quarter of the material back in the cylinder and tamp vigorously until no further compaction can be obtained. Repeat with the second quarter, tamping as before, and so on for the third and fourth quarters, tamping the final surface as level as possible.

Measure down from the top of the cylinder to the surface of the compacted material. This distance in millimeters divided by the height of the cylinder (250mm) is the Compaction Fraction of the material under test.

To obtain a representative sample about 50kg of the proposed material should be heaped on a clear surface and divided with the spade down the middle into two halves.

One of these should then be similarly divided, and so on until the required weight sample is left.

2.18. Selected Backfill Material

Backfill in contact with the pipes shall be selected material and shall not contain larges stones, rocks, tree roots or similar objects which through impact or by concentrating imposed loads might damage the pipes. The material shall be capable of being compacted without the use of heavy rammers and should be free of clay lumps or other material larger than 745mm or stones larger than the maximum particle size specified for pipe bedding.

2.19. Backfilling of Pipe Trenches

The trench above pipe bedding level (300mm above the crown of the pipe) shall be filled with the approved back fill material obtained from the trench excavations, free from clay limps, boulders and rock fragments larger than 150mm.

If the quantity of material which can be obtained from the pipe trench excavation is insufficient, the Contractor shall either screen the excavated material or transport suitable material from other excavations or borrow pits on the Site. In cases where insufficient material exists on the Site, the Contractor shall import suitable material after obtaining the written approval of the Engineer.

The material shall be placed in layers not exceeding 150mm thickness and compacted by the use of rammers to achieve a density of not less than 95% maximum density at optimum moisture content +5% to -2% as determined by the BS Heavy Compaction Test to BS 1377. For trenches in fields and open areas where agreed by the Engineer the trench backfill shall be compacted to obtain a density of not less than 85% maximum dry density at optimum moisture content +5% to -2% as determined by the BS Heavy Compaction Test to BS 1377. The density of the compacted fill shall be determined by the Contractor using the "sand replacement" method as directed by the Engineer.

Before backfilling trenches the Contractor shall obtain approval from the Engineer of the methods he proposes to use and shall demonstrate by means of tests that the specified compaction can be achieved. The method of compaction shall at all times be to the approval of the Engineer.

Where ground water conditions are such that the bedding material would be likely to act as a carrier for ground water from higher of lower ground, the Engineer may

instruct flow barriers of suitable selected earth or concrete to be inserted in lieu of bedding material. Such barriers to be erected at reasonable intervals close to flexible joints in the pipe.

2.19.1. Pipe protection by warning marker tapes

All pipes laid shall be protected from future damage arising from excavations. This shall be achieved by use of brightly pigmented detectable pipe marker tapes made from aluminum and polyethylene strips with tensile strength of 50N/mm2. The tapes shall be laid above the pipe at depth not exceeding 450mm and not less than 600 above the pipe. They shall be inert to acids and alkalis and retain their pigmentation and markings for at least 50 years. The contractor shall provide evidence of quality compliance from the manufacturer. The marker tapes shall carry the message specified in the BOQs.

2.19.2. Making Good Subsidence after Backfilling

Backfilling, whether in foundations or in pipe trenches, shall be thoroughly compacted by ramming and any subsidence due to consolidation shall be made up with extra compacted material.

Should subsidence occur after any surface reinstatement has been completed the surface reinstatement shall first be removed, the hollows made up, and then the surface reinstatement re-laid.

Any subsidence that occurs adjacent to the Site of the Works which is attributable to the Contractor's activities shall be reinstated to the full satisfaction of the Engineer.

2.20. Removal of Timbering from Excavations

Timbering shall be removed from the excavations before or during the process of

backfilling except in so far as this removal of timber would be likely to cause damage to adjacent property, structures or structure foundations in which event the Contractor shall leave in the excavation such timbering as he considers necessary or as may be ordered by the Engineer.

2.21. Reinstatement of Surfaces

All surfaces whether public or private that are affected by the Works shall be reinstated temporarily in the first instance and when the ground has consolidated fully the Contractor shall reinstate the surfaces permanently.

Temporary reinstatement and permanent reinstatement of all surfaces affected by the operations of the Contractor shall be carried out and maintained to the satisfaction of the Engineer and the responsible authority or owner.

Temporary reinstatement shall be carried out immediately the trenches are backfilled. Permanent reinstatement shall not be carried out until the ground has consolidated completely. The Contractor shall inform the Engineer before carrying out this work. In the event of further settlement occurring after completion of the permanent reinstatement the Contractor shall forthwith make good the reinstatement to the approval of the Engineer or responsible authority. For the purpose of temporary and permanent reinstatement in bitumen and surfaced roads the surface width of trenches shall be increased by 150mm on each side of the trench for a depth of 75mm to provide a solid abutment for the surfacing material.

Reinstatement of surfaced roads shall be carried out to the approval of the relevant authority. The responsible authority shall have the right to carry out permanent reinstatement at the Contractor's expense. Trenches in open ground shall be reinstated to the condition in which the ground was before excavation was commenced. The final surface of the trench shall be flush with the surrounding ground.

In verges and other grass surfaces and after the backfilling had been thoroughly consolidated the topsoil shall be re-laid rolled and planted with grass or other vegetation as directed by the Engineer as may be necessary and watered until the grass has become well established. Should the planting fail it shall be replanted as required until satisfactory growth is obtained. If at any time any reinstatement deteriorates the Contractor shall restore it to a proper condition immediately.

Should the Contractor not remedy the defect to the Engineer's satisfaction forthwith any remedial work considered necessary may be undertaken by the Employer and/or the responsible authority at the Contractor's expense.

All trees, shrubs and plants shall be carefully transplanted and shall be returned to their original location after the refilling of the excavations. Return of old or mature trees may be waived in cases where the age of the tree makes return impracticable, and approved tree seedlings shall be planted in their place. Topsoil shall be carefully set aside and replaced at the surface of the backfilling.

The trenches shall be refilled and rammed solid as specified in the Contract and shall not be topped up above the original surface level to allow settlement.

If any trench becomes dangerous the Engineer may call upon the Contractor for its reinstatement at three hours' notice and failing this to have the work done by others at the Contractor's expense.

In the case of footpaths, the trench shall be refilled and rammed as specified to within 125mm of the surface. A foundation layer of 100mm compacted thickness of approved crushed limestone shall then be laid and compacted. The surface shall be cleaned and primed and the footpath surfacing shall be temporarily reinstated with 25mm compacted thickness of 14 mm nominal size dense wearing course macadam laid and compacted so as to achieve a dense, smooth and even course surface using a roller of 750 to 3000kg mass. Any kerbs shall be reinstated to their original condition.

The trench surface shall be thus maintained until the end of the Period of Maintenance or permanent reinstatement is ordered by the Engineer. Where permanent reinstatement is ordered by the Engineer the temporary surface and part of the foundation shall be removed to 50mm depth to permit the construction of a tiled or paved surface to match the original surface. An approved tiled or paved surface shall then be laid and bedded on sand or mortar to an even finish.

2.22. Safety of Excavations in Roads

Where the surface of the road (other than that which lies immediately above the trench) is damaged either by the concentration of traffic caused by an open trench, by subsidence or other causes arising from the operations of the Contractor, he shall permanently reinstate the whole of the surface so damaged to its original condition.

The Contractor shall ensure that trenches and reinstatement are maintained in a safe condition and shall take immediate action to remedy any deterioration which renders the works unsafe. If in the opinion of the Engineer any excavation or reinstatement is in a dangerous condition the Contractor shall immediately remedy the defect. Should the Contractor fail to carry out the reinstatement promptly the work any be carried out by others at the Contractor's expense.

2.23. Temporary Reinstatement of Asphalted Roads

In all asphalted or bitumen sprayed roads the trenches shall be refilled and compacted to the underside of the original road surface. A sub-base layer shall then be laid consisting of approved free drainage granular material conforming to the following grading limits:

100% by weight passing 50mm sieve 75-95 by weight passing 25.4mm sieve 40-75 by weight passing 9.51mm sieve 30-60 by weight passing 4.75mm sieve 20-45 by weight passing 2.0mm sieve 15-30 by weight passing 425mm sieve 5-15 by weight passing 72mm sieve.

A base layer shall then be laid consisting of approved crushed limestone material conforming to the following grading limits.

100%	by weight	passing 50mm sieve
60% - 80%	by weight	passing 20mm sieve
25% - 40%	by weight	passing 5mm sieve

9The materials shall have a plasticity index of not exceeding 6%. The materials forming the sub-base and foundation shall be laid in layers, brought to optimum moisture content and compacted to 95% of the maximum dry density as determined by Part 4 Clauses 3.3/3.4 BS 1377:1990.

Prior to application of the temporary reinstatement the surface of the road foundation shall be cleared of all dust, debris and other deleterious matter and shall then be primed with one application of prime coat MC-70 or similar approved. All joints with adjacent road surfacing shall be cut straight and vertical and primed.

The road surfacing shall be temporarily reinstated with 25mm finished thickness of asphaltic concrete. The asphaltic concrete shall be laid and compacted so as to achieve a dense smooth and even surface using a roller of not less than 12 tons' mass.

The surface shall be maintained until the end of the period of Maintenance or until instructions are given for the permanent reinstatement to be carried out. The surface shall not be topped up above the original surface level to allow for settlement.

2.24. Temporary Reinstatement of Unmade Roads

In all unmade roads the trenches shall be refilled and compacted as specified in the Contract to within 150mm of the surface.

The trench shall be surfaced with 150mm compacted thickness of base layer material as specified above.

The surface shall be maintained until the end of the Period of Maintenance and shall not be topped up above the level of the original surface to allow for settlement.

2.25. Permanent Reinstatement of Asphaltic Roads

Where instructions are given that permanent reinstatement is to be carried out then the temporary asphaltic concrete surface and part of the foundation layer shall be removed to a minimum depth of 200mm and the surface of the foundation shall be rolled, all dust and debris removed, joints cut straight and vertical.

The permanent reinstatement shall comprise crushed limestone material to a total compacted thickness of 150mm and the wearing course 50mm compacted thickness of 14 mm nominal size dense wearing course asphaltic concrete. The laying and finishing of the coated macadam shall be carried out so as to achieve a dense, smooth and even surface using a roller of not less than 12 tones mass.

2.26. Forming Banks and Filled Areas

The filling to be used in the embankments and filled areas shall be material selected from that arising from surplus excavation (unless otherwise defined in the Particular Specification), the material being placed according to its nature as shall be directed by the Engineer. The fill shall be placed in layers not exceeding 150mm thick, each layer being thoroughly compacted by an approved roller to the satisfaction of the Engineer.

2.27. Restoration of Borrow Areas, Spoil Tips and Quarries

Any spoil tips, quarries or other borrow area developed by the Contractor for the purpose of the Works shall be finished to safe and fair slopes to the approval of the Engineer.

2.28. Top soiling and Grassing

Where required surfaces shall be soiled with fine sifted soil or silt not less than 100 mm compacted thickness which shall be raked and brought to a fine tilt.

Surfaces required to be grassed shall be planted with approved local grass at a spacing of 200mm x 200mm. The grassed area shall be replanted if the first or subsequent operation is

unfruitful or if for any reason the grass is destroyed. Grassed areas shall be watered and attended until the grass has become well established.

The soiling and planting of the grass in slopes shall be carried out immediately the slope is formed and the grass shall be kept weeded and cut until the work is accepted at the time of the Certificate of Completion.

The Contractor shall supply attendance during the Defects Liability Period to ensure that all planted grass is kept weeded and cut, and if necessary watered.

2.29. Free Draining Fill

Free draining fill for use as backing to wall shall consist of sound hard stone or broken rock or concrete derived from demolition of structures. The particles shall be roughly cu biform and shall be between 75mm and 25mm in size. All smaller particles, Dust, rubbish and organic matter shall be excluded.

2.30. Hardcore

Hardcore shall consist of sound hard stone or broken rock or concrete derived from excavations or demolition of structures and shall be graded from 150mm to 50mm in size, except that sufficient but not excessive blinding materials of smaller sizes may be permitted at the discretion of the Engineer.

5 SECTION 3.

3. CONCRETE WORKS – GENERAL

3.1. Scope

This Specification applies to structural concrete in small structures such as manholes, chambers and superstructure elements of small building works. This specification also applies to concrete in thrust blocks, blinding, supports, fill etc.

3.2. Concrete

3.2.1. Classes

This Specification includes 4 grades of concrete

- Grade CI5
- Grade C20
- Grade C25
- Grade C30

The grade refers to the 28-day characteristic strength in N/mm2

3.2.2. Composition

The concrete composition shall generally conform to the requirements of the prescribed mix design, as set out in BS 5328 Tables I and 2. Small quantities of concrete may with the approval of the Engineer be batched in accordance with the Table 3.1 of Nominal Mixes Table 3.1 Nominal Mixes

Grade of concrete	Approx. volume of Aggregate m^3 per m^3 concrete		Approx. cement per m^3 finished concrete in bags (each 50 kg)	Remarks
	Fine	Coarse		
Cl5	0.450	0. 900	5	Aggregate max. size to be 20 mm. Fine aggregate to Zone M of BS 882 Water not to exceed 28 liters per
C20	0.400	0.875	6	
C25	0.375	0.825	8	
C30	0.350	0.725	11	
				50kg of Cement

3.2.3. Structural Concrete

Structural concrete shall be Grade C20, C25 or C30, as shown on the drawings. The cement content shall not be less than 320 kg per cubic meter and the water/cement ratio shall not exceed 0.55 (27.5 liters per 50 kg of cement). The slump shall be 50 mm
+/- 15mm when tested to BS 1881.

Unless otherwise approved by the Engineer, the fine aggregate shall comply with Zone M or Zone F of BS 882. Coarse aggregate shall be 20 mm max size. The proportions of the mix shall be approximately as shown in the Tables 1 and 2 of BS 5328 but these proportions may be varied to obtain the specified strength requirements. Admixtures may not be used in ordinary structural concrete. A trial mix of the concrete to be used shall be made in the presence of the Engineer's Representative sufficiently in advance of the commencement of concreting to permit the 28-day compression test result of the cubes taken from the mix to the approved by the Engineer's Representatives. 28-day compression cube tests shall be carried out taking one sample for each 20 m^3 of concrete placed with a minimum of one sample per day. Three cubes are to be cast from each sample. If more than 5% of test results fall below the specified characteristic strength when tested to BS 1881, adjustments to the mix shall be made in order to

obtain the strength required and the Engineer may require concrete already placed to be made good as described in this Specification.

3.2.4. Cement

Cement for normal concrete shall be Ordinary Portland or Rapid Hardening cement to BS 12 or shall be CEMI-32.5, CEMII-32.5 or CEMIV-32.5 or higher strength grade in accordance with Kenya Standard KS 1725 Part 1 and Part 2. Cement for Sulphate resisting concrete shall be Sulphate resisting cement to BS 4027. Cement which is not fresh and dry before mixing shall not be used in the Works.

3.2.5. Water

Water shall be potable

3.2.6. Aggregates

Fine aggregate shall be clean natural sand. Coarse aggregate shall be crushed stone, washed gravel or other inert granular material as approved by the Engineer.

All aggregates shall comply with the requirements of BS 882 and grading curves shall be provided for all aggregates used.

3.3. Reinforcement

Reinforcement steel shall comply in all respects with the requirements of BS 4449 for high-yield steel reinforcement for concrete and shall be cut, bent and shaped strictly in accordance with BS 4466, using approved mechanical bending equipment to avoid cracking or damage. Fabric reinforcement shall be manufactured from cold-drawn hightensile steel wire and shall conform to the requirements of BS 4483, including specified mesh sizes, wire diameters, and mechanical properties.

All reinforcement shall be free from oil, grease, loose rust, dirt, paint, or other deleterious materials that may impair bond with concrete. Where light surface rust or mill scale is present, the bars shall be thoroughly wire-brushed or otherwise cleaned prior to fixing; reinforcement exhibiting excessive corrosion, pitting, or reduction in cross-section shall not be used. Reinforcement shall be accurately placed, securely fixed, and adequately supported in the correct position and cover as shown on the drawings, using approved spacers and chairs, and shall be inspected and approved by the Engineer before concreting.

3.3.1. Steel reinforcement bars and slabs

Steel reinforcement bars for use in reinforcement shall comply with BS 4449:2005 + A3:2016 (UK Standard for steel bars for concrete reinforcement) or ASTM A615/A615M Bars shall be high yield deformed steel with a nominal yield strength of 500 N/mm² (Grade 500) unless otherwise specified. Concrete slabs and beams shall be constructed to the specified dimensions and levels using the approved concrete grade, with properly fixed reinforcement, sound formwork, adequate compaction, and proper curing, all in accordance with the drawings and relevant standards.

3.3.2. Galvanized Mild steel trachracks

The trash rack shall be fabricated from quality mild steel conforming to relevant BS/EN standards, accurately cut, drilled, and welded to form a rigid and durable assembly. All steelwork shall be hot-dip galvanized after fabrication in accordance with BS EN ISO 1461, providing a uniform protective coating against corrosion. The trash rack shall be securely anchored into concrete using approved holding-down bolts or embedded plates, set true to line and level. The item shall include all materials, fabrication, galvanizing, transport, fixing, and any necessary making good, complete and ready for use as directed by the Engineer. Reinforcement mesh shall be A142 welded steel fabric manufactured from high-yield deformed steel wire. The mesh shall comply with **BS 4483** for steel fabric reinforcement and the reinforcing steel shall comply with the applicable requirements of **BS 4449**

3.4. Formwork

3.4.1. Requirements

Formwork shall be accurately formed and shall be of sufficient strength and rigidity as to carry the weights and pressures of the concrete without deformation. It shall be tight so as to avoid the loss of grout and shall be clean and free from damage.

"Rough Finish Formwork" shall consist of sawn boards or sheet metal panels and shall only be used where specified in the Bill to produce a rough finish.

"Fair Finish Formwork" shall produce a high standard of finish. Where not otherwise specified in the Bill of Quantities this formwork shall be used throughout the Works. It shall consist of wrought timber boarding 40 mm thick tongued and grooved, or framed plywood, and arranged in a uniform pattern.

3.4.2. Striking and Removal of Formwork

Striking of formwork shall be carried out having regard for the climatic conditions prevailing, and shall be 'undertaken at the sole risk of the Contractor. Where premature removal of formwork takes place and deformation is apparent, with or without distress in the concrete, the work shall be made good as described in this Specification. The following striking' times are included as a guide for normal conditions and shall be treated as a minimum requirement:

Suspended Slabs	(props left under)	5 days
Ditto	(props removed)	10 days
Beam soffits	(props left under)	9 days
Ditto	(props removed)	19 days
Sides of beams, walls and columns		1 day

All exposed concrete arrises are to have 20mm x 20mm chamfer unless otherwise shown on the drawings.

3.5. Concreting

3.5.1. Requirements

The finished concrete shall be dense durable and free from cracks and honeycombing.

3.5.2. Mixing, Transporting and Placing

All concrete shall be made in a mechanical mixer. Concrete shall be placed within 30 minutes of completing the mixing or agitation. Mixing may be continued in the mixer or agitator up to a maximum period of 90 minutes and for not less than the period required to achieve an even consistency of the mix. All concrete shall be compacted by a mechanical vibrator and a slump test shall be carried out on each batch mixed, unless otherwise approved by the Engineer's Representative.

3.5.3. Concreting in difficult weather conditions

Concreting during hot or cold weather conditions shall comply with the established requirements of good practice. During wet weather adequate covering shall be provided to both materials and concrete.

3.5.4. Curing

All concrete shall be properly cured for 7 days, by wetting or by use of an approved curing membrane.

3.5.5. Finishes to Concrete

All exposed faces of concrete shall be hard, smooth and free from honeycombing and other blemishes. All projections shall be rubbed down with carborundum stone. The normal finish to slabs and screeds, unless otherwise specified, shall be formed by wood floating the accurately leveled or screeded surface.

3.5.6. Making Good

Any section of the work which, in the opinion of the Engineer, does not conform to the requirements or clear intent of this Specification, or to the requirements of established good practice, shall be made good or removed and replaced as directed by the Engineer at the expense of the Contractor.

3.6. Ready Mixed Concrete

Ready mixed concrete shall comply with the requirements of this Specification and to those other requirements of BS 5328 which do not conflict with the Specification. Granolithic Concrete

Granolithic concrete shall conform to the recommendations laid down in the "Specification for Granolithic floor toppings laid on in-situ concrete" as published by the Cement and Concrete Association with special reference to monolithic construction.

3.7. Concrete Benching

Concrete benching shall consist of structural concrete, as herein specified, placed to a low workability and finished while still green with 50 mm Grade C25 fine concrete using a maximum aggregate size of 10 mm and steel troweled to a smooth dense finish to the concrete contours.

3.8. Precast Concrete Units

3.8.1. Requirements

Precast concrete units, unless otherwise stated, shall be obtained from an approved manufacturer and shall be true to dimension and shape with true arisses and with perfectly smooth exposed faces free from surface blemishes, air holes, crazing and other defects, whether developed before or after building-in. They shall comply with the appropriate BS. In addition, the following requirements particular to the various units shall be complied with:

3.8.2. Kerbs

Precast concrete kerb shall conform to BS 340, except that coarse aggregate shall conform to BS 882. Fine aggregate shall consist of sand resulting from the natural disintegration of rock. Approved air-entraining agents may be permitted to be used providing that approved adjustments are made to the mix with regard to water and fine aggregate proportions In such cases the moisture absorption limits set out in BS 340 may be neglected subject to the concrete satisfying an approved freeze-thaw test based on thirty cycles of exposure.

3.8.3. Flags

Flags shall conform to BS 368

3.9. Other Blocks

Blocks used for building work shall conform to BS 6073/2028.

6 SECTION 4

4. PIPELINES, PIPEWORK

4.1. General

4.1.1. Equivalency of Goods, Materials and Plant

Wherever reference is made in the Contract, including Specifications, Drawings and Bill of Quantities, to specified manufacturers or suppliers for the supply of goods, materials and plant for the Works, goods, materials and plant from no alternative manufacturers and suppliers will be permitted, unless otherwise expressly stated in the Contract, providing these other goods, materials and plant are substantially equal or of a higher quality than those of the specified manufacturer or supplier and are approved in writing by the Engineer. Differences between the specified goods, materials or plant and the proposed alternative shall be described in writing by the Contractor and submitted to the Engineer, together with such manufacturer's or supplier's technical literature and samples as the Engineer may reasonably require. At least 28 days prior to the date when the Contractor desires the Engineer's consent. In the event the Engineer determines that such proposed alternative goods, materials or plant do not ensure substantially equal or higher quality, the Contractor shall obtain the goods, materials or plant from the manufacturer of supplier specified in the Contract.

4.1.2. Materials

Any material which will come into contact with potable water or water to be used for potable supply shall comply with the UK regulations on the use of materials for potable water supply. Water Supply (Water Quality) Regulations 1989 and 15th Statement of the Department of Environment Committee on Chemical and Materials of Construction for use in public water supplies and swimming pools, published by the Department of the Environment, UK or national standards adopted for use in Kenya.

4.1.3. Approval

As soon as possible after commencement of the Contract, the Contractor shall submit to the Engineer for his approval a list of his proposed suppliers, sources of materials and proposed standards. No materials, plant or equipment shall be procured for the Contract without first obtaining the Engineer's approval. Samples of materials shall be submitted to the Engineer for approval as required by the Engineer. Materials subsequently supplied shall conform to the quality of the samples which have been approved by the Engineer. No standards, method

of manufacture or specification shall be changed without the approval of the Engineer. Where possible, plant shall be supplied to the same standards or to compatible standards.

The Contractor shall provide secure storage for all samples submitted to the Engineer.

4.1.4. Dimensions

Plant and materials shall be supplied to the general arrangements and dimension, or to suit the dimensions, shown on the Drawings or otherwise indicated in the Contract. Where no such dimensions are shown the Contractor shall be responsible for sizing the Plant. Any redesign, extra design, additional construction or any other costs resulting from the use of Plant to other arrangements or to other dimensions shall be the responsibility of the Contractor.

4.1.5. Packaging and Protections

All items shall be adequately crated or packaged to withstand damage and prevent deterioration due to shipping, handling and storage. The methods of protection and shipping shall be to the approval of the Engineer.

4.1.6. Marking

All Plant shall be marked in accordance with Clause 5 of BS EN 545 and Clause 37 of BS 5163. Before shipping, all items shall be clearly marked. Crates or packages shall be marked on two sides with indelible paint with the name of the project, the Employer and the Contract number shall bear marks indicating the contents.

4.1.7. Receipt, Storage, Handling and Transportation

Plant, equipment and materials shall be stored in such a manner as to preserve its quality and condition to the standards required by the Contract. The Engineer shall refuse to accept or shall reject any materials of Plant that in his opinion is defective or otherwise fails to comply with the standards required by the Contract. All such defective items shall be removed from the Site as directed by the Engineer. Repairs shall be carried out in accordance with procedures approved by the Engineer and shall be completed to the Engineer’s satisfaction.

4.1.8. Manufacturer's Certificates

The Contractor shall furnish the Engineer with a manufacturer's certificate conforming compliance to the specification in respect of all items of Plant, equipment and materials. The original and one copy of the manufacturer's certificate shall be delivered to the Engineer not later than 14 days prior to the intended date of delivery of the item to Site.

4.1.9. Proprietary Materials

Proprietary materials shall be supplied in suitable containers and in appropriate batch sizes for the work to be undertaken. The containers shall be marked with the following information:

i. Storage instructions ii. The manufacturer's name iii. Shelf life and dates of manufacture iv. Material identification
v. Batch reference number vi. Net weight vii. Mixing instructions viii. Any warnings or precautions concerning the contents and their safe use.

The Contractor shall supply with each consignment of proprietary material delivered to the Site, certificates furnished by the manufacturer or his agent stating:

i. The manufacturer's name and address ii. The agent's name and address where applicable iii. Material identification
iv. Batch reference numbers, size of each batch and the number of containers in the consignment
v. Date of manufacture.

4.1.10. Rejected Materials

Should any item of plant, materials or manufactured articles be in the judgment of the Engineer, unsound or of inferior quality or in any way unsuited for the purpose in which it is proposed to employ them, such items, materials or manufactured articles shall not be used upon the Works but shall be branded, if in the opinion of the Engineer this is necessary, and shall forthwith be removed from the Site.

4.2. Samples and Storage of Materials

Where required by the Engineer the Contractor shall submit to the Engineer for approval samples of pipes, fittings and materials prior to procurement. The Contractor shall only store pipe, fittings and other material at places approved by the Engineer and shall at all times

provide adequate supervision and watchmen to prevent theft or damage. Any loss or damage incurred will be the Contractor's responsibility.

Pipes shall not be stacked higher than recommended by the manufacturer. The area on which the pipes are to be stacked shall be free draining, the grass or other vegetation shall be kept cut and suitable timber cradles shall be provided on which the pipes shall be laid. End stops to all stacks shall be provided.

Fittings and valves shall not be stacked more than one tier high and they shall be supported off the ground by suitable timbers.

Air valves, rubber joint rings, gaskets, bolts and similar fittings and materials shall be kept in approved locked premises and such fittings and materials shall not be distributed to the trench side until immediately prior to laying, fitting, jointing or assemble thereof. All rubber joint rings and gaskets must be stored in a cool damp location and all fittings and materials shall at all times be stored in the shade under cover and protected from the weather to the satisfaction of the Engineer.

4.3. Flanges

Flanges shall be faced and drilled to conform to the dimensions specified in BS 4504. Flanges shall be compatible with the pressure rating of the adjacent pipe work or as stated on the drawings. Bolts, nuts and washers (two washers per bolt) shall be to BS EN 1092-3; 2003. No bolt shall project less than two full threads beyond its nut after tightening. In no circumstances shall the shortening of excessively long bolts by cutting be allowed.

Gaskets shall comply with replaced by BS EN 1514 (1997) and replaced by BS EN 681-2

(200) and BS 681-1 (1996) Type W. Flanges shall be painted with two coats of epoxy resin paint. Puddle flanges shall be fitted to all pipe work passing through waterretaining structures and manholes greater than 2.5m deep.

4.4. Mechanical Couplings

Unless otherwise specified or shown in the Drawings pipes and fittings shall be supplied with flexible joints. Mechanical couplings shall be of the Dresser, Viking Johnson type without a center register. Joints rings used shall be of the ethylene propylene rubber (EPDM) or other material approved by the Engineer. All mechanical couplings and flange adapters including nuts, bolts and washers shall be supplied with 'Risen' nylon thermoplastic polyamide applied by fluidized bed dipping or similar approved.

4.5. Materials for the Assembly of Flexible Joints

Lubricant shall be of a kind not conducive to the growth of bacteria and shall have no deleterious effects on either the joint rings or pipes. Lubricants for water supply shall not impart to water, taste, colour, or any effect known to be injurious to health.

4.6. Ductile Iron Pipes

4.6.1. General

Ductile iron pipes and fittings for water supply shall comply with BS EN 545 (1995). Pipes and fittings shall have spigot and socket joints unless otherwise specified. Pipes shall be class K9. Spigot and socket flexible joints shall be of the push-fit type with gaskets of ethylene propylene rubber (EPDM). The Contractor shall supply 5% of the straight pipes suitable for cutting on site and these shall be clearly marked.

4.6.2. Corrosion Protection

Pipes and fittings shall be protected externally with an extruded polyethylene or polyurethane coating complying with DIN 30674 Part 1. Pipes and fittings shall be lined internally with centrifugally applied cement mortar and complying with DIN 30674. Joint areas shall be coated with epoxy or polyurethane to DIN 30674. All lining and coating materials shall be approved for contact with potable water by an internationally recognized body like the Drinking Water Inspectorate of UK.

4.7. Galvanized Steel Pipes

Galvanized steel pipes shall be medium duty manufactured to BS 1387.

4.8. Steel Pipes

4.8.1. General

Steel pipes shall be manufactured to BS EN 10224 or AWWA C200and shall be suitable for the pressure ratings required by the Contract. Fittings shall conform dimensionally to BS EN 10224, AWWA 208-59 or AWWA M11. Unless otherwise specified or necessary to meet the requirements of the Contract steel pipes shall be manufactured as follows:

a. DN300mm and below shall be manufactured to minimum of Grade L235 or API 5L Grade B
b. DN350mm and above shall be manufactured to a minimum of Grade L275 or API 5L Grade X42.

The pipes and fittings of diameter 600mm or less shall be supplied with push-fit spigot and socket type joints with integral gasket of EPDM rubber or similar to BS EN 10224 or BS CP 2010. Pipes greater than 600mm shall be supplied with ends cut square suitable for use with flexible couplings and the external weld ground back sufficiently.

The Contractor shall supply 5% of the straight pipes as half-length pipes (not exceeding 6m). Each pipe shall be supplied complete with a coupling for jointing.

4.8.2. Corrosion Protection

Steel pipes and fittings shall be protected externally at the manufacturer's works with fusion bonded epoxy resin in accordance with AWWA C213. Pipes greater than 600mm and all fittings shall also be lined internally with fusion bonded epoxy to AWWA C213. Pipes 600mm or less shall be lined with cement mortar to AWWA C205 or BS EN 10298. All lining and coating materials shall be approved for contact with potable water by an internationally recognized body like the Drinking Water Inspectorate of UK.

Where required by the Bills of Quantities, the Supplier shall also price for the provision of an alternative 3LPE coating to DIN 30670 or AWWA C215 of a triple wrap system of fusion bonded or sprayed epoxy primer, an intermediate polymer adhesive layer and an extruded high- density polyethylene coating in general conformance with ISO/DIS 21809-1 Class B as appropriate.

4.9. Glass Reinforced Plastic (GRP) Pipes and Fittings

Glass reinforced plastic (GRP) pipes and fittings for sewers shall be high stiffness and shall comply with the relevant provision of BS 5480. The minimum pipe stiffness shall be 5,000 N/m2.

Pipes and fittings shall be marked in accordance with Clause II g. BS 5480.

Pipes shall only be cut by techniques which can be shown not to impair the pipes pressure regression performance. Where any pipe is cut the exposed fibers at the cut pipe end shall be resealed to prevent potential long term degradation. Methods of cutting and resealing exposed fibers shall be submitted to the Engineer for Approval. Elastomeric sealing rings and foils shall comply with BS EN 681.

On delivery to site and immediately prior to installation each pipe shall be visually inspected both externally, and where possible, internally for damage such as star cracking of the gel coat layer. Where any damage extends through the pipe wall the pipe shall be rejected or the

damaged section cut out and replaced in accordance with repair methods approved by the Engineer. If in the Engineer's opinion the pipe is not suitable of repair it shall be rejected and removed from site.

4.10. uPVC Sewers and Pressure Pipes and Fittings

Unplasticised PVC pipes and fittings for water supply pressure pipes shall comply with British Standards 3505 current but also superseded by BS EN 1452 and 4346. They shall be obtained from an approved manufacturer and shall be minimum pressure rated (14 bars) unless otherwise stated.

Unplasticised PVC pipes and fittings for gravity sewers and drains shall comply with British Standards 4660 or 5481 and shall be obtained from an approved manufacturer. Restrained rubber ring type push fit flexible joints shall be used unless otherwise stated. Solvent weld joints will not normally be permitted. Pipes and fittings shall be protected from the direct rays of the sun at all times by means of reflective cover sheets.

4.11. Concrete Pipes Bends and Junctions

Concrete pipes bends and junctions for use in sewers shall be made with Sulphateresisting cement. Pipes, bends and junctions shall conform to the requirements of BS 5911 for the particular class of pipe required to be used. The internal dimensions shall be true and regular and the internal surface smooth and free from surface blemish. The actual diameter of the pipe shall be not less than the nominal diameter. All joints shall be of the gasket type with flexible spigot and socket approved by the Engineer. Gaskets shall be Elastomeric complying with BS EN 681.

The main pipe and branches of all junctions shall be of the same strength classification and shall have the same internal dimensions as the pipes with which they are to be used.

The pipes, bends and junctions delivered to the Site shall be certified by the pipe manufacturer to have complied with BS 5911, or other approved standard and one copy of the certificate shall be delivered to the Engineer before the goods are unloaded.

Unless otherwise specified pipes are required to be of Extra Strength; they may, unless otherwise specifically called for, be reinforced either with cast-in steel or by an external wrapping of Fiber glass and resin, applied by an approved manufacturer.

The Contractor shall provide all facilities for and shall carry out jointly with the Engineer (if so required) a full visual inspection of all pipes, bends and junctions for manufacturer's

defects and other faults or damage. Before any pipe, bend or junction is laid it shall again be carefully examined and sounded with a wooden mallet. Any pipe found to be cracked or otherwise defective shall not be used on the Works.

Concrete pipes shall be internally coated with a 100 percent solids coal tar epoxy lining 70 percent minimum epoxy content. Coat thickness 300-micron minimum.

4.12. Polyethylene Pipes and Fittings

4.12.1. General

Polyethylene pipes up to nominal size 63mm for below ground use shall be colored blue and comply with the relevant provisions of BS 6572. Polyethylene pipes shall be High Density Polyethylene (HDPE) ultra-violet protected, black with colored blue strips running the entire length suitable for the working pressure indicated in the Bill of Quantities (BOQ) bars.

The pipes shall be clearly and indelibly marked in a repeated pattern spaced at one (1) meter to show the name of the manufacturer, diameter, pressure rating, Standard Dimension Ratio (SDR), material grade, date of manufacture, etc.

House connection pipe work downstream of the manifold shall be PE80; all other HDPE pipe work shall be PE100.

4.12.2. Joints

Unless otherwise specified or approved by the Engineer polyethylene pipes shall be butt fusion or electrofusion welded. Where the latter is used, the fittings involved are deemed to be included in the rate for pipe laying. Joints between polyethylene pipes supplied from different manufactures or not manufactured from the same grade of polymer shall only be jointed by electrofusion or by push fit mechanical couplings. Mechanical couplers and compression type fittings shall incorporate a serrated internal liner to support the

pipe against compression loads exerted by the fitting and to prevent pullout under axial load.

Butt or socket fusion joint techniques shall only be applied between pipes supplied from single source and manufactured from the same grade of base polymer. Fusion welding of polyethylene pipes shall only be undertaken by skilled operatives using appropriate specialized tooling. Pipes to be jointed shall be free from contamination and care shall be used to protect fusion jointing operations from wind and against the effects of inclement weather. Mechanical jigs or other approved methods shall be used to ensure correct

alignment of the pipe when making butt fusion joints. Details of fusion welding procedures including details of tools, operatives, materials and method statements shall be submitted to the Engineer for approval prior to any jointing.

Steel and iron pipe fittings shall comply with the relevant provision of BS EN 545 (1995) replaced by BS EN 10224 but also current.

4.13. Gate Valves

4.13.1. General

Valves for normal duty on water pipelines with pressure ratings up to PN25 shall be key operated cast iron flanged gate valves for waterworks purposes generally complying with the requirements of BS 5163 (Type B). All Gate Valves shall be supplied with a 10year manufacturer's warranty.

Cast iron gate valves for pressure ratings to PN14 shall be cast iron flanged valves complying with BS 5150 replaced by BS EN 1171 (both BS 5150 and BS 5151) or cast iron parallel slide valves complying with BS 5151.

Butterfly valves for pressure ratings of up to PN14 shall be double flanged wafer type butterfly valves complying with BS 5155.

Unless otherwise specified valves for use on steel pipes shall be flanged, where buttweld ends are specified valves shall comply with BS EN 1984, or BS EN 13709.

A bypass with gate valve forming an integral part of the valve shall be provided to all high- pressure lines.

4.13.2. Wedge Gate Valves for Manual Operation

Valves up to and including DN 300 shall be of the resilient seal type and valves larger than DN 300 shall have metal seals.

Spindles shall be of the non-rising type and screwed so as to close the valves when rotated in the clockwise direction. The direction of closing shall be clearly cast on the valve cap or hand wheel as appropriate. The valves shall be constructed of the following materials:

body	-	cast iron;
spindle	-	forged bronze or stainless steel;
metal faces and seal	-	gunmetal.

The valves shall be suitable for the unbalanced head as specified or indicated in the schedules.

Suitable gearing and anti-friction devices such as ball bearing thrust collars shall be provided as necessary to enable opening and closing by manual operation at the pressure stated, using an effort no greater than 26kg on the tee key or hand wheel supplied. Hand wheels shall not exceed 500mm diameter. A bypass with gate valve forming an integral part of the valve shall be provided where recommended by the valve manufacturer for the pressures specified. Gearing on valves of DN 300 and less shall be enclosed in a sealed gearbox suitable for buried installation and operated with a tee key. Except where shown in the Drawings, all valves exceeding DN 300 shall be provided with bevel gearing and hand wheels. Valves to be used for washouts and isolating air valves shall have screwed seats.

Extension spindles shall be galvanized or stainless steel adequately supported with cast iron brackets, and of sufficient diameter to prevent any whiplash effect through twisting when being used to operate the valves. The spindles shall be capped for key operation. Valve caps shall be fitted with hexagonal set screws.

Valves shall be coated with an approved epoxy complying with DIN 30674. Keys for valve operation shall be of sufficient length so that the valves can be operated by a man standing, but shall not exceed 1.2m in length, and shall have a detachable cross bar.

4.14. Butterfly Valves

4.14.1. General

Butterfly valves shall conform to BS EN 593. All Butterfly Valves shall be supplied with a 10- year manufacturer's warranty.

4.14.2. Construction

Butterfly valves shall have a high-grade cast-iron body to BS EN 1561 designed to the specified working and test pressures. The pressure rating valve shall be cast in the valve body. The disc shall be of high-grade cast iron to BS EN 1561 or nodular cast iron to BS 2789 to the defined working and test pressures. It shall have a convex shape designed to achieve low head loss characteristics. The valve shafts shall be of stainless-steel operating in self-lubricating bushes in the body.

The valve seat shall be of gunmetal to BS 1400. The sealing ring shall be a renewable Ethylene Propylene Diene Monomer (EPDM) rubber attached to the disc edge by a sectional bronze retaining ring to form a resilient and durable seal.

The valves shall be fitted with hand wheel actuators not exceeding 500mm diameter incorporating gearing to allow opening and closing by manual operation at the pressure stated using an effort no greater than 36kg on the hand wheel supplied.

In all cases the gearing shall be designed to close the valve, from fully open to fully closed in a period of not less than ten minutes with this effort. Actuators shall be designed so as to close the valves when the hand wheel is turned in a clockwise direction; the direction of closing shall be clearly cast on the hand wheel. Position indicators shall be fitted to all actuators.

Where required valves shall be electrically actuated with a manual override. Remote actuation shall be provided with a visual indication of valve open, valve closed and percentage opening together with fault indication.

4.14.3. Valve Performance

A performance curve, relating percentage valve travel, open area and discharge

coefficient shall be submitted to the Engineer. The head loss coefficient with valve fully open shall be defined.

4.14.4. Testing

All valves shall be tested in accordance with BS EN 593 and pressure and material test certificates shall be submitted to the Engineer for approval.

4.15. Air Valves

Air valves shall be:

i. Controlled Air Transfer Technology (anti shock, anti-surge) air release valves capable of venting bulk air discharge and high velocity air discharges
ii. Air valves shall be supplied with an independent isolating butterfly valve (BV) which permits the complete removal of the air valve from the main, without affecting the flow of water in the main.
iii. Each air valve assembly shall be suitable for connection to a flange on the pipeline.
iv. At the connection between the air valve and its isolating valve a BSP tapping shall be made suitable for fitting of a pressure gauge. All tapping shall be sealed by a brass plug and copper compression ring gasket.
v. Air valves shall operate automatically and be constructed so that the operating mechanism will not jam in either the open or closed positions.

4.16. Non-Return Valves

4.16.1. Swing Check Valves

Non-return valves shall be suitable for waterworks purposes and shall be manufactured to comply with the general requirements of BS EN 12334. They shall be double flanged type, non-slamming and recoilless on flow reversal.

Valves of DN 700 and larger shall be of the multi-disc type or tilting disc type. The valves shall have a high grade cast iron body and cover to BS EN 1561 Grade 220/260 with gun metal nickel bronze alloy door seating. The hinge pin shall be of stainless steel carried on non- corrodible bearings.

4.16.2. Nozzle Check Valves

Nozzle check valves shall be slam free closing with a streamlined cross section as manufactured by Mannesmann Demag or similar.

4.17. Flow Control Valves

Flow controls unless otherwise specified shall be butterfly valves. They shall be installed complete with a headstock and position indicator showing the degree of opening.

4.18. Pressure Reducing Valves

Pressure reducing valves shall automatically reduce a higher inlet pressure to a steady lower downstream pressure regardless of changing flow rate or varying inlet pressure. The valve shall be a hydraulically operated pilot controlled diaphragm type, globe or

angle valve. The Kv loss factor of the standard valve throttled to 5% opening should be less than 3% of the Kv factor of the fully open valve. This data should be backed by a hydraulic test report. All valve components shall be accessible and serviceable without removing the valve from the pipeline. stainless steel nuts and bolts shall be used in assembly of the PRV for corrosion protection.

