IRRIGATION AUTHORITY

EUROPEAN UNION

IRRIGATION AUTHORITY

OPEN NATIONAL BIDDING
FOR WORKS

GCCA+ FLAGSHIP INITIATIVE
"Supporting Climate Smart Agriculture for Small Holders in the Republic of Mauritius"

Building Resilient Irrigation Infrastructures at Solitude I, Solitude II and Pointe Aux Piments Drip Irrigation Projects

Procurement Reference No: EU/W-2022/01R

BIDDING DOCUMENTS

Public Body: Irrigation Authority
5th Floor, Fon Sin Building
12, Edith Cavell Street
Port Louis

May 2022

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Section I Instruction to Bidders

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1. Introduction

The Irrigation Authority also referred to as the Employer, invites eligible local contractors to submit their bid for the works described in detail hereunder. Any resulting contract shall be subject to the terms and conditions referred to in this document.

The Works consist of Building Resilient Irrigation Infrastructure at Solitude I, Solitude II and Pointe aux Piments Drip Irrigation Projects.

Participation is limited to citizens of Mauritius or entities incorporated in Mauritius. Joint Ventures should be among entities incorporated in Mauritius

1.1. Clarifications, if any, should be addressed to:

The General Manager
Irrigation Authority
5th Floor, Fon Sing Building
12, Edith Cavell Street
Port Louis

1.2. The Employerwill respond in writing to any request for clarification, provided that such request is received 14 days prior to the deadline for submission of bids.

The Employer shall respond to such request at latest 7 days prior to the deadline set for submission of bids.

1.3. Bidders are advised to carefully read the complete Bidding document, including the Particular Conditions of Contract in Section IV, before preparing their bids. The standard forms in this document may be retyped for completion but the Bidder is responsible for their accurate reproduction.

2. Validity of Bids

The bid validity period shall be Ninety (90) days from the date of bid submission, that is, **27 September 2022**.

3. Works Completion Period

The Intended Completion period for the whole of the works shall be **One hundred and Eighty (180)** calendar days from the Start Date.

4. Site Visit

Bidders or their designated representatives are invited to attend a pre-bid meeting/ site visit scheduled for **Wednesday, 08 June 2022 at 10.00 hrs** at the conference room of the sub-office of the Irrigation Authority at Plaine des Papayes. The purpose of the pre-bid meeting / site visit will be to clarify issues and to answer questions on any matter that may be raised at that stage.

The bidders shall be deemed to have a thorough understanding of the nature and extent of the works and thus, any request for extension of time during the bidding period will be not entertained.

5. Sealing and Marking of Bids

Bids should be sealed in a single envelope, clearly marked with the Procurement Reference Number, addressed to the Public Body with the Bidder's name at the back of the envelope.

6. Submission of Bids

Bids should be deposited in the Tender Box located at the reception at:

Irrigation Authority

5th Floor, Fon Sing Building

12, Edith Cavell Street

Port Louis

not later than 15.00 hours local time on **Thursday, 30 June 2022.** Bids by post or hand delivered should reach the above-mentioned address by the same date and time at latest. Late bids will be rejected. Bids received by e-mail will not be considered.

7. Bid Opening

Bids will be opened by the Irrigation Authority at **15:30 hours on the same day and date** of submission of Bids referred to in section 6 above. Bidders or their representatives may attend the Bid Opening if they choose to do so.

8. Evaluation of Bids

The Public Body shall have the right to request for clarification during evaluation. Offers that are substantially responsive shall be compared on the basis of evaluated cost to determine the lowest evaluated bid.

9. Eligibility Criteria

To be eligible to participate in this bidding exercise, Bidder should:

a. have the legal capacity to enter into a contract to execute the works;
b. be duly registered with the CIDB under the grade that would allow him to perform the value of works for which he is submitting his bid. (Note 1)
c. not be insolvent, in receivership, bankrupt, subject to legal proceedings for any of these circumstances or in the process of being wound up;
d. not have had your business activities suspended;
e. not be under a declaration of ineligibility by the Government of Mauritius in accordance with applicable laws at the date of the deadline for bid submission or appearing on the ineligibility lists of African Development Bank, Asian Development Bank, European Bank for Reconstruction and Development, Inter-American Development Bank Group and World Bank Group;
f. not have a conflict of interest in relation to this procurement requirement; and

g. have a Business Registration Card.

h. Proposed goods in accordance with the 'Rules on Nationality and Origin' as detailed in the Statement of requirements (Section III) Clause 1.10

Note 1

Sub-contractors undertaking works are also subject to registration with CIDB as applicable to Contractors.