The critical cavitation coefficient of the PRV will be Less than 1.5. The minimal upstream opening pressure should be at least 5 m pressure. The minimal pressure differential for valve closure should be less than 2 m pressure.

The downstream pressure in steady-state conditions should have an accuracy of +0.5 m pressure (0.05 bars) of the set-value at high, as well as near-zero demand flow rates.

The valve should regulate to a steady, pre-set downstream pressure, regardless of flow or supply pressure variations. The gain of the valve in low travel should be so that the Kn/Kv<Tn/To (Kn is the Kv at travel Tn. To is the complete valve travel). The main valve shall have a single removable seat and a resilient disc.

4.19. Ball Float Valves

Ball float valves which are to be installed within reservoirs shall be the delayed action type to eliminate inflow at small valve openings. They shall be fitted with a stilling chamber, auxiliary float valve and inlet bellmouth with regulating valve. The main valve shall be fitted with a long actuating lever to provide a long float travel for slow valve closure.

Valves shall be of the right angle pattern type with flanged inlet and have a resilient synthetic rubber disc which forms a drop tight seal against a removable seat insert.

Valves shall be free of cavitation and vibration under the specified working conditions. Flanged tapers shall be provided on the inlets as necessary to suit the size of valves proposed.

Valves shall be capable of withstanding the maximum static pressure and of passing the maximum flow rate shown. Orifice plates shall be provided as necessary to absorb excess working pressure at the initial flow rates indicated.

The pressure rating of the valve shall be cast into the body of the valve.

4.20. Constant Flow Valves

Constant flow valves shall maintain a constant rate of flow regardless of fluctuations in upstream pressure.

Valves shall be hydraulically operated, diaphragm actuated globe pattern. They shall have a resilient synthetic rubber disc which forms a drop tight seal against a removable seat insert. The diaphragm assembly and valve stem shall be fully guided at both ends by bearings in the valve cover and valve seat. The diaphragm shall consist of nylon fabric bonded with synthetic rubber. Packing glands and stuffing boxes are not permitted and there shall be no pistons operating the valve or pilot controls.

The pilot control shall be direct acting diaphragm valve designed to close when the actuating differential increases beyond the spring setting. The actuating differential pressure shall be produced by a thin edged orifice plate installed in an orifices flange downstream of the valve. Any necessary repairs to the valve shall be accomplished without removing the valve from the main.

Valves shall be sized to pass the maximum continuous flow stated on the drawings at the working pressure given. The pressure rating of the valve shall be cast into the body of the valve.

4.21. Surface Boxes and Chamber Covers

Surface boxes and chamber covers shall be either Reinforced Concrete or Polyresin. Surface boxes over gate valves shall be hinged and chained and shall generally comply with BS 5834.

In roads, tracks, verges: Heavy duty with 150 x 150mm nominal clear opening.

In fields and areas subjected to light wheeled or pedestrian traffic: Medium duty with 150 x 150 mm nominal clear opening.

Surface boxes for hydrant chambers shall have a 150 x 150mm clear opening and shall comply with BS 750 and shall be suitable for heavy traffic loading.

Covers to air valve and other chambers shall be to the dimensions and loading requirements shown on the Drawings or as stated in the Bill of Quantities.

Covers shall be suitable for the following maximum safe center static loads:

Light duty	-250kg
Medium duty	- 1500kg

Heavy duty	- 5000kg

Where applicable, covers shall comply with BS EN 124 or other appropriate Standard. Lifting keys shall be provided for each type surface box or cover supplies. One set of keys shall be provided for every ten surface boxes or covers subject to a minimum of ten sets of keys or the actual number of covers if less than ten.

4.22. Gully Gratings and Frames

Road gully gratings and frames shall be of approved type and manufacture in cast Grey Ductile Iron and shall be of Heavy Duty Non-rocking Pattern designed for wheel load of 11.5 tonne and generally in accordance with BS EN 124. Single gullies of nominal size 1050mm x 750mm. Inlet gratings of other plan dimensions shall have a minimum water way area of 49% of the total inlet grating area.

Gully frames shall be set in cement mortar and haunched with Class C25 concrete. It shall be the Contractor's responsibility to establish the finished road levels from the appropriate authority and fix the gratings accordingly.

4.23. Manhole Safety Chains

Mild steel chain shall be 8 mm nominal size Grade M (4) non-calibrated chain, Type 1, complying with BS withdrawn. After manufacture, mild steel safety chains shall be hot dip galvanized in accordance with BS EN 124.

4.24. Manhole and Chamber Access Covers

The manhole and chamber access covers shall comply with BS 497 Part 1 and be obtained from an approved manufacturer and shall be to the internal minimum clear opening as detailed in the Contract.

All manhole and chamber access covers in road shall be to an approved Heavy Duty pattern and in footpaths shall be medium/heavy duty unless otherwise specified. The frame and lid shall have key holes formed with sealed pockets underneath to prevent ingress of sand, grit and surface water and shall be of an approved non-rocking pattern. The covers and frames shall have accurate seating faces to prevent rocking and the ingress of sand or water, and it shall be tight fitting to resist overflow conditions or unauthorized removal. The seating faces shall be coated with graphite grease before installation of the cover.

A supply of keys for use with every type of manhole cover and surface box shall be handed over by the Contractor at the completion of the Contract on the basis of one set of keys for each 50 covers or part thereof.

Manhole and chamber cover frames shall be set in cement mortar and haunched with Class C30/10 concrete and shall be set to the camber or fall of the finished road surface. It shall be the Contractor's responsibility to establish the finished road surface levels from the appropriate authority and to fix the covers accordingly.

4.25. Manhole Step Irons

Manhole step irons shall be of galvanized malleable iron and shall conform in all particulars to BS EN 13101.

7 SECTION 5.

5. PIPELINE CONSTRUCTION

5.1. General

This section covers the installation of all types of gravity flow pipelines. The pipelines shall be constructed in accordance with BSCP 2010

5.2. Pipes and Fittings

Pipes and fittings shall be of the type shown on the Drawings and shall comply with the following standards and requirements:

5.2.1. Concrete and Clayware and Fittings

Concrete and Clayware pipes and fittings shall comply with the appropriate standards listed below: -

BS65 BS 1194	Clay drain and sewer pipes and fittings Concrete porous pipes for under drainage Clayware field drain pipes
BS 1196	Prestressed concrete pipes for drainage and sewerage
BS 5178	Concrete cylindrical pipes and fittings
BS 5911	

5.2.2. Asbestos Cement Pipes and Fittings

Asbestos cement pipes and fittings shall comply with BS 3656

5.2.3. Steel cast Iron and Ductile Iron Pipes and Fittings

Steal and ductile iron pipes and fittings shall comply with the following standards:

BS 437	Cast iron and socket pipes and fittings
BS 534	Steel pipes and specials for water and sewerage
BS 4772	Ductile iron pipes and fittings

Steel pipes which are to be welded shall have the ends prepared by the manufacturer to suit the type of welded joint to be used.

5.2.4. Unplasticised PVC and GRP Pipes and Fittings

Unplasticised PVC pipes shall comply with BS 4660 or BS 5481 as applicable for drain pipes.

GRP pipes and fittings shall comply with BS 5480.

5.3. Topographic Surveys

Topographic surveys along pipeline routes shall be either: -

- Plan and profile surveys, or
- Line and level traverse surveys, As instructed by the Engineer.

Plan and profile surveys shall cover a strip of 10.0m wide centrally on the proposed centre line of the pipeline. The survey shall be carried out in accordance with the specification detailed in Clause 106.

Line and level surveys shall comprise a traverse line along the centre line of the pipeline as established by the Engineer.

5.4. Handling and Transport of Pipes and Fittings

The loading, transporting, unloading and handling of pipes and fittings shall be carried out such that no damage is caused, all in accordance with the recommendations of the manufacturer and to the approval of the Engineer. The use of lifting hooks is not permitted. Pillows shall be provided between lashing (ropes, wires or chains) and the pipes. All cradles and lashings shall be of such widths as to prevent damage to the coating of the pipe, or distortion of the pipes.

Valves and fittings shall be transported in timber packing and where possible in the manufacturer's original packaging.

Protective cover and other protective materials provided by the manufacturer shall not be permanently removed until immediately prior to installation.

In the event of any damage being caused to a pipe, the Engineer shall determine whether damaged piece shall be replaced or repaired. Repair to coating only shall be allowed and shall be as directed by the Engineer.

In all instances when along trench sides, ferrous pipes shall be supported within 1

meter of either end on sand filled bags such that no part of the wall of the pipe touches the ground, and in the case of pipes over 6 meters long with additional central sand bags.

When pipes are being loaded into vehicles care shall be taken to avoid their coming into contact with any sharp corners such as cope irons, loose nail heads, etc. Whilst in transit, pipes shall be well secured over their entire length and not allowed to project unsecured over the tailboard of the lorry.

Pipes may not be offloaded from lorries by rolling them, suitable carnage shall be used. Pipes shall not be rolled or dragged along the ground.

5.5. Stringing and Examination of Pipes Prior to Laying

All DI and Steel Pipes and their coatings and linings shall be carefully inspected on Site prior to laying.

Inspection of the pipe will be made by the Engineer after delivery and again immediately prior to laying. Any pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though pipes may have been accepted as satisfactory at the place of manufacture. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the site.

All pipe or fittings shall be examined before lying and no piece shall be installed which is found to be defective. Any damage to the pipe linings or coatings shall be repaired as directed by the Engineer. Handling and lying of pipe and fittings shall be in accordance with the Manufacturer's written instructions and as specified herein.

Before lowering into the trench or placing in position each ductile iron pipe or casting shall be slung and sounded with a mallet to test for hair cracks. Pipes that do not ring true will be discarded.

All cement mortar linings shall be visually inspected for defects such as cracking or spalling and crack widths shall be measured to confirm that width is such that natural re-sealing will occur once put into service; otherwise cracks as well as any spalling shall be made good before laying in accordance with the manufacturer's written instructions.

All epoxy linings and all coatings shall be subjected to holiday detection tests, in accordance with NACE RP 0490, the voltage of the holiday detector being selected appropriate for the material and its thickness. No pipe shall be laid having failed the holiday tests until the defective area is made good in accordance with the manufacturer's written instructions and retested satisfactorily before use.

All pipe and fittings shall be thoroughly cleaned before laying, and shall be kept clean until they are used in the work, and when laid, shall conform to the lines and grades required. Pipe shall not be laid unless the trench is free of water and in a satisfactory condition. Ductile iron pipe and fittings shall be installed in accordance with the requirements of AWWA C600 except as otherwise provided herein. If any defective pipe is discovered after it has been laid,

it shall be removed and replaced with a sound pipe in a satisfactory manner by the Contractor, at his own expense.

When laying is not in progress, including any work break exceeding 30 minutes, the open ends of the pipe shall be closed by watertight plugs or other approved means. Good alignment shall be preserved in laying. The deflection at joints shall not exceed that recommended by the Manufacturer. End caps shall not be removed until such time as the pipe is to be inspected and laid.

Where the pipeline crosses roads, tracks or any other access or where directed by the Engineer, the Contractor shall place the pipes so that access to the public is not in any way prohibited. Shortly before laying or fixing any valve, pipe or fitting, the Contractor shall examine each valve, pipe and fitting to ascertain that there is no damage or defect. The Contractor shall give the Engineer not less than 48 hours' notice of his intention to undertake such examination. The Contractor shall not lay such pipes and fittings until he has received approval from the Engineer.

Linings shall be inspected prior to laying and any defect made good.

5.6. Laying Pipes

Immediately before any pipe is lowered into the trench the plug shall be removed from the end of the last pipe laid and the new pipe shall be carefully lowered into the trench.

Each pipe and fitting shall be laid true to alignment curve and gradient in accordance with the Drawings or as directed by the Engineer. The minimum gradient shall not be flatter than 1 in 500.

Pipes shall be boned to gradient and sight rails shall be provided for this purpose at intervals not exceeding 50m and at all changes in grade. No dips or summits shall be permitted other than as shown on the Drawings.

5.7. Embedment and Compaction

All ductile iron and steel pipes shall be embedded using a sand or coarse-grained soil with less than 12% fines, which if necessary shall be imported if excavated material is found to be unsuitable:

In areas prone to water logging or where specifically called for on the Drawings or in the Bills of Quantities a single size or graded gravel shall be used as a special lower bedding, with grading as indicated below.

Nominal Pipe Diameter (mm)	Grading for Special Lower Bedding [to ASTM Sieve Sizes]	
	Single size Gravel	Graded gravels
< 200	10 or 14 single-size gravel	14 to 5 graded
200 to 500	10, 14 or 20 single-size gravel	14 to 5 graded or 20 to 5 graded
> 500	10, 14, 20 single-size crushed rock, or gravel	14 to 5 graded or 20 to 5 graded

The suitability of as-dug trench material as an embedment material and where imported, the source shall be approved by the Engineer. Any delays as a result of not seeking this approval in good time shall be entirely to the Contractor's account

All layers of the embedment shall be thoroughly compacted and shall not exceed 150 mm and be raised evenly on both sides of the pipe as it is placed. A minimum compaction of 90% MPD shall be achieved at all times, this being confirmed by sampling and testing at intervals on different levels of embedment at intervals of not more than 50 m with testing in accordance with BS 1377 or ISO 22476 using the "sand replacement" method.

Should any results fail to achieve this absolute minimum level, then the pipes, embedment material and layer shall be removed for an equal distance on either side of the failed test, the total distance being equal to the length between adjacent sampling locations and re-laid appropriately but with compacted layer thickness halved. In addition, the distance between sampling and testing shall also be halved until in the opinion of the Engineer's Representative a sufficient number of consecutive passes allows both individual layer thickness and the distance between sampling and testing to be returned to the previous thickness and spacing.

All backfill soil above the embedment shall be free from clay lumps, boulders and rock fragments greater than 50 mm and as far as practicable, given the nature of the soil, 90 % MPD shall be attained. However, this requirement may be relaxed to 85% MPD by the Engineer's Representative if he considers the circumstance warrant it.

5.7.1. Pipes Laid in Trench

Pipes and fittings laid in trench shall have at least the minimum cover stated in the Drawings. Long radius curves in buried pipelines shall be negotiated by deflections taken up in the joints of one or more pipes. The deflection at joints shall not exceed

75% of the manufacturer's maximum specified limits. Designs have been based upon the use of 6m long pipes. If the Contractor provides longer pipes sufficient short lengths shall be provided to enable the proposed pipe curvature without additional bends or deep excavation.

Pipes shall not be dragged along the trench bottom. Pipes laid in trenches shall be laid and firmly bedded on an even and uniform bed. Where pipes are not laid on a granular bed, the bottom of the trench shall be smooth and free from stones or other projections.

Joint holes shall be excavated below the trench bottom and shall be as small as possible and shall be filled in and compacted after the pipes are laid and before the refilling of the trench is commenced.

5.7.2. Pipe Bedding and Surround

For polyethylene, uPVC and GRP pipelines, Class S bedding shall be used where the cover is equal to or greater than 1.0m. Where there is less than 0.6m cover, Class A concrete surround shall be used. In between the Engineer shall decide upon the bedding type dependent upon the assessed risk of damage to the pipe.

5.7.3. Pipes Laid Above Ground

Pipelines to be laid above ground shall be constructed of flanged ductile iron pipes with mechanical type expansion joints. Supports shall be provided at a maximum spacing of one pipe length and adjacent to the flanged joints.

The expansion joints shall compensate for a variation of ambient temperature between zero and 40º C on the adjoining pipeline. Anchorages shall be provided immediately uphill of each expansion joint and at each change in vertical and horizontal alignment. The ground/rock surface under the pipeline shall be re-graded as necessary to allow a satisfactory vertical alignment of the pipeline.

The Contractor may propose, as an alternative to the use of mechanical expansion joints, either of the following methods for accommodating thermal expansion:

i. A zigzag pipeline alignment whereby the thermal movement is accommodated by deflection of the bends.

ii. A rigid form of construction with the thermal movement being constrained within the pipe walls by the use of substantial anchor blocks.

Joints shall be made in compliance with the manufacturer's instructions as approved by the Engineer. Care shall be taken to ensure the absolute cleanliness of the pipe ends and joint components. Only the recommended approved lubricants shall be used.

Jointing shall only be carried out by experienced personnel under close supervision by the Contractor.

The Contractor shall ensure that no dirty water or other extraneous matter is allowed to enter the pipes during or after lying. In the event of dirty water or extraneous matter entering the pipes the Contractor shall immediately carry out cleaning and disinfection as directed by the Engineer.

Except when necessary for jointing, the end of the last pipe laid shall be kept plugged to the satisfaction of the Engineer to prevent the ingress of dust, dirt, rocks and other debris.

The Contractor shall be liable for any damage caused to the Employer's Plant and apparatus or other equipment as a result of foreign matter of any kind not having been cleared out of pipelines before Taking-Over.

Pipe trenches shall not be backfilled until approved by the Engineer. Once approved trenches shall be backfilled without delay to at least the minimum extent required for pressure testing.

5.8. Cutting Pipes

The edges of the cut pipes shall be clean, true and square. Ductile iron pipes shall only be cut with an approved mechanical pipe cutter in conformity with the pipe manufacturer's recommendations. The use of oxyacetylene flame cutter will not be permitted. The edges of the cut together with those parts of the pipes from which the coating has been removed shall be given two coats of bituminous paint and the internal lining repaired. When the cut pipe is to be inserted in a "Tyton" type joint it shall be bevelled for 10mm at 30º to pipe the axis.

Asbestos Cement, HDPE, uPVC and GRP pipes shall be cut with an approved mechanical pipe cutter and in conformity with the pipe manufacturer's recommendations. Where the cut end of the pipe is to be incorporated in a joint the pipe shall be turned down to the correct

diameter required for forming the joint by and approved mechanical turning machine. The length of turning shall be accurately bevelled by mechanical means to the dimensions specified in the manufacturer's recommendations.

Steel pipes shall be cut by using a mechanical pipe cutter approved by the Engineer. The use of an oxyacetylene flame cutter will not be permitted. The edges of the cut shall be given two coatings of liquid epoxy compatible with the original coating. The external coating and the internal lining shall be repaired to the approval of the Engineer. The cut end shall be bevelled as required to suit the form of joint used. The cost of all cutting, trimming, chamfering, threading, etc, shall be included in the rates for laying and jointing the pipes.

5.9. Proprietary Joints and Couplings

Proprietary joints and couplings shall be assembled in accordance with the manufacturer's instruction as approved by the Engineer. Where pipes are laid above ground and jointed with bolted couplings the joint shall be protected against vandalism by sheathing with an approved heat-shrink moulding as manufactured by Raychem of Swindon UK or similar approved.

5.10. Flanged Joints

Flanged joints shall be made with two washers per bolt, one under the bolt head and the other under the nut. The tightening of the bolts shall be carried out in the sequence and to the torque recommended by the manufacturer. A torque wrench shall be used.

Buried flange joints shall be protected by painting with approved bitumen paint and by wrapping using 'Denso' paste, mastic tape and outer wrap, or similar approved materials all in accordance with the manufacturer's instructions as approved by the Engineer, unless supplied with epoxy coating and galvanized bolts.

Flanged adaptors and mechanical couplings shall have a RILSAN nylon coating applied by the manufacturer.

5.11. Steel Pipelines Welded Joints

If specifically required under the contract pipes shall not be welded. If permitted by the Engineer for particular conditions the Contractor shall submit to the Engineer a detailed method statement for constructing the pipeline using welded joints which shall include, but not be limited, to:

a) details of the Contractor's skilled labour and supervision staff who have direct experience in the construction of welded steel pipe;
b) details of the Contractor's plant to be deployed;
c) details of temporary staging, access and craneage;
d) procedure for construction of supports and anchorages, and welding joints;
e) quality assurance proposals for testing the integrity of the welds.

These details shall be submitted to the Engineer for his approval not later than 21 days before the Contractor wishes to commence pipe lying.

All field welds shall be inspected visually with special attention given to the line up and down the root run or stringer beads. Non destructive testing of the completed weld shall be carried our using radiographic methods with procedures in accordance with BS 2910.

On completion and inspection of joint welding, remedial works shall be carried out on the internal lining and external coating. No more than five pipe joints shall be welded without completion of remedial works to joints.

5.12. Fixing Valves and Penstocks

Valves, penstocks and other fittings shall be securely fixed. Extension spindles and headstocks shall be properly aligned and fixed in a vertical position and valve caps shall be fixed securely using the locking nut.

5.13. Thrust and Anchor Blocks

Concrete thrust and anchor blocks shall be formed at bends tees and valves in accordance with the details shown on the Drawings or as directed by the Engineer. Excavation shall be made after pipe lying and the blocks concreted immediately after excavation. The back supports and blocks shall abut in to solid undisturbed ground with all loose material being removed before concreting.

No pressure shall be applied in any section of main until the concrete has achieved adequate strength and at least three day's curing.

Flexible joints shall not normally be cast in. Where the size of the block does not make

this possible, additional flexible joint shall be provided no greater than half a pipe diameter beyond each face of the block.

5.14. Concrete Surround to Pipes

Where pipelines pass under streams and rivers or where directed by the Engineer, the pipeline shall be surrounded with concrete as shown on the Drawings.

Concrete surround shall be "broken" at all pipe joints to retain flexibility in the pipeline. No joints shall be concreted in without the prior approval of the Engineer.

5.15. Flotation of Pipelines

The Contractor shall ensure that flotation of the pipeline does not occur during construction. Sufficient backfill shall be placed over each pipe after laying and before testing to prevent flotation.

5.16. Pressure Rating

The pressure rating of pipes shall be as indicated on the drawing or Bill of Quantities or if not indicated then selected such that the maximum pressure in the pipeline inclusive of surge pressures shall not exceed the maximum allowable sustained working pressure rating of the pipe;

The surge pressure amplitude (the difference between maximum and minimum surge pressures) shall not exceed one half of the maximum allowable sustained working pressure rating of the pipe.

5.17. Testing of Water Supply Pipelines

All pressure pipelines shall be hydrostatically tested. Site test pressures shall be1.5 times the maximum working pressure or allowance pressure plus 5 bar whichever is the smaller measured at the lowest part of the pipeline, unless otherwise specified on the drawings.

The Contractor shall give the Engineer not less than 48 hours' notice of his intention to carry out a pressure test. Testing shall not commence without the Engineer's approval. Before a length of pipe is tested, each pipe shall be securely anchored. All thrust, and anchor blocks shall have been constructed and, the barrel of each pipe shall be backfilled to the extent necessary to prevent flotation or movement of the pipeline and shall be not less than 600mm. Normally joints shall be left exposed until pressure testing has been satisfactorily completed. Any need to backfill a pipeline before pressure testing shall not relieve the Contractor of his responsibility to excavate to locate and repair any leaks.

Pressure testing shall be carried out as the work proceeds in such lengths as are convenient but not exceeding 500m. The ends of the length of pipeline under test shall be closed by means of securely anchored caps or blank flanges. Pipeline valves shall not be used for this purpose. All washout valves shall be fitted with blank flanges and the valves opened before the commencement of any pressure test. At each air valve location, a special air release

arrangement shall be provided to allow manual release of air during filling operations. Pressure testing shall not be carried out with permanent air valves in place. The pipeline to be tested shall be filled slowly with water in such a manner that all air is expelled. Air vents shall be checked to ensure that no air is trapped at high points.

The pressure in the pipeline shall slowly be raised to the working pressure, the test pump disconnected, and the pipeline left charged under pressure with air valves opened for a period of not less than 24 hours to allow air in the pipeline to be expelled and pipe linings and pipe walls of absorbent materials to become saturated. At the end of this period of time air valves shall be closed and the test pump shall be reconnected and the pressure in the pipeline raised to the test pressure and this pressure maintained for a period of 24 hours or such other period as directed by the Engineer.

Throughout this period the pressure in the pipeline shall not be allowed to fall or rise more than 6m head of water above the test pressure and this shall be accomplished by pumping water into or releasing water from the pipeline as required. The volume of water pumped into or released from the pipelines shall be carefully measured. At the end of the test period the pressure in the pipeline shall be adjusted to the test pressure by pumping water into or releasing water from the pipeline as required.

The apparent leakage from the pipeline shall be ascertained from the net volume of water that has been pumped into the pipeline during the test period. The permissible loss shall not exceed 2 litres per metre nominal bore per kilometer length per m head per 24 hours.

During the pressure test exposed joints shall be inspected and any leakage or seeping joints shall be remedied. All signs of leakage shall be remedied whether total apparent leakage from the pipeline under test is less than the apparent allowable leakage or not. Should any length of pipeline fail to pass the pressure test the Contractor shall at his own expense carry out all work necessary to locate and remedy the faults and to retest the pipeline until it satisfactorily passes the test.

A low-pressure air test (not exceeding 0.3 bars) may be used as a preliminary joint tightness test prior to backfilling and hydrostatic testing. The water used for pressure

testing shall be provided by the contractor and shall be free from impurities and of such a quality which will not pollute or injure the pipeline. The Contractor shall be responsible for obtaining the water, transporting it and for its safe disposal on completion.

5.18. Cleansing and Sterilizing of Pipelines

After the pipelines have been completed and pressure tested satisfactorily as herein specified the Contractor shall flush out and cleanse the pipelines. Where water is provided by the Employer, the cost of this will be reimbursable under a provisional sum.

Diameters 300 mm and greater:

Pipelines shall be cleansed in sections and this shall be carried out by means of passing through polyurethane foam swabs. The swabs shall be to the approval of the Engineer.

Diameters less than 300 mm:

Pipelines shall be cleansed in sections by flushing with potable water, for a period of time to be decided by the Engineer's Representative.

Cleansing of any section shall be repeated as required by the Engineer's Representative in the event of the initial or subsequent operation not being to his satisfaction. The cost of such water shall be charged to the Contractor.

The Contractor shall supply all necessary equipment for the cleansing and sterilizing operations, including all swabs and swab detectors which shall be handed over to the Employer on completion of the Works.

Swabs shall be passed through pipelines at speeds of between 0.2 and 0.4 metres per second to obtain the best cleaning results with the minimum number of passes. Should it be apparent from the debris collected by the swab that damage to the lining has occurred, the Contractor shall be wholly responsible for repairing the lining to the satisfaction of the Engineer's Representative.

The swabbing operation shall be controlled by an experienced Engineer to ensure that no undue surges in the pipeline, heavy docking of the pig or pressurising of the pipeline occur causing damage to any of the permanent works. Any damage caused shall be made good by the Contractor to the satisfaction of the Engineer's Representative.

The Contractor shall make all necessary arrangements for the transportation of water from the point of supply from the Employer to the required location, and make all

arrangements for the disposal of the water. All disposal methods and locations shall be to the approval of the Engineer's Representative.

When the pipelines have been cleansed to the satisfaction of the Engineer's Representative the Contractor shall introduce at a slow rate of water flow by a portable

chlorinator or other approved means of a solution of sterilizing agent in such quantity and of such strengths as will result in the concentration of chlorine throughout the length of the pipelines of not less than 30 parts per million. This sterilizing charge shall be allowed to remain in the pipelines for 24 hours after which time the pipelines shall be thoroughly flushed using the supply water to remove chlorine in excess of that in the supply water.

When this flushing has been satisfactorily completed samples of water will be taken by the Engineer's Representative for bacteriological analysis by the Employer. If any of the results of the analysis are unsatisfactory when compared with those of the control sample of the supply water the sterilizing process shall be repeated until satisfactory results are obtained. On completion of sterilizing and flushing the pipelines shall be left full of supply water.

The Contractor shall be solely responsible for the provision of all labour, materials and chemicals necessary for carrying out the foregoing operations.

The cost of water used for repeated cleansing, sterilizing and flushing pipelines in accordance with this clause of the Specification will be charged to the Contractor and the Contractor shall be responsible for all temporary works and other arrangements in connection with cleansing, sterilizing and flushing the pipelines.

The costs of the initial sampling analysis and preparing reports on the bacteriological quality of the water shall be borne by the Employer but the costs of any subsequent sampling analysis and preparing reports should the initial reports be unsatisfactory shall be borne by the Contractor.

5.19. Painting

All steel or ductile iron pipes and fittings exposed to view including above ground pipelines shall be painted after making good the external protection with two coats of "Bitumastic Aluminum solution D. 5909" or similar approved.

Pipes and fittings in chambers shall be painted with two coats of "Bituros Solution" or similar approved. Valves and Surface Boxes shall be similarly painted.

8 SECTION 6.

6. BUILDING AND STRUCTURES

6.1. Concrete Building Blocks

Concrete building blocks shall be of approved manufacture and shall be formed in a press. The blocks manufactured in Class C30 concrete shall be cured for at least 10 days before use. Blocks shall be well and evenly formed with true corners and unbroken arises, and shall be carefully handled and stacked.

From the quarries, high quality impermeable blue stone (Not Ndarugupumiceous tuff) can also be used.

6.2. Laying Building Blocks

Joints between blocks shall be filled solid with mortar and shall be of regular thickness of 5 to 10mm. The blocks shall be laid in level courses and bonded so that each vertical joint is midway above the face of the block below, except at junctions and piers where a bond of not less than 100mm shall be provided. The walls shall be raised in lifts not exceeding three metres in height in any one day, and truly vertical. All blocks shall be wetted before being laid.

Joints of exposed work shall be raked out and neatly flush-pointed in the same mortar. The whole of the visible faces of the walls shall be left perfectly cleans and all surface mortar and droppings shall be removed before they have set.

Joints in work to be rendered shall be raked out to a depth of 8mm to provide a key for the rendering.

Blockwork shall be tied into adjoining structural members at the same level as blockwork reinforcement using 150mm long butterfly tangs or equivalent fixed and mortared into proprietary vertical strips.

6.3. Precast Concrete Units Generally

All precast concrete units shall include all fixing plugs and strips to enable screw ties or other fixing devices to be firmly attached. For all precast units to be set in block of masonry walls the plugs and strips shall be so positioned as to provide fixing at course and in no case exceeding 450mm centres.

6.4. Masonry Using Natural Irregular Stones

Stones shall come from selected quarry layers to the approval of the Engineer. They shall be homogeneous, frost resistant, flawless, free of any cracks or bousins, solid, and of equal grain

and shall have all the required quantities to give a regular facing. They shall give out a clear sound when hit by a hammer.

Mortar shall be removed from the external surface of the wall. The Contractor shall prepare a wall sample approved by the Engineer which shall be kept at the construction site until all the masonry is completed.

6.5. Composition of Mortars

a. Cement mortar for bonding concrete shall be composed of cement and sand mixed in the proportion of the jointed concrete.
b. Cement mortar for setting precast concrete or pitching shall be composed of cement and sand mixed in the proportion of 50kg of cement to 0.14m3 of sand, with the addition of an approved plasticizer.
c. Cement mortar for blockwork in concrete blocks shall be composed of cement and sand mixed in the proportion of 50kg of cement to 0.14m3 of sand.
d. Sand and Cement for mortars shall be as described in the specification for concrete.
e. Plastering shall include cleaning, prepping, and applying cement-sand (or limecement) plaster in two coats to walls and ceilings, finished smooth or textured, cured for 7 days, reinforced at corners, and executed within ±5 mm tolerances using quality materials in accordance with BS/KEBS standards.
f. Expansion joints shall allow movement in walls and floors, using compressible fillers and elastomeric sealants, installed at specified intervals, finished neatly, and made of durable, weather-resistant materials.

6.6. Mixing of Mortars

a) The materials of mortars shall be measured out in their correct proportions and shall first be thoroughly mixed together in a dry state by turning them over upon a clean wooden stage until they are of a homogeneous appearance in consistency and colour. Clean water shall then be added while the mixture is being turned over until it attains a suitable consistency. Plasticizer shall be

added in accordance with the manufacturer's recommendations as approved by the Engineer.

The mortar shall be used immediately after it has been mixed. No mortar which has commenced its first set shall be used, or mixed up again. Mortar shall, where possible in hot weather, be protected from too rapid action by covering with impervious material such as polyethylene film.

Mixing by hand will be allowed only if the Engineer gives specific approval. Mixing by machine using the same sequence of operations described above shall be carried out whenever possible.

b) Anti-termite treatment

Approved anti-termite treatment shall be applied to all foundation trenches, column bases, floor slab areas, and plinth surrounds using a registered termiticide, strictly in accordance with the manufacturer's instructions and relevant standards. The treatment shall be applied to prepared soil surfaces before concreting to ensure uniform coverage and long-term protection against termite infestation, complete to the satisfaction of the Engineer.

6.7. Cement Rendering

Rendering shall be in a 50 kg: 017-2-.20m3 cement: sand mix but where approval had been given to the use of a plasticizer or other additives these proportions may be modified to the approval of the Engineer.

All surfaces to receive a finishing coat of cement rendering or fine concrete shall be thoroughly prepared and cleaned and the rendering or screeding shall be placed immediately after such surfaces have been thoroughly wetted.

All rendering shall be put to a minimum of two coats, the first being left rough to a minimum of 10 mm thickness, but the second coat shall be trowelled up to a fair faces as soon as possible after it is applied.

All internal rendering shall be finished to an even and polished surface with a float, trowel or other suitable tool, special care being taken to obtain perfectly smooth and glazed faces. It shall not be less than 15mm thickness when finished unless instructed otherwise.

All external rendering shall be brought to an even surface with a wood float following which a tyrolean finish of approved colour shall be applied unless otherwise stated.

All rendering shall be protected from sun and rain by adequate and suitable coverings which shall be supplied and fixed in advance of these conditions arising. The renderings shall be kept damp while setting and protected from drying winds.

6.8. Tanking to Buried Concrete Surfaces

External concrete surfaces to be tanked shall be coated with a bituminous waterproofing membrane 3mm minimum thick. The tanking shall be dressed into structure as shown in the Drawings and be protected by non-rotting boarding prior to backfilling.

6.9. Waterproof Rendering

Waterproof rendering slurry shall comprise a 50kg to 125kg cement sand mix with an approved waterproofing admixture such as styrene arcrylate copolymer.

The material shall block capillaries and minor shrinkage cracks to prevent water ingress while allowing the passage of water vapour through the structure.

The render shall be applied to a total thickness of not less than 20mm the first coat shall be applied leveled scratched and left to dry for not less than 3 days.

6.10. Joint Sealing Compound and Sealants

Joint sealing compounds shall be impermeable ductile materials of a type suitable for the conditions of exposure in which they are to be placed, and capable of providing durable, flexible and watertight seal by adhesion to the concrete throughout the range of joint movement.

Hot poured joint sealants shall comply with BS 2499, Ordinary Type A1 sealant.

Cold poured polymer-based joint sealants shall comply with BS 5212: Part 1, Normal Type N sealant.

Two-part polysulphide based sealants shall comply with the relevant provisions of BS 4254. Pouring Grade shall be applied to horizontal upward facing joints and Gun Grade to joints of any other aspect or inclination. Other two-part polymer based sealants of Gun or Trowel Grade shall comply with the physical and test requirements of BS 4254.

Silicon bases building sealants shall comply with the relevant provisions of BS 5889. Primers for use with joint sealants shall be compatible with, and obtained from the same manufacturers as, the adjacent sealant. Primers shall have no harmful effects on the concrete. Sealants and primers which will be in contact with water to be used for potable supply shall not impart to water taste, colour, or any effect known to be harmful to health, and shall be resistant to bacterial growth. Sealants and primers which will be in contact with sewage or sewage sludge shall be resistant to biodegradation.

6.11. Precast Culvert Rings

Culverts, including box, pipe, and slab types, shall be constructed using minimum C25/30 concrete and HYSD 500 reinforcement, complying with relevant standards (BS 8110, BS 4449, BS EN 1916). They must be designed for the required hydraulic capacity and vehicular loads, with proper alignment, cover, and scour protection at inlets and outlets. Excavation must reach firm bearing, bedding and backfill properly compacted, and reinforcement accurately placed. Quality control includes concrete strength tests, reinforcement certification, and verification of dimensions and hydraulic performance.

9 Section 7

7. Safety, Health and Environment

7.1. Introduction

The prevention of injury and/or illness to the site personnel and the public, damage to the Works and to public and private property, protection of the environment, and compliance with applicable laws, are primary objectives of the Employer. Because of the importance the Employer places on meeting these objectives, selected minimum requirements are outlined in these Safety, Health and Environmental Specifications with which Contractors shall comply while working on this contract. Given that these Specifications cannot cover every eventuality, the Contractor shall be expected to exercise good judgment in all such matters, even though not mentioned in these Specifications, and shall take any and all additional measures, as required or necessary, to meet his responsibility for safety, health and environmental matters during the period of the Contract.

The Employer nor its representatives shall not be held liable for any actions taken by the Contractor that are attributed to following the minimum requirements stated hereinafter. The Contractor shall throughout the execution and completion of the Works and the remedying of any defects therein:

a. have full regard for the safety of all persons on the Site and keep the Site and the Works in an orderly state appropriate to the avoidance of danger to any person;
b. know and understand all laws governing his activities along with any site requirements and work site hazards. Such information shall be communicated by the Contractor to his personnel and subcontractors;
c. take all necessary measures to protect his personnel, the Employer's personnel, other persons, the general public and the environment;
d. avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequent of carrying out the Works.

7.2. Compliance with Specifications

The Contractor shall comply with the requirements of these Safety, Health and Environmental Specifications and all other applicable regulations or requirements under Kenyan laws, laid down by relevant authorities or issued by the Employer or the

Engineer concerning safety, health and the environment, in force or introduced or issued from time to time during the period of the Contract.

In so far as these Specifications are applicable, they shall apply to sites and personnel outside the Site associated with the performance of the Contract.

The Specifications equally apply to subcontractors and all other parties engaged by the Contractor and their personnel. The Contractor shall ensure all such parties are fully aware of and comply with the Specifications.

The Contractor shall comply with all notifications and written or verbal instruction regarding safety issued pursuant to these Specifications by the Employer, Engineer or relevant authorities within the time specified in the notification or instruction.

The Contractor shall adopt a positive approach, awareness and responsibility towards safety, health and the environment, and take appropriate action, by:

a. ensuring the Specifications are enforced and followed by the Contractor's personnel. Any failure by the Contractor's personnel to follow the Specifications shall be regarded as a failure by the Contractor.
b. paying attention to possible injury to unauthorized persons entering the site, particularly children.

Whenever in these Specifications the Contractor is required to provide test certificates for equipment and personnel and to comply with the relevant authorities' requirements and no independent test facilities are available or no relevant authorities exist in Kenya, the Contractor shall provide:

a. in lieu of independent test certificates:

   - for equipment – details of the tests that have been carried out by the Contractor and a written statement that the Contractor has satisfied himself that the item of equipment is fit and safe for use;
   - for personnel – details of the training and experience of the personnel and a written statement that the Contractor has satisfied himself that they have the required level of competency;

b. in lieu of relevant authorities' requirements – details of the Contractor's own rules, regulations, requirements and procedures regarding safety, health and the environment.

If the Engineer is dissatisfied with the details provided by the Contractor, the Contractor shall provide further details or carry out further tests or provide further written statements as may be reasonably required by the Engineer.

When the Engineer has satisfied himself regarding the Contractor's own rules, regulations, requirements and procedures provided in accordance with (b) above, such rules, etc. shall be deemed to form part of these Specifications and to which Clause 3 shall equally apply.

7.3. Failure to Comply with Specifications

7.3.1. General

Should the Contractor fail to comply with any of the Specifications or requirements of the Engineer:

(a) the Engineer may suspend the Works of part of the Works until the Contractor has taken the necessary steps, to the satisfaction of the Engineer, to comply with the Specifications or requirements.

(b) the Employer may, following written notice to the Contractor, carry out themselves or arrange for another contractor to carry out such measures as they may consider appropriate on behalf of the

Contractor. Any such actions by the Employer shall not affect or diminish the Contractor's obligations or responsibilities under the Contract.

(c) the Engineer may, by written notice of suspension to the Contractor, suspend all payment to the Contractor under the Contract if the Contractor fails to rectify any breach of the Specifications within the period specified by the Engineer, provided that such notice of suspension:

(i) shall specify the nature of the failure or failures; and

(ii) shall request the Contractor to remedy each such failure within a specified period after receipt by the Contractor of such notice of suspension.

Such suspension of payment shall remain in force until such time as the Contractor has rectified the breach or breaches to the satisfaction of the Engineer. No interest shall be paid on the suspended payments.

Failure to comply with the Specifications or requirements shall be considered a breach of the Contract by the Contractor and may result in termination of the Contract by the Employer. In the event of the Employer taking action based on this Clause, the Contractor shall not be entitled to any additional costs or extension to the Contract Completion Date. All costs incurred by the Employer pursuant to Sub-Clause 703.1.1 (b) shall be deducted from the amounts otherwise due to the Contractor.

7.4. General Requirements

7.4.1. Preamble

All references to safety shall be deemed to include health and the environment.

7.4.2. Safety Officer

The Contractor shall appoint a competent Safety Officer who shall be responsible for safety, health and the environment. The Safety Officer shall be given sufficient time by the Contractor to carry out his duties; minimum requirements shall be as follows:

Workforce on site of over 250	-	full time Safety Officer;
Workforce on Site of 100 – 250	-	50% of Safety Officer's time;

Workforce on site below 100	- as required for the Works but a minimum of 5 hours per week of Safety Officer's time where more than 20 workers.

The Contractor shall provide the Safety Officer with appropriate identification, including a white hard hat with red cross symbol and an identification badge. The appointment of the Safety Officer shall be in writing and copied to the Engineer. The appointment shall include specific instructions to enforce these Specifications and delegated authority to take any action, measure or to issue instruction regarding their enforcement. All persons on Site shall be made aware of the name and authority of the Safety Officer and instructed to comply with any instruction or direction in safety matters, verbal or in writing issued by the Safety Officer.

The Safety Officer shall be provided with a mobile phone or other similar means of communication. The Safety Officer shall be accessible and available at all times including normal working hours.

7.4.3. Safety Training

The Contractor shall provide safety induction training for all site personnel upon starting on site.

The Contractor shall provide safety refresher/reinforcement training at regular intervals for his staff.

7.4.4. Safety Meetings

The Contractor shall hold regular safety meetings to provide safety instructions and receive feedback from site personnel on safety, health and environmental matters. A weekly safety Meeting shall be chaired by the Safety Officer and minutes shall be taken of the meeting. The meeting/minutes shall be given to the Engineer. The Safety Officer should attend the Contractor's weekly site meetings and "Safety" shall be an item on the agenda.

7.4.5. Safety Inspections

The Safety Officer shall make regular safety inspection of the work site. The Safety Officer shall prepare a report of each inspection. This report shall include details of all breaches of these Specifications and any other matters or situations relating to safety

found during the inspection, instructions issued by the Safety Offices and actions taken by the Contractor. A copy of the Safety Officer's reports shall be given to the Engineer.

7.4.6. Control of Substances Hazardous to Health

Hazardous materials shall be stored in approved safety containers and handled in a manner specified by the manufacturers and/or prescribed by relevant authorities.

Only properly trained and equipped personnel shall handle hazardous materials.

7.4.7. Potential Hazards

The Contractor shall inform employees of potential hazards, take the appropriate steps to reduce hazards and be prepared for emergency situations. The Contractor shall make an assessment of every operation involving hazardous substances. The assessment shall be recorded on a Hazardous and Flammable Substances Assessment Method Statement which shall be submitted to the Engineer prior to the delivery and use of the substance on Site.

7.4.8. Accident Reporting

The Contractor shall report all accidents and dangerous occurrences to the Engineer. The Contractor shall prepare a report on each accident or dangerous occurrence and a copy of the report, together with witness statements and any other relevant information, shall be submitted to the Engineer. A reportable accident or dangerous occurrence shall include any accident to any person on site requiring medical attention or resulting in the loss of working hours or any incident that resulted, or could have resulted, in injury, damage or a danger to the Works, persons, property or the environment.

In the event of an accident or dangerous occurrence, the Contractor shall be responsible for completing all statutory notifications and reports. Copies of all statutory notifications and reports shall be passed to the Engineer.

All accidents and dangerous occurrences shall be recorded in a Site Accident Book. The Site Accident Book shall be available at all times for inspection by the Engineer.

The Contractor shall immediately rectify any situation or condition that could result in injury, damage or a danger to the Works, person, property or the environment. If the situation or condition cannot be corrected immediately, the Contractor shall provide temporary barriers and appropriate warning signs and devices and/or take other

appropriate action necessary for the protection of persons, property and the environment.

7.4.9. Notices, Signs, Etc.

All safety, health, environmental and other notices and signs shall be clearly displayed and written in English. All requirements, instructions, procedures, etc. issued by the Contractor concerning these Specifications shall be printed in English and displayed and readily available to the Contractor's personnel.

7.4.10. First Aid and Medical Attention

The Contractor shall have comprehensive First Aid Kit(s) on Site at all times. First Aid Kits shall be conveniently located and clearly identifiable.

The Contractor shall have one employee on site trained in first aid for every 25

employees. Such persons shall be provided with appropriate identification, including a red hard hat with a white "red cross" symbol; and an identification badge.

The Contractor shall make contingency arrangements for calling a Doctor and transporting injured persons to hospital. The telephone numbers of the emergency services and the name,

address and telephone number of the Doctor and nearest hospital shall be prominently displayed in the Contractor's site office.

7.4.11. Employee Qualification and Conduct

The Contractor shall employ only persons who are fit, qualified and skilled in the work to be performed. All persons shall be above the minimum working age. Contractor's personnel shall use the toilet facilities provided by the Contractor.

The Contractor shall ensure:

1 that no firearms, weapons, controlled or illegal substances or alcoholic beverages are brought onto the Site and that no personnel under the influence of alcohol or drugs are permitted on Site.

2 That all personnel obey warning signs, product or process labels and posted instructions.

3 That drivers or operators of vehicles, machinery, plant and equipment follow the rules for safe operations. Drivers shall wear seat belts and obey all signs and posted speed limits.

7.5. Safety Requirements

4 Personal Protective Equipment

The Contractor shall provide personal protective equipment, including hard hats, safety glasses, respirators, gloves, safety shoes, and such other equipment as required, and shall take all measures or actions for the protection and safety of Contractor's personnel.

Non-metallic hard hats shall be worn at all times by all personnel at the worksite with the exception of those areas where the Engineer has indicated it is not necessary to do so. Safety glasses shall meet international standards and be available for use and worn in specified worksite areas.

As a minimum, safety glasses shall be worn for the following types of work: hammering, chipping, welding, grinding, use of electrically powered or pneumatic equipment, insulation handling, spray painting, working with solvents, and other jobs where the potential of an eye injury exists. Face shields and/or goggles shall be worn where possible exposure to hazardous chemicals, cryogenic fluids, acids, caustics or dust exists and where safety glasses may not provide adequate protection.When handling acids, caustics and chemicals with corrosive or toxic properties, suitable protection, such as acid suits or chemical resistant aprons and gloves, shall be worn to prevent accidental contact with the substance.

Personnel shall not be permitted to work whilst wearing personal clothing or footwear likely to be hazardous to themselves or others.

The wearing of safety shoes with steel reinforced toes is recommended for all Contractor's personnel on site. In all cases, Contractor's personnel shall wear substantial work shoes that are commensurate with hazards of the work and the work site area.

Hearing protection, including muffs, plugs or a combination thereof, shall be provided for all personnel operating in areas where the noise level exceeds 90 decibels. Such protections shall also be provided for operators working with equipment exceeding such a level. This may include equipment such as excavators, shovels, jackhammers, saws, drills, grinders and the like are being used.

The Contactor shall encourage employees to wear substantial work gloves whenever practical and safe to do so.

7.5.1. Fire Protection and Prevention

The Contractor shall comply with fire protection instructions given by the Authorities having jurisdiction in regard to fire protection regulations. The Contractor shall, upon moving on site, provide to the Engineer and the Authorities a fire prevention and evacuation plan. This shall include drawing(s) showing the fire assembly points. The fire prevention and evacuation plan and drawing(s) shall be updated from time to time as the Works progress. The Contractor shall ensure all personnel are fully informed on escape routes and assembly points and any changes thereto.

Fuel storage will not be permitted in construction work areas. Contractors may establish fuel storage tanks in specified areas set aside for the purpose and approved by the Engineer. Storage tanks shall be adequately bunded to control spillage. Fire extinguishers shall be provided and installed in a suitable nearby location.

Highly combustible or volatile materials shall be stored separately from other materials and as prescribed by relevant authorities and under no circumstances within buildings or structures forming part of the permanent Works. All such materials shall be protected and not exposed to open flame of other situations which could result in a fire risk.

No combustible material shall be located inside or within 10 metres of a building if structure forming part of the permanent Works. Where units have to be used in these circumstances, they shall be constructed of non-combustible materials and have a halfhour fire rating inside to outside and outside to inside. Non-combustible furniture shall be used where practical.

All temporary accommodation and stores shall be provided with smoke detectors and fire alarms.

Smoking shall be banned in high risk areas.

Expanded polystyrene with or without flame retarding additive, polythene, cardboard and hardwood shall not be used as protection materials. Plywood and chipboard shall only be used as protection on floors. Vertical protection shall be non-combustible. Debris netting and weather protection sheeting shall be fire retardant.

When using cutting or welding torches or other equipment with an open flame, the Contractor shall provide a fire extinguisher close by at all times. All flammable materials

shall be cleared from areas of hot works or work locations prior to welding or oxy/gas burning operations. All hot works shall cease half an hour before the end of a work shift to allow for thorough checking for smouldering materials. Where appropriate, areas of hot works are to be soused in water before the shift ends.

An adequate number of fire extinguishers of types suited to the fire risk and the material exposed shall be provided. These shall be placed in accessible, well-marked locations throughout the job site. Contractor's personnel shall be trained in their use. Extinguishers shall be checked monthly for service condition and replaced or recharged, as appropriate after use. Only approved containers shall be used for storage, transport and dispensing of flammable substances. Portable containers used for transporting or transferring gasoline or other flammable liquids shall be approved safety cans.

Fuel burning engines shall be shut off while being refuelled. Adequate ventilation to prevent an accumulation of flammable vapours shall be provided where solvents or volatile cleaning agents are used.

Flammables shall not be stored under overhead pipelines, cable trays, electrical wires or stairways used for emergency egress. Paints shall be stored and mixed in a room assigned for the purpose. This room shall be kept under lock and key.

Oily waste, rags and other such combustible materials shall be stored in proper metal containers with self-closing lids and removed every night to a safe area or off site. Every precaution shall be taken to prevent spontaneous combustion.

7.5.2. Electrical Safety

All temporary electrical installations, tools and equipment shall comply with current regulations dealing with on-site electrical installations. The Contractor shall establish a permit- to-work system for work in or in proximity to energized circuits of any voltage. Contractor's personnel shall not commence work on such circuits unless a permit to work has been issued and adequate safety measures have been taken and the work operation has been reviewed and approved by the Engineer.

Only authorized personnel shall be allowed to work or repair electrical installations and equipment. Portable tools and equipment shall be 240 volt, unless otherwise agreed by the Engineer.

When portable or semi-portable equipment operates at voltages in excess of 240 volts, the supply shall be protected by a Residual Current Device (RCD) regardless of any such device fitted to the equipment. The RCD must have a tripping characteristic of 30 milliamps at 30 milliseconds maximum.

All static, electrically powered equipment, including motors, transformers, generators, welders and other machinery, shall be properly earthed, insulated, and/or protected by a ground fault interruption device. In addition, the skin metal buildings and trailers with electric service shall be earthed. Metal steps, when used shall be securely fixed to the trailer. Lamp holders on festoon lighting shall be moulded to flexible cable and be of the screw in type. Clip on guards shall be fitted to each lamp unit.

All tungsten-halogen lamps shall be fitted with a glass guard to the element. These

lamps must be permanently fixed at high level.

Electrical equipment shall be periodically inspected and repaired as necessary by competent persons.

Any work in electrical equipment and systems shall be made safe through locking, tagging, and/or isolation of the equipment before work commences. Prior to the start of the work, the

equipment or systems shall be tested to ensure that they have been properly deenergised and isolated.

Electrical repair work on energized systems shall be avoided whenever possible. Electrical trouble shooting shall be conducted only after getting written approval of the Engineer.

Unauthorized personnel shall not enter enclosures or area containing high voltage equipment such as switchgear, transformers or substations.

7.5.3. Oxygen/Acetylene/Fuel Gases/Cartridge Tools

Compressed oxygen shall never be used in the place of compressed air. Flash-back (Spar) arrestors shall be fitted to all gas equipment. Liquid petroleum Gas (LPG) cylinders shall not be stored or left in areas below ground level overnight. Cylinders must be stored upright.

The quantity of oxygen, acetylene and LPG cylinders at the point of work shall be restricted to a maximum of one day's supply. Cylinders shall be kept in upright vertical rack containers or be safely secured to a vertical support.

Cartridge tools shall be of the low velocity type. Operators must have received adequate training in the safe use and operation of the tool to be used.

7.5.4. Scaffolding/Temporary Works

No aluminum tube shall be used, except for proprietary mobile towers, unless otherwise agreed with the Engineer.

Drawings and calculations shall be submitted to the Engineer, prior to commencement of work on the site, for all Temporary Works, including excavations, falsework, tower cranes, hoists, services and scaffolding. Designs shall conform to international standards.

The Engineer will not approve Temporary Work designs but the Contractor shall take account of any comments on such designs made by the Engineer.

The Contractor shall inspect and approve all Temporary Works after erection and before access, loading or use is allowed. Completed and approved Temporary Works shall be tagged with a scaff-tag or similar safety system and the Safe Structure insert displayed. For scaffolding, one tag shall be displayed every 32 m^2 of face area. A central record system shall be kept on all Temporary Work. Temporary Works shall be inspected weekly and similarly recorded.

All mobile scaffold towers shall be erected in accordance with the manufacturer's instructions and a copy of these shall be submitted to the Engineer prior to any use on site. Additionally, all towers shall be erected complete with access ladder, safety rails and kick boards whatever the height.

The Contractor shall repair or replace, immediately, any scaffold, including accessories, damaged or weakened from any cause.

The Contractor shall ensure that any slippery conditions on scaffolds are eliminated as soon as possible after they occur.

All scaffolds used for storing materials, for brick or block laying, for access to formwork or for any other purpose where materials may be accidentally fall, shall be provided with wire mesh guards of a substantial material, in addition to kick boards.

7.5.5. Use of Ladders

Manufactured ladders shall meet the applicable safety codes for wood or metal ladders. Metal ladders shall not be used where there is any likelihood of contact with electric cables and equipment. All metal ladders shall be clearly marked: "Caution – Do not use around electrical equipment". Job made ladders shall not be permitted.

Extension or straight ladders shall be equipped with non-skid safety feet, and shall be no more than 12 m in height. The maximum height of a step ladder shall be 2 m. Ladders shall not be used as platforms or scaffold planks.

Ladders rungs and steps shall be kept clean and free of grease and oil.

Extension and straight ladders shall be tied off at the top and/or bottom when in use. Only one person shall be allowed in a ladder at a time.

Defective ladder shall be taken out of service and not used. Ladders shall not be painted and shall be inspected for defects prior to use.

7.5.6. Elevated Work

The Contractor shall provide all personnel, while working at an elevated position, with adequate protection from falls. Details of such protections shall be submitted to the Engineer. The Contractor shall carry out daily inspections of all elevated work platforms. Defects shall be corrected prior to use.

7.5.6.1. Roofing and Sheet Metal Laying

7.5.6.1.1. A Method Statement detailing the procedures to be adopted shall be submitted to and agreed with the Engineer prior to commencement of work on the site.

7.5.6.1.2. Mobile elevating work platforms or the equivalent shall be used to install roofing and sheet materials wherever practicable and a suitable base is available.

7.5.6.2. Erection of Structures

7.5.6.2.1. A Method Statement detailing the procedures to be adopted shall be submitted to and agreed with the Engineer prior to commencement of work on the site.

7.5.6.2.2. Safety harness and lines shall be provided by the Contractor for use by the erection personnel and worn at all times.

7.5.6.2.3. Mobile elevating work platforms or the equivalent shall be used to erect structures wherever practicable and a suitable base is available.

7.5.6.3. Mobile Elevating Work Platforms

Operators shall be trained in the safe use of such platforms and hold a current Certificate of Competence.

7.5.6.4. Hoists

7.5.7. A copy of the current Test Certificate shall be submitted to the Engineer before any hoist (personnel or material) is brought into operation on the site.

Where the range of travel is increased or reduced a copy of the revised Test Certificate shall be submitted.

7.5.8. Each landing gate shall be fitted with a mechanical or electrical interlock to prevent movement of the hoist when any such gates is in the open position.

7.5.9. Safety harness must be worn and used by personnel erecting, altering and dismantling hoists.

7.5.9.1. Suspended Cradles

7.5.10. Suspended cradles shall be installed, moved and dismantled by a specialist contractor.

7.5.11. Suspended cradles shall comply with local regulations.

7.5.12. All powered suspended cradles shall incorporate independent safety lines to overspeed braking devices and independent suspension lines for personal safety harness attachment.

7.5.13. Use of Temporary Equipment

The safe design of any piece of equipment shall not be exceeded, nor shall the equipment be modified in any manner that alters the original factor of safety or capacity. Mobile equipment shall be fitted with suitable alarm and motion sensing devices, including back-up alarm, when required. The Contractor shall ensure that the

installation and use of equipment are in accordance with the safety rules and recommendations laid down by the manufacturer, taking into account the other installations already in place or to be installed in the future.

The contractor shall inspect Equipment prior to its use on the Works and periodically thereafter to ensure it is in safe working order. Special attention shall be given to such items as cables, hoses, guards, booms, blocks, hooks and safety devices. Equipment found to be defective shall not be used and immediately removed from services, and a warning tag attached.

Natural and synthetic Fibre rope made of material such as manila, nylon, polyester, or polypropylene shall not be used as slings. Only trained, qualified and authorized personnel shall operate equipment. All drivers and operators shall hold a current Certificate of Training Achievement for the equipment being used. A safety observer shall be assigned to watch movements of heavy mobile equipment where hazards may exist to other personnel from the movement if such equipment, or where equipment could hit overhead lines or structures. The observer shall also ensure that people are kept clear of mobile equipment and suspended tools. When mobile or heavy equipment is travelling onto a public thoroughfare or roadway, a flagman shall ensure that traffic has been stopped prior to such equipment proceeding. While the mobile or heavy equipment is travelling on a public roadway, a trailing escort vehicle with a sign warning of a slow-moving vehicle that is dangerous to pass shall be provided.

7.5.14. Cranes:

a. The Contractor shall give a minimum of 48 hours' notice to the Engineer prior to bringing a crane on site.
b. No cranes shall be erected in the site without the prior approval of the Engineer. The Engineer may direct the Contractor as to location where cranes may not be located. The Contractor shall take such directions into account when submitting his proposals for crane location points, base footings, pick up points and swing radius. Compliance with any such direction shall not entitle the Contractor to any extension of the Period of Completion or to any increase of the Contract Price.
c. Safety harness shall be worn and used at all times by personnel engaged on the erection, alterations and dismantling of tower cranes.
d. The Contractor shall provide a copy of the current Test Certificate (see SubClause 702.5) to the Engineer before any crane (tower or mobile) is brought into operation on the Site.
e. All lifting tackle must hold a current Test Certificate. All lifting tackle must be thoroughly examined every 6 months and an inspection report raised.

f. All fibrous/web slings shall be destroyed and replaced 6 months after first use.
g. All crane drivers/operators shall hold a Certificate of Training Achievement for the class of crane operated.
h. All banksman/slingers shall hold a Training Certificate from a recognized training agency.
i. The maximum weekly working hours of a crane driver or banksman shall be restricted to 60 hours.
j. Under no circumstances shall a crane or load come within 4 m of any energized overhead power line or other critical structure.

7.5.15. Locking-out, Isolating and Tagging Equipment.

Equipment that could present a hazard to personnel if accidentally activated during the performance of installation, repair, alteration, cleaning, or inspection work shall be made inoperable and free of stored energy and/or material prior to the start of work. Such equipment shall include circuit breakers, compressors, conveyors, elevators, machine tools, pipelines, pumps, valves, and similar equipment.

Where equipment is subject to unexpected external physical movement such as rotating, turning, dropping, falling, rolling, sliding, etc., mechanical and/or structural constraints shall be applied to prevent such movement.

Equipment which has been locked-out, immobilized, or taken out of services for repair or because of a potentially hazardous condition shall be appropriately tagged indicting the reason it has been isolated and/or taken out of service.

Where safety locks are used for locking out or isolating equipment, the lock shall be specially identified and easily recognized as a safety lock.

7.5.16. Installation of Temporary or Permanent Equipment

During installation and testing the Contractor's specialists Engineer shall be in attendance. All control mechanism panel and wiring diagrams shall be available and printed in English.

7.5.17. Laser Survey Instruments

Details of the types and use of laser instruments shall be submitted and agreed with the Engineer.

7.5.18. Working in Confined Spaces

Confined spaces, including tanks, vessels, containers, pits, bins, vaults, tunnels, shafts, trenches, ventilations ducts, or other enclosures where known or potential hazards may exist, shall not be entered without prior inspection by and authorization from the Site Safety Officer and the issuance of a Hazardous Work Permit.

Prior to entering the confined space, the area shall be completely isolated to prevent the entry of any hazardous substances or materials which could cause an oxygen deficient atmosphere. All equipment that could become energized or mobilized shall be physically restrained and tagged. All lines going into the confined space shall be isolated and/or blanked.

Personnel working in a confined space where emergency escape or rescue could be difficult, shall wear a safety harness attached to a lifeline. A qualified attendant(s), trained and knowledgeable in job-relater emergency procedures, shall be present at all times while persons are working within the confined space.

The attendant shall be capable of affecting a rescue, have necessary rescue equipment immediately available, and be equipped with at least the same protective equipments as the person making entry.

All equipment to be used in a confined space shall be inspected to determine its acceptability for use. Where a hazard from electricity may exist, equipment utilized shall be of low voltage type. The atmosphere within the confined space shall be tested to determine if it is safe to enter. Acceptable limits are:

- oxygen: 19.5% lower, 22% higher;
- flammable gas: not to exceed 10% of lower explosion limit;
- toxic contaminants: not to exceed the permissible exposure limit.

Subsequent testing shall be done after each interruption and before re-entering the confined space, as well as at intervals not exceeding 4 hours. Continuous monitoring is preferable and may be necessary in certain situations.

Adequate ventilation shall be provided to ensure the atmosphere is maintained within acceptable limits.

7.5.19. Demolition

A detailed Method Statement detailing the demolition procedures/techniques to be used shall be submitted to and approved by the Engineer prior to commencement of work on site.

The Method Statement must include full details of measures to be taken to ensure that there are no persons remaining in the building/structure and to distance members of the public and Contractor's personnel from the building/structure prior to demolition.

7.5.20. Use of Explosives

The Contractor shall not use explosives without the written permission from the Engineer and relevant authorities.

The Contractor shall observe all regulations regarding proper purchasing, transportation, storage, handling and use of explosives.

The Contractor shall ensure that explosives and detonators are stored in separate special building. These secured buildings shall be constructed, located and clearly marked in English:

7.6. "DANGER – EXPLOSIVES"

all as approved by the Engineer and relevant authorities. The Contractor shall ensure that all possible precautions are taken against accidental fire or explosion and ensure that explosives and detonators are kept in a proper and safe condition. The contractor shall ensure that explosives and detonators are always transported in separate vehicles and kept apart until the

last possible moment and that metallic tools are not used to open boxes of explosives or detonators.

Blasting Procedure: the contractor shall carry out blasting operations in a manner that will not endanger the safety of persons or property. The Contractor shall, along with other necessary precautions:

a. clear all persons from building and the area affected by the blasting. All such persons shall be given adequate notice of the actual time and date of blasting;
b. ensure that police and other local authorities are kept fully informed, in advance, of the blasting programme so that they may be present when blasting takes place if they so require;

c. erect warning notices around the area affected that blasting operation are in progress;
d. carry out a thorough search of buildings and the area affected prior to blasting;
e. ensure that blasting is only carried out by experienced shot firers. Priming, charging, stemming and shot firing shall be carried out with greatest regard for safety and in strict accordance with the rules and regulations of the relevant authorities.
f. ensure that explosive charges are not excessive, charged boreholes are properly protected and proper precautions are taken for the safety of persons and property.

The Contractor shall maintain an up-to-date inventory of all explosives and explosive devices and shall submit a monthly report to the Engineer, detailing the use of all explosives by date and location.

7.6.1. Excavation and Trenching

An excavation permit signed by the Engineer must be issued before excavation

proceeds in any work location. The contractor shall investigate and identify the location of existing services by study of the drawings, a visual/physical study of the site, sweeping by appropriate detection equipment and where necessary hand excavation of trial holes.

Following this investigation, the Contractor shall submit a written request for an excavation permit to the Engineer.

The Engineer will return the permit signed and dated to indicate:

- services which are to be maintained.
- services which are to be isolated.
- any special precautions to be taken.

A sample Excavation Permit is given in Annex 1 to this Specification. The issue of an Excavation Permit by the Engineer shall not relieve the Contractor of his responsibilities under the Contract.

The side of all excavations and trenches which in the opinion of the Engineer might expose personnel or facilities to danger resulting from shifting earths shall be protected by adequate temporary supports or sloped to the appropriate angle of repose.

All excavations, slopes and temporary supports shall be inspected daily and after each rain, before allowing personnel to enter the excavation.

Excavations 1.3 metres or more in depth and occupied by personnel shall be provided with ladders as a means for entrance and egress. Ladders shall extend not less than 1 metre above the top of the excavation.

The Contractor shall provide adequate barrier protection to all excavations. Barriers shall be readily visible by day of night.

Excavated or other materials shall be stored at least 0.65 metres from the sides of excavations.

7.6.2. Concrete Reinforcement Starter Bars

The Contractor shall ensure concrete reinforcement starter bars are not a danger to personnel. Where permitted by the Engineer, starter bars shall be bent down. Alternatively, the starter bars shall be protected using either hooked starters, plastic caps, plywood covers, or other methods agreed with the Engineer.

7.7. Environmental and Health Requirements

7.7.1. Protection of the Environment

The Contractor shall be knowledgeable of and comply with the Environmental Management Plan (EMP) and with all environmental laws, rules and regulations for materials, including hazardous substances or wastes under his control. The contractor shall not dump, release or otherwise discharge or dispose of any such materials without the authorization of the Engineer. Any release of a hazardous substance to the environment, whether air, water or ground, must be reported to the Engineer immediately. When releases resulting from Contractor action occur, the Contractor shall take proper precautionary measures to counter any known environmental or health hazards associated with such release. These would include remedial procedures such as spill control and containment and notification of the proper authorities.

7.7.2. Air Pollution

The Contractor, depending on the type and quantity of materials being used, may be required to have an emergency episode plan for any releases to the atmosphere. The Contractor shall also be aware of local ordinances affecting air pollution.

The Contractor shall take all necessary measures to limit pollution from dust and any wind- blown materials during the Works, including damping down with water on a regular basis during dry climatic conditions.

The contractor shall ensure that all trucks leaving the Site are properly covered to prevent discharge of dust, rocks, sand, etc.

7.7.3. Water Pollution

The contractor shall not dispose of waste solvents, petroleum products, toxic chemicals or solutions on the city drainage system or watercourse and shall not dump or bury garbage on the Site. These types of waste shall be taken to an approved disposal facility regularly, and in accordance with requirements of relevant Authorities. The Contractor shall also be responsible for the control of all run-offs, erosion, etc.

7.7.4. Solid Waste

7.7.4.1. General Housekeeping

7.7.4.1.1. The Contractor shall maintain the site and any ancillary areas used and occupied for performance of the Works in a clean, tidy and rubbish-free condition at all times.

7.7.4.1.2. Upon the issue of any Taking-Over Certificate, the Contractor shall clear away and remove from the Works and the Site to which the Taking-Over Certificate relates, all Contractor's Equipment, surplus material, rubbish and Temporary Works of every kind, and leave the said Works and Site in a clean condition to the satisfaction of the Engineer. Provided that the Contractor shall be entitled to retain on Site, until the end of the Defects Liability Period, such materials,

Contractor's Equipment and Temporary Works as are required by him for the purpose of fulfilling his obligations during the Defects Notification Period.

7.7.4.2. Rubbish Removal and Disposal

7.7.4.2.1. The Contractor shall comply with statutory and municipal regulations and requirements for the disposal of rubbish and waste.

7.7.4.2.2. The Contractor shall provide suitable metal containers for the temporary storage of waste.

7.7.4.2.3. The Contractor shall provide suitable metal containers from site as soon as they are full. Rubbish containers shall not be allowed to overflow.

7.7.4.2.4. The Contractor shall provide hard standings for and clear vehicle access to rubbish containers.

7.7.4.2.5. The Contractor shall provide enclosed chutes of wood or metal where materials are dropped more than 7 metres. The area onto which the material is dropped shall be provided with suitable enclosed protection barriers and warning signs of the hazard of falling materials. Waste materials shall not be removed from the lower area until handling of materials above has ceased.

7.7.4.2.6. Domestic and biodegradable waste from offices, canteens and welfare facilities shall be removed daily from the site.

7.7.4.2.7. Toxic and hazardous waste shall be collected separately and be disposed of in accordance with current regulations.

7.7.4.3. Asbestos Handling and Removal

The Contractor shall comply with all local regulations regarding the handling of asbestos materials. In the absences of local regulations, relevant International Standards shall

apply.

7.7.4.4. Pest Control

The Contractor shall be responsible for the rodent and pest control on the Site. If requested, the contractor shall submit to the Engineer, for approval, a detailed programme of the measures to be taken for the control and eradication of rodents and pests.

7.7.5. Noise Control

The Contractor shall ensure that the works is conducted in a manner so as to comply with all restrictions of the Authorities having jurisdiction, as they relate to noise.

The Contractor shall, in all cases, adopt the best available plant/and or machinery shall be used. All equipment shall be maintained in good mechanical order and fitted with the appropriate silencers, mufflers or acoustic covers where applicable. Stationary noise sources shall be sited as far away as possible from noise-sensitive areas and, where necessary, acoustic barriers shall be used to shield them. Such barriers may be proprietary types or may consist of site materials such as bricks or earth mounds as appropriate.

Compressors, percussion tools and vehicles shall be fitted with effective silencers of a type recommended by the manufacturers of the equipment. Pneumatic drills and other noisy appliances shall not be use during days of rest or after normal working hours without the consent of the Engineer.

Areas where noise levels exceed 90 decibels, even on a temporary basis, shall be posted as high noise level areas.

7.8. Additional Requirements for Work in Public Areas

7.8.1.1 General

Those additional requirements shall apply to all works carried out in Public Areas.

Public Areas are defined as areas still used by or accessible to the public. These include public roads and pavements, occupied buildings and areas outside the Contractor's boundary fencing.

All work in Public Areas shall be carried out to minimize disturbance and avoid dangers

to the public.

Before commencing work, the Contractor shall ensure that all necessary resources, including labour, plant and materials will be available when required and that the works will proceed without delays and be completed in the shortest possible time. Period of inactivity and slow progress or delays in meeting the agreed programme for the Works, resulting from the Contractor's failure to provide necessary resources or other causes within the control of the Contractor, will not be accepted. In the event of such inactivity, slow progress or delays, the Contractor shall take immediate action to rectify the situation, including all possible acceleration measures to complete the works within the agreed programme.

Details of the actions and acceleration measures shall be submitted to the Engineer. If the Engineer is dissatisfied with the Contractor's proposals, the Contractor shall take such further actions or measures as required by the Engineer. All costs incurred shall be the responsibility of the Contractor.

7.8.2 Method Statement

The Contractor shall submit to the Engineer a method statement for each separate area or work in Public Areas. The Method Statement shall include:

a. a general description of the Works and methodology of how it will be carried out.
b. Details of the measures and temporary works to minimize disturbance and safeguard the public. These shall include temporary diversions, safety barriers, screens, signs, lighting, watchmen and arrangements for control of traffic and pedestrians and advance warning to be given to the public.
c. Details of temporary reinstatement and maintenance of same prior to final reinstatement.
d. For works involving long lengths of trenches or works to be completed in sections, the lengths or sections of each activity (e.g. up to temporary reinstatement, final reinstatement) to be carried out at any one time.
e. Details of the availability of necessary resources (labour, plant, materials, etc.) to complete the work.
f. A programme showing start and completion dates and period for all activities of each length or section, including temporary works, and the works overall.
g. Such further information as necessary or required by the Engineer.

The Contractor shall not commence work, including temporary works, until after the approval of the Contractor's Method Statement by the Engineer.

Method Statements shall be updated bases on actual progress or as and when required by the Engineer.

7.8.3 Closure of Roads, Etc.

The closure or partial closure of roads, pavements and other public areas will only be permitted if approved by the Engineer and Relevant Authorities. The Contractor shall detail for each closure the extent of area to be closed, the reasons and duration of the closure, and where appropriate, proposed diversions. A sample Street Closure Permit is given at Annex 2 to this Specification.

7.8.4 Trench and Other Excavations

The requirements covering trench and other excavations will depend on the location and type of the excavation and the potential risks to the public.

The following guidelines apply particularly to trenches but shall also apply to other types of excavations:

a. before commencing work the Contractor shall:
b. notify the Engineer of the location and duration of the work. An excavation permit signed by the Engineer must be issued in accordance with Sub- Clause 705.16 before excavation proceeds in any work location;
c. obtain permission from relevant authorities including the police when required;
d. erect all temporary works such as barriers, warning signs, lighting, etc.;
e. have available adequate materials for temporary supports to sides of excavations and necessary labour, plant and materials to complete the work within the shortest possible time.
f. in carrying out the works the Contractor shall, unless otherwise permitted or required by the Engineer:
g. not open more than one excavation within a radius of 250 metes;

- limit the length of trench excavation open at one time to 150 metres;
- maintain and alter or adapt all temporary works including supports to sides of excavations;
- remove all surplus excavated material the same day it is excavated;
- complete the works, including final reinstatement within ten days;
- where final reinstatement is not achieved within the required time, to carry

  out temporary reinstatement;

- ensure that any temporary reinstatement is maintained at the correct level until final reinstatement is achieved.

The above guidelines shall not relieve the Contractor of his obligations and responsibilities.

7.8.5 Safety Barriers

Safety barriers shall be provided to the perimeter of work areas and to trench and other types of excavations and to existing openings such as manholes, drawpits and the like. When exposed to the public, safety barriers shall be provided to both sides and ends of trenches and around all sides of openings.

The Contractor shall provide details of the type or types of safety barriers for each excavation for the approval of the Engineer prior to commencing work. No work shall commence until the safety barriers are in place.

The type of safety barrier used shall be appropriate to the particular location and the potential risks to the public. Examples of different types of safety barriers are given below:

- Type 1 - excavated material;
- Type 2 - non-rigid barrier of rope or florescent tape strung between metal rods driven into the ground;
- Type 3 - rigid barrier of timber, steel or concrete. Such barriers could be in the form of horizontal rail(s) or sheet material secured to posts driven or concreted onto the ground.

The following are guidelines on the type of safety barriers that could be used in differing situations. They apply particularly to trenches but also apply to other types of excavation, existing openings onto the perimeter of work areas:

areas not subject to vehicular traffic - Types 1 or 2; roadways

(low traffic speed) - Types 1 or 2;

roadways (high traffic speed or where excavation are greater than 2 m) - Type 3. The above examples of the types of barriers and the guidelines on situations in which they could be used shall not relieve the Contractor of his obligations and responsibilities.

7.9. Contractor's Site Check List

A sample Contractor's Site Check List is included in Annex 3 to this Specification. This is included to assist contractors should they wish to introduce such a system as part of their site management procedures. The list is not exhaustive and further items will need to be added by the Contractor.

The list is issued for guidance only, and does not, in any way, revise or limit the requirements covered elsewhere in these Specifications.

7.10. Miscellaneous

7.10.1.1 General

The Contractor is referred to the drawings as to the general character of the works and he shall allow in his rates for any reason of the work being in detached positions, in small quantities, difficulty of access or for any other cause. He should also make due allowance for specialist installations taking place during the currency of this contract.

This section of the specification refers to miscellaneous items. Clauses elsewhere in the specification shall be followed where relevant.

7.10.2 Bondies Ties

Bonding ties shall be 75mm wide x 250mm long galvanised bitumen - coated expanded metal strip, cast 100mm into concrete surface in contact with block work. The bonding tie used shall be approved by the Engineer.

7.10.3 Precast Lintels

All precast items shall be marked with the date of casting and shall not be built until they have matured for 28 days. Ends of bar reinforcement shall be hooked. The cover for reinforcement shall be 25mm from internal faces and 38mm from external exposed faces. The top of lintels shall be numbered for identification.

Lintels shall have timber or pre-formed inserts cast in for fixing metal windows where required and shall have fair face finish on all surfaces exposed to view and hacked surfaces where plastered.

7.10.4 Blockwork

Building blocks shall be dense concrete blocks complying with the requirements of SRN

804 with faces for plastering and having a compressive strength of 14 N/sq.mm

Blocks shall be obtained from an approved manufacturer and shall be equal to sample blocks previously approved by the Engineer.

Blocks shall be carefully handled and stored on site and protected from the weather at all times. Surfaces on which blockwork is to be built shall be kept clean. Blocks shall be well wetted before being laid and the tops of walls where blockwork has been left shall be well wetted before re-commencing. Blockwork shall be built plumb, true to line and level, with all perpendiculars vertical and in line. Block shall be built in half bond and alternate -courses shall be block bonded at all junctions, no cut block shall be less than half block. Joints in concrete blockwork shall be well filled with gauged mortar and shall not exceed 10mm in width.

7.10.5 Floor slabs and Damp - Proof Course (Dpc)

Floor slabs shall be constructed in reinforced concrete of the specified grade, laid to the required thickness, lines, and levels as shown on the drawings. Sub-base preparation, anti-termite treatment, damp-proof membrane, reinforcement placement, concreting, compaction, finishing, and curing shall be carried out in accordance with the specifications and relevant standards to produce a durable, level, and crack-free floor slab, complete to the satisfaction of the Engineer. Hessian based metal cored bitumen for- damp-proof course shall be lead cored, complying with SRN 803 weighing not less than 4. 4kg per square metre. Damp - proof course shall be bedded horizontally in mortar as for blockwork with 115mm laps in length and full laps at angles.

7.10.6 Hardwood and softwood

Hardwood for joinery shall be sound, well conditioned and seasoned hardwood complying with the requirements of SRN 816. A sample of each representative section for use in the work shall be previously submitted by the contractor for approval by the Engineer. Moisture content shall be 12 (+ or- 2%). Sawn cypress timber shall be of approved quality, well seasoned, free from defects, and pressure-treated with an approved preservative to protect against termites, fungi, and decay. Timber shall be straight, true to size, and suitable for its intended structural or finishing use, in accordance with relevant standards and to the satisfaction of the Engineer.

7.10.7 Plywood

Plywood generally shall comply with SRN 811. That from sources not included in SRN 811 shall be of corresponding grades of veneers and types of bonding. Plywood for flush doors shall be Grade 1- hardwood veneered.

7.10.8 Doors

Internal doors shall be hardwood framed solid cored flush doors constructed in accordance with SRN 817, faced both sides with 3mm thick hardwood veneered plywood and lipped all round with matching hardwood lipping. Moisture content at delivery shall be 12% (+ or - 2%).

7.10.9 Frames and Linings

Door frames and linings shall be class 1 hardwood mortice and tenon jointed at angles. Sub- frames for internal doors shall be Class 1 hardwood tongued at angles.

7.10.10 Architraves and Stops

Architraves and stops shall be Class 1 hardwood matching to the frames and linings.

7.10.11 Roofing

Roofing sheets shall be of approved type and profile, manufactured from high-quality galvanized or pre-painted steel, free from defects, and conforming to relevant standards. Sheets shall be of the specified thickness, securely fixed to the roof structure with approved fasteners and accessories, including ridges and flashings. Installation shall be carried out to the manufacturer's recommendations to ensure a watertight, durable, and neatly finished roof, complete to the satisfaction of the Engineer.

7.10.12 Ironmongery

All ironmongery shall be obtained from a source approved by the Engineer. Samples shall be submitted before ordering and the articles ordered shall match up with the approved samples. Screws of a like metal shall be used for all fittings.

7.10.13 Joinery

All exposed joiner's work shall have wrought faces. The prices of all joiner's work shall include for slightly rounded arises.

Where the term framing or framed is made use of it shall be understood to mean all halvings, dovetails, tenons and hardwood pins and the best known means of putting the work together. All framed work shall be put together loosely and stacked under cover where a free current of air can circulate and is not to be wedged and glued until it is required for fixing.

All joinery, when brought on the works, shall be stacked under cover. The Engineer or his representative, shall have full right of access to the joinery works and power to condemn any work not approved and any approval expressed or implied is not to relieve the contractor from his responsibility and liability to make good any shrinkage or other defects that may appear after the work is fixed.

All joinery to be painted shall be knotted and primed.

The Contractor shall provide all materials, labour, framing, fixing, etc., nails, screws and everything necessary for the proper execution and completion of the work.

7.10.14 Fixing Joinery

Doors shall be hung on one or one and a half pairs of butt hinges to give a maximum even tolerance of 2mm all round.

Sub-frames shall be fixed to blockwork with three fixing clamps per side and one dowel let 50mm into floor and d50mm into foot of each leg. Linings shall be fixed after completion of other finishings by means of screwing and pellating to sub-frames with matching hardwood pellates. Architraves and stops shall be pinned on, heads punched and filled with tinted filler.

7.10.15 Fixing Ironmongery

The rates for supplying and fixing ironmongery shall include for all sinking, boring, mortising etc., making good, replacing damaged screws, oiling, adjusting and leaving in good working order and for mastering all keys.

7.10.16 Bolts and Nuts

Bolts and nuts shall comply with the relevant requirements for the Standards as set out below:

Black Hexagon Bolts, Screws and Nuts SRN 914 Metal Washers for General Purpose

SRN 925

Black Cup and countersunk Head Bolts and Screws with nuts SRN 932

The items shall preferably have coarse metric threads but items with B.S.W. or approved equivalent threads may be used. Bolt lengths shall be sufficient to ensure that nuts are full threaded when tightened in their final position.

7.10.17 Structural Steelwork

The whole of the structural steelwork and testing shall comply with the relevant clauses of SRN 863. The Contractor shall include for the preparation of all shop details from the drawings supplied by the Engineer. All such details shall be approved in writing by the Engineer before the work is put in hand. Every drawing shall show the number and sizes of all rivets and bolts, compete details of welds, type of electrodes, welding procedure, whether the welds are to be made in the shop or elsewhere and any other relevant information. The Contractor shall be responsible for the accuracy of his shop details and for shop fittings and site connections. The Contractor shall take the dimensions from the structure and he shall verify all dimensions given on the drawings before the work is put in hand.

Any damage to materials on the site due to inadequate precautions being taken during the erection of the steelwork shall be made good to the satisfaction of the Engineer at the Contractor's expense.

The fabrication and erection of the steelwork shall be carried out in accordance with SRN 863.

7.10.18 Galvanized work

Iron and steel, where galvanized, shall comply with SRN 903, entirely coated with zinc after fabrication by complete immersion in a zinc bath in one operation and all excess carefully removed. The finished surface shall be clean and uniform. Specification:

Gates shall be fabricated from sound mild steel sections (angles, flats, plates, and hollow sections as specified), accurately cut, welded, and ground smooth to form a rigid and durable assembly. All steelwork shall be hot-dip galvanised after fabrication in accordance with BS EN ISO 1461 to provide long-term corrosion protection. Gates shall be complete with heavy-duty hinges, locking arrangements, stoppers, and all necessary

fittings, all suitably galvanised or corrosion-resistant. Installation shall include fixing to concrete or masonry using approved anchor bolts or embedded plates, setting true to line and level, and making good all disturbed surfaces. The work shall be completed to the satisfaction of the Engineer and ready for operation.

7.11. Roads and Footpaths.

- Preparation of Road Formation.
- After excavation or filling has been completed the road formation shall be shaped to the required contour and compacted with an 8 - 10 tonne roller.
- If any soft places develop in the formation during compaction they shall be excavated to such depths as the Engineer may direct, refilled with hard core or other approved granular material, levelled and re-compacted before the sub-base is laid.

7.11.1. Murram Sub-Base.

The murram sub-base shall comprise well-graded granular soil, free from organic material, soft lumps, or deleterious matter. It shall be laid in layers not exceeding 200 mm loose thickness, moistened to near optimum moisture content (OMC), and compacted to ≥ 95% of Maximum Dry Density (MDD) as determined by BS 1377-4. Sub-base thickness shall suit traffic loading, typically 150–200 mm for light traffic, 200–250 mm for medium, and 250–300 mm for heavy traffic. Construction quality shall be verified through field density and moisture content tests, ensuring a level, uniform surface ready for the base course.

The murram sub-base shall be of thickness as shown on drawings or stated in the Bill of Quantities.

7.11.2. Water Bound Macadam Base

The base shall consist of crushed building stone mechanically laid in one or more separate layers, so as to give a total compacted thickness as shown on the drawings, or stated in the Bill of Quantities. The first layer shall be laid to produce a thickness of 75 mm to 150mm after compaction as specified. Where a greater thickness than 150mm of base is specified the material shall be in separate layers each not less than 75mm or than 150mm in thickness after compaction.