10. Qualification and Experience Criteria

Bidders should have the following minimum qualifications and experience:

(a) Valid registration certificate with the CIDB under the grade that will enable the contractor to perform the works quoted for under the following class: Civil Engineering Construction works or Building Construction works.

(b) Experience in one (1) work of similar nature related to supply and installation of control valves over the last 10 years, of value not less than MUR 2 Million.

(c) Qualification and experience of Key personnel required for the Contract shall be:

(i). One Contract Manager (part time), holding at least a Degree in Civil Engineering from a recognised institution. He shall have at least 5 years experience in civil engineering works or building construction works.

(ii). Site agent (full-time) holding at least a Degree in Civil Engineering from a recognised institution and shall be registered with the Council of Registered Professional Engineer of Mauritius. He shall have at least 3 years post registration experience civil engineering works.

(iii). One foreman having at least 3 years of experience in pipe laying works and installation of water works.

(iv). At least one qualified plumber/pipe fitter having a minimum 3 years of experience related to installation of water works.

(d) Minimum amount of liquid assets and/or credit facilities, **''net of other contractual commitments''** of three million Mauritian rupees (MUR 3,000,000).

11. Contents of bid

The Bid shall comprise the following:

(a) Duly filled Bid Submission Form;

(b) Duly filled Priced Bill of Quantities/Activity Schedule;

(c) Duly filled Qualification Information Form and attachments required

(d) Report on the financial standing of the Bidder for the last three years, such as certified copies of Financial Statements or Audited Accounts as filed at the Registrar of Companies before the deadline set for submission of bids

(e)Valid Registration certificate with the CIDB, as applicable

(f)Signed C.V of Contract Manager;

(g)Documentary evidence of liquid assets and/or credit facilities (Note 1);

(h)Any other documents deemed necessary as per the requirements of this bidding document

Note 1

Bidders to demonstrate access to, or availability of, financial resources such as liquid assets, lines of credit, and other financial means, other than any contractual advance payments to meet the overall cash flow requirements for the contract and its current commitments. Documentary evidence may comprise but not limited to Bank certificate, Certificate from Auditors, Certificate from a Professional Accountant registered with MIPA, Certificate from Insurance companies.

12. Joint Venture

Bids submitted by a joint venture of two or more firms as partners shall comply with the following requirements:

a. The Bid shall include all the information required as per the Qualification Information form for each joint venture partner;
b. The Bid shall be signed so as to be legally binding on all partners;

c. The Bid shall include a copy of the agreement entered into by the joint venture partners defining the division of assignments to each partner and establishing that all partners shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms; **alternatively**, a Letter of Intent to execute ajoint venture agreement in the event of a successful bid shall be signed by all partners and submitted with the bid, together with a copy of the proposed agreement;
d. one of the partners shall be nominated as being in charge, authorized to incur liabilities, and receive instructions for and on behalf of any and all partners of the joint venture; and
e. Theexecution of the entire Contract, including payment, shall be done exclusively with the partner in charge.

13. Prices and Currency of Payment

Bidders should quote for the whole works. Prices for the execution of works shall be quoted and fixed in Mauritian Rupees (MUR). Items for which no rate or price is entered by Bidders, shall not be paid for by the Public Body when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities.

Bids shall cover all costs of labour, materials, equipment, overheads, profits and all associated costs for performing the works, and shall include all duties. The whole cost of performing the works shall be included in the items stated, and the cost of any incidental works shall be deemed to be included in the prices quoted. Bidders are required to submit their bid prices **including contingency sum and exclusive of 15% VAT**.

14. Bid Securing Declaration

Bidders are required to subscribe to a Bid Securing Declaration in the Bid Submission Form.

15. Margin of Preference

Margin of Preference shall not apply.

16. Award of Contract

The Bidder having submitted the lowest evaluated substantially responsive bid and qualified to perform the works shall be selected for award of contract. Award of contract shall be by issue of a Letter of Acceptance in accordance with terms and conditions contained in Section IV: General Conditions of Contract and Particular Conditions of Contract.

17. Performance Security and signing of contract

Within twenty-eight (28) days of the receipt of the Letter of Acceptance from the Employer, the successful Bidder shall furnish a Performance Security, in the amount equal to 10% of the Contract price (exclusive of VAT), in accordance with the conditions of contract, using for that purpose the Performance Security Form included in Section II Contract Forms.