The stone shall have the following gradings:

Standard sieve size % by weight passing

5 in. (125mm) ring	100
3 in. (75rnm)	25 - 80
1 . 5 in. (38mm)	0-20
¾ in. (20mm)	0-5

Alternatively a stone base may be placed by hand. If this case the first stones in each layer, which shall be of a cubicle nature, shall be placed to the approximate height of the layer. When an area has been covered in this way a second placing of stones or smaller size shall be positioned by eye in the spaces between these first placed, and wedged horne by hammering. A third placing of stone shall follow the second and so on until in the opinion of the Engineer the voids are sufficiently filled to permit compaction.

Thoroughly watering shall be carried out at all stages of compaction. Initial compaction shall be with a light roller. The surface shall be blinded with quarry dust so as to fill the interstices complete and gain rolled, this time using a heavy roller. The base shall then be well watered and brushed and permitted to dry. Further rolling with heavy roller, blinding with quarry dust, watering and brushing shall be carried on until the whole presents a homogeneous surface and no movement is visible under the action of the heavy roller. On completion of the base, and before any surfacing is laid the finished surface shall be maintained free from potholes, ruts and undulations, irregularities, depressions, loose material or other defects, and shall remain true to cross- section, line and level.

7.11.3. Rolled Asphalt Hot Process Wearing Course

Rolled asphalt wearing course shall be made and laid in accordance with SRN Rolled Asphalt (Hot process) and the thickness after compaction shall be as shown on the drawings or stated in the Bill of Quantities. Except where impracticable the rolled asphalt shall be laid using an approved paver.

Where a base course has been used as part of the surfacing, the wearing course shall be laid thereon as soon as practicable, care being taken that the latter is thoroughly clean. In any case the wearing course should be laid within 3 days of the laying of the base course, unless the Engineer allows otherwise, and no construction or other traffic shall be allowed on the basecourse.

7.11.4. Bitumen Macadam Wearing Course

Bitumen macadam wearing shall be made and laid in accordance with SRN 866 and nominal size of aggregate all as shown on the drawings or stated in the Bill of Quantities. Except where impracticable the bitumen macadam shall be laid using an approved paver. The maximum mixing temperature for Straight run bitumen of penetration 85 - 100 is 155 degrees centigrade. For other penetration bitumen it shall be as determined by the Engineer.

7.11.5. Compaction and Surface Finish

As soon as rolling can be effected without causing undue displacement of the material, and while the material is above the minimum temperature it shall uniformly compacted by an 8 - 10 tonne roller having a width of roll not less than 18 inches.

7.11.6. Preparation of The Base For Surfacing Or Surface Dressing

Before any binder or coating material is applied to a base the latter shall have been freed from all extraneous material by brushing with mechanical sweepers or stiff brooms.

Macadam or murram bases shall normally receive a priming coat in accordance with the following clause.

Concrete, bitumen bound or rolled asphalt bases shall normally receive a tack coat in accordance with the following clause.

7.11.7. Prime Coat and Tack Coat

When a base is to be sealed before surfacing by means of a prime coat, the surface shall first be prepared in accordance with the preceding clause. Unless otherwise stated in the Bill of Quantities or ordered by the Engineer, the prime coat material shall be bitumen grade M.C.O. at a rate of application of 1.2 - 1.5 litre/s.q.m. It shall be applied with a mechanical bitumen distributor complying with the requirements or SRN 935 Binder Distributors for Road Surface Dressing.

The prime coat shall be cured for 48 hours. This period may be relaxed at discretion of the Engineer who shall be informed and shall give his consent before any surfacing works are commenced.

The Contractor shall not permit traffic to run on a prime coat. Where this is unavoidable to the Engineer shall order an application of medium sand at a rate of 6kg./sq.m. which item shall be measured and paid for separately.

Unless otherwise stated in the Bill of Quantities or ordered by the Engineer, the tack coat material shall be approved bitumen emulsion in accordance with SRN866 Bitumen Road Emulsion containing not less than 55 of the bitumen. It shall be mechanically applied at a rate of 0.38 - 0.43 lit./sq.m. The tack coat shall be allowed to cure to a tacky condition and the Engineer's consent obtained before any surfacing works are commenced. Any ponding which has occurred out to bring the coverage within the limits specified.

The contractor shall not permit traffic under any circumstances to run on a coat.

7.11.8. Rolling of Surface Materials

The type and weight of the roller to be employed on each courses of surfacing shall be approved beforehand by the Engineer. Notwithstanding, the Engineer may call for a certified weigh bridge ticket in respect of any roller at any time.

Roller wheels shall always be clean and even. An adequate water tank shall be provided together with a fully operating roller sprinkler system. The roller shall be operated by a man fully trained and experienced in rolling technique.

Rolling shall be generally carried out in a longitudinal direction, working from the edge of superlevated carriageway, from the low to the high side. The second pass should be precisely on the path of the first, before the roller shifts transversely. Heavy drive wheels should approach the freshly laid material. Reversing should be carried out slowly and smoothly and the reversing points staggered across the carriageway to avoid any wave effect. Rolling should be continued until all roll marks are eliminated and there is no perceptible movement under the roller wheels. Idle standing on freshly laid material is not permitted.

If the total of surfacing to be compacted exceeds 3,330 sq.m. per day, the contractor shall provide a second roller. In confined areas where normal rolling is not possible, mechanical tamping will be permitted. The tampers must be employed systematically to give a smooth "as

- rolled" finish. No traffic will be permitted to use a new carriageway at any stage of construction without the written permission of the Engineer.

Notwithstanding any conditions which the Engineer may stipulate at the time of giving his permission of the Engineer. Notwithstanding any condition the Engineer may stipulate at the time of giving his permission, the Contractor will be solely responsible

for maintaining the new carriageway, keeping the surface clean and for making good at his own expense any damage or wear so caused.

7.11.9. Laying Kerbs, Channels and Edging Blocks

Kerbs, channels and edging blocks shall he bedded true to line and level in cement mortar in a concrete foundation class 15nO. They shall he haunched with concrete class 15/20. The foundation and haunch shall be laid before the approved sub-base is laid to the dimensions shown on the drawings.

7.11.10. Preparation of Footpath Formation.

After the excavated of filling has been completed as specified the footpath formation shall be regulated to an even and uniform surface, and compacted with a roller weighing not less than

2.5 tonnes. If any soft places develop in the formation during compaction they shall be excavated and backfilled with approved granular material, levelled and re-compacted.

7.11.11. Precast Concrete Paving

Precast concrete paving slabs shall be to SRN 859 and shall be jointed with 1:3 lime mortar. They shall be laid at a level not exceeding 4mm above the top of the kerb or concrete edging. The joints shall be thoroughly cleaned out and grouted with cement mortar well brushed in and flushed off. No cracked or broken slabs shall be used.

7.11.12. Chasing

Chasing in load - bearing walling for pipes, etc. is to be kept to a minimum size of cut and positions and runs of chases are to approved by the Engineer before any cutting is commenced.

7.11.13. Damp - Proof Courses (Dpc)

Damp - proof courses shall be 1000 gauge polythene free from tears and holes and be laid with 150mm minimum laps on and including a levelling screed of cement mortar.

7.11.14. Bituminous Felt Roofing.

Bituminous felt roofing shall be-carried nut complete by an approved specialist subContractor.

Felt roofing shall be extented in accordance with SRN 936 and strictly in accordance with the manufacturer's instructions, laps shall be 100mm minimum and falls 100 mm in 3 metres for flat roofs and the minimum specification shall be as follows:

a. One layer of asphalt saturated felt (weighing 6.8kg per 10 square metres) laid loose to screed or random and lap nailed to the boarding.
b. One layer of ditto - but weighing 9 kg. Per 10 square metres and bedded to under layer with hot bituminous compound.
c. One layer of white mineral surfaced roofing felt (weighing not less than 23kg. Per 10 square metres) bedded to under layer with compound as last.

7.11.15. Hacking Etc.

The prices for all pavings and plastering, etc., shall include for hacking concrete surfaces and for raking out joints of walls 12mm deep and for cross scoring undercoats to form a proper key.

Plastering on walls generally shall be taken to include flush faces of lintels, beams, etc., in same.

7.12. Surfaces

All surfaces to be paved or plastered must be brushed clean and well wetted before each coat is applied. All cement pavings and plaster shall be kept continually damp in the interval between application of coats and for seven days after the application of the final coat.

7.12.1. Prices for Paving

Prices for paving are to include for adequate covering and protection during the progress of the works to ensure that the floors are handled over in perfect condition on completion.

7.12.2. Polished Terrazo

Polished terrazo shall be laid by an approved sub-Contractor and shall consist of a screed or backing coat and a finishing coat of "snowcrete" and marble chippings (1:2) mixed with "cemantone No. 1" colouring compound in accordance with the manufacturer's instructions in the proportions of 1 kg. Compound to 10kg Cement. Overall thickness is to be as specified.

The finishing coat shall be a minimum of 12mm thick for pavingstrowelled to a smooth and even finish and well embbed and polished with carborundum.

8. TEMPORARY RIVER COFFERDAM FOR IRRIGATION WEIR

8.1. Scope of Works

Provide, construct, maintain and remove a temporary river cofferdam and diversion works to isolate the construction area for an irrigation weir or intake, ensuring safe and dry working conditions throughout the construction period.

8.2. Design Basis (Temporary Works)

The cofferdam shall be designed as temporary works. The minimum design flood shall be Q10 unless otherwise approved. A minimum freeboard of 0.5 m shall be provided above the design water level. The cofferdam shall have a minimum factor of safety of 1.5 against sliding and overturning. Seepage and piping shall be controlled by cut-off trenches, filters, or liners. The Contractor shall submit temporary works drawings and calculations for approval prior to construction.

8.3. Cofferdam Type

The cofferdam type shall be selected based on river width, flow velocity, bed material, and access conditions. Acceptable types include earth/rockfill cofferdams with impervious cores, sandbag or gabion cofferdams with liners, or sheet pile cofferdams where flows or velocities are high.

8.4. Materials

Earth fill for impervious core shall be clayey soil with Plasticity Index not less than 12 and free from organic matter. Rockfill shall be hard, durable, angular stone of size 150–300 mm. Filter material shall be graded sand or gravel complying with filter criteria. Gabions shall be made of galvanized wire not less than 2.7 mm diameter. Sandbags shall be UV-stabilized polypropylene filled with clean sand. HDPE liners, where used, shall be not less than 1.0 mm thick.

8.5. Geometry and Dimensions

The cofferdam crest width shall not be less than 1.5 m for earth or rockfill dams and 1.0 m for gabion dams. Typical upstream slope shall be 1V:2.5H and downstream slope 1V:2H for earth cofferdams. A cut-off trench of minimum 0.6 m depth and width shall

be excavated and keyed into impermeable material. Freeboard shall not be less than 0.5 m.

8.6. Construction Method

The foundation shall be cleared of loose material and a cut-off trench excavated. Fill materials shall be placed in layers not exceeding 200 mm and compacted to at least 95% Modified Proctor Density. Liners or filters shall be installed as specified. Erosion protection shall be provided on the upstream face. The diversion shall be commissioned before closing the cofferdam.

8.7. River Diversion

River diversion shall be by bypass channel, pipes, or pumping. Diversion pipes shall not be less than DN600 unless otherwise approved. Inlet and outlet protection using riprap or gabions shall be provided. Standby pumps shall be provided where pumping is used. Slope stabilization shall comprise the supply of all materials, labour, plant and equipment necessary to prepare, protect and stabilize earth slopes against erosion and failure. The work shall include trimming and compaction of slopes, installation of approved erosion control measures such as stone pitching, rip rap, vegetation or geotextiles, provision of adequate drainage, and maintenance of the completed works to ensure long-term stability and durability in accordance with the drawings, specifications and the Engineer's instructions.

8.8. Slide gates

Slide gates shall be supplied, fabricated, and installed to control water flow in channels or culverts, comprising mild steel or stainless steel gates and frames with rubber or neoprene seals, corrosion protection, and a smooth-operating hand-wheel, gear, or motorized mechanism. Gates shall fit accurately in prepared recesses, allow free movement, provide watertight closure, and be tested for full-load operation, with all materials and workmanship durable and compliant with relevant standards.

8.9. Water meters installations

Provide, handle, install, test and commission a **100 mm diameter double-flanged water meter** suitable for installation on a **100 mm steel pipeline**, complete with all necessary bolts, nuts, gaskets, flanges, supports and accessories. The meter shall be of the specified type (electromagnetic, ultrasonic or Woltman turbine), comply with **ISO 16399**, **ISO 4064/OIML R49**, or approved equivalent standards, and have a

minimum **PN16** pressure rating. Installation shall be carried out in accordance with the manufacturer's recommendations, including the provision of adequate upstream and downstream straight pipe lengths and isolation valves where specified. The meter shall be factory calibrated and tested for accuracy, leak-tightness and proper operation before commissioning, with calibration certificates submitted to the Engineer.

8.10. Pump provision structures

The structures are intended to provide designated and structurally sound abstraction points for the future installation of irrigation pumps. The works shall include excavation, foundation preparation, reinforced concrete construction, installation of embedded fittings and pump connection provisions, backfilling, and reinstatement of disturbed areas. All works shall be executed in accordance with the contract drawings, technical specifications, and the Engineer's instructions to ensure safe, durable, and efficient operation of the irrigation scheme.

8.11. Calibrated galvanized steel staff (head) gauges

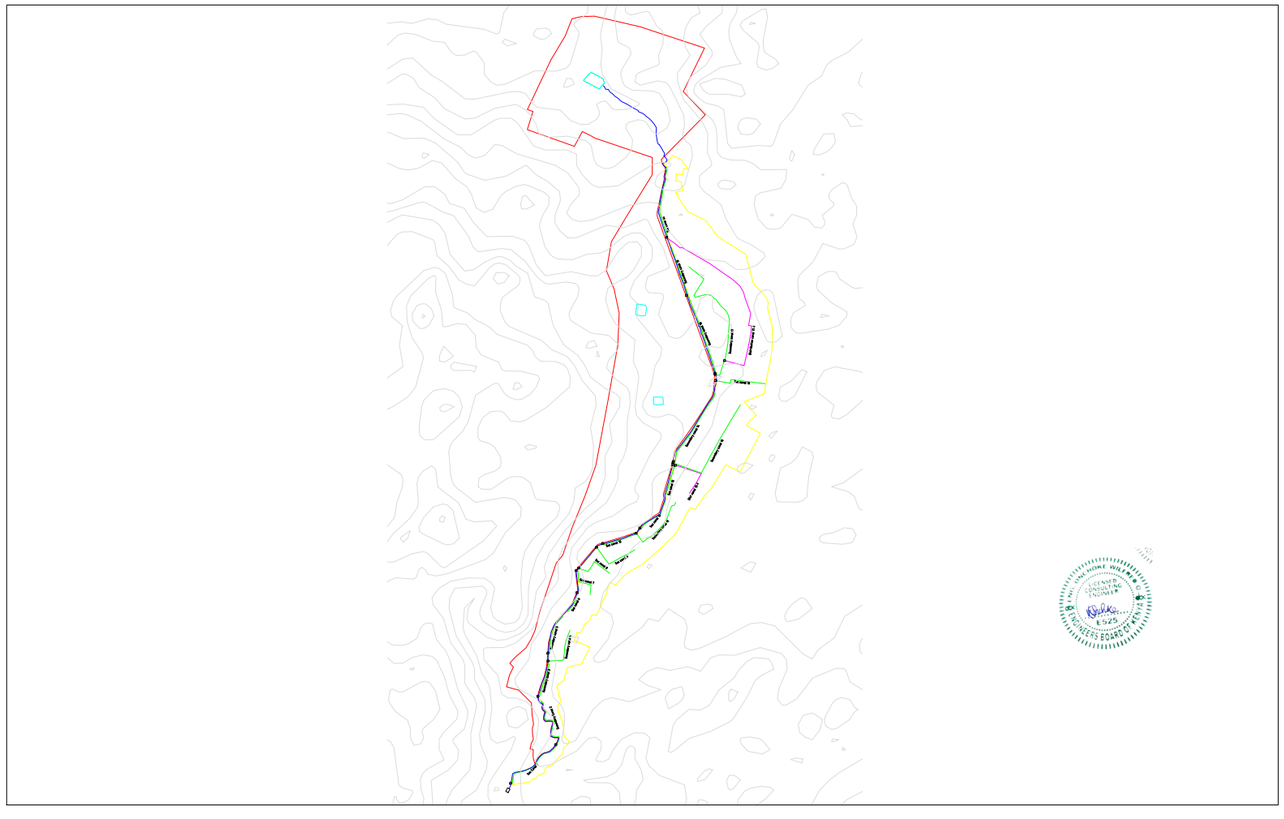
This specification covers the supply, installation, and calibration of galvanized steel staff (head) gauges at water distribution structures for accurate water level measurement and operational control within the irrigation scheme.

The staff gauge shall be manufactured from hot-dip galvanized steel with permanent, clearly legible metric graduations and shall be securely mounted in a vertical position using corrosion-resistant fixings. The gauge shall be aligned with the approved hydraulic datum, calibrated to ensure accurate water level measurements, and tested before commissioning. The Contractor shall provide all materials, labour, fittings, calibration, testing, and incidental works necessary for a complete, durable, and operational installation.

COUNTY GOVERNMENT OF KAJIADO

NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT
(NAVCDP)

PROPOSED REHABILITATION OF ISINET - KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI / ESELENKEI WARD, KAJIADO SOUTH SUB-COUNTY.



VOLUME III - BOOK OF DRAWINGS

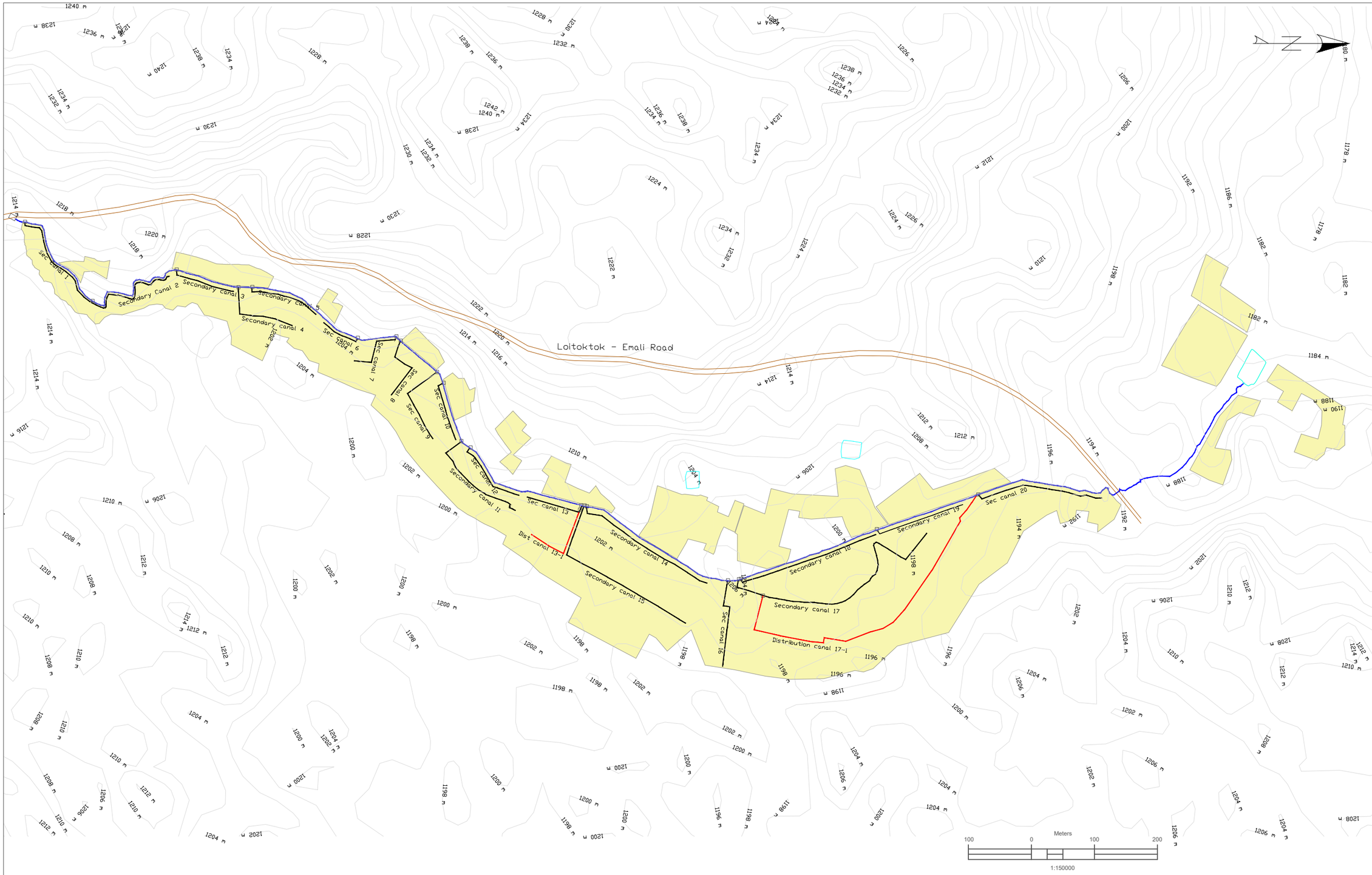
June 2026

DETAILED DESIGN DRAWING LIST

DRAWING No	DRAWING DESCRIPTION	SHEETS
	LAYOUT DRAWINGS	
ISI/DFR/101	Topography and Contour Map	1
ISI/DFR/102	Scheme Blocking and Canal Network	1
ISI/DFR/103	Cadatral Maps and Block Farms	1
	HEADWORKS	
ISI/DFR/201	Proposed Intake Layout Plan	1
ISI/DFR/202	Intake - General Arrangement	3
ISI/DFR/203	Pipe Outlet Structure	1
ISI/DFR/204	Structural & Reinforcement Details	4
ISI/DFR/205	Bar Bending Schedule	1
	MAIN CANAL PROFILES	
ISI/DFR/301	Main Canal (MC)	6
	SECONDARY CANAL PROFILES	
ISI/DFR/401	Secondary Canal 1	1
ISI/DFR/402	Secondary Canal 2	1
ISI/DFR/403	Secondary canal 3	1
ISI/DFR/404	Secondary canal 4	1
ISI/DFR/405	Secondary canal 5	1
ISI/DFR/406	Secondary canal 6	1
ISI/DFR/407	Secondary Canal 7	1
ISI/DFR/408	Secondary Canal 8	1
ISI/DFR/409	Secondary canal 9	1
ISI/DFR/410	Secondary canal 10	1
ISI/DFR/411	Secondary canal 11	1
ISI/DFR/412	Secondary canal 12	1
ISI/DFR/413	Secondary Canal 13	1
ISI/DFR/414	Secondary Canal 14	1
ISI/DFR/415	Secondary canal 15	1
ISI/DFR/416	Secondary canal 16	1

DRAWING No	DRAWING DESCRIPTION	SHEETS
ISI/DFR/417	Secondary Canal 17	1
ISI/DFR/418	Secondary canal 18	1
ISI/DFR/419	Secondary Canal 19	1
ISI/DFR/420	Secondary Canal 20	1
	DISTRIBUTION CANAL PROFILES	
ISI/DFR/501	Distribution Canal 13-1	1
ISI/DFR/502	Distribution Canal 17-1	2
	CANAL STRUCTURES	
ISI/DFR/601	Division Box	1
ISI/DFR/602	Ring Culvert	1
ISI/DFR/603	Footbridge	2
ISI/DFR/604	Cattle Trough	1
ISI/DFR/605	Slide Gate	1
ISI/DFR/606	Pump Provision Structure	1
	SANITATION FACILITIES	
ISI/DFR/701	Toilet/ Latrine Facility	1

DRAWING No	DRAWING DESCRIPTION	SHEETS



Canal	Length (m)
Secondary 1	577
Secondary 2	565
Secondary 3	322
Secondary 4	423
Secondary 5	374
Secondary 6	206
Secondary 7	314
Secondary 8	375
Secondary 9	461
Secondary 10	306
Secondary 11	594
Secondary 12	379
Secondary 13	275
Distribution 13-1	463
Secondary 14	743
Secondary 15	979
Secondary 16	480
Secondary 17	1360
Distribution 17-1	1753
Secondary 18	745
Secondary 19	466
Secondary 20	657

Datum: Arc1960
Projection: UTM
Zone: 37M

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

TOPOGRAPHY & CONTOUR MAP

DWG. No. ISI/DFR/101

Sheet No. 1/1

Designed:	A.M	Date:	23RD/SEPT/2025
Drawn:	A.M	Date:	23RD/SEPT/2025
Checked:	ENG. W. ONCHOKE	Date:	23RD/SEPT/2025
Approved:	ENG. J. KIMANI	Date:	23RD/SEPT/2025



LEGEND

- Main Canal
- Sec Canal
- Dist Canal
- (pf) Pump-fed
- Water Pan
- Irrigation blocks
- Road

Canal	Length (m)
Secondary 1	577
Secondary 2	565
Secondary 3	322
Secondary 4	423
Secondary 5	374
Secondary 6	206
Secondary 7	314
Secondary 8	375
Secondary 9	461
Secondary 10	306
Secondary 11	594
Secondary 12	379
Secondary 13	275
Distribution 13-1	463
Secondary 14	743
Secondary 15	979
Secondary 16	480
Secondary 17	1360
Distribution 17-1	1753
Secondary 18	745
Secondary 19	466
Secondary 20	657

Datum: Arc1960
Projection: UTM
Zone: 37M

Meters
100 0 100 200
1:150000

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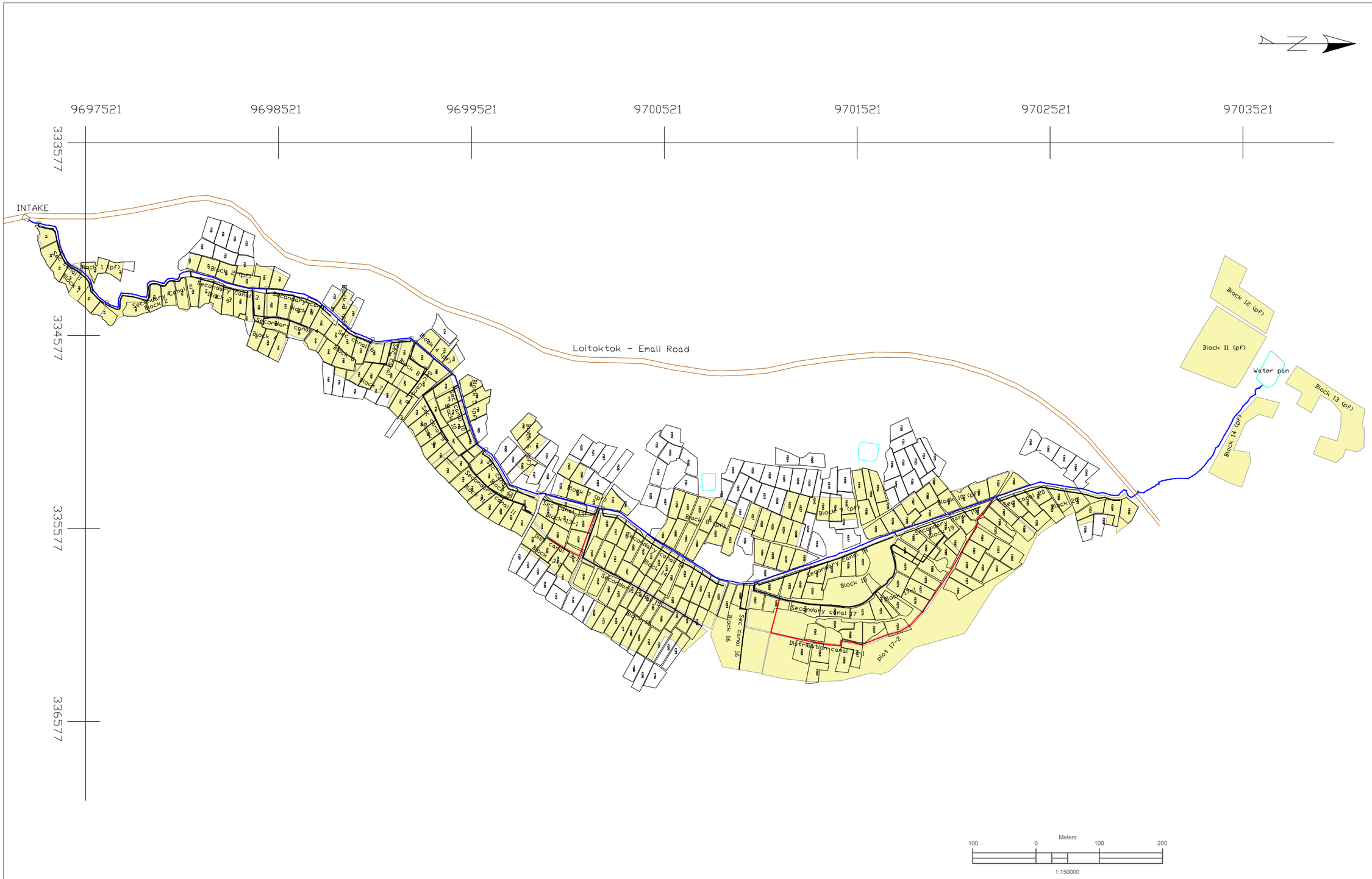
TITLE OF DRAWING:

SCHEME BLOCKING & CANAL NETWORK

DWG. No. ISI/DFR/102

Sheet No. 1/1

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Approved: ENG. J. KIMANI	Date: 23RD/SEPT/2025		



LEGEND

- Main Canal
- Sec Canal
- Dist Canal
- Road
- (pf) Pump-fed
- Water Pan
- Irrigation Area
- 2 acre plots

Canal	Length (m)
Secondary 1	577
Secondary 2	565
Secondary 3	322
Secondary 4	423
Secondary 5	374
Secondary 6	206
Secondary 7	314
Secondary 8	375
Secondary 9	461
Secondary 10	306
Secondary 11	594
Secondary 12	379
Secondary 13	275
Distribution 13-1	463
Secondary 14	743
Secondary 15	979
Secondary 16	480
Secondary 17	1360
Distribution 17-1	1753
Secondary 18	745
Secondary 19	466
Secondary 20	657

Datum: Arc1960
Projection: UTM
Zone: 37M

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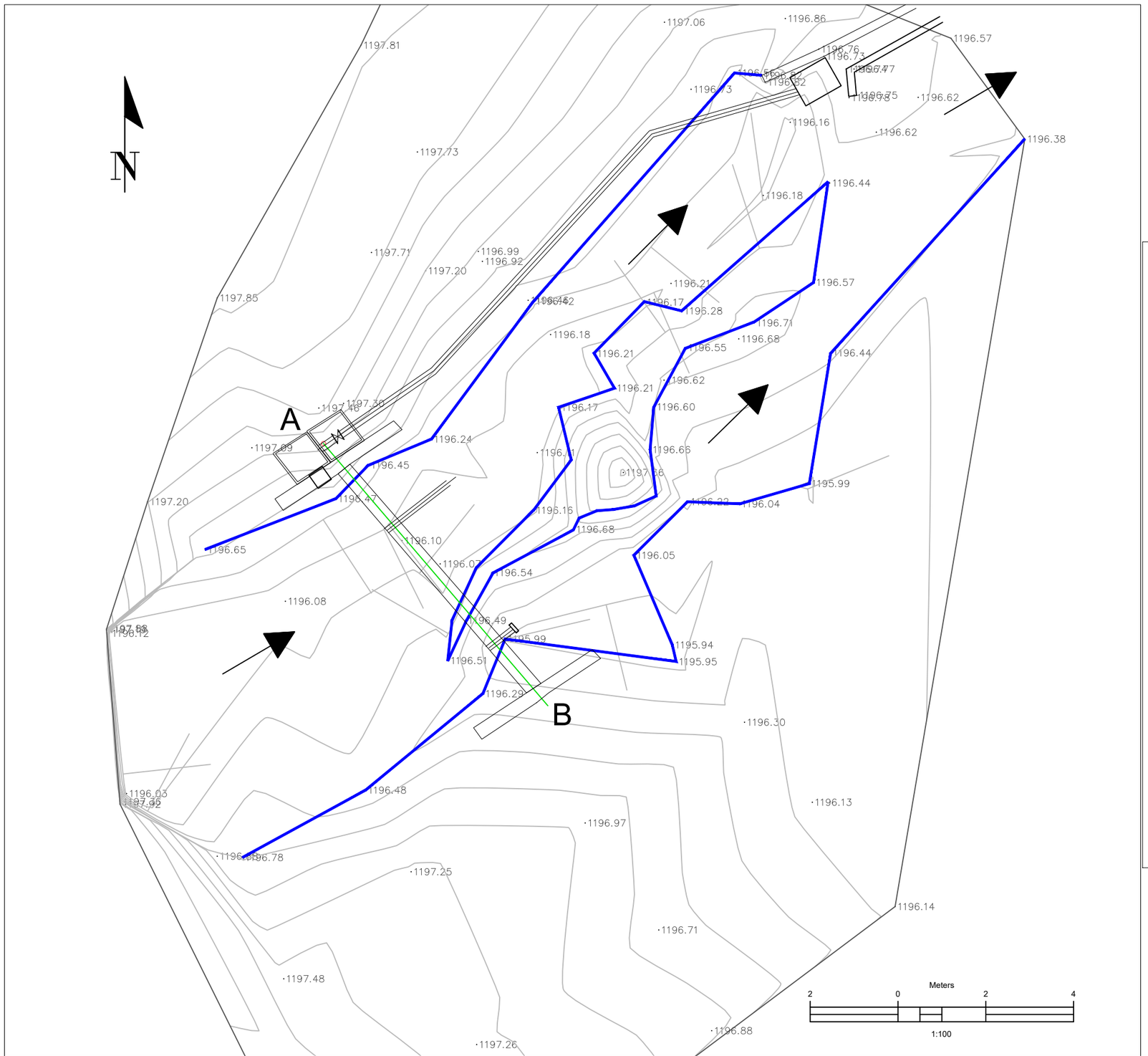
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CADASTRAL MAP & BLOCK FARMS

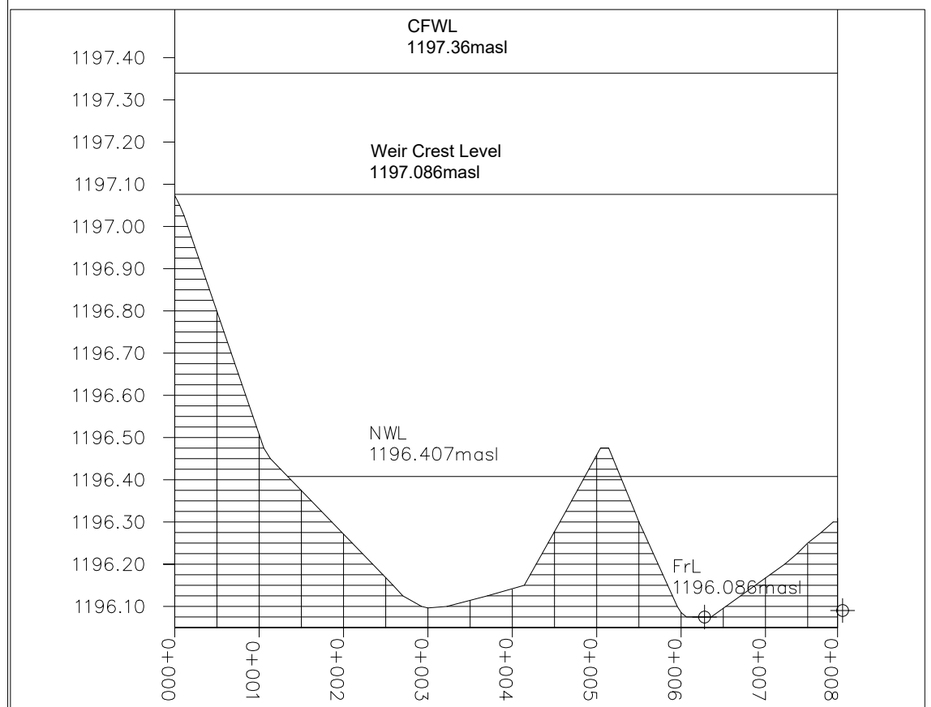
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Sheet No. 1/1

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INTAKE LAYOUT AND WEIR PROFILE



CFWL: Culvert Flood Water Level

NWL: Normal Water Level

FrL: Floor Level

DATUM: Arc1960
PROJECTION: UTM
ZONE: 37M

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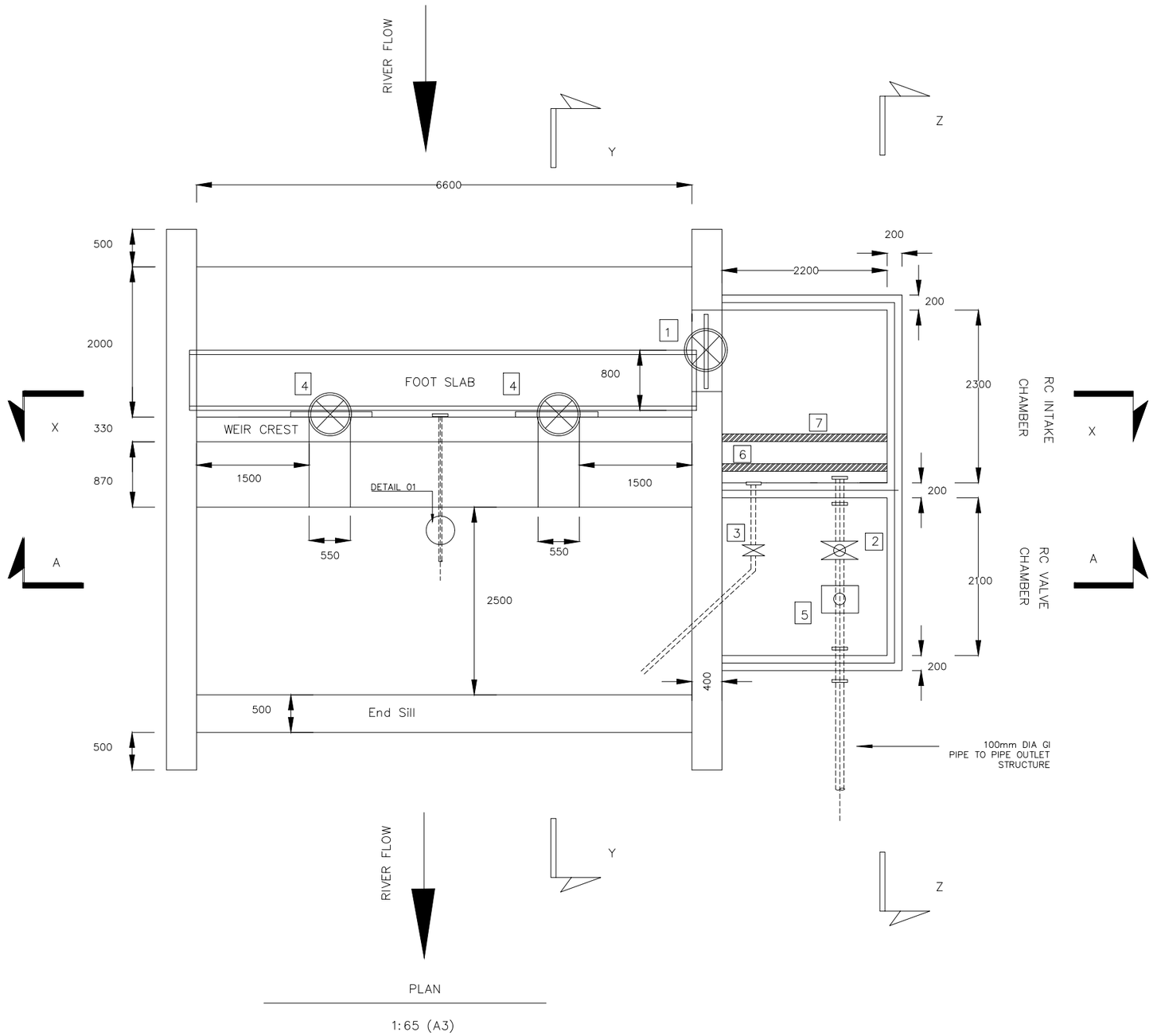
PROPOSED INTAKE LAYOUT PLAN

DWG. No. ISI/DFR/201

Sheet No. 1/1

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PART	DESCRIPTION
1	INTAKE GATE
2	100MM SLUICE VALVE
3	50mm SCOURE VALVE/PIPE
4	SLUICE WAY / GATE
5	WATER METER TO FIT DN 100MM PIPE
6	FINE SCREEN
4	COARSE SCREEN



PLAN

1:65 (A3)

No.	APPROVAL	DATE	REFERENCE

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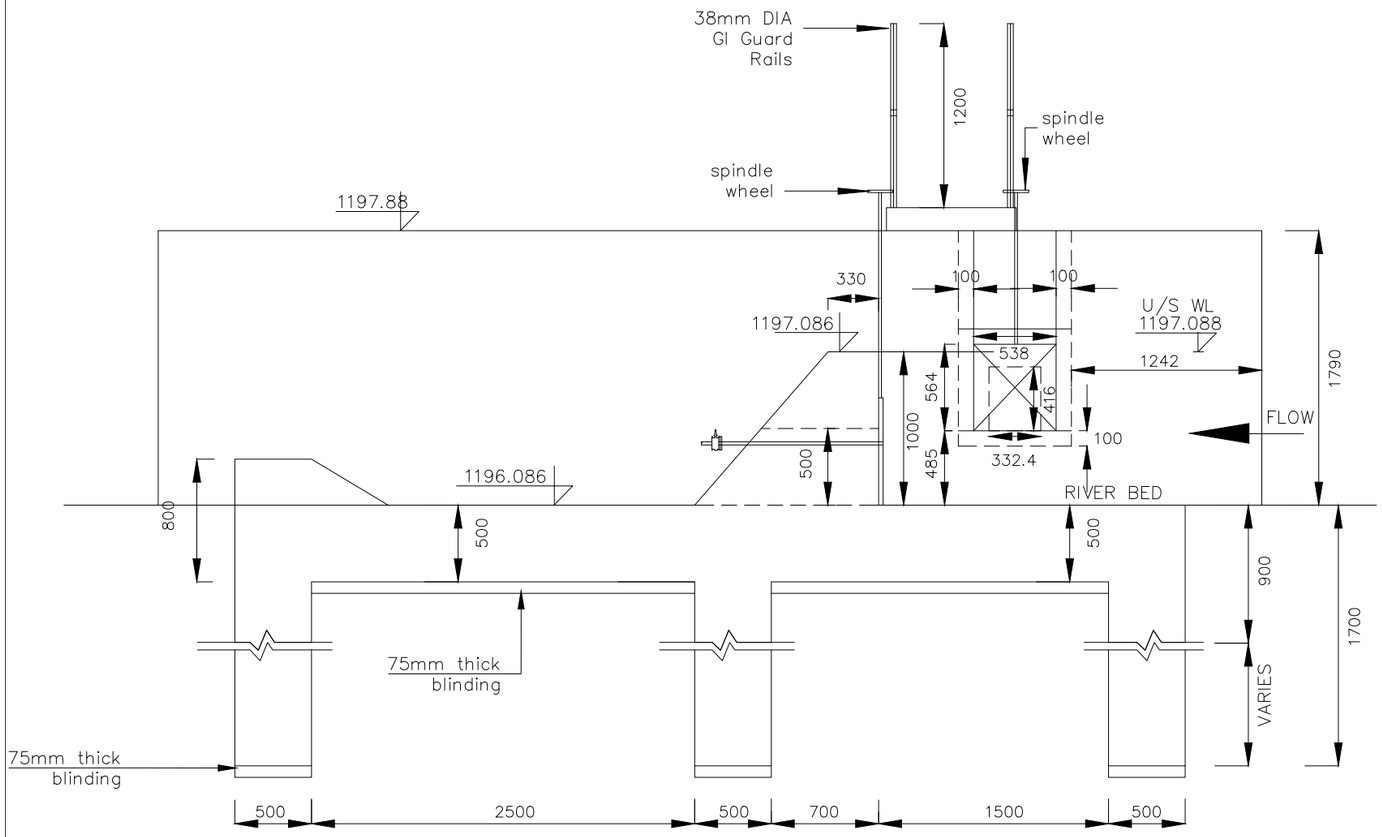
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INTAKE – GENERAL ARRANGEMENT

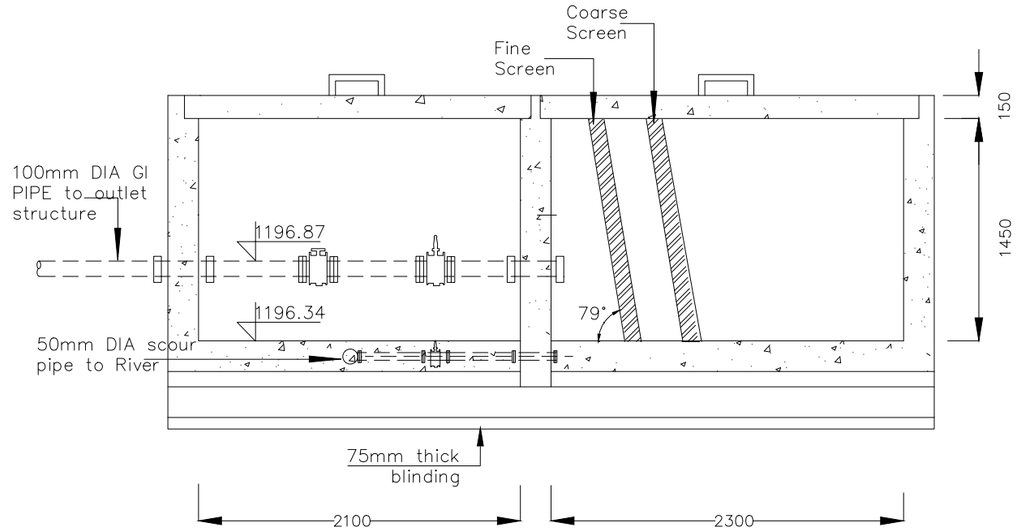
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Sheet No. 1/3

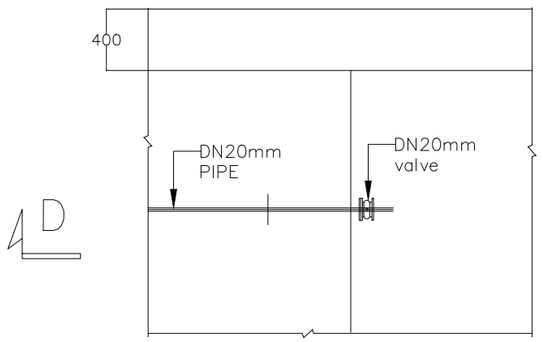
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Approved: ENG. W. ONCHOKE	Date: 17TH/JUNE/2026	



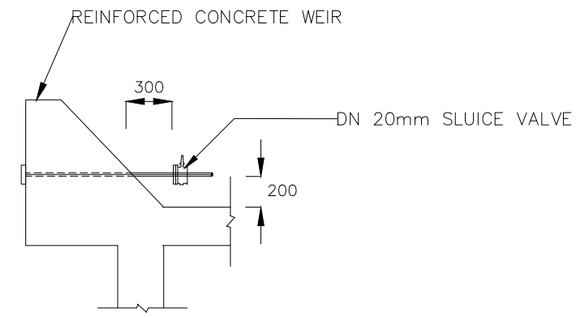
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SECTION Z – Z
1:40 (A3)



DETAIL '01'
NDTS



SECTION D – D
NDTS

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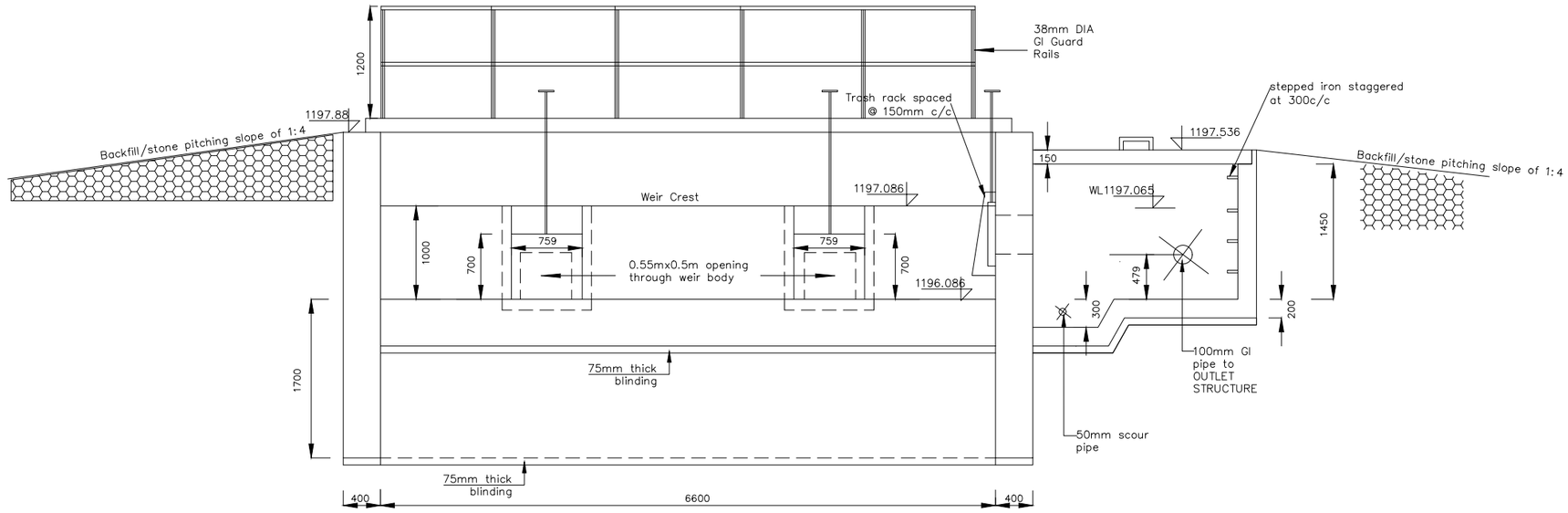
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DWG. No. ISI/DFR/202

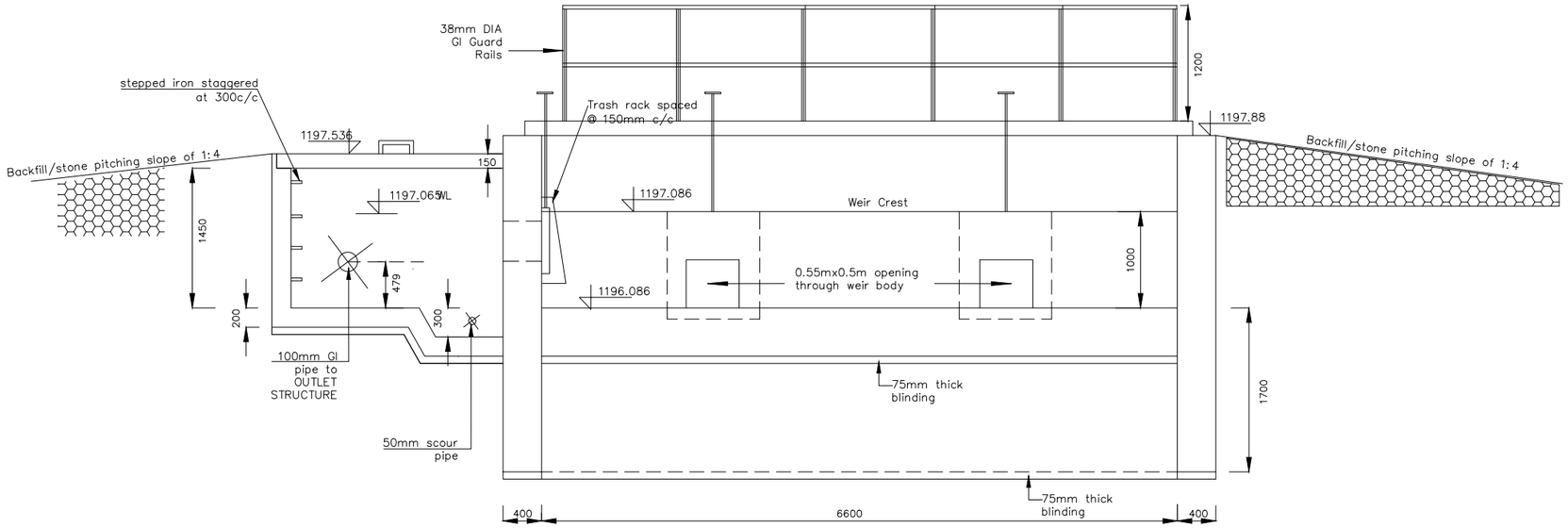
Sheet No. 2/3

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SECTION X – X

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SECTION A – A

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TITLE OF DRAWING:

INTAKE – GENERAL ARRANGEMENT

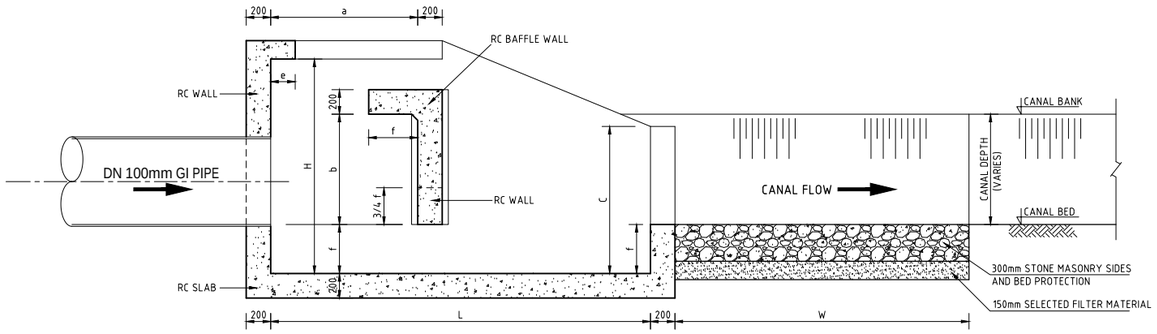
DWG. No. ISI/DFR/202

Sheet No. 3/3

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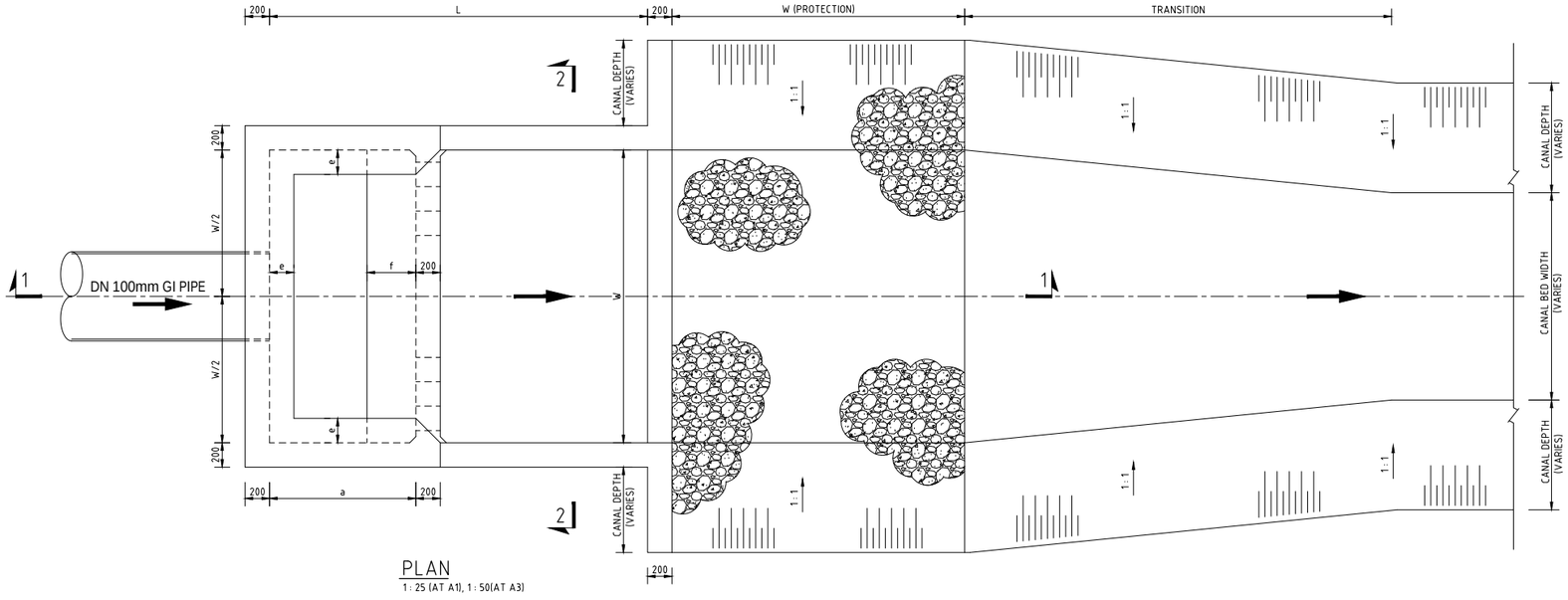
OUTLET STRUCTURE SCHEDULES

LINE	Chainage	Dia (mm)	W	H	a	b	c	L	f	e
INTAKE CHAMBER PIPELINE	13	110	400	350	250	170	700	1200	300	50



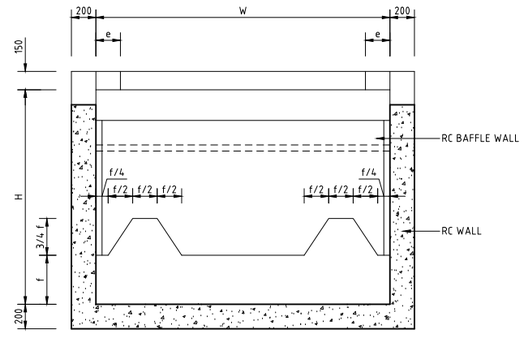
SECTION 1-1

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PLAN

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SECTION 2-2

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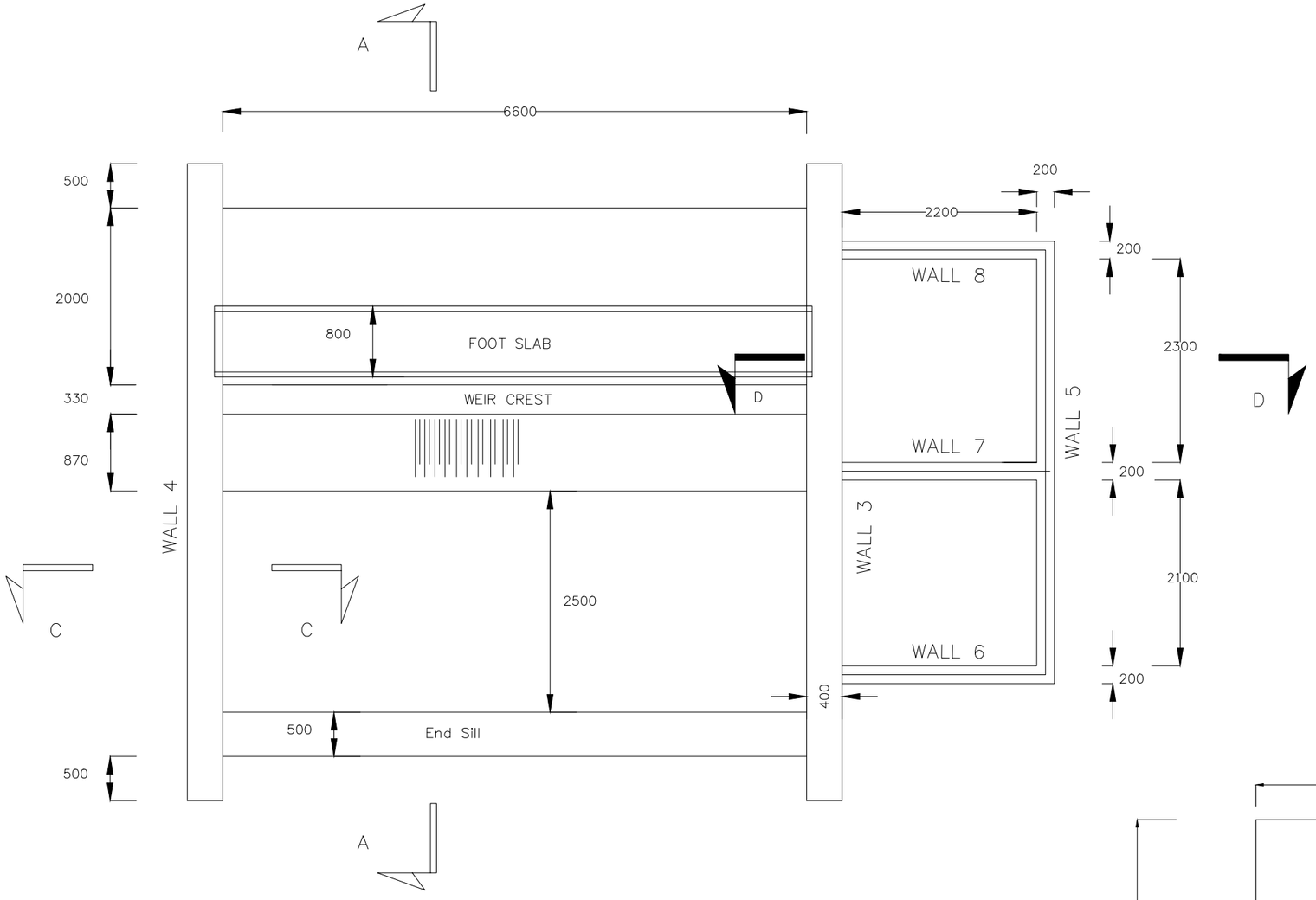
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PIPE OUTLET STRUCTURE

DWG. No. ISI/DFR/203

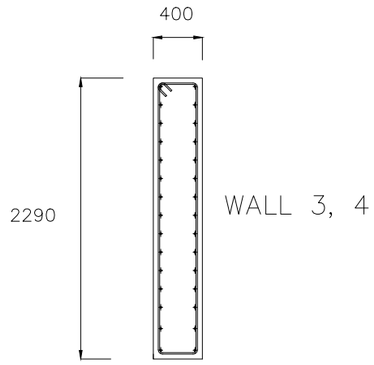
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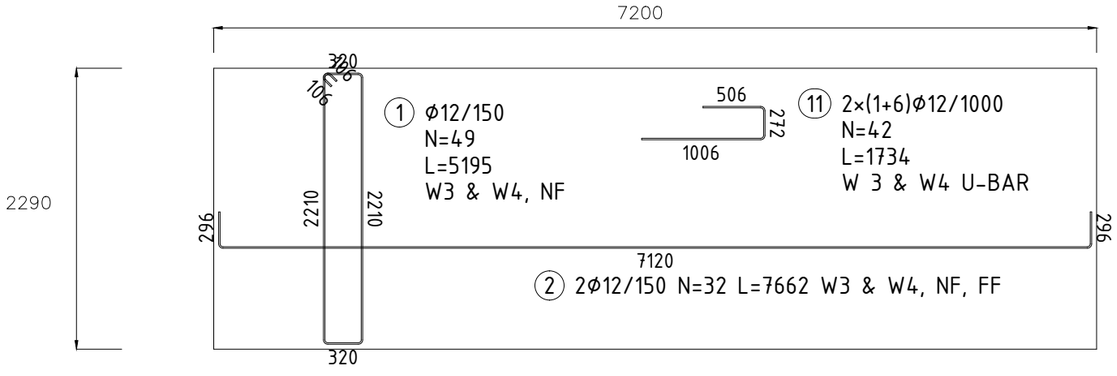
PLAN

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Section C–C

1:50 (A3)



W 3 & 4

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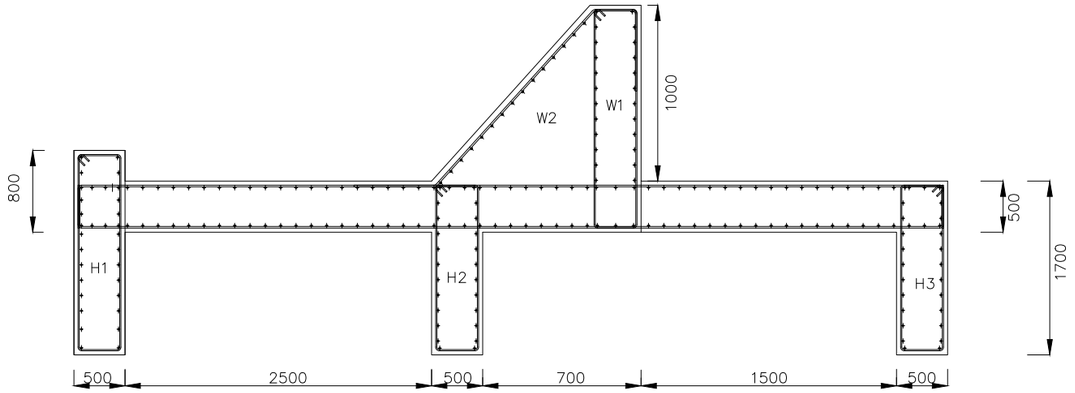
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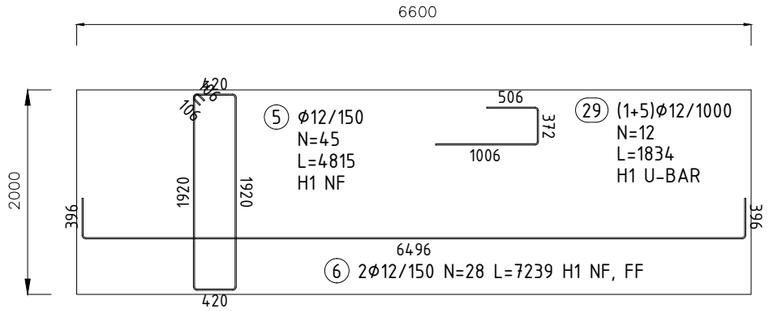
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Drawn: A.M	Date: 20TH/JUNE/2026		
Checked: P.O	Date: 20TH/JUNE/2026		
Approved: ENG. W. ONCHOKE	Date: 20TH/JUNE/2026		

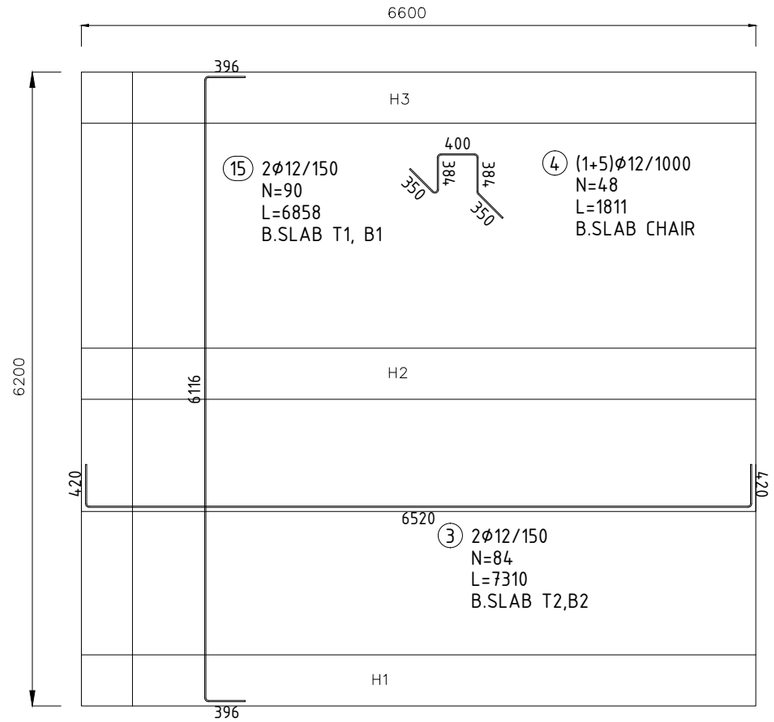


SECTION A – A

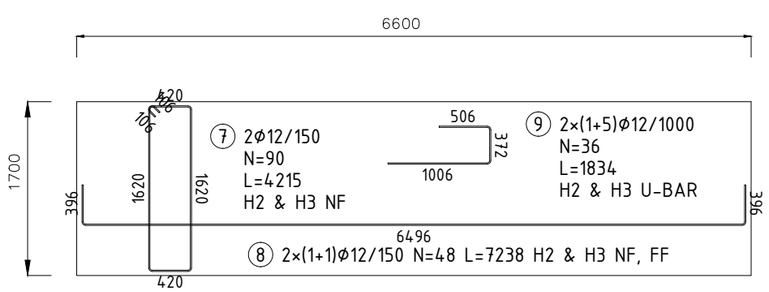
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HEEL 1 (H1) 1:60 (A3)



BASE SLAB
1:60 (A3)



HEELS 2 & 3 (H2 & H3) 1:60 (A3)

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

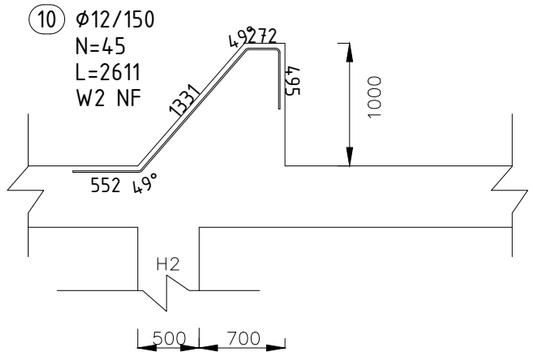
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STRUCTURAL REINFORCEMENT DETAIL

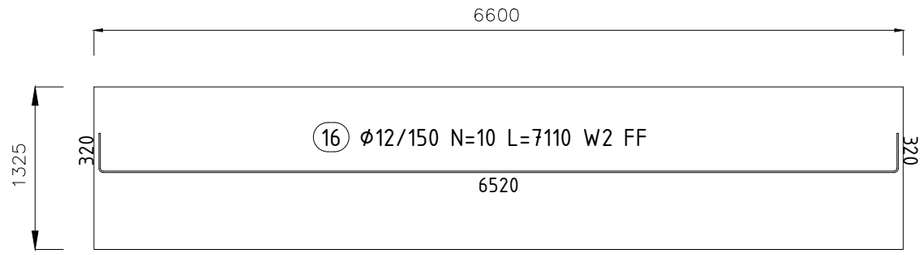
DWG. No. ISI/DFR/204

Sheet No. 2/4

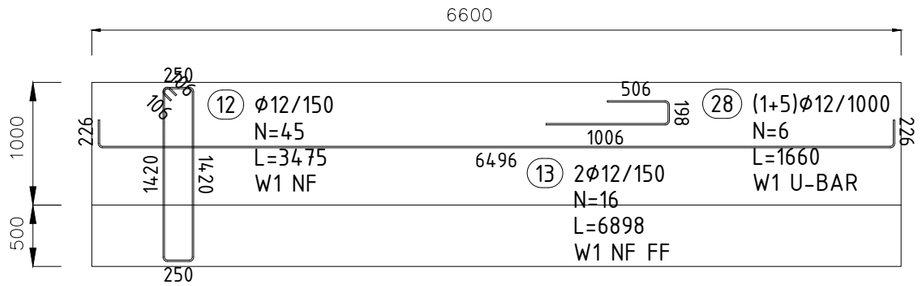
Designed: A.M	Date: 20TH/JUNE/2026	
Drawn: A.M	Date: 20TH/JUNE/2026	
Checked: P.O	Date: 20TH/JUNE/2026	
Approved: ENG. W. ONCHOKE	Date: 20TH/JUNE/2026	



WALL 2 (W2 – NF) 1:50 (A3)



WALL 2 (W2 – FF) 1:50 (A3)



WALL 1 (W1) 1:50 (A3)

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

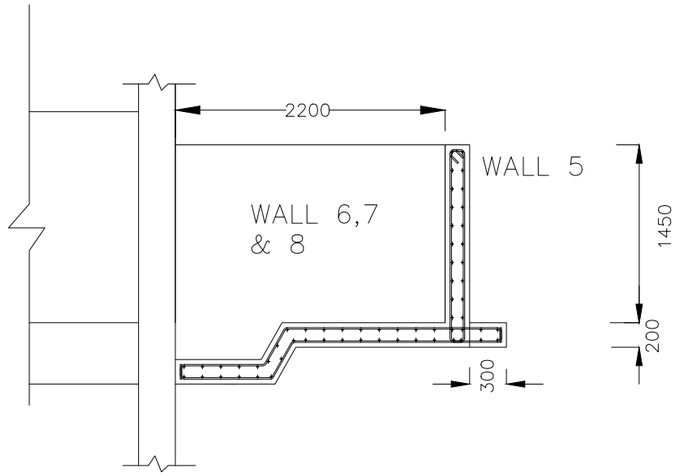
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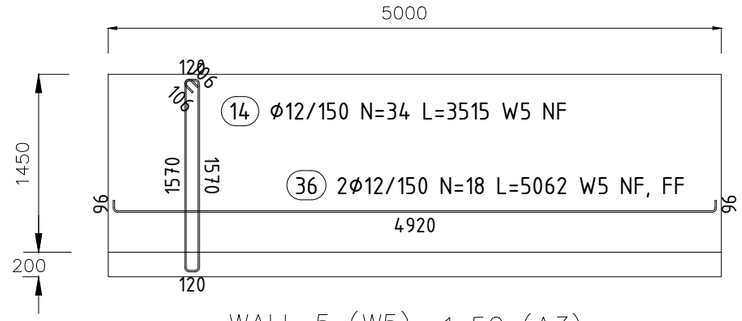
DWG. No. ISI/DFR/204

Sheet No. 3/4

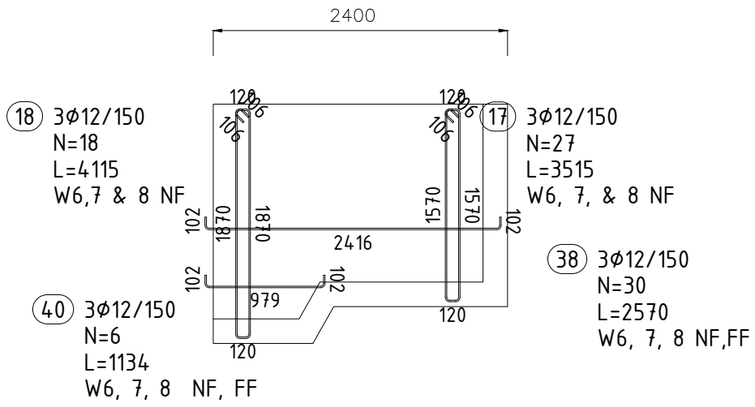
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Drawn: A.M	Date: 20TH/JUNE/2026	
Checked: P.O	Date: 20TH/JUNE/2026	
Approved: ENG. W. ONCHOKE	Date: 20TH/JUNE/2026	



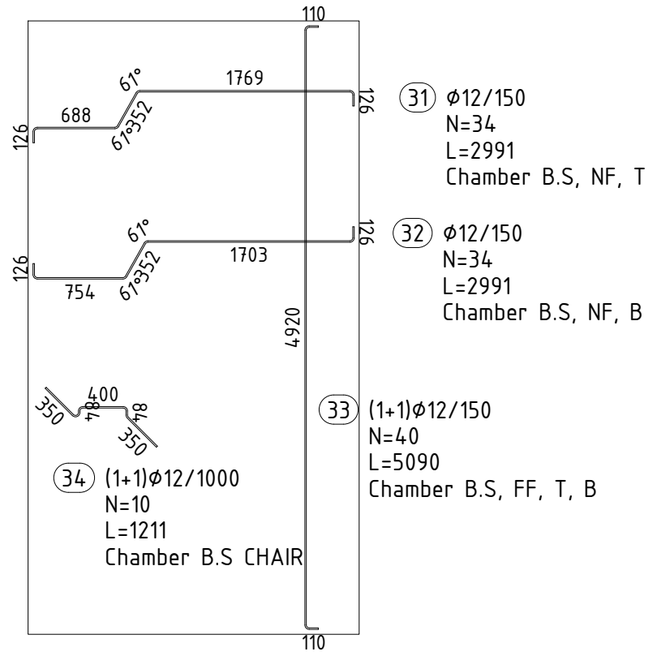
SECTION D – D
1:50 (A3)



WALL 5 (W5) 1:50 (A3)



WALL 6, 7 & 8
1:50 (A3)



Chamber Base
Slab (BS)
1:50 (A3)

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

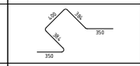
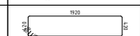
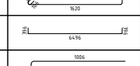
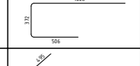
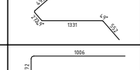
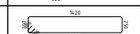
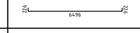
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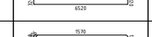
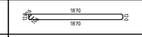
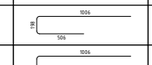
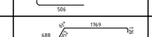
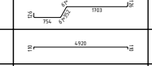
STRUCTURAL REINFORCEMENT DETAIL

DWG. No. ISI/DFR/204

Sheet No. 4/4

Designed:	A.M	Date:	20TH/JUNE/2026
Drawn:	A.M	Date:	20TH/JUNE/2026
Checked:	P.O	Date:	20TH/JUNE/2026
Approved:	ENG. W. ONCHOKE	Date:	20TH/JUNE/2026

Mark	Mark	Grade	Dia [mm]	Bending shape [mm]	Cutting length [mm]	Mass of each bar [kg]	Total number	Total length [mm]	Total mass [kg]	%	Note
①	①	B450C	12		5195	4.61	49	254542	225.99	5.7%	W3 & W4, NF
②	②	B450C	12		7662	6.8	32	245177	217.67	5.5%	W3 & W4, NF, FF
③	③	B450C	12		7310	6.49	84	614061	545.17	13.7%	B.SLAB T2,B2
④	④	B450C	12		1811	1.61	48	86912	77.16	1.9%	B.SLAB CHAIR
⑤	⑤	B450C	12		4815	4.27	45	216663	192.36	4.8%	H1 NF
⑥	⑥	B450C	12		7239	6.43	28	202683	179.94	4.5%	H1 NF, FF
⑦	⑦	B450C	12		4215	3.74	90	379327	336.77	8.5%	H2 & H3 NF
⑧	⑧	B450C	12		7238	6.43	48	347436	308.46	7.8%	H2 & H3 NF, FF
⑨	⑨	B450C	12		1834	1.63	36	66023	58.62	1.5%	H2 & H3 U-BAR
⑩	⑩	B450C	12		2611	2.32	45	117509	104.33	2.6%	W2 NF
⑪	⑪	B450C	12		1734	1.54	42	72838	64.67	1.6%	W 3 & W4 U-BAR
⑫	⑫	B450C	12		3475	3.08	45	156363	138.82	3.5%	W1 NF
⑬	⑬	B450C	12		6898	6.12	16	110372	97.99	2.5%	W1 NF FF
⑭	⑭	B450C	12		3515	3.12	34	119501	106.09	2.7%	W5 NF
⑮	⑮	B450C	12		6858	6.09	90	617235	547.99	13.8%	B.SLAB T1, B1

Mark	Mark	Grade	Dia [mm]	Bending shape [mm]	Cutting length [mm]	Mass of each bar [kg]	Total number	Total length [mm]	Total mass [kg]	%	Note
⑮	⑮	B450C	12		6858	6.09	90	617235	547.99	13.8%	B.SLAB T1, B1
⑯	⑯	B450C	12		7110	6.31	10	71102	63.13	1.6%	W2 FF
⑰	⑰	B450C	12		3515	3.12	27	94898	84.25	2.1%	W6, 7, & 8 NF
⑱	⑱	B450C	12		4115	3.65	18	74065	65.76	1.7%	W6,7 & 8 NF
㉘	㉘	B450C	12		1660	1.47	6	9959	8.84	0.2%	W1 U-BAR
㉙	㉙	B450C	12		1834	1.63	12	22008	19.54	0.5%	H1 U-BAR
㉛	㉛	B450C	12		2991	2.66	34	101682	90.27	2.3%	Chamber B.S, NF, T
㉜	㉜	B450C	12		2991	2.66	34	101682	90.27	2.3%	Chamber B.S, NF, B
㉝	㉝	B450C	12		5090	4.52	40	203610	180.77	4.6%	Chamber B.S, FF, T, B
㉞	㉞	B450C	12		1211	1.07	10	12107	10.75	0.3%	Chamber B.S CHAIR
㊱	㊱	B450C	12		5062	4.49	18	91121	80.9	2%	W5 NF, FF
㊳	㊳	B450C	12		2570	2.28	30	77107	68.46	1.7%	W6, 7, 8 NF,FF
㊵	㊵	B450C	12		1134	1.01	6	6802	6.04	0.2%	W6, 7, 8 NF, FF
Total mass = 3971 kg											

Grade	Dia [mm]	Total length [mm]	Total mass [kg]
B450C	12	4472786	3971

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

BAR BENDING SCHEDULE

DWG. No. ISI/DFR/205

Sheet No. 1/1

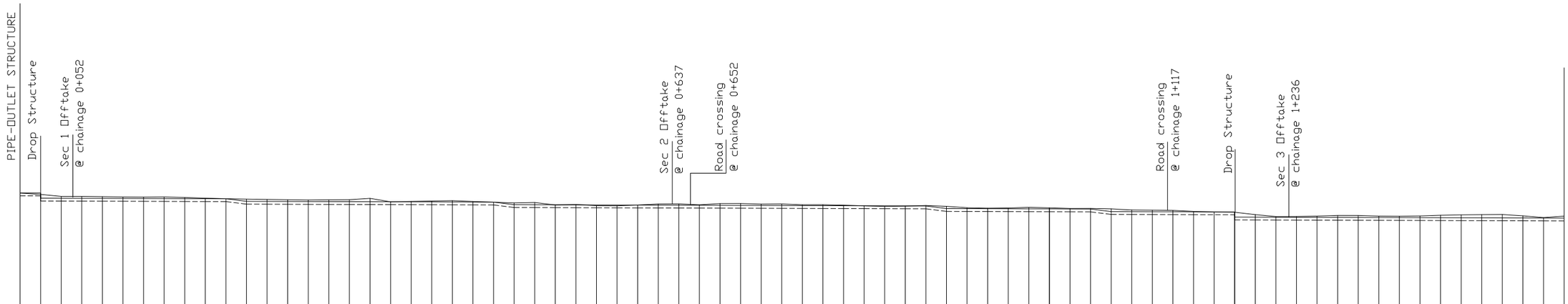
Designed: A.M	Date: 20TH/JUNE/2026		
Drawn: A.M	Date: 20TH/JUNE/2026		
Checked: P.O	Date: 20TH/JUNE/2026		
Approved: ENG. W. ONCHOKE	Date: 20TH/JUNE/2026		

LEGEND

- Canal Base
- Canal Bank
- Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM
1150 m amsl

| CHAINAGE (m) | 000.00 | 020.00 | 040.00 | 060.00 | 080.00 | 100.00 | 120.00 | 140.00 | 160.00 | 180.00 | 200.00 | 220.00 | 240.00 | 260.00 | 280.00 | 300.00 | 320.00 | 340.00 | 360.00 | 380.00 | 400.00 | 420.00 | 440.00 | 460.00 | 480.00 | 500.00 | 520.00 | 540.00 | 560.00 | 580.00 | 600.00 | 620.00 | 640.00 | 660.00 | 680.00 | 700.00 | 720.00 | 740.00 | 760.00 | 780.00 | 800.00 | 820.00 | 840.00 | 860.00 | 880.00 | 900.00 | 920.00 | 940.00 | 960.00 | 980.00 | 1000.00 | 1020.00 | 1040.00 | 1060.00 | 1080.00 | 1100.00 | 1120.00 | 1140.00 | 1160.00 | 1180.00 | 1200.00 | 1220.00 | 1240.00 | 1260.00 | 1280.00 | 1300.00 | 1320.00 | 1340.00 | 1360.00 | 1380.00 | 1400.00 | 1420.00 | 1440.00 | 1460.00 | 1480.00 | 1500.00 |
|---|---|---