The contract agreement shall be signed within 28 days after the successful bidder receives the letter of acceptance unless the parties agree otherwise.

Failure of the successful Bidder to submit the above-mentioned Performance Security or sign the contract within the required time may constitute sufficient grounds for the annulment of the award.

18. Notification of Award and Debriefing

Prior to the expiration of the period of bid validity, the Employer shall, for contract amount above Rs 15 million, notify the selected bidder of the proposed award and accordingly notify unsuccessful bidders. Subject to Challenge and Appeal, the Employer shall notify the selected Bidder, in writing, by a Letter of Acceptance for award of

contract. Until a formal contract is prepared and executed, the notification of award shall constitute a binding Contract.

The Public Body shall after award of contract, exceeding Rs 1 million and up to Rs 15 million, promptly inform all unsuccessful bidders in writing of the name and address of the successful bidder and the contract amount.

Furthermore, the Public Body shall attend to all requests for debriefing for contract exceeding Rs 1 million, made in writing within 30 days the unsuccessful bidders are informed of the award.

19. Advance Payment

The Public Body shall provide an Advance Payment on the Contract Price as stipulated in the General Conditions of Contract. The Advance Payment shall be guaranteed by an Advance Payment Security as per the format contained in Section II.

The Advance Payment shall be limited to fifteen percent (15%) of the Contract Price, excluding 15% VAT less any provisional and contingencies sums.

20. Integrity Clause

The Public Body commits itself to take all measures necessary to prevent corruption and ensures that none of its staff, personally or through his/her close relatives or through a third party, will in connection with the bid for, or the execution of a contract, demand, take a promise for or accept, for him/herself or third person, any material or immaterial benefit which he/she is not legally entitled to.

21. Rights of Public Body

The Irrigation Authority reserves the right to accept or reject any bid or to cancel the bidding process and reject all bids at any time prior to contract award without incurring any liability to the Public body.

22. Challenge and Appeal

Unsatisfied bidders shall follow procedures prescribed in Regulations 48, 49 and 50 of the Public Procurement Regulations 2008 to challenge procurement proceedings and award of procurement contracts or to file application for review at the Independent Review Panel.

The address, Tel.& Fax No.& Email address to file Challenges in respect of this procurement is:

The General Manager,

Irrigation Authority

5th, Floor, Fon Sing Building

12, Edith Cavell Street

Port Louis

Tel : +230 2106596

Fax: +230 212 7652

Email :irrig@irrig.org

The address to file Application for Review is:

The Chairperson

Independent Review Panel,

5th Floor,

Belmont House

Intendence Street

Port Louis

Tel : +230 2602228

Email :irp@govmu

Section II

Bidding Forms

Note: Bidders are required to fill all the forms in this section and submit as part of their bid. Non-submission of any form may lead to rejection of the bid

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BID SUBMISSION FORM

Date: ……..

Procurement Reference No: **EU/W-2022/01R**

To: The General Manager

Irrigation Authority

5th, Floor, Fon Sing Building

12, Edith Cavell Street

Port Louis

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda issued;

(b) We offer to execute in conformity with the Bidding Documents the Works under **CONTRACT: EU/W-2022/01R** consisting of, inter alia:

(i) Dismantling of existing control valves and to replace them with the supply, installation and testing of new control valves in existing reinforced chambers wherever specified on the delivery main and distribution main including for provision of all ancillary fittings.

(ii) Dismantling of existing equipment within main filtration plant and existing headworks and to replace respective existing equipment with the installation, testing of new equipment and ancillary fitting as specified.

(iii) Repair of existing reinforced concrete chambers including steel frame/cover, hinges and locking device wherever specified on the delivery/distribution main and as directed by Project Manager.

(iv) Supply of compensated and non-compensated dripper lines as specified and same to be determined and confirmed by the Employer.
(v) Supply all materials and goods required for construction of the project.
(vi) Temporary works where required.
(vii) The Contractor will be requested to provide training for Small Planters and Staff of the Irrigation Authority in the field of climate change and operation and maintenance irrigation equipment in the context of climate smart agriculture.

The intended completion period shall be **One Hundred and Eighty (180) calendar days** from the Start Date.

The whole of the works shall be carried out in strict accordance with the Drawings, Scope of Works, Specifications and Performance Requirements; and Conditions of Contract.