LEGEND

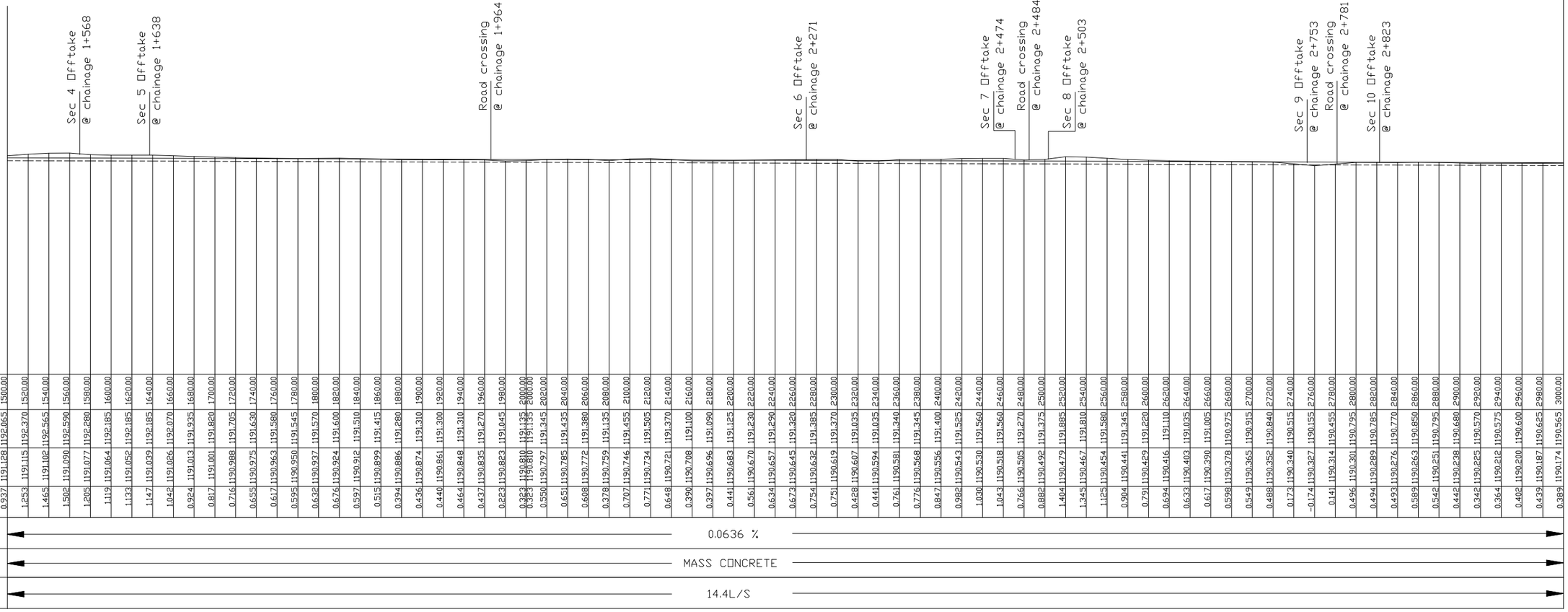
Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



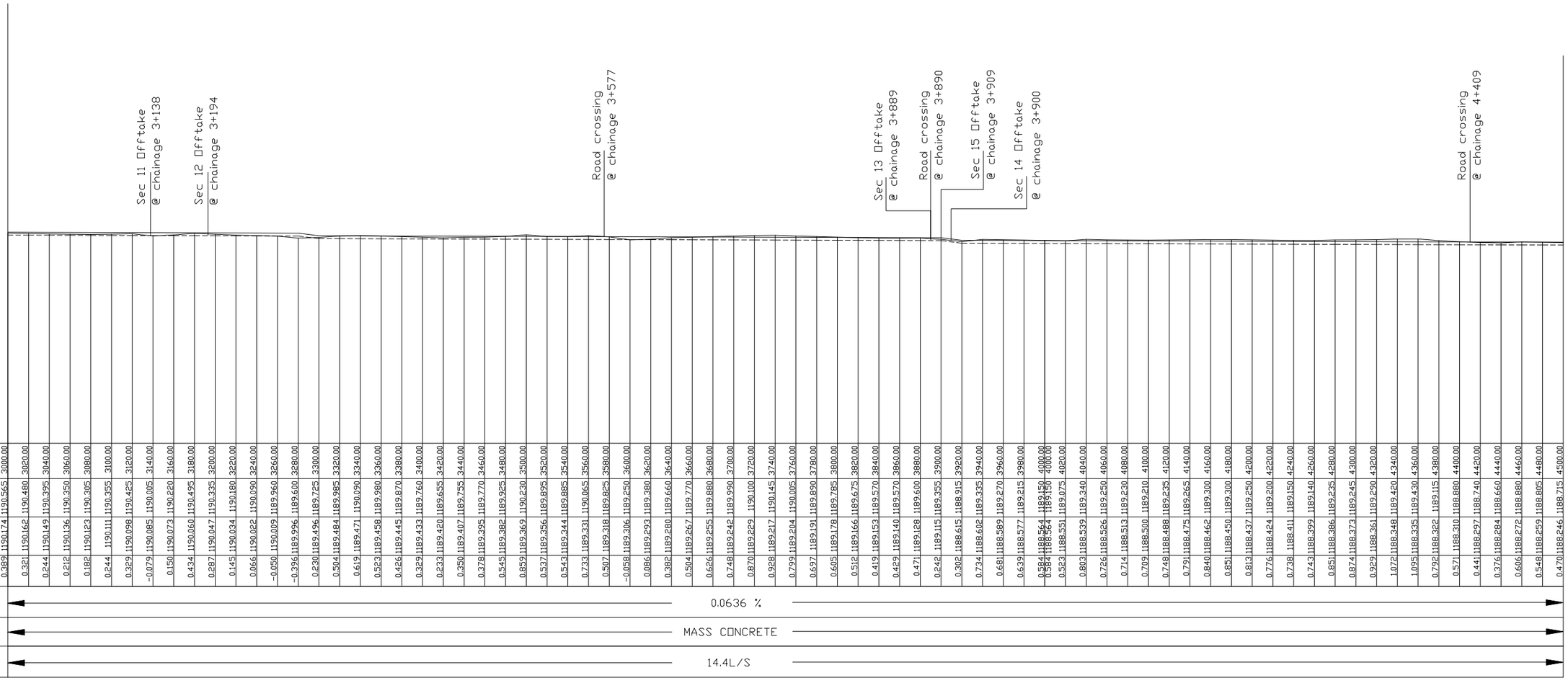
| | | |

LEGEND

- Canal Base
- Canal Bank
- Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM 1150 m amsl

| CHAINAGE (m) | 3000.00 | 3020.00 | 3040.00 | 3060.00 | 3080.00 | 3100.00 | 3120.00 | 3140.00 | 3160.00 | 3180.00 | 3200.00 | 3220.00 | 3240.00 | 3260.00 | 3280.00 | 3300.00 | 3320.00 | 3340.00 | 3360.00 | 3380.00 | 3400.00 | 3420.00 | 3440.00 | 3460.00 | 3480.00 | 3500.00 | 3520.00 | 3540.00 | 3560.00 | 3580.00 | 3600.00 | 3620.00 | 3640.00 | 3660.00 | 3680.00 | 3700.00 | 3720.00 | 3740.00 | 3760.00 | 3780.00 | 3800.00 | 3820.00 | 3840.00 | 3860.00 | 3880.00 | 3900.00 | 3920.00 | 3940.00 | 3960.00 | 3980.00 | 4000.00 | 4020.00 | 4040.00 | 4060.00 | 4080.00 | 4100.00 | 4120.00 | 4140.00 | 4160.00 | 4180.00 | 4200.00 | 4220.00 | 4240.00 | 4260.00 | 4280.00 | 4300.00 | 4320.00 | 4340.00 | 4360.00 | 4380.00 | 4400.00 | 4420.00 | 4440.00 | 4460.00 | 4480.00 | 4500.00 |
|---|---|---

LEGEND

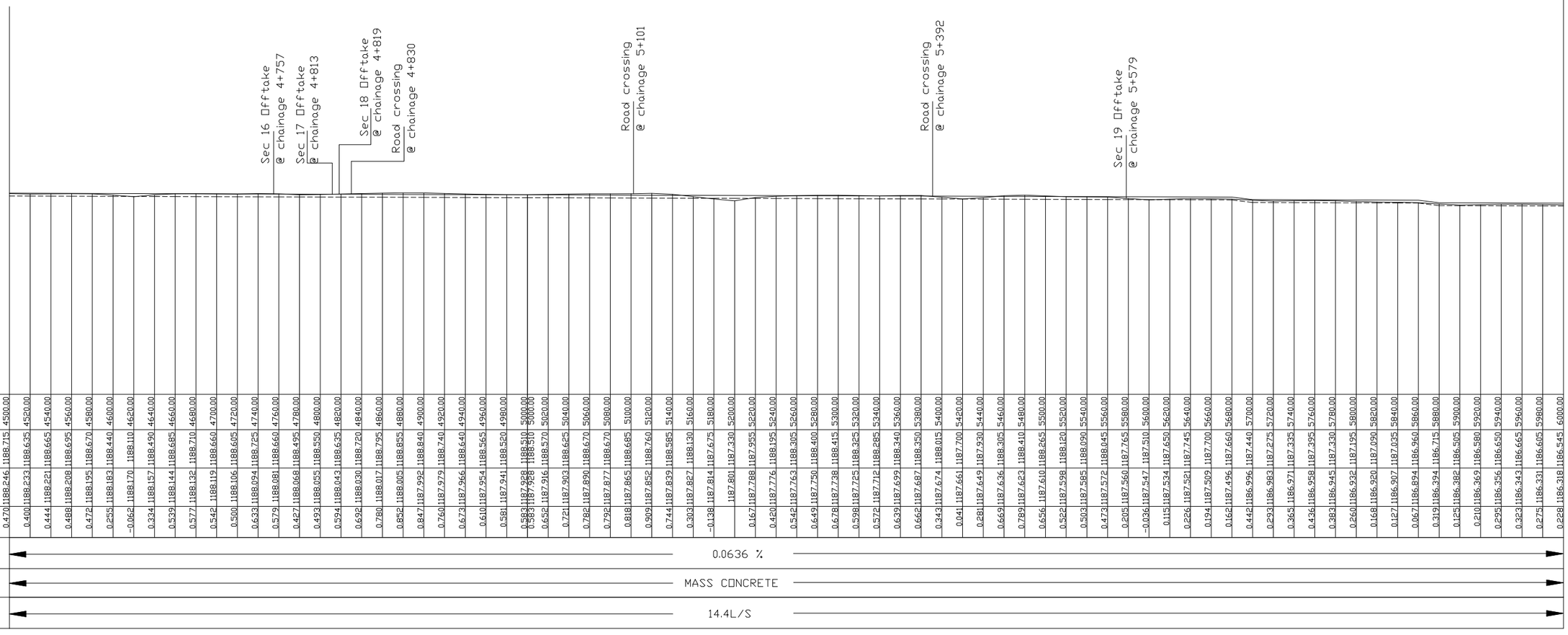
Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM
1150 m amsl

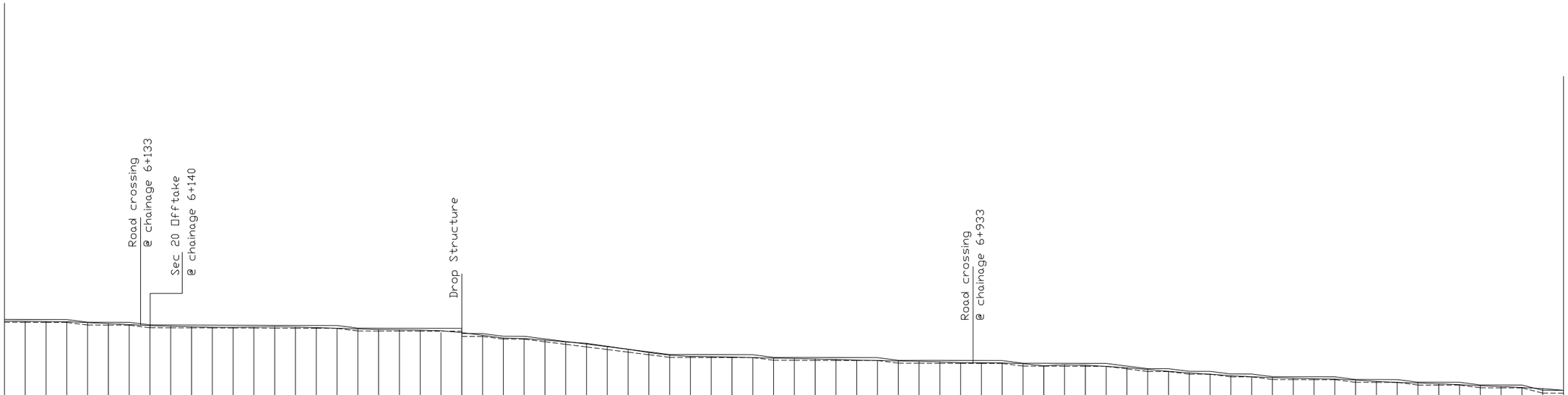
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|---|---|---

LEGEND

- Canal Base
- Canal Bank
- Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM 1150 m amsl

| CHAINAGE (m) | 6000.00 | 6020.00 | 6040.00 | 6060.00 | 6080.00 | 6100.00 | 6120.00 | 6140.00 | 6160.00 | 6180.00 | 6200.00 | 6220.00 | 6240.00 | 6260.00 | 6280.00 | 6300.00 | 6320.00 | 6340.00 | 6360.00 | 6380.00 | 6400.00 | 6420.00 | 6440.00 | 6440.00 | 6460.00 | 6480.00 | 6500.00 | 6520.00 | 6540.00 | 6560.00 | 6580.00 | 6600.00 | 6620.00 | 6640.00 | 6660.00 | 6680.00 | 6700.00 | 6720.00 | 6740.00 | 6760.00 | 6780.00 | 6800.00 | 6820.00 | 6840.00 | 6860.00 | 6880.00 | 6900.00 | 6920.00 | 6940.00 | 6960.00 | 6980.00 | 7000.00 | 7000.00 | 7020.00 | 7040.00 | 7060.00 | 7080.00 | 7100.00 | 7120.00 | 7140.00 | 7160.00 | 7180.00 | 7200.00 | 7220.00 | 7240.00 | 7260.00 | 7280.00 | 7300.00 | 7320.00 | 7340.00 | 7360.00 | 7380.00 | 7400.00 | 7420.00 | 7440.00 | 7460.00 | 7480.00 | 7500.00 |
|---|---|---

LEGEND

— — — — Canal Base

———— Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM
1150 m amsl

CHAINAGE (m)	7500.00	7520.00	7540.00	7560.00	7580.00	7600.00	7620.00	7640.00	7660.00	7680.00	7700.00	7720.00	7740.00	7760.00	7780.00	7800.00	7820.00	7840.00	7860.00	7880.00	7900.00
GROUND LEVEL (m amsl)	1173.215	1172.875	1172.540	1172.265	1172.110	1171.975	1171.900	1171.745	1171.740	1171.620	1171.495	1171.565	1171.445	1171.065	1170.945	1170.830	1170.725	1170.160	1169.915	1169.675	1169.650
CANAL BASE (m amsl)	1172.670	1172.657	1172.157	1172.144	1172.131	1171.631	1171.619	1171.606	1171.593	1171.581	1171.081	1171.068	1171.055	1171.042	1170.542	1170.530	1170.517	1170.017	1169.517	1169.504	1169.492
INVERT LEVEL (m)	0.543	0.220	0.384	0.120	-0.023	0.344	0.280	0.138	0.146	0.038	0.417	0.493	0.388	0.023	0.402	0.301	0.206	0.141	0.396	0.172	0.158
GRADIENT (%)	0.0636 %																				
CANAL MATERIAL	MASS CONCRETE																				
DESIGN FLOW (l/s)	14.4L/S																				

MAIN CANAL PROFILE
7+500 to 7+900

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

MAIN CANAL PROFILE

DWG. No. ISI/DFR/301

Sheet No. 6/6

Designed:	A.M	Date:	23RD/SEPTEMBER/2025
Drawn:	A.M	Date:	23RD/SEPTEMBER/2025
Checked:	ENG. W. ONCHOKE	Date:	23RD/SEPTEMBER/2025
Approved:	ENG. J. KIMANI	Date:	23RD/SEPTEMBER/2025

LEGEND

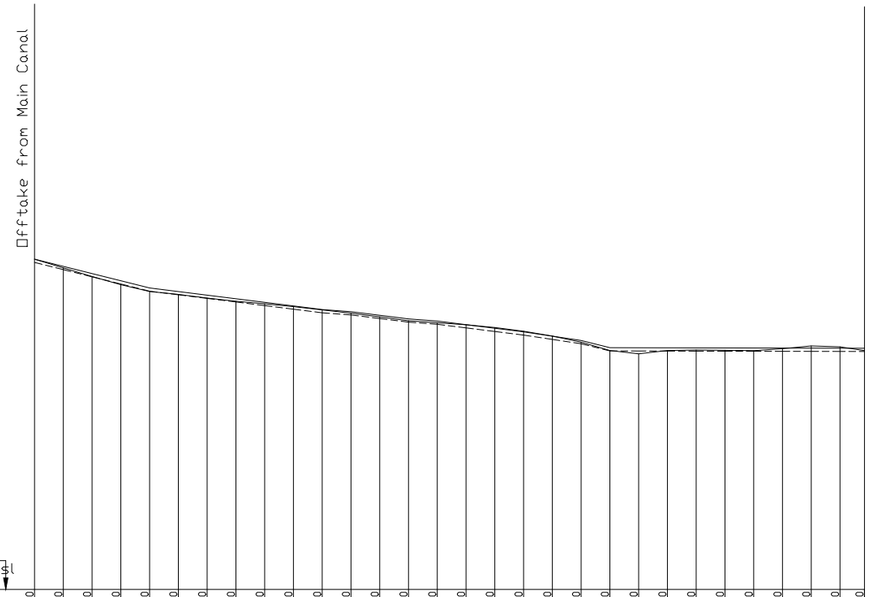
Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	440.00	460.00	480.00	500.00	520.00	540.00	560.00	577.00
GROUND LEVEL (m amsl)	1195.897	1194.685	1193.490	1192.355	1191.405	1191.005	1190.495	1190.050	1189.695	1189.300	1188.850	1188.385	1187.880	1187.335	1187.060	1186.780	1186.400	1185.885	1185.210	1184.365	1183.205	1182.745	1183.205	1183.275	1183.240	1183.185	1183.460	1183.840	1183.710	1183.190
CANAL BASE (m amsl)	1195.447	1194.447	1193.447	1192.447	1191.447	1190.947	1190.447	1189.947	1189.447	1188.947	1188.447	1188.147	1187.647	1187.147	1186.847	1186.347	1185.847	1185.347	1184.747	1184.147	1183.147	1183.138	1183.129	1183.120	1183.111	1183.102	1183.093	1183.083	1183.074	1183.067
INVERT LEVEL (m)	0.450	0.238	0.045	-0.092	-0.043	0.059	0.048	0.104	0.250	0.355	0.402	0.239	0.233	0.189	0.214	0.433	0.554	0.536	0.462	0.219	0.056	-0.394	0.074	0.155	0.130	0.085	0.366	0.758	0.638	0.123
GRADIENT (%)	0.04527 %																													
CANAL MATERIAL	MASS CONCRETE																													
DESIGN FLOW (l/s)	1.31L/S																													

SECONDARY CANAL 1 PROFILE
0+000 to 0+577

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:
SECONDARY CANAL 1 PROFILE

DWG. No.
ISI/DFR/401

Sheet No.
1/1

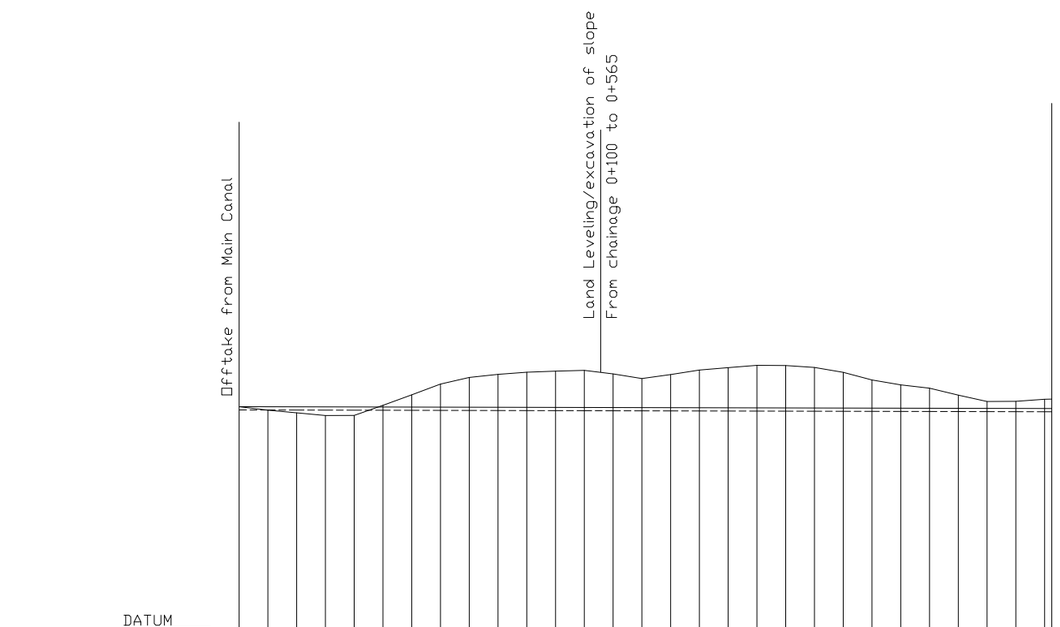
Designed: A.M	Date: 23RD/SEPTEMBER/2025
Drawn: A.M	Date: 23RD/SEPTEMBER/2025
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025

LEGEND

- Canal Base
- Canal Bank
- Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



| | | |

LEGEND

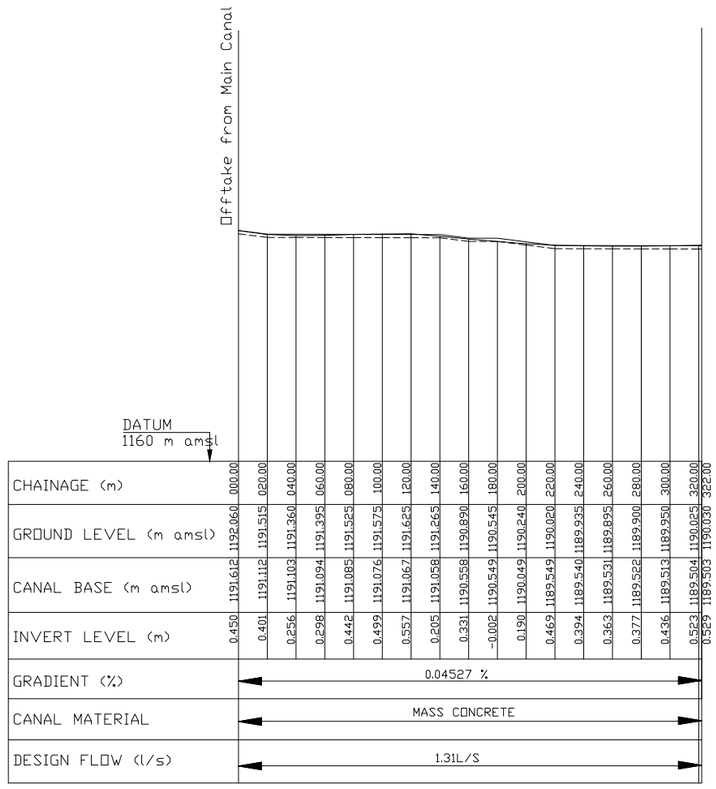
— — — — Canal Base

——————— Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00					
GROUND LEVEL (m amsl)	1192.060	1191.515	1191.360	1191.395	1191.525	1191.575	1191.625	1191.265	1190.890	1190.545	1190.240	1190.020	1189.935	1189.895	1189.900	1189.950	1190.025	1190.030				
CANAL BASE (m amsl)	1191.612	1191.112	1191.103	1191.094	1191.085	1191.076	1191.067	1191.058	1190.558	1190.549	1190.049	1189.549	1189.540	1189.531	1189.522	1189.513	1189.504	1189.503				
INVERT LEVEL (m)	0.450	0.401	0.256	0.298	0.442	0.499	0.557	0.205	0.331	−0.002	0.190	0.469	0.394	0.363	0.377	0.436	0.523	0.529				
GRADIENT (%)	0.04527 %																					
CANAL MATERIAL	MASS CONCRETE																					
DESIGN FLOW (l/s)	1.31L/S																					

SECONDARY CANAL 3 PROFILE
0+000 to 0+322

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 3 PROFILE

DWG. No. ISI/DFR/403

Sheet No. 1/1

Designed: A.M	Date: 23RD/SEPTEMBER/2025
Drawn: A.M	Date: 23RD/SEPTEMBER/2025
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025

LEGEND

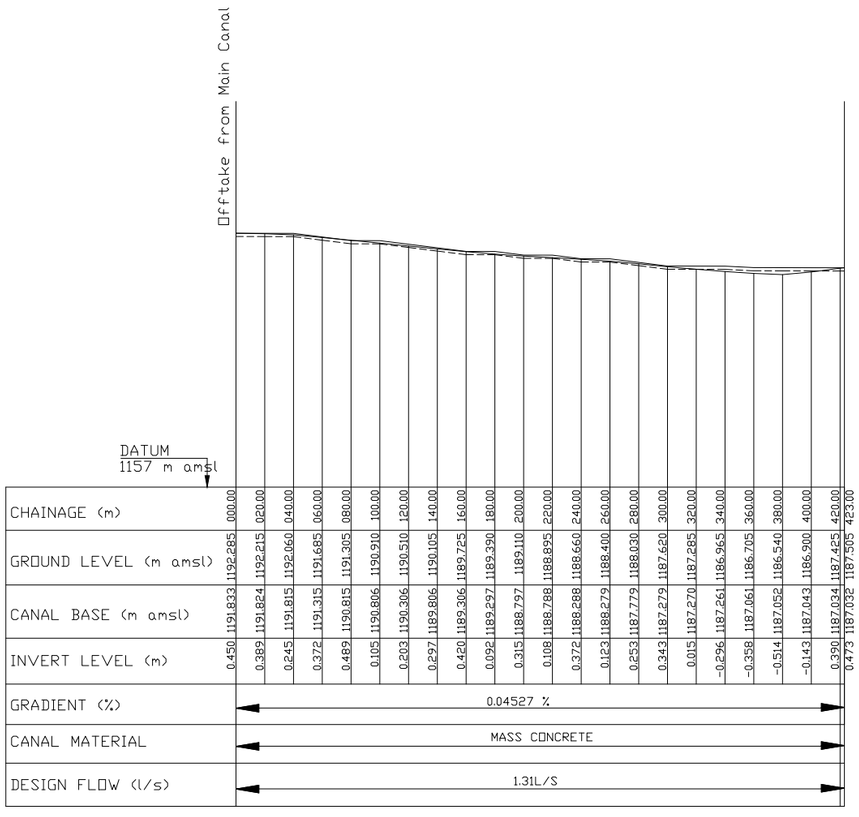
— — — — Canal Base

———— Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	423.00
GROUND LEVEL (m amsl)	1192.285	1192.215	1192.060	1191.685	1191.305	1190.910	1190.510	1190.105	1189.725	1189.390	1189.110	1188.895	1188.660	1188.400	1188.030	1187.620	1187.285	1186.965	1186.705	1186.540	1186.900	1187.425	1187.505
CANAL BASE (m amsl)	1191.833	1191.824	1191.815	1191.315	1190.815	1190.806	1190.306	1189.806	1189.306	1189.297	1188.797	1188.788	1188.288	1188.279	1187.779	1187.279	1187.270	1187.261	1187.061	1187.052	1187.043	1187.034	1187.032
INVERT LEVEL (m)	0.450	0.389	0.245	0.372	0.489	0.105	0.203	0.297	0.420	0.092	0.315	0.108	0.372	0.123	0.253	0.343	0.015	-0.296	-0.358	-0.514	-0.143	0.390	0.473
GRADIENT (%)	0.04527 %																						
CANAL MATERIAL	MASS CONCRETE																						
DESIGN FLOW (l/s)	1.31L/S																						

SECONDARY CANAL 4 PROFILE
0+000 to 0+423

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 4 PROFILE

DWG. No. ISI/DFR/404

Sheet No. 1/1

Designed: A.M	Date: 23RD/SEPTEMBER/2025		
Drawn: A.M	Date: 23RD/SEPTEMBER/2025		
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025		
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025		

LEGEND

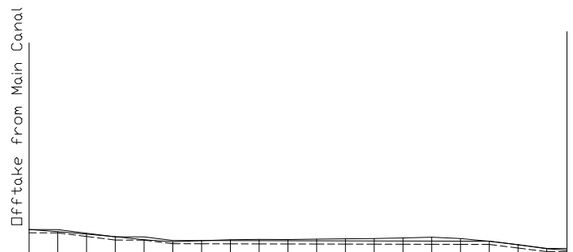
— — — — Canal Base

———— Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM
1158 m amsl

CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	374.00
GROUND LEVEL (m amsl)	1192.070	1191.780	1191.435	1191.070	1190.655	1190.380	1190.520	1190.655	1190.700	1190.680	1190.740	1190.785	1190.820	1190.905	1191.010	1190.815	1190.440	1189.965	1189.400	1189.190
CANAL BASE (m amsl)	1191.618	1191.609	1191.109	1190.609	1190.600	1190.100	1190.091	1190.082	1190.073	1190.064	1190.055	1190.046	1190.037	1190.028	1190.019	1190.010	1190.000	1189.500	1189.000	1188.994
INVERT LEVEL (m)	0.450	0.169	0.326	0.463	0.055	0.281	0.431	0.571	0.629	0.618	0.683	0.741	0.786	0.876	0.989	0.808	0.441	0.467	0.399	0.196
GRADIENT (%)	0.04527 %																			
CANAL MATERIAL	MASS CONCRETE																			
DESIGN FLOW (l/s)	1.31L/S																			

SECONDARY CANAL 5 PROFILE
0+000 to 0+374

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 5 PROFILE

DWG. No. ISI/DFR/405

Sheet No. 1/1

Designed: A.M	Date: 23RD/SEPTEMBER/2025		
Drawn: A.M	Date: 23RD/SEPTEMBER/2025		
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025		
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025		

LEGEND

— — — — Canal Base

———— Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM
1159 m amsl

CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	206.00
GROUND LEVEL (m amsl)	1191.385	1191.000	1190.995	1190.990	1190.975	1191.050	1191.105	1191.005	1190.730	1190.310	1189.790	1189.625
CANAL BASE (m amsl)	1190.935	1190.926	1190.917	1190.908	1190.899	1190.890	1190.880	1190.871	1190.371	1189.871	1189.371	1189.369
INVERT LEVEL (m)	0.450	0.072	0.079	0.085	0.078	0.160	0.225	0.135	0.357	0.440	0.417	0.258
GRADIENT (%)	0.04527 %											
CANAL MATERIAL	MASS CONCRETE											
DESIGN FLOW (l/s)	1.31L/S											

SECONDARY CANAL 6 PROFILE
0+000 to 0+206

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:
SECONDARY CANAL 6 PROFILE

DWG. No.
ISI/DFR/406

Sheet No:
1/1

Designed: A.M	Date: 23RD/SEPTEMBER/2025
Drawn: A.M	Date: 23RD/SEPTEMBER/2025
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025

LEGEND

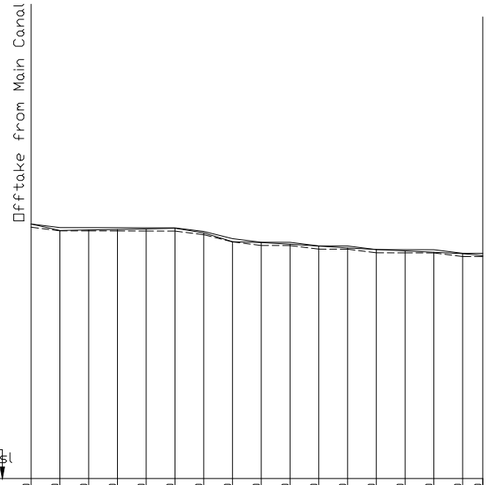
Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM
1156 m amsl

CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	314.00					
GROUND LEVEL (m amsl)	1191.375	1190.470	1190.550	1190.610	1190.685	1190.785	1190.140	1188.915	1188.750	1188.565	1188.305	1188.040	1187.835	1187.640	1187.445	1187.250	1186.990					
CANAL BASE (m amsl)	1190.925	1190.425	1190.416	1190.407	1190.398	1190.389	1189.889	1188.889	1188.389	1188.380	1187.880	1187.871	1187.371	1187.361	1187.352	1186.852	1186.846					
INVERT LEVEL (m)	0.450	0.044	0.136	0.202	0.288	0.395	0.250	0.027	0.402	0.188	0.424	0.170	0.462	0.277	0.092	0.398	0.142					
GRADIENT (%)	0.04527 %																					
CANAL MATERIAL	MASS CONCRETE																					
DESIGN FLOW (l/s)	1.31L/S																					

SECONDARY CANAL 7 PROFILE
0+000 to 0+314

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 7 PROFILE

DWG. No. ISI/DFR/407

Sheet No. 1/1

Designed:	A.M	Date:	23RD/SEPTEMBER/2025
Drawn:	A.M	Date:	23RD/SEPTEMBER/2025
Checked:	ENG. W. ONCHOKE	Date:	23RD/SEPTEMBER/2025
Approved:	ENG. J. KIMANI	Date:	23RD/SEPTEMBER/2025

LEGEND

- Canal Base
- Canal Bank
- Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM
1158 m amsl

CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	375.00
GROUND LEVEL (m amsl)	1191.885	1190.430	1189.290	1187.235	1189.215	1189.140	1188.975	1188.765	1188.510	1188.415	1188.450	1188.695	1188.845	1188.910	1188.885	1188.835	1188.875	1188.915	1188.950	1188.940
CANAL BASE (m amsl)	1191.434	1190.434	1189.434	1188.934	1188.924	1188.915	1188.906	1188.506	1188.497	1188.488	1188.479	1188.470	1188.461	1188.452	1188.443	1188.434	1188.425	1188.416	1188.407	1188.400
INVERT LEVEL (m)	0.450	-0.005	-0.145	0.304	0.290	0.227	0.069	0.258	0.014	-0.073	-0.031	0.223	0.386	0.459	0.441	0.402	0.450	0.497	0.544	0.539
GRADIENT (%)	0.04527 %																			
CANAL MATERIAL	MASS CONCRETE																			
DESIGN FLOW (l/s)	2.29L/S																			

SECONDARY CANAL 8 PROFILE
0+000 to 0+375

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:
SECONDARY CANAL 8 PROFILE

DWG. No.
ISI/DFR/408

Sheet No.
1/1

Designed: A.M	Date: 23RD/SEPTEMBER/2025
Drawn: A.M	Date: 23RD/SEPTEMBER/2025
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025

LEGEND

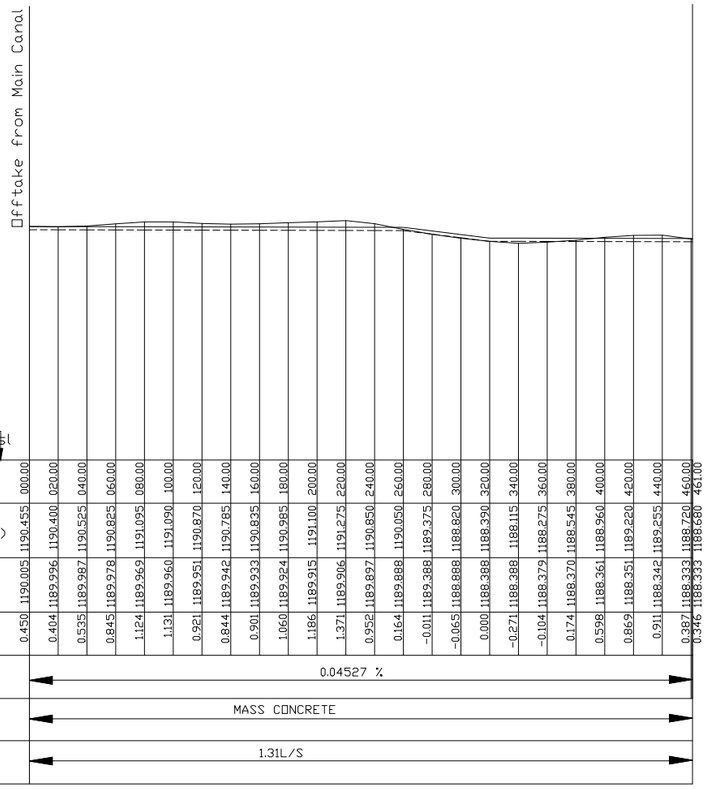
— — — — Canal Base

———— Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	440.00	460.00	461.00
GROUND LEVEL (m amsl)	1190.455	1190.400	1190.525	1190.825	1191.095	1191.090	1190.870	1190.785	1190.835	1190.985	1191.100	1191.275	1190.850	1190.050	1189.375	1188.820	1188.390	1188.115	1188.275	1188.545	1188.960	1189.220	1189.255	1188.720	1188.680
CANAL BASE (m amsl)	1190.005	1189.996	1189.987	1189.978	1189.969	1189.960	1189.951	1189.942	1189.933	1189.924	1189.915	1189.906	1189.897	1189.888	1189.388	1188.888	1188.388	1188.388	1188.379	1188.370	1188.361	1188.351	1188.342	1188.333	1188.333
INVERT LEVEL (m)	0.450	0.404	0.535	0.845	1.124	1.131	0.921	0.844	0.901	1.060	1.186	1.371	0.952	0.164	-0.011	-0.065	0.000	-0.273	-0.104	0.174	0.598	0.869	0.911	0.387	0.346
GRADIENT (%)	0.04527 %																								
CANAL MATERIAL	MASS CONCRETE																								
DESIGN FLOW (l/s)	1.31L/S																								

SECONDARY CANAL 9 PROFILE
0+000 to 0+461

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 9 PROFILE

DWG. No. ISI/DFR/409

Sheet No. 1/1

Designed:	A.M	Date:	23RD/SEPTEMBER/2025
Drawn:	A.M	Date:	23RD/SEPTEMBER/2025
Checked:	ENG. W. ONCHOKE	Date:	23RD/SEPTEMBER/2025
Approved:	ENG. J. KIMANI	Date:	23RD/SEPTEMBER/2025

LEGEND

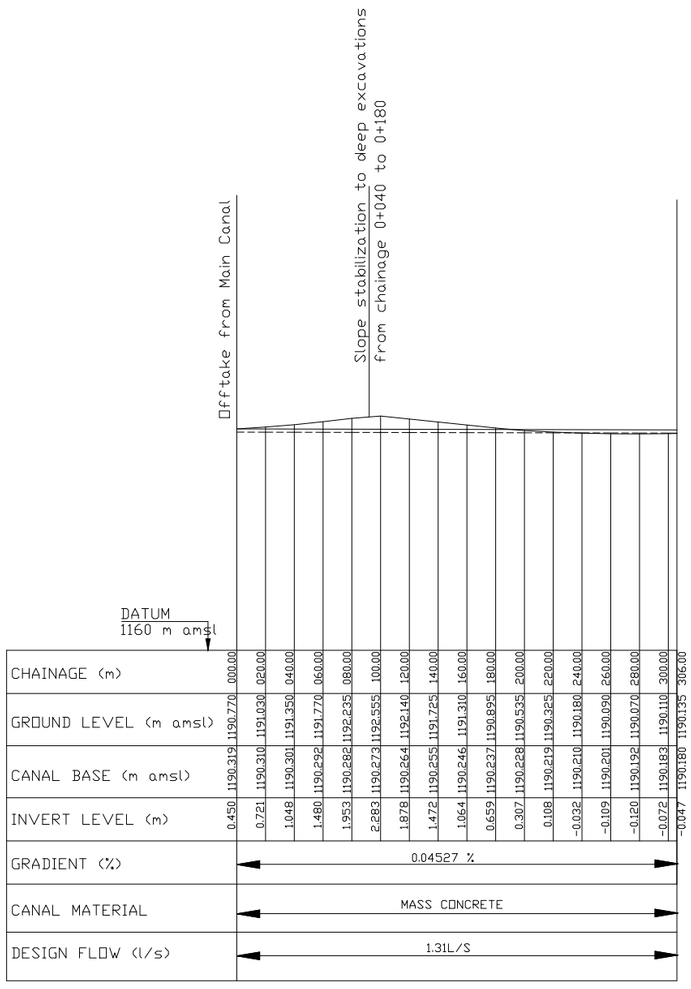
Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00
GROUND LEVEL (m amsl)	1190.770	1191.030	1191.350	1191.770	1192.235	1192.555	1192.140	1191.725	1191.310	1190.895	1190.535	1190.325	1190.180	1190.090	1190.070	1190.110	1190.135
CANAL BASE (m amsl)	1190.319	1190.310	1190.301	1190.292	1190.282	1190.273	1190.264	1190.255	1190.246	1190.237	1190.228	1190.219	1190.210	1190.201	1190.192	1190.183	1190.180
INVERT LEVEL (m)	0.450	0.721	1.048	1.480	1.953	2.283	1.878	1.472	1.064	0.659	0.307	0.108	-0.032	-0.109	-0.120	-0.072	-0.047
GRADIENT (%)	0.04527 %																
CANAL MATERIAL	MASS CONCRETE																
DESIGN FLOW (l/s)	1.31L/S																

SECONDARY CANAL 10 PROFILE
0+000 to 0+306

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 10 PROFILE

DWG. No. ISI/DFR/410

Sheet No. 1/1

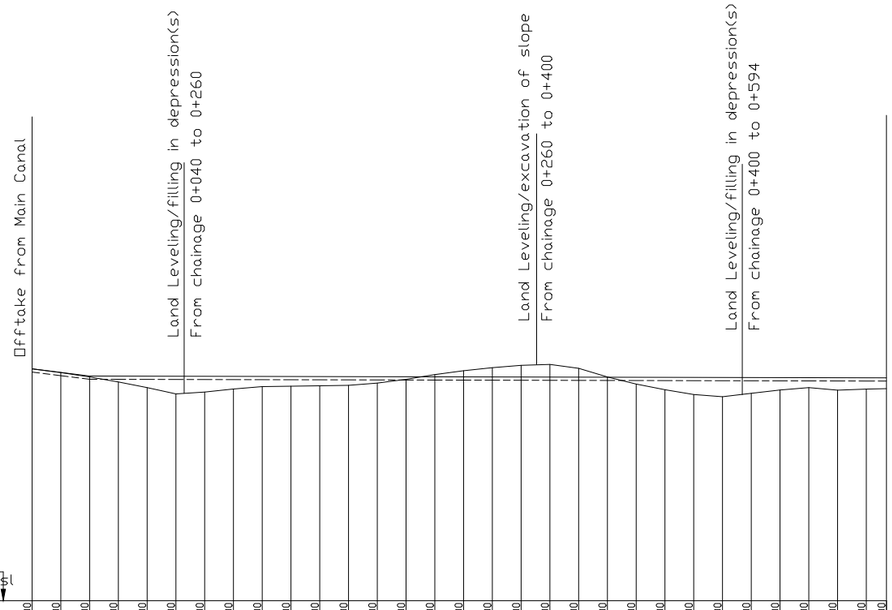
Designed: A.M	Date: 23RD/SEPTEMBER/2025
Drawn: A.M	Date: 23RD/SEPTEMBER/2025
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025

LEGEND

- Canal Base
- Canal Bank
- Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM
1158 m amsl

CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	440.00	460.00	480.00	500.00	520.00	540.00	560.00	580.00	594.00
GROUND LEVEL (m amsl)	1190.220	1189.705	1189.095	1188.400	1187.615	1186.740	1186.995	1187.420	1187.755	1187.810	1187.865	1187.930	1188.240	1188.765	1189.420	1189.960	1190.385	1190.710	1190.835	1190.295	1189.090	1188.105	1187.320	1186.635	1186.350	1186.820	1187.280	1187.615	1187.255	1187.405	1187.470
CANAL BASE (m amsl)	1189.772	1189.272	1188.772	1188.763	1188.754	1188.745	1188.736	1188.727	1188.718	1188.709	1188.700	1188.691	1188.681	1188.672	1188.663	1188.654	1188.645	1188.636	1188.627	1188.618	1188.609	1188.600	1188.591	1188.582	1188.573	1188.564	1188.555	1188.546	1188.537	1188.528	1188.521
INVERT LEVEL (m)	0.450	0.431	0.324	-0.364	-1.140	-2.005	-1.739	-1.305	-0.963	-0.900	-0.834	-0.758	-0.442	0.094	0.759	1.308	1.741	2.072	2.208	1.675	0.483	-0.494	-1.270	-1.926	-2.224	-1.742	-1.276	-0.931	-1.281	-1.121	-1.050
GRADIENT (%)	0.04527 %																														
CANAL MATERIAL	MASS CONCRETE																														
DESIGN FLOW (l/s)	2.62L/S																														

SECONDARY CANAL 11 PROFILE
0+000 to 0+594

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 11 PROFILE

DWG. No. ISI/DFR/411

Sheet No. 1/1

Designed: A.M	Date: 23RD/SEPTEMBER/2025
Drawn: A.M	Date: 23RD/SEPTEMBER/2025
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025

LEGEND

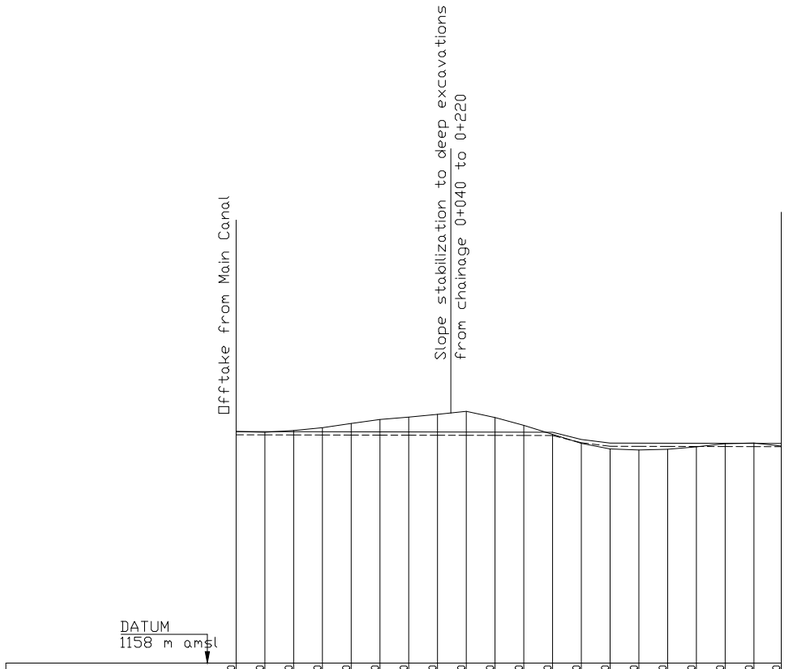
Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	379.00
GROUND LEVEL (m amsl)	1190.180	1190.075	1190.325	1190.715	1191.305	1191.860	1192.185	1192.570	1192.990	1192.125	1191.040	1189.790	1188.540	1187.760	1187.615	1187.720	1188.055	1188.495	1188.590	1188.160
CANAL BASE (m amsl)	1189.729	1189.720	1189.711	1189.702	1189.693	1189.684	1189.675	1189.666	1189.657	1189.648	1189.639	1189.630	1188.630	1188.130	1188.120	1188.111	1188.102	1188.093	1188.084	1188.076
INVERT LEVEL (m)	0.450	0.354	0.614	1.013	1.612	2.174	2.512	2.903	3.334	2.479	1.402	0.162	-0.089	-0.370	-0.503	-0.393	-0.046	0.402	0.507	0.085
GRADIENT (%)	0.04527 %																			
CANAL MATERIAL	MASS CONCRETE																			
DESIGN FLOW (l/s)	1.64L/S																			

SECONDARY CANAL 12 PROFILE
0+000 to 0+379

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 12 PROFILE

DWG. No. ISI/DFR/412

Sheet No. 1/1

Designed: A.M	Date: 23RD/SEPTEMBER/2025		
Drawn: A.M	Date: 23RD/SEPTEMBER/2025		
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025		
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025		

LEGEND

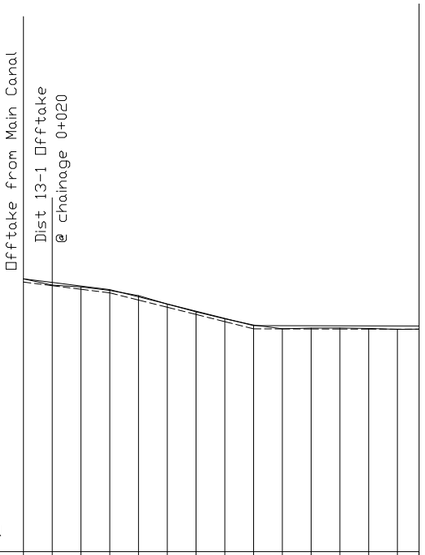
— — — — Canal Base

———— Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	275.00
GROUND LEVEL (m amsl)	1188.915	1188.045	1187.790	1187.305	1186.585	1185.495	1184.330	1183.360	1182.490	1181.975	1182.070	1182.085	1182.025	1181.890	1181.930
CANAL BASE (m amsl)	1188.467	1187.967	1187.467	1186.967	1185.967	1184.967	1183.967	1182.967	1181.967	1181.958	1181.948	1181.939	1181.930	1181.921	1181.915
INVERT LEVEL (m)	0.450	0.078	0.324	0.338	0.617	0.440	0.366	0.394	0.525	0.019	0.121	0.147	0.096	-0.032	0.015
GRADIENT (%)	0.04527 %														
CANAL MATERIAL	MASS CONCRETE														
DESIGN FLOW (l/s)	2.95L/S														

SECONDARY CANAL 13 PROFILE
0+000 to 0+275

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 13 PROFILE

DWG. No. ISI/DFR/413

Sheet No. 1/1

Designed: A.M	Date: 23RD/SEPTEMBER/2025
Drawn: A.M	Date: 23RD/SEPTEMBER/2025
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025

LEGEND

Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



| DATUM 1152 m amsl | | |

LEGEND

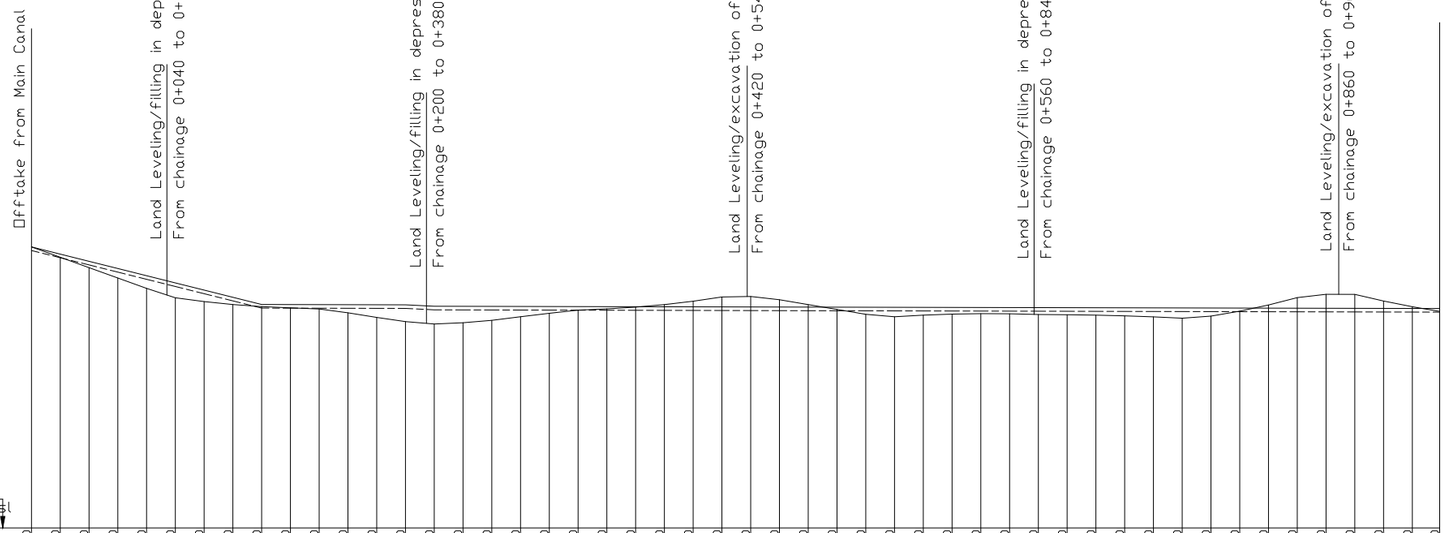
— — — — Canal Base

———— Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	440.00	460.00	480.00	500.00	520.00	540.00	560.00	580.00	600.00	620.00	640.00	660.00	680.00	700.00	720.00	740.00	760.00	780.00	800.00	820.00	840.00	860.00	880.00	900.00	920.00	940.00	960.00	979.00
GROUND LEVEL (m amsl)	1189.060	1187.620	1186.180	1184.740	1183.300	1181.990	1181.460	1181.055	1180.765	1180.595	1180.435	1179.905	1179.263	1178.680	1178.345	1178.520	1178.855	1179.360	1179.835	1180.275	1180.455	1180.695	1181.045	1181.515	1182.105	1182.170	1181.720	1181.045	1180.370	1179.625	1179.350	1179.580	1179.225	1179.785	1179.765	1179.665	1179.640	1179.580	1179.480	1179.335	1179.155	1179.445	1180.130	1180.990	1182.010	1182.470	1182.465	1181.540	1180.745	1180.095
CANAL BASE (m amsl)	1188.559	1187.559	1186.559	1185.559	1184.559	1183.559	1182.559	1181.559	1180.559	1180.550	1180.541	1180.532	1180.523	1180.514	1180.314	1180.305	1180.296	1180.286	1180.277	1180.268	1180.259	1180.250	1180.241	1180.232	1180.223	1180.214	1180.205	1180.196	1180.187	1180.178	1180.169	1180.160	1180.151	1180.142	1180.133	1180.123	1180.114	1180.105	1180.096	1180.087	1180.078	1180.069	1180.060	1180.051	1180.042	1180.033	1180.024	1180.015	1180.006	1179.997
INVERT LEVEL (m)	0.500	0.060	−0.380	−0.819	−1.259	−1.567	−1.097	−0.506	0.205	0.044	−0.104	−0.628	−1.259	−1.835	−1.969	−1.784	−1.440	−0.928	−0.444	0.009	0.195	0.443	0.804	1.283	1.882	1.958	1.514	0.849	0.183	−0.482	−0.818	−0.581	−0.427	−0.356	−0.368	−0.457	−0.476	−0.527	−0.618	−0.751	−0.924	−0.625	0.072	0.937	1.970	2.439	2.441	1.526	0.742	0.100
GRADIENT (%)	0.04527 %																																																	
CANAL MATERIAL	MASS CONCRETE																																																	
DESIGN FLOW (l/s)	4.91L/S																																																	

SECONDARY CANAL 15 PROFILE
0+000 to 0+979

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 15 PROFILE

DWG. No. ISI/DFR/415

Sheet No. 1/1

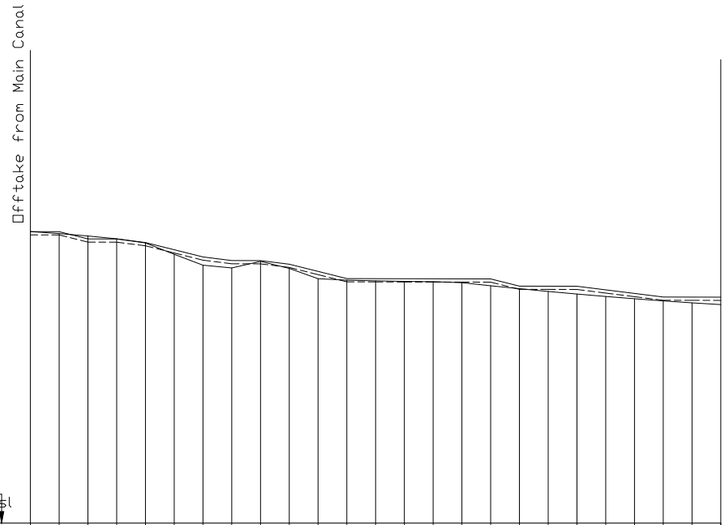
Designed: A.M	Date: 23RD/SEPTEMBER/2025
Drawn: A.M	Date: 23RD/SEPTEMBER/2025
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025

LEGEND

- Canal Base
- Canal Bank
- Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	440.00	460.00	480.00
GROUND LEVEL (m amsl)	1188.495	1188.225	1187.895	1187.500	1186.925	1185.340	1183.835	1183.450	1184.365	1183.385	1181.955	1181.750	1181.655	1181.585	1181.535	1181.400	1180.970	1180.565	1180.180	1179.820	1179.480	1179.165	1178.870	1178.600	1178.355
CANAL BASE (m amsl)	1188.046	1188.036	1187.036	1187.027	1186.527	1185.527	1184.527	1184.027	1184.018	1183.518	1182.518	1181.518	1181.509	1181.500	1181.491	1181.482	1181.473	1180.473	1180.464	1180.455	1179.955	1179.455	1178.955	1178.946	1178.937
INVERT LEVEL (m)	0.450	0.189	0.857	0.470	0.399	-0.187	-0.694	-0.578	0.346	-0.136	-0.565	0.230	0.147	0.084	0.045	-0.084	-0.503	0.091	-0.283	-0.635	-0.474	-0.290	-0.084	-0.347	-0.584
GRADIENT (%)	0.04527 %																								
CANAL MATERIAL	MASS CONCRETE																								
DESIGN FLOW (l/s)	2.95L/S																								

SECONDARY CANAL 16 PROFILE
0+000 to 0+480

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 16 PROFILE

DWG. No. ISI/DFR/416

Sheet No: 1/1

Designed: A.M	Date: 23RD/SEPTEMBER/2025
Drawn: A.M	Date: 23RD/SEPTEMBER/2025
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025

LEGEND

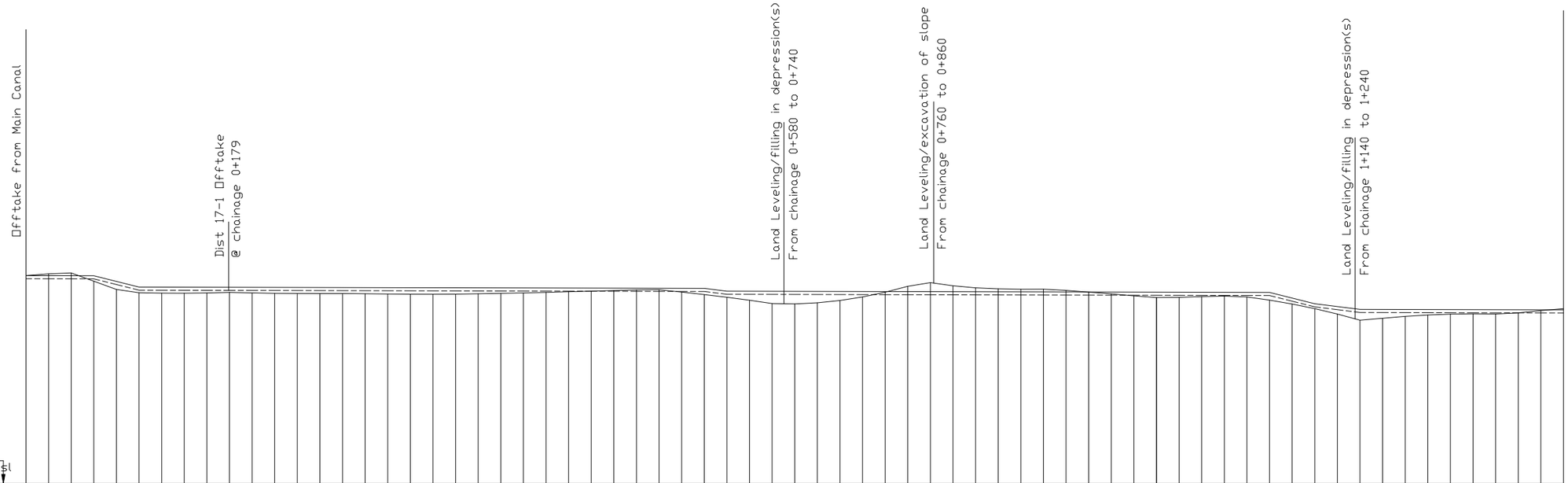
Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM
1152 m amsl

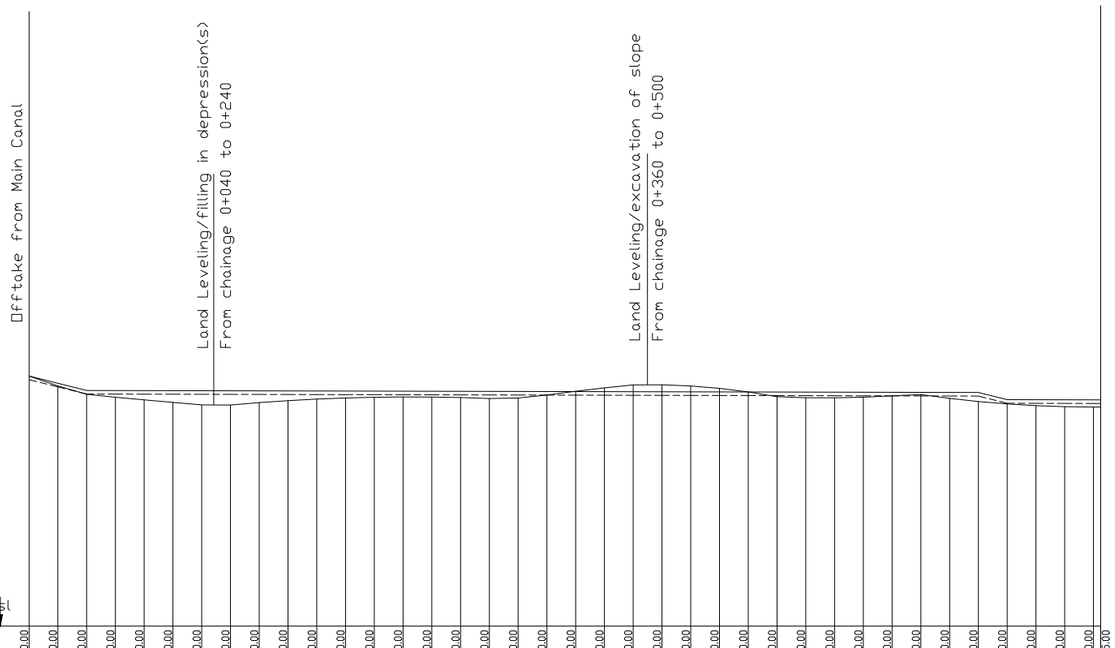
| CHAINAGE (m) | 000.00 | 020.00 | 040.00 | 060.00 | 080.00 | 100.00 | 120.00 | 140.00 | 160.00 | 180.00 | 200.00 | 220.00 | 240.00 | 260.00 | 280.00 | 300.00 | 320.00 | 340.00 | 360.00 | 380.00 | 400.00 | 420.00 | 440.00 | 460.00 | 480.00 | 500.00 | 520.00 | 540.00 | 560.00 | 580.00 | 600.00 | 620.00 | 640.00 | 660.00 | 680.00 | 700.00 | 720.00 | 740.00 | 760.00 | 780.00 | 800.00 | 820.00 | 840.00 | 860.00 | 880.00 | 900.00 | 920.00 | 940.00 | 960.00 | 980.00 | 1000.00 | 1020.00 | 1040.00 | 1060.00 | 1080.00 | 1100.00 | 1120.00 | 1140.00 | 1160.00 | 1180.00 | 1200.00 | 1220.00 | 1240.00 | 1260.00 | 1280.00 | 1300.00 | 1320.00 | 1340.00 | 1360.00 |
|---|---|---

LEGEND

- Canal Base
- Canal Bank
- Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	0.000	0.020.00	0.040.00	0.060.00	0.080.00	0.100.00	0.120.00	0.140.00	0.160.00	0.180.00	0.200.00	0.220.00	0.240.00	0.260.00	0.280.00	0.300.00	0.320.00	0.340.00	0.360.00	0.380.00	0.400.00	0.420.00	0.440.00	0.460.00	0.480.00	0.500.00	0.520.00	0.540.00	0.560.00	0.580.00	0.600.00	0.620.00	0.640.00	0.660.00	0.680.00	0.700.00	0.720.00	0.740.00	0.745.00
GROUND LEVEL (m amsl)	1188.755	1187.385	1186.225	1185.810	1185.450	1185.095	1184.745	1184.735	1185.065	1185.340	1185.555	1185.715	1185.810	1185.850	1185.840	1185.775	1185.635	1185.705	1186.120	1186.645	1187.115	1187.525	1187.545	1187.375	1187.045	1186.550	1185.890	1185.740	1185.735	1185.820	1186.005	1186.185	1185.660	1185.215	1184.885	1184.630	1184.505	1184.455	1184.445
CANAL BASE (m amsl)	1188.256	1187.256	1186.256	1186.247	1186.237	1186.228	1186.219	1186.210	1186.201	1186.192	1186.183	1186.174	1186.165	1186.156	1186.147	1186.138	1186.129	1186.120	1186.111	1186.102	1186.093	1186.084	1186.075	1186.065	1186.056	1186.047	1186.038	1186.029	1186.020	1186.011	1186.002	1185.993	1185.984	1185.975	1184.975	1184.966	1184.957	1184.948	1184.946
INVERT LEVEL (m)	0.500	0.131	-0.029	-0.434	-0.786	-1.131	-1.474	-1.476	-1.136	-0.853	-0.627	-0.461	-0.355	-0.306	-0.307	-0.364	-0.493	-0.413	0.009	0.542	1.020	1.442	1.470	1.309	0.990	0.505	-0.146	-0.288	-0.286	-0.190	0.002	0.190	-0.324	-0.762	-0.090	-0.317	-0.453	-0.494	-0.499
GRADIENT (%)	0.04527 %																																						
CANAL MATERIAL	MASS CONCRETE																																						
DESIGN FLOW (l/s)	4.58L/S																																						

SECONDARY CANAL 18 PROFILE
0+000 to 0+745

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 18 PROFILE

DWG. No. ISI/DFR/418

Sheet No. 1/1

Designed:	A.M	Date:	23RD/SEPTEMBER/2025
Drawn:	A.M	Date:	23RD/SEPTEMBER/2025
Checked:	ENG. W. ONCHOKE	Date:	23RD/SEPTEMBER/2025
Approved:	ENG. J. KIMANI	Date:	23RD/SEPTEMBER/2025

LEGEND

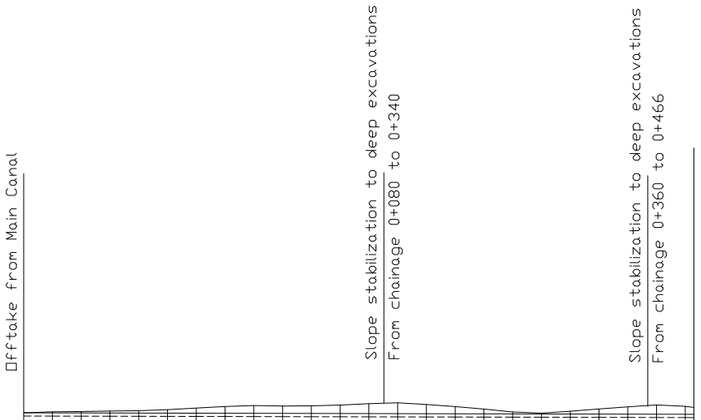
Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM
1156 m amsl

CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	440.00	460.00	466.00									
GROUND LEVEL (m amsl)	1187.510	1187.645	1187.690	1187.755	1187.805	1187.945	1188.170	1188.385	1188.515	1188.450	1188.475	1188.585	1188.780	1188.900	1188.665	1188.370	1188.030	1187.630	1187.465	1187.730	1188.040	1188.335	1188.600	1188.410	1188.255									
CANAL BASE (m amsl)	1187.061	1187.052	1187.043	1187.034	1187.024	1187.015	1187.006	1186.997	1186.988	1186.979	1186.970	1186.961	1186.952	1186.943	1186.934	1186.925	1186.916	1186.907	1186.898	1186.889	1186.880	1186.871	1186.862	1186.852	1186.850									
INVERT LEVEL (m)	0.450	0.594	0.647	0.722	0.781	0.928	1.162	1.387	1.527	1.473	1.505	1.623	1.829	1.959	1.732	1.447	1.116	0.724	0.567	0.839	1.163	1.466	1.740	1.559	1.406									
GRADIENT (%)	0.04527 %																																	
CANAL MATERIAL	MASS CONCRETE																																	
DESIGN FLOW (l/s)	1.64L/S																																	

SECONDARY CANAL 19 PROFILE
0+000 to 0+466

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

SECONDARY CANAL 19 PROFILE

DWG. No. ISI/DFR/419

Sheet No. 1/1

Designed:	A.M	Date:	23RD/SEPTEMBER/2025
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Approved:	ENG. J. KIMANI	Date:	23RD/SEPTEMBER/2025

LEGEND

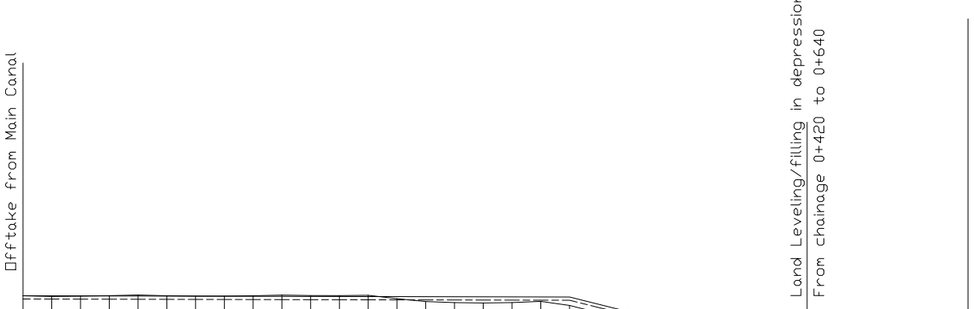
Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM
1152 m amsl

| | | |

LEGEND

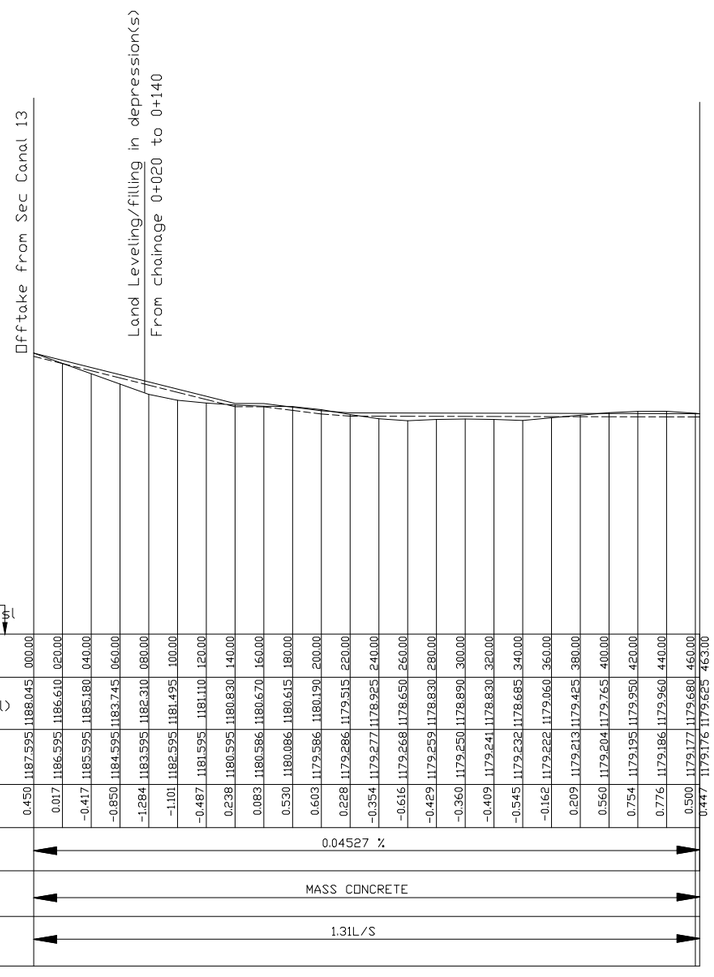
Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	000.00	020.00	040.00	060.00	080.00	100.00	120.00	140.00	160.00	180.00	200.00	220.00	240.00	260.00	280.00	300.00	320.00	340.00	360.00	380.00	400.00	420.00	440.00	460.00	463.00
GROUND LEVEL (m amsl)	1188.045	1186.610	1185.180	1183.745	1182.310	1181.495	1181.110	1180.830	1180.670	1180.615	1180.190	1179.515	1178.925	1178.650	1178.830	1178.890	1178.830	1178.685	1179.060	1179.425	1179.765	1179.950	1179.960	1179.680	1179.625
CANAL BASE (m amsl)	1187.595	1186.595	1185.595	1184.595	1183.595	1182.595	1181.595	1180.595	1180.586	1180.086	1179.586	1179.286	1179.277	1178.268	1179.259	1179.250	1179.241	1179.232	1179.222	1179.213	1179.204	1179.195	1179.186	1179.177	1179.176
INVERT LEVEL (m)	0.450	0.017	-0.417	-0.850	-1.284	-1.101	-0.487	0.238	0.083	0.530	0.603	0.228	-0.354	-0.616	-0.429	-0.360	-0.409	-0.545	-0.162	0.209	0.560	0.754	0.776	0.500	0.447
GRADIENT (%)	0.04527 %																								
CANAL MATERIAL	MASS CONCRETE																								
DESIGN FLOW (l/s)	1.31L/S																								

DISTRIBUTION CANAL 13-1 PROFILE
0+000 to 0+463

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

DISTRIBUTION CANAL 13-1 PROFILE

DWG. No. ISI/DFR/501

Sheet No. 1/1

Designed:	A.M	Date: 23RD/SEPTEMBER/2025
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Checked:	ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025
Approved:	ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025

LEGEND

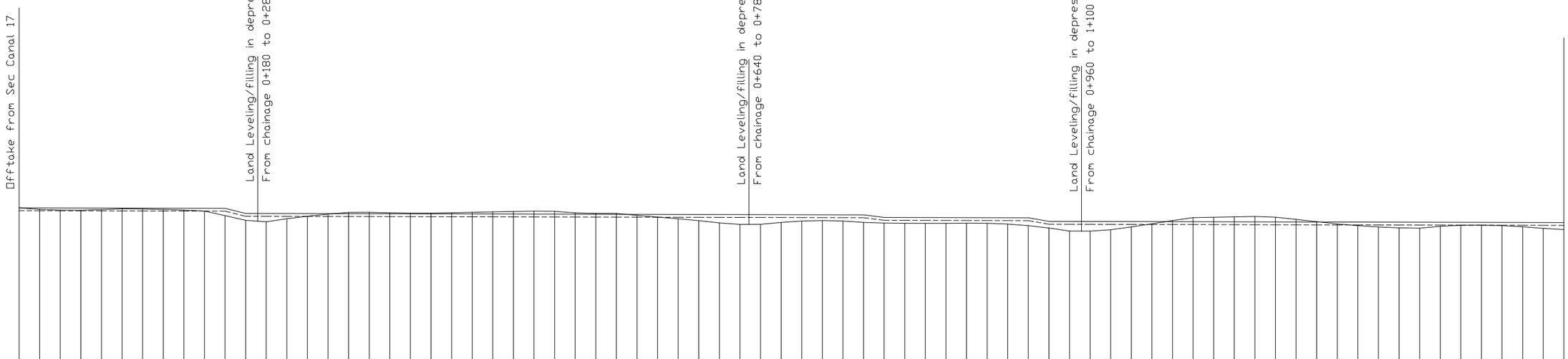
Canal Base

Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



DATUM 1152 m amsl

| CHAINAGE (m) | 000.00 | 020.00 | 040.00 | 060.00 | 080.00 | 100.00 | 120.00 | 140.00 | 160.00 | 180.00 | 200.00 | 220.00 | 240.00 | 260.00 | 280.00 | 300.00 | 320.00 | 340.00 | 360.00 | 380.00 | 400.00 | 420.00 | 440.00 | 460.00 | 480.00 | 500.00 | 520.00 | 540.00 | 560.00 | 580.00 | 600.00 | 620.00 | 640.00 | 660.00 | 680.00 | 700.00 | 720.00 | 740.00 | 760.00 | 780.00 | 800.00 | 820.00 | 840.00 | 860.00 | 880.00 | 900.00 | 920.00 | 940.00 | 960.00 | 980.00 | 1000.00 | 1020.00 | 1040.00 | 1060.00 | 1080.00 | 1100.00 | 1120.00 | 1140.00 | 1160.00 | 1180.00 | 1200.00 | 1220.00 | 1240.00 | 1260.00 | 1280.00 | 1300.00 | 1320.00 | 1340.00 | 1360.00 | 1380.00 | 1400.00 | 1420.00 | 1440.00 | 1460.00 | 1480.00 | 1500.00 |
|---|---|---

LEGEND

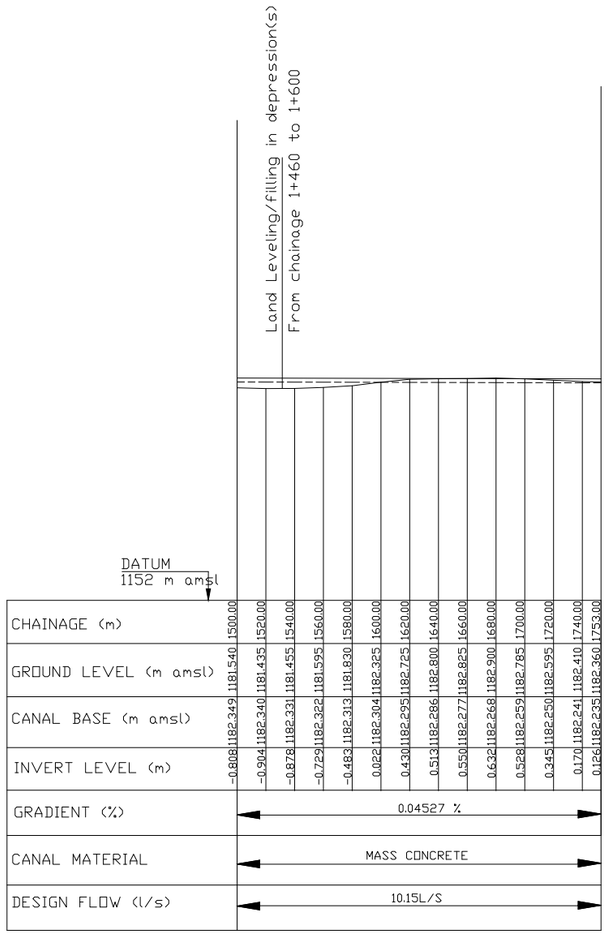
— — — — Canal Base

———— Canal Bank

Ground level

NOTES

Back filling material to canal base shall be applied on layers, 20cm thick, watered and compacted to min 95% to comply with modified AASHTO Density Test (T-80)



CHAINAGE (m)	1500.00	1520.00	1540.00	1560.00	1580.00	1600.00	1620.00	1640.00	1660.00	1680.00	1700.00	1720.00	1740.00	1753.00											
GROUND LEVEL (m amsl)	1181.540	1181.435	1181.455	1181.595	1181.830	1182.325	1182.725	1182.800	1182.825	1182.900	1182.785	1182.595	1182.410	1182.360											
CANAL BASE (m amsl)	1182.349	1182.340	1182.331	1182.322	1182.313	1182.304	1182.295	1182.286	1182.277	1182.268	1182.259	1182.250	1182.241	1182.235											
INVERT LEVEL (m)	-0.808	-0.904	-0.878	-0.729	-0.483	0.022	0.430	0.513	0.550	0.632	0.528	0.345	0.170	0.126											
GRADIENT (%)	0.04527 %																								
CANAL MATERIAL	MASS CONCRETE																								
DESIGN FLOW (l/s)	10.15L/S																								

DISTRIBUTION CANAL 17-1 PROFILE
1+500 to 1+753

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

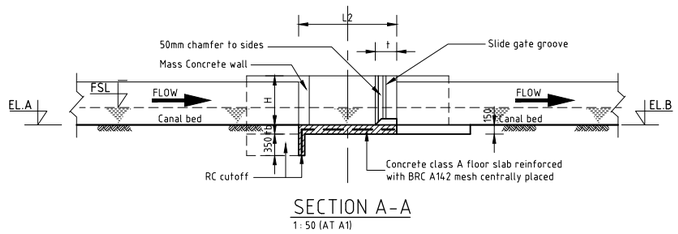
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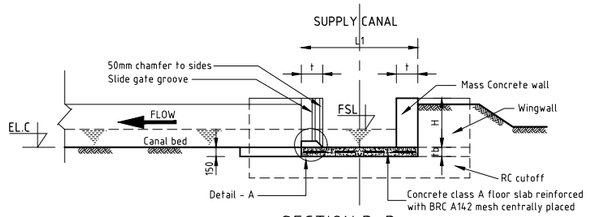
DWG. No. ISI/DFR/502

Sheet No. 2/2

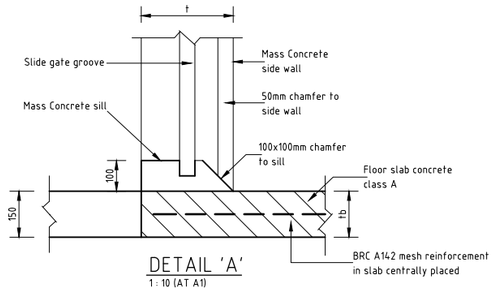
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Drawn: A.M	Date: 23RD/SEPTEMBER/2025
Checked: ENG. W. ONCHOKE	Date: 23RD/SEPTEMBER/2025
Approved: ENG. J. KIMANI	Date: 23RD/SEPTEMBER/2025



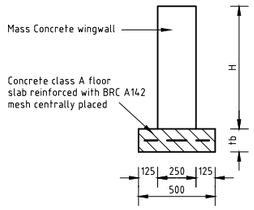
SECTION A-A
1 : 50 (AT A1)



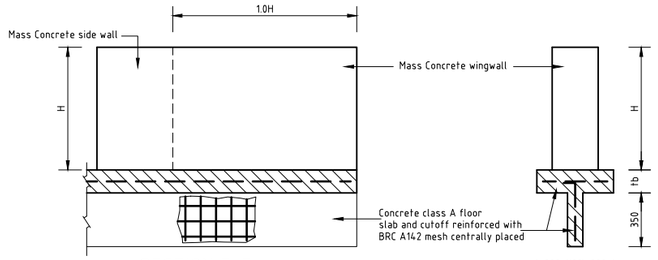
SECTION B-B
1 : 50 (AT A1)



DETAIL 'A'
1 : 10 (AT A1)



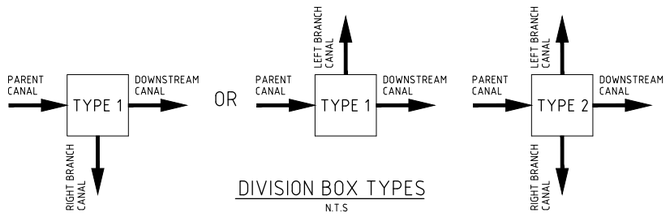
SECTION E-E
1 : 20 (AT A1)



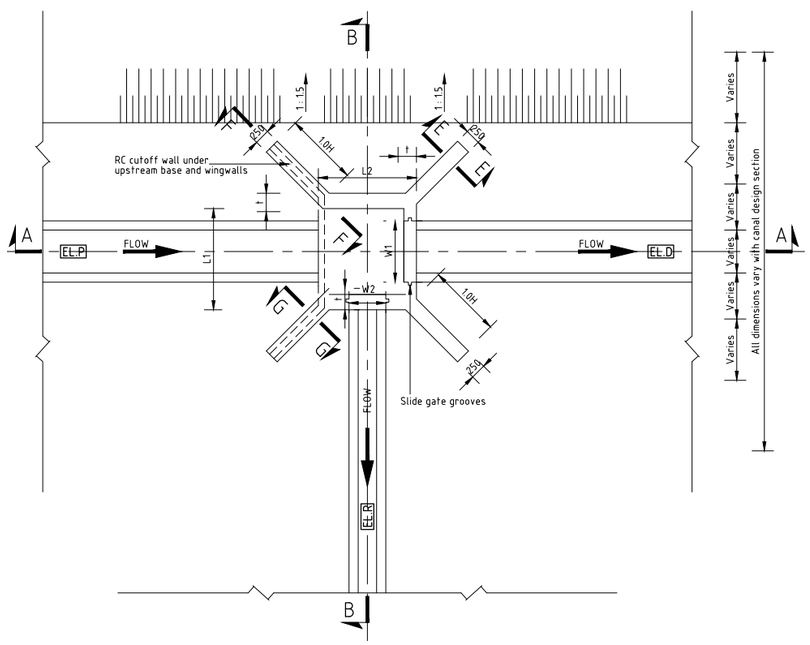
SECTION F-F
1 : 20 (AT A1)

NOTE:
RC cutoff wall to upstream
base and wingwalls only

SECTION G-G
1 : 20 (AT A1)



DIVISION BOX TYPES
N.T.S



PLAN
1 : 50 (AT A1)

TYPE 1

NOTES
1. Dimensions in millimetres unless otherwise indicated
2. Levels in metres above mean sea level
3. Reinforced concrete Class A unless otherwise stated
4. Mass concrete Class C unless otherwise stated
5. Chamfer all exposed concrete edges - 25mm
6. Concrete to be placed on scarified, compacted in-situ material. Any over-excavation below design level to be made up with mass concrete only.
7. Backfill to structure, including cutoff walls to be placed on horizontal, scarified and wetted in-situ material.
8. Water depth gauge plates as per Specification from invert level to wall top level.
9. Excavation below weir slab to proceed in 0.5m layers until such level as approved by the Enginner
10. For Steel slide gate see Drg. No.