(c) The total price of our Bid and contingency sum excluding 15% VAT is: _____(MUR):

(d) Our bid shall be valid for a period of ninety (90) days from the date fixed for the bid submission deadline in accordance with the Bidding and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(e) We hereby confirm that we have read and understood the content of the Bid Securing Declaration attached hereto and subscribe fully to the terms and conditions contained therein, if required. We understand that non-compliance to the conditions mentioned may lead to disqualification.

(f) If our bid is accepted, we commit to obtain a Performance Security in accordance with the Bidding Document;

(g) We, including any subcontractors or suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 9;

(h) We are not participating, as a Bidder in more than one bid in this bidding process;

(i) Our firm, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, has not been declared ineligible under the laws of Mauritius;

(j) We have taken steps to ensure that no person acting for us or on our behalf will engage in any type of fraud and corruption as per the principles described hereunder, during the bidding process and contract execution:

i. We shall not, directly or through any other person or firm, offer, promise or give to any of the Public Body's employees involved in the bidding process or the execution

of the contract or to any third person any material or immaterial benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

ii. We shall not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelisation in the bidding process.

iii. We shall not use falsified documents, erroneous data or deliberately not disclose requested facts to obtain a benefit in a procurement proceeding.

We understand that transgression of the above is a serious offence and appropriate actions will be taken against such bidders.

(k) We understand that this bid, together with your written acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;

(l) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive; and

(m) If awarded the contract, the person named below shall act as Contractor's Representative:

Name: .....

In the capacity of: .....

Signed: .....

Duly authorized to sign the Bid for and on behalf of: .....

Date: .....

Seal of Company .....

Appendix to Bid Submission Form

BID SECURING DECLARATION

By subscribing to the undertaking in the Bid Submission Form:

I/We accept that I/we may be disqualified from bidding for any contract with any Public Body for the period of time that may be determined by the Procurement Policy Office under section 35 of the Public Procurement Act, if I am/we are in breach of any obligation under the Bid conditions, because I/we:

(a) have modified or withdrawn my/our bid after the deadline for submission of bids during the period of bid validity specified by the Bidder in the Bid Submission Form; or

(b) have refused to accept a correction of an error appearing on the face of the bid; or

(c) having been notified of the acceptance of our bid during the period of bid validity,

(i) Have failed or refused to execute the Contract, if required, or

(ii) Have failed or refused to furnish the Performance Security, in accordance with the Instructions to Quote.

I/We understand this Bid Securing Declaration shall cease to be valid:

(a) in case I/we am/are the successful bidder, upon our receipt of copies of the contract signed by you and the Performance Security issued to you by me/us ; or

(b) if I am/we are not the successful Bidder, upon the earlier of (i) the receipt of your notification of the name of the successful Bidder; or (ii) thirty days after the expiration of the validity of my/our bid.

In case of a Joint Venture, all the partners of the Joint Venture shall be jointly and severally liable.

QUALIFICATION INFORMATION

*[The information to be filled in by **bidders** in the following pages shall be used for purposes of post-qualification or for verification of prequalification as provided for in ITB. This information shall not be incorporated in the Contract. Attach additional pages as necessary. Pertinent sections of attached documents should be translated into English. If used for prequalification verification, the Bidder should fill in updated information only.]*

1. Individual Bidders or Individual Members of Joint Ventures

1.1 Constitution or legal status of Bidder: [*attach copy]*

Place of registration: [*insert]*

Principal place of business: [*insert]*

1.2 Bidder shall provide 2 works of a nature and amount similar to the Works performed as Contractor over the last 5 years.

Project/Contract name and country	Name of client and contact person	Type of work performed and year of completion	Value of contract (national currency)
(a) (b)			

1.3 Proposed subcontracts and firms involved. Refer to General Conditions of Contract Clause 7.

Sections of the Works	Value of subcontract	Subcontractor (name and address)	Experience in similar work
(a) (b)			

[Bidders have to ascertain that sub-contractors executing works are duly registered with the CIDB in accordance with CIDB Act 2008.

1.4 Name, address, and telephone, telex, and facsimile numbers of banks that may provide references if contacted by the Public Body.

2. Additional **2**.1 Bidders should provide any additional information Requirements requested in the Bidding Document.

CONTRACT AGREEMENT

THIS AGREEMENT made the ……. of …… ***[Date]***, between …… ***[Name of 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 the other Contract documents.
    a) The Letter of Acceptance
    b) The Bid
    c) The Addenda Nos……..(Insert Addenda numbers if any)
    d) The Appendix to the General Conditions of Contract
    e) The General Conditions of Contract;
    f) The Specifications
    g) The Drawings; and
    h) The Completed Schedules
3. In consideration of the payments to be made by the Employer to the Contractor as indicated in this Agreement, the Contractor hereby convenants with the Employer to execute the Works and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer hereby convenants 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 Mauritius on the day, month and year indicated above.

Signed by:	**Signed by:**
……	……
For and on behalf of the Employer	For and on behalf of the Contractor
In the presence of:	**In the presence of**
……..……	……..
Witness, Name, Signature, Address, Date	Witness, Name, Signature, Address, Date

PERFORMANCE SECURITY

.....*Bank/Insurance Company's Name and Address of Issuing Branch or Office*.....

Beneficiary: .....*Name and Address of Public Body*.....

Date.....

PERFORMANCE GUARANTEE No.: .....

We have been informed that .....*[name of the Contractor]* ..... (hereinafter called "the Contractor") has entered into Contract No.....*[reference number of the Contract]* ..... dated..... with you, for the execution of .....*[name of Contract and brief description of Works]* .....(hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, a performance security is required.

At the request of the Contractor, we ..... *[name of Bank/Insurance Company]* .....hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of ..... *[amount in figures (amount in words)]* ..... such sum being payable in the types and proportions of currencies in which the Contract Price is payable, upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation(s) under the Contract, without your needing to prove or to show grounds for your demand or the sum specified therein.

This guarantee shall expire and returned to us not later than twenty- one days from the date of issuance of the Defects Liability Certificate, calculated based on a copy of such Certificate which shall be provided to us, or on the.....day of ....., ..., whichever occurs first. Consequently, any demand for payment under this guarantee must be received by us at this office on or before that date.

…….....*Seal of bank/Insurance Guarantee and*

***Signature(s)*.....**

ADVANCE PAYMENT SECURITY

[Bank's/ Insurance Company's Name, and Address of Issuing Branch or Office]

Beneficiary: ***..... [Name and Address of Employer] .....***
Date:***.....***
Advance Payment Guarantee No.: ***.....***

We have been informed that . . .. . ***[name of the Contractor]*** . . . . . (hereinafter called "the Contractor") has entered into Contract No. . . . . ***[reference number of the Contract]*** . . . . . dated . . . . with you, for the execution of . . . . . ***[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 . . . . . ***[name of the currency and amount in figures]*** [1]. . . . . (. . .. . ***[amount in words]*** . . . . .) is to be made against an advance payment guarantee.

At the request of the Contractor, we . . .. . ***[name of the Bank/Insurance Company]*** . . . . . hereby irrevocably undertake to pay you any sum or sums not exceeding in total an amount of . . .. . ***[name of the currency and amount in figures] ****. . . . . (. . . . . ***[amount in words]*** . . . . .) upon receipt by us of your first demand in writing accompanied by a written statement stating that the Contractor is in breach of its obligation under the Contract because the Contractor used the advance payment for purposes other than the costs of mobilization in respect of the Works.

It is a condition for any claim and payment under this guarantee to be made that the advance payment referred to above must have been received by the Contractor on its account number . . .. . ***[Contractor's account number]*** . . . . . at . . .. . ***[name and address of the Bank/Insurance Company]*** . . . . . .

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as indicated 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 eighty (80) percent of the Contract Price has been certified for payment, or on the . . . day of . . . . , ... [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.

. . . . . ***[Seal of Bank/Insurance Company and Signature(s)]*** . . . . . .

QUOTATION CHECKLIST

Procurement Reference No: EU/W-2022/01R

S.N	Description	Attached (please tick if submitted)
1	Bid Submission form	
2	Priced Bill of quantities	
3	Specifications and Compliance sheet	
4	Bid Securing declaration	
5	Qualification Information	
6	Programme of Works	
7	Origin of goods	

Disclaimer: *The list defined above is meant to assist the Bidder in submitting the relevant documents and shall not be a ground for the bidder to justify its non-submission of major documents for its quotation to be responsive. The onus remains on the Bidder to ascertain that it has submitted all the documents that have been requested and are needed for its submission to be complete and responsive.*

Section III

Statement of Requirements

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A. SCOPE OF WORKS