PARENT CANAL DIVISION BOX DETAILS

STRUCTURE NUMBER	Description: Parent Canal Max Flow	Description: Branch Canal Max Flow	Structure Dimensions: Height	Length	Length	Wall Thickness	Base Thickness	Stoplog Width	Stoplog Width
	Q (l/s)	q (l/s)	H (m)	L1 (m)	L2 (m)	t (m)	tb (m)	W1 (m)	W2 (m)
DB 1	Varies	Varies	0.60	1.2	1.2	0.25	0.15	Varies	Varies
MC	16.3	—	0.60	1.2	1.2	0.25	0.15	0.7	Varies
SC13	3.31	1.38	0.60	1.2	1.2	0.25	0.15	0.6	0.6
SC17	11.57	11.57	0.60	1.2	1.2	0.25	0.15	0.7	0.7

BRANCH CANAL DIVISION BOX DETAILS

CANAL	Structure Dimensions: Parent Canal Max Flow	Branch Canal Max Flow	Stoplog Width
	Q (l/s)	q (l/s)	W2 (m)
SC1	16.3	1.65	0.6
SC2	–	1.65	0.6
SC3	–	1.65	0.6
SC4	–	1.65	0.6
SC5	–	1.65	0.6
SC6	–	1.65	0.6
SC7	–	1.65	0.6
SC8	–	2.2	0.6
SC9	–	1.65	0.6
SC10	–	1.65	0.6
SC11	–	2.48	0.6
SC12	–	1.38	0.6
SC13	–	3.31	0.6
DC13-1	3.31	1.38	0.6
SC14	–	6.34	0.65
SC15	–	5.51	0.65
SC16	–	3.03	0.6
SC17	–	8.26	0.7
SC17-1	11.57	11.57	0.7
SC18	–	4.68	0.65
SC19	–	1.93	0.6
SC20	–	3.58	0.6

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

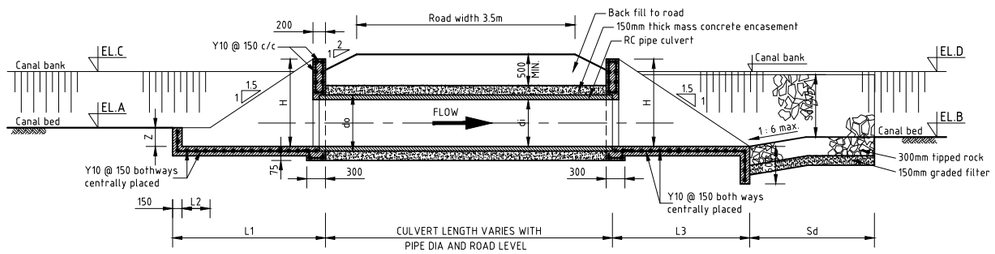
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DIVISION BOX STRUCTURE

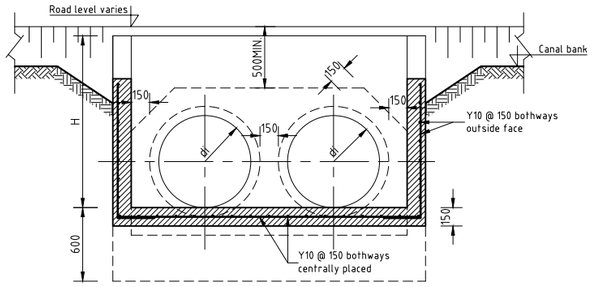
DWG. No.: ISI/DFR/601

Sheet No.: 1/1

Designed:	A.M	Date: 25TH/MARCH/2025
Drawn:	A.M	Date: 25TH/MARCH/2025
Checked:	ENG. W. ONCHOKE	Date: 25TH/MARCH/2025
Approved:	ENG. J. KIMANI	Date: 25TH/MARCH/2025



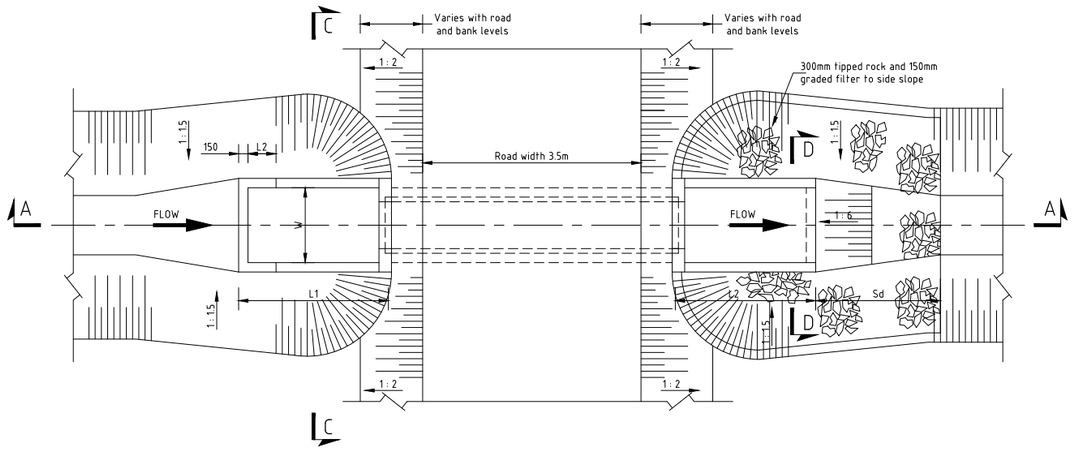
SECTION A-A
1 : 50 (AT A1)



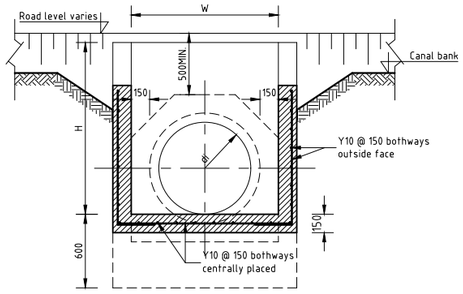
SECTION B-B
1 : 25 (AT A1)

Drawing Notes

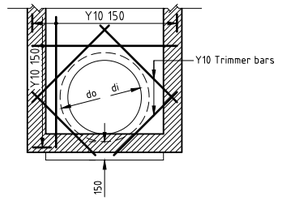
1. Dimensions in millimetres unless otherwise indicated
2. Levels are in metres
3. Reinforced concrete Class A
4. Mass concrete Class B
5. Provide 40mm minimum cover to reinforcement
6. Chamfer concrete edges 25mm
7. Concrete to be placed on compacted in-situ material. Any over excavation below design level must be made up with mass concrete only.
8. Backfill to structure, including cutoff walls to be placed on horizontal, scarified and wetted in-situ material.
   Backfill material to be selected in-situ material, compacted in 150mm layers.
   Moisture content to be between optimum moisture content (OMC) less 3% and OMC.
   Compaction to 95% Standard Proctor test.
9. Graded filter material to be clean, well graded coarse sand and gravel, class B
10. Tipped rock to be clean well-graded hard rock, class F
11. Road to be ramped as necessary to achieve minimum cover to pipe



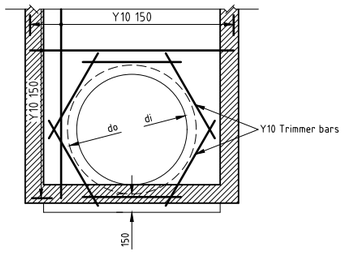
SINGLE BORE CULVERT PLAN
1 : 50 (AT A1)



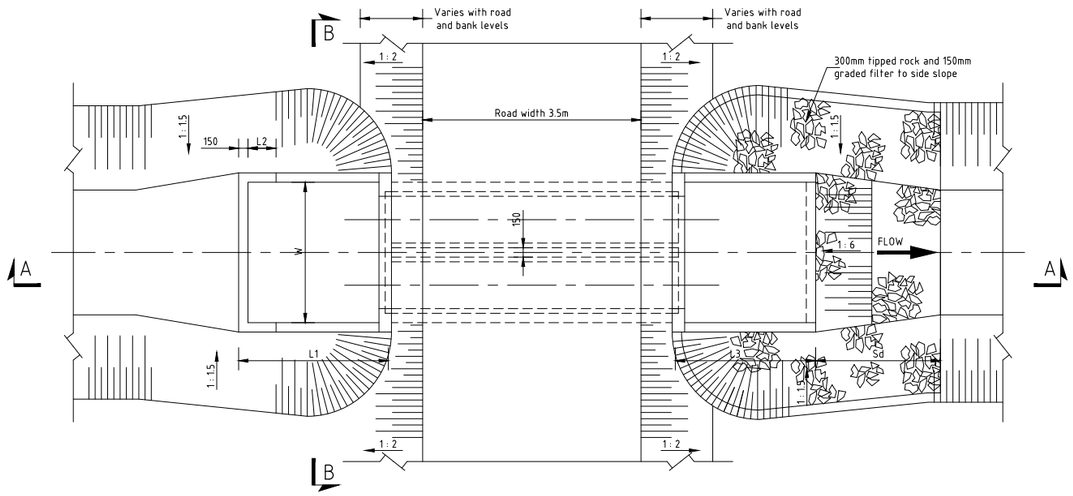
SECTION C-C
1 : 25 (AT A1)



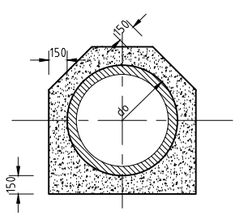
REINFORCEMENT TRIMMING DETAIL PIPE DIA (di) LESS THAN 600mm
1 : 25 (AT A1)



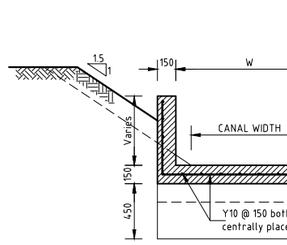
REINFORCEMENT TRIMMING DETAIL PIPE DIA (di) BETWEEN 600-900mm
1 : 25 (AT A1)



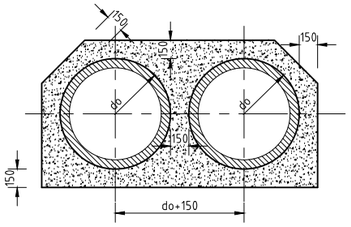
MULTIPLE BORE CULVERT PLAN
1 : 50 (AT A1)



TYPICAL SINGLE CULVERT BED AND SURROUND DETAIL
1 : 25 (AT A1)



SECTION D-D
1 : 25 (AT A1)



TYPICAL MULTIPLE CULVERT BED AND SURROUND DETAIL
1 : 25 (AT A1)

REINFORCED CONCRETE CULVERTS

Description		Dimensions									
CANAL	MAX FLOW	Pipe Internal Diameter	Pipe External Diameter	No. of Bores	Height	Structure Internal width	Inlet Structure Length	Inlet Box Length	Outlet Structure Length	Level Diff	d/s protection
	Q (l/s)	di (mm)	do (mm)	No.	H (m)	W (m)	L1 (m)	L2 (m)	L3 (m)	Z (m)	Sd (m)
MC	16.3	450	650	1	1.5	1.2	1.0	0.35	1.2	0.3	1.5
MC	6.34	450	650	1	1.5	1.2	1.0	0.35	1.2	0.3	1.5

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

PROJECT TITLE:

PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

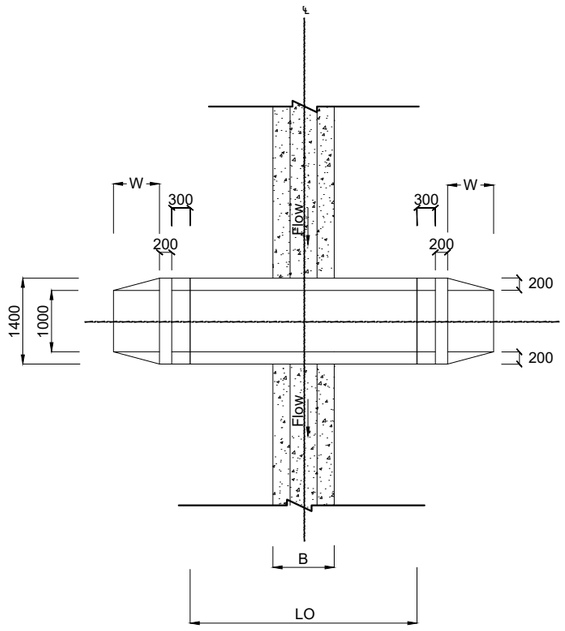
TITLE OF DRAWING:

RING CULVERT

DWG. No. ISI/DFR/602

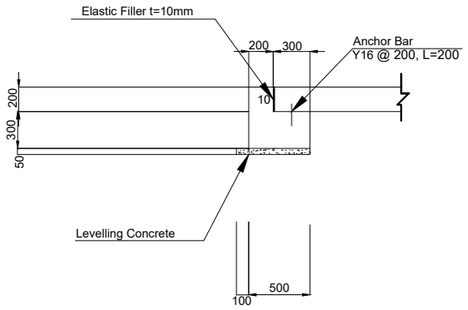
Sheet No. 1/1

Designed: A.M	Date: 25TH/MARCH/2025
Drawn: A.M	Date: 25TH/MARCH/2025
Checked: ENG. W. ONCHOKE	Date: 25TH/MARCH/2025
Approved: ENG. J. KIMANI	Date: 25TH/MARCH/2025



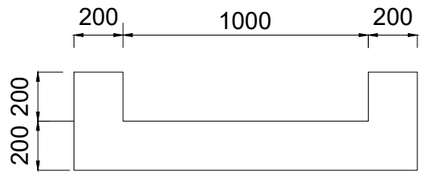
PLAN

Scale 1:100



ABUTMENT

Scale 1:50

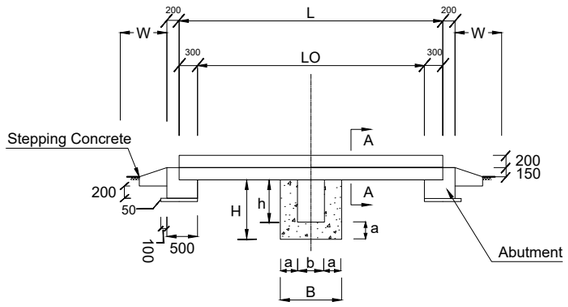


SECTION A-A

Scale 1:25

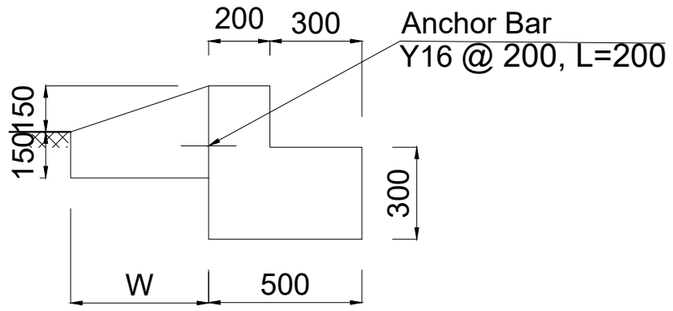
LIST OF FOOT BRIDGE OVER IRRIGATION CANALS
(Dimension Table)

Canal	a	b	h	H	B	LO	L
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)
MC	150	400	400	550	700	900	1500



PROFILE

Scale 1:100



STEPPING CONCRETE

Scale 1:20

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NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

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PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

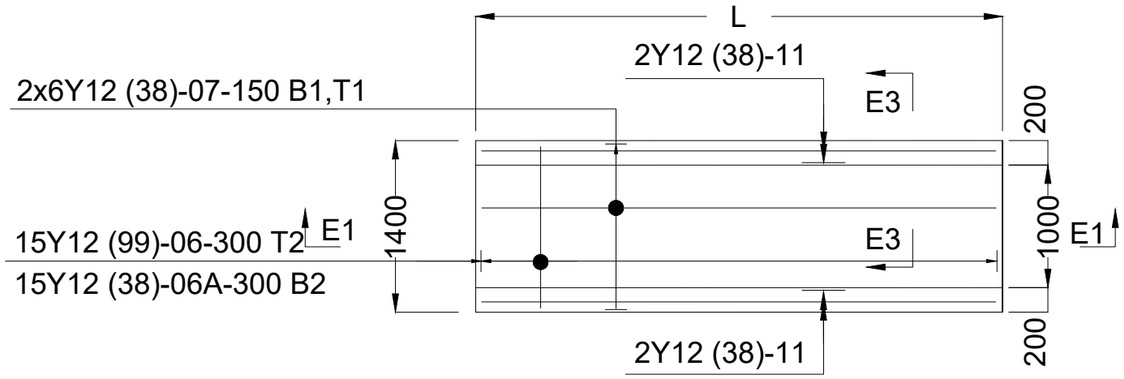
TITLE OF DRAWING:

FOOTBRIDGE STRUCTURE

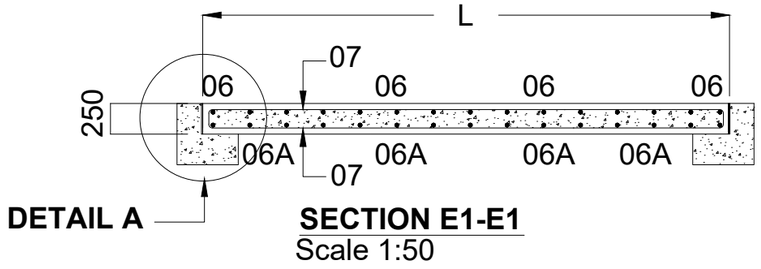
DWG. No. ISI/DFR/603

Sheet No. 1/2

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Approved:	ENG. J. KIMANI	Date:	25TH/MARCH/2025

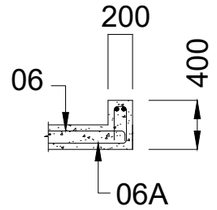


PLAN
Scale 1:50

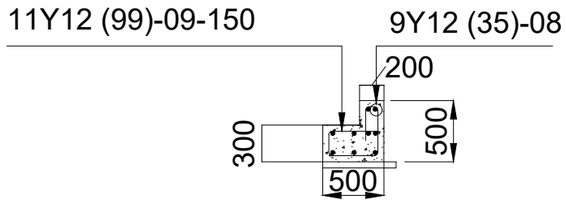


DETAIL A

SECTION E1-E1
Scale 1:50



SECTION E3-E3
Scale 1:50



ABUTMENT (2No)
Scale 1:50

NOTE:

BAR ANNOTATION

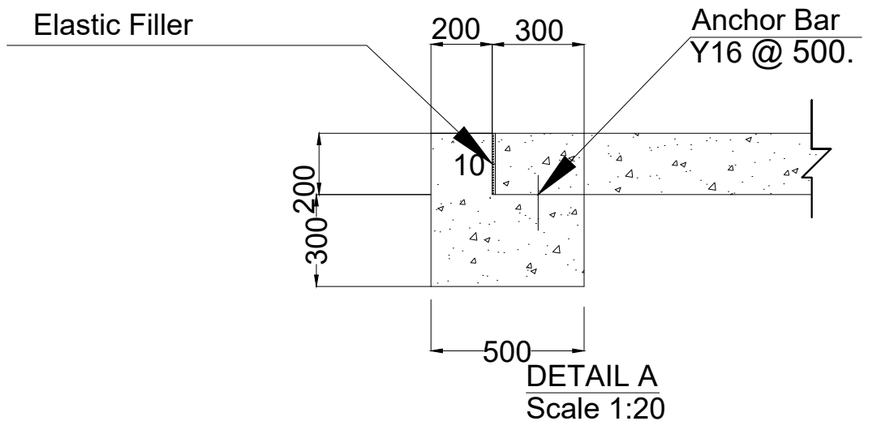
2x9Y12 (38)-04-300 NF

- 2 TIMES 9No.
- REINFORCEMENT BAR TYPE
- BAR DIAMETER
- BAR BENDING SHAPE CODE
- BAR PLACING POSITION
- BAR PLACING CENTRES
- BAR MARK

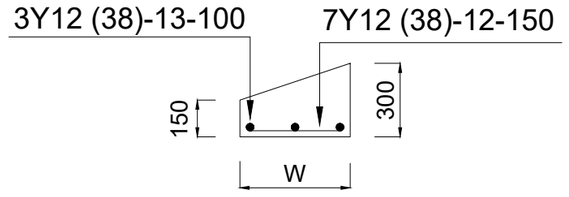
BAR ANNOTATION

NF DENOTES NEAR FACE
FF DENOTES FAR FACE
B1 DENOTES BOTTOM LOWER LAYER
B2 DENOTES BOTTOM UPPER LAYER
T1 DENOTES TOP UPPER LAYER
T2 DENOTES TOP LOWER LAYER

BAR SHAPES:
BAR BENDING SHAPES TO BS 4466



DETAIL A
Scale 1:20



STEPPING CONCRETE (2No)
Scale 1:25

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

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PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

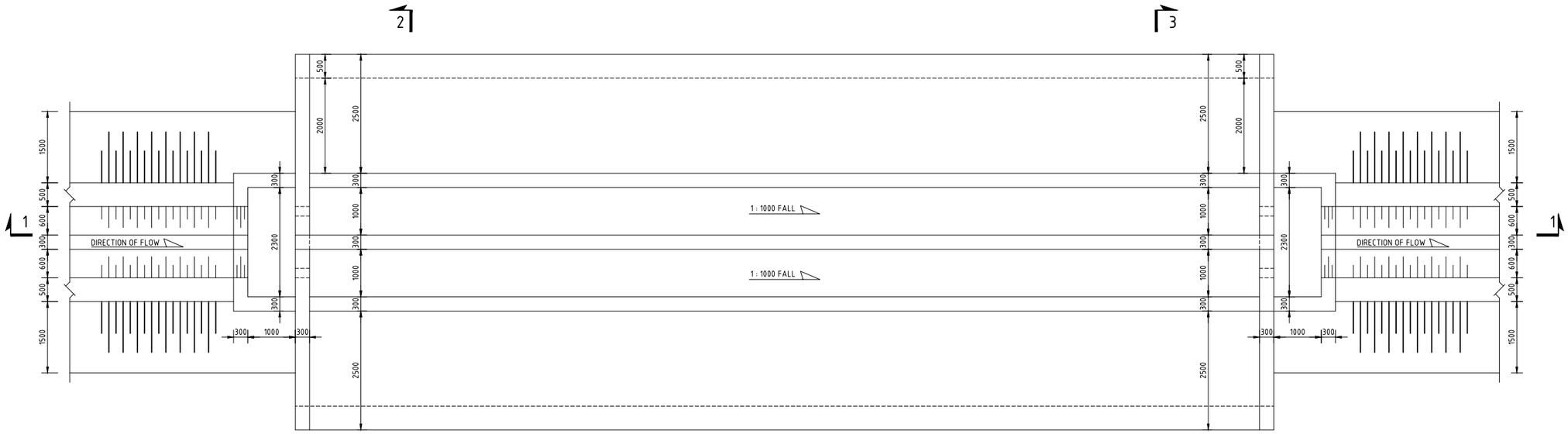
TITLE OF DRAWING:

FOOTBRIDGE STRUCTURE

DWG. No. ISI/DFR/603

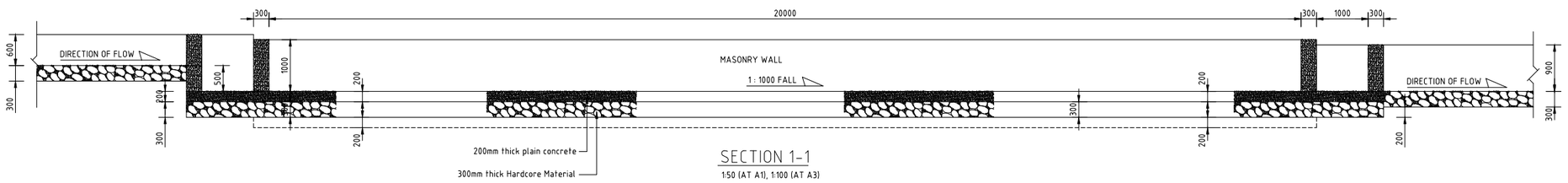
Sheet No. 2/2

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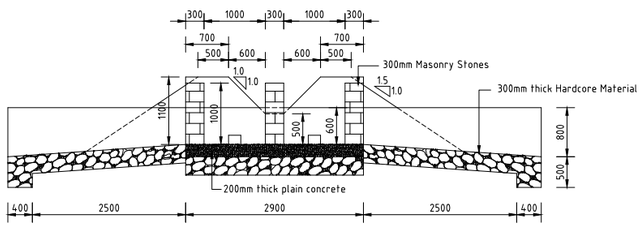
PLAN

1:50 (AT A1), 1:100 (AT A3)



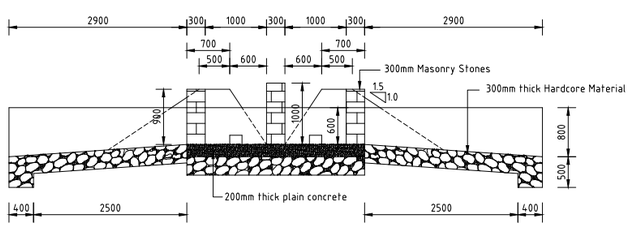
SECTION 1-1

1:50 (AT A1), 1:100 (AT A3)



SECTION 2-2

1:50 (AT A1), 1:100 (AT A3)



SECTION 3-3

1:50 (AT A1), 1:100 (AT A3)

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

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PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:

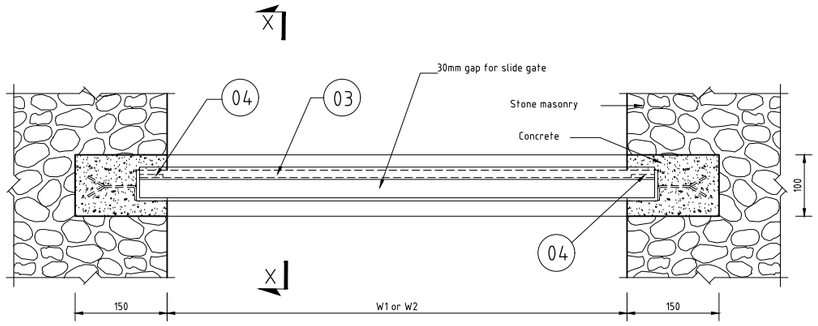
CATTLE TROUGH

DWG. No.: ISI/DFR/604

Sheet No.: 1/1

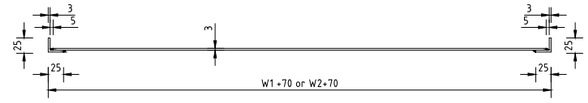
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Approved:	ENG. J. KIMANI	Date:	25TH/MARCH/2025

Note:
1.Dimensions H, W1 and W2 refer to standard division box dimensions

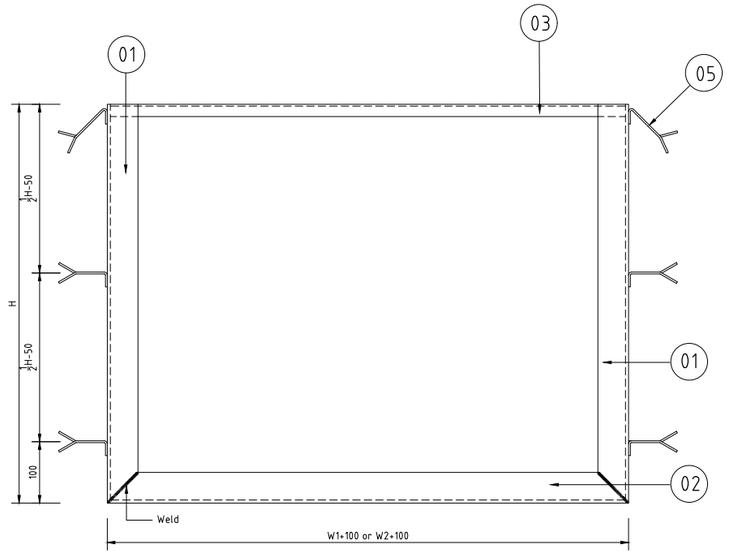


PLAN OF FRAME
1:5 (AT A1), 1:10 (AT A3)

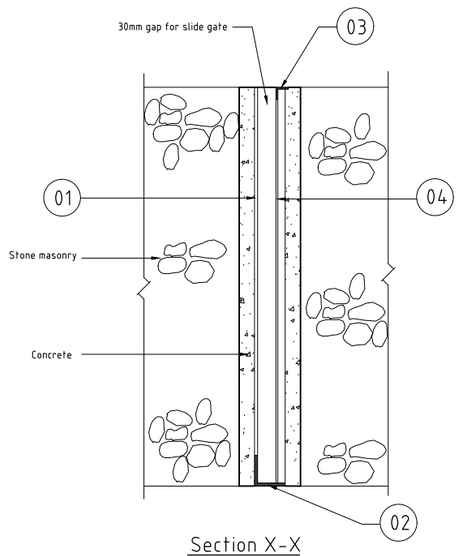
PART No.	Description	Material	Corrosion Protection	Steel Section Dimensions (mm)	Quantity (No.)
	FRAME FIXED IN GROOVES:				
01	Angle Iron - frame sides	Structural Steel	Galvanised	50 x 50 x 5	2
02	Angle Iron - frame bottom	Structural Steel	Galvanised	50 x 50 x 5	1
03	Angle Iron - frame top	Structural Steel	Galvanised	50 x 50 x 5	1
04	Flat iron-runner guide	Mild Steel Plate	Galvanised	38 x 3	2
05	Anchor plate	Mild Steel Plate	Galvanised	80 X25X3	6
	GATE BLADE				
06	Angle Iron - blade sides	Structural Steel	Galvanised	25 x 25 x 3	2
07	Angle Iron - blade bottom	Structural Steel	Galvanised	25 x 25 x 3	1
08	Angle Iron - blade top	Structural Steel	Galvanised	25 x 25 x 3	1
09	Gate blade	Mild Steel Plate	Galvanised	3	1
10	Gate handle	Mild Steel rod	Galvanised	12 dia. - 160	2



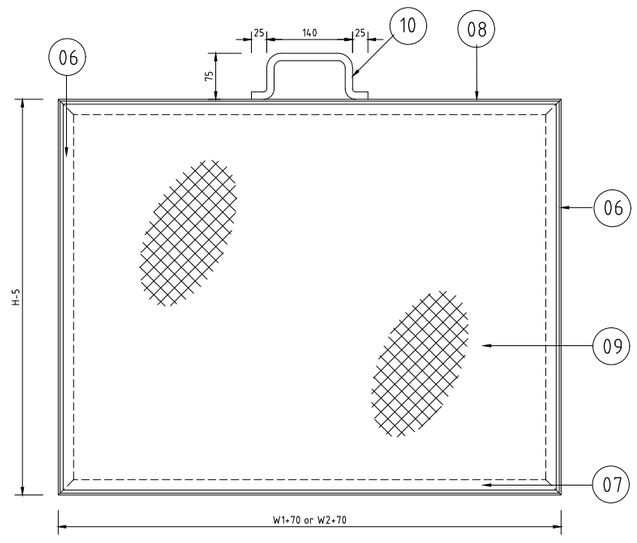
SECTION 1-1
1:5 (AT A1), 1:10 (AT A3)



SLIDE GATE FRAME
1:5 (AT A1), 1:10 (AT A3)



Section X-X
1:5 (AT A1), 1:10 (AT A3)



MS SLIDE GATE
1:5 (AT A1), 1:10 (AT A3)

No.	APPROVAL	DATE	REFERENCE

REPUBLIC OF KENYA

NAVCDP
NATIONAL AGRICULTURAL VALUE CHAIN DEVELOPMENT PROJECT

KAJIADO COUNTY

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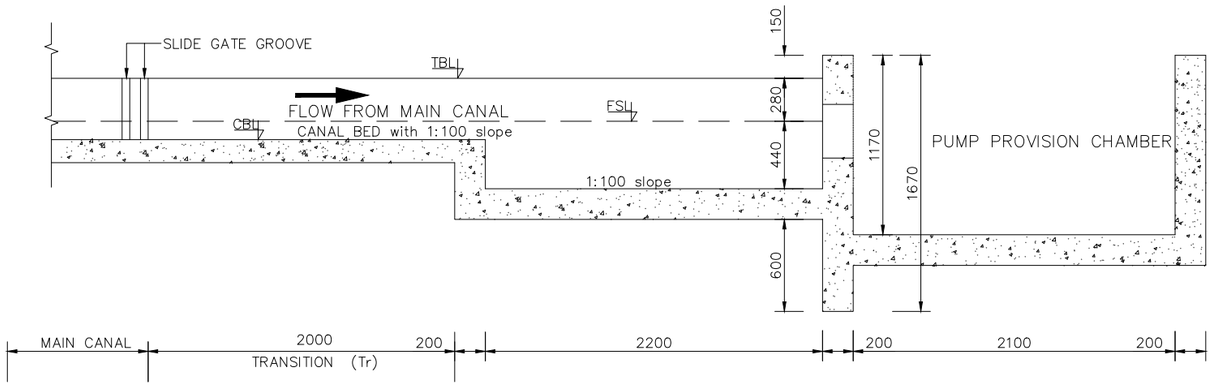
PROPOSED REHABILITATION OF ISINET-KALESIRUA IRRIGATION SCHEME IN IMBIRIKANI/ ESELENKEI WARD, KAJIADO SOUTH SUBCOUNTY

TITLE OF DRAWING:
SLIDE GATE

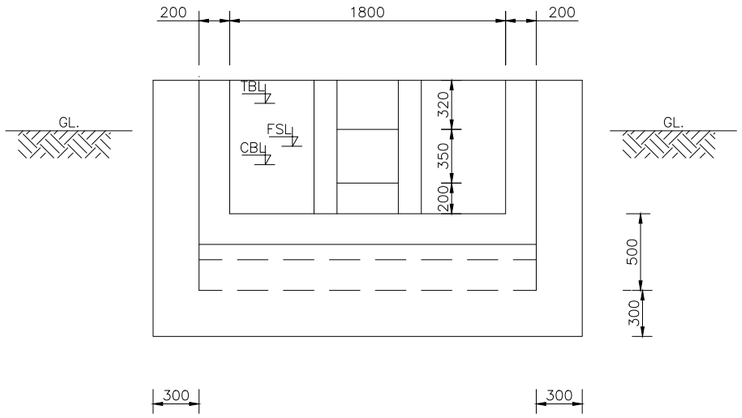
DWG. No.
ISI/DFR/605

Sheet No.
1/1

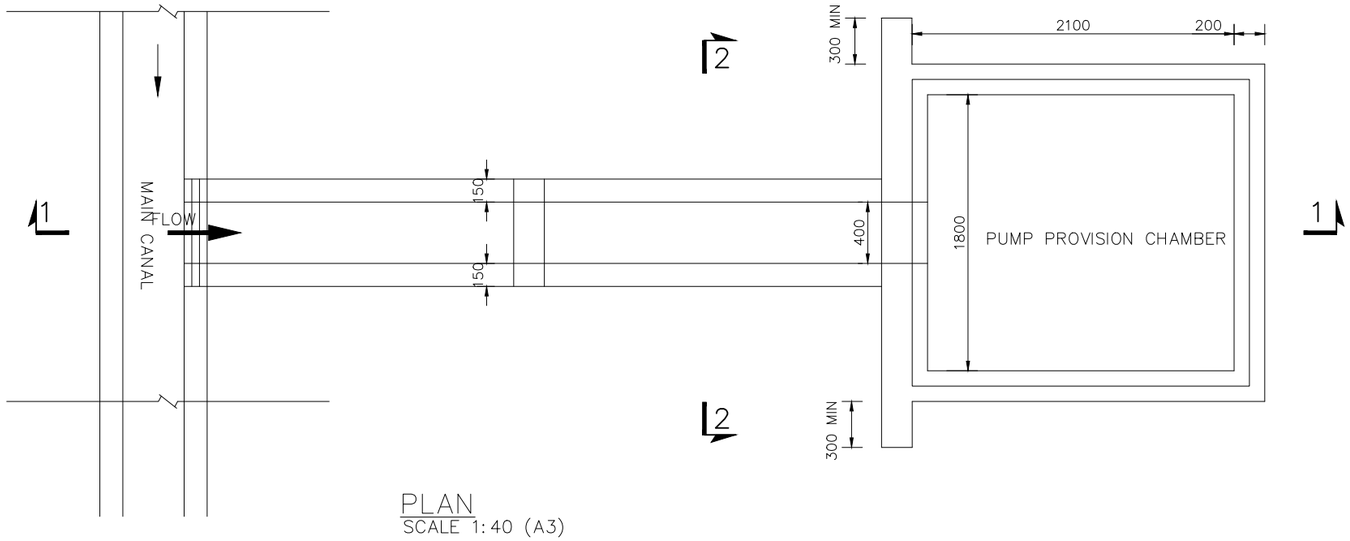
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Approved:	ENG. J. KIMANI	Date:	25TH/MARCH/2025



SECTION 1–1
SCALE 1:40 (A3)



SECTION 2–2
SCALE 1:40 (A3)



PLAN
SCALE 1:40 (A3)

LEGEND
CBL = CANAL BED LEVEL
FSL = FULL SUPPLY LEVEL
TBL = TOP BANK LEVEL

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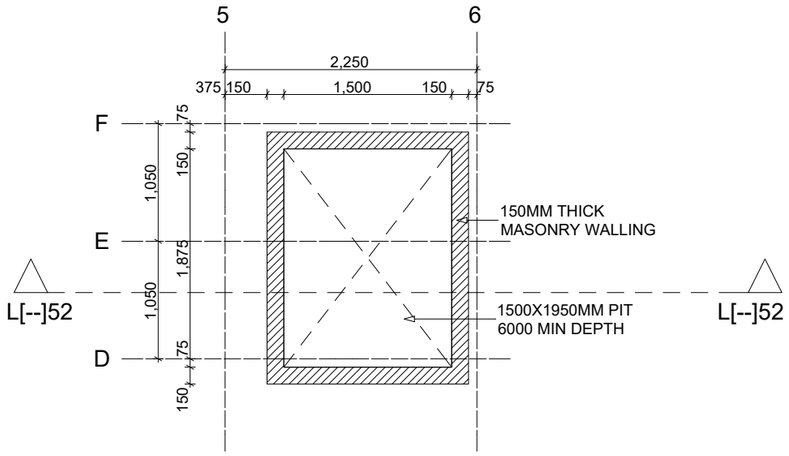
TITLE OF DRAWING:

PUMP PROVISION STRUCTURE

DWG. No. ISI/DFR/606

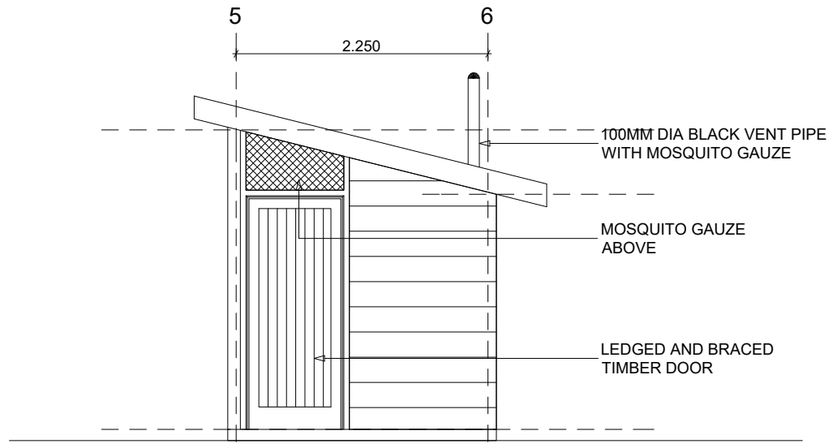
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Approved:	ENG. W. ONCHOKE	Date:	20TH/JUNE/2026

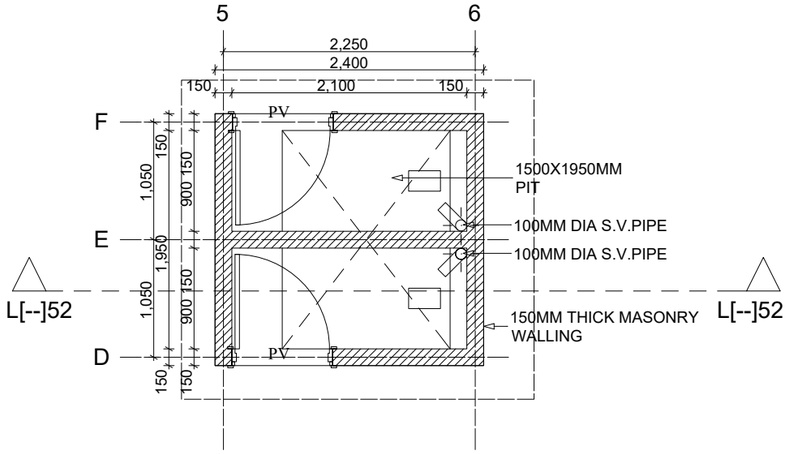


L[--]51 THE PIT

L[--]53

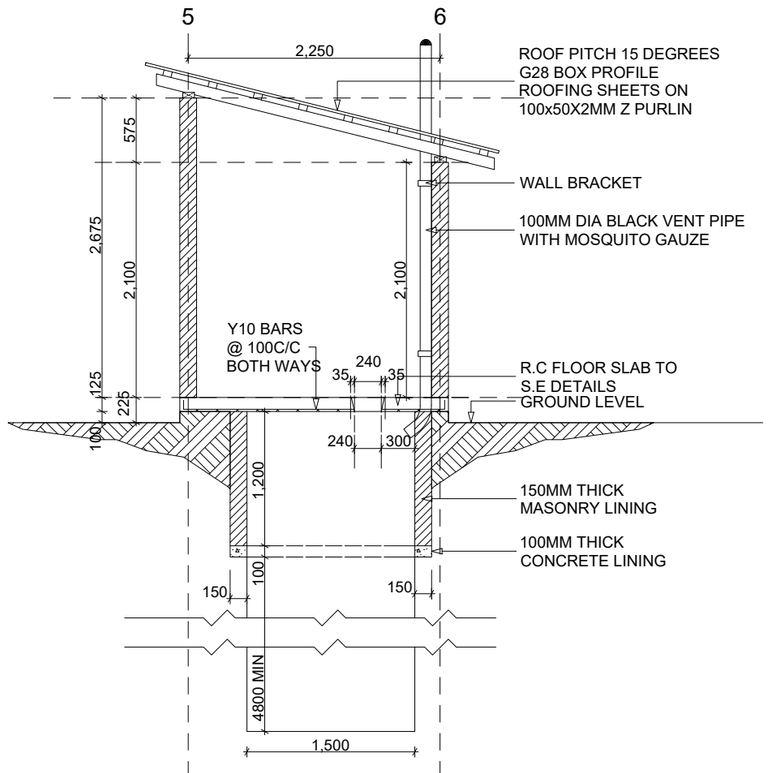


L[--]53 ELEVATION



L[--]50 DOUBLE DOOR PIT LATRINE

L[--]53



L[--]52 SECTION

No.	APPROVAL	DATE	REFERENCE

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TITLE OF DRAWING:

TOILET/LATRINE FACILITY

DWG. No. ISI/DFR/701

Sheet No. 1/1

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Drawn:	A.M	Date:	23RD/SEPT/2025
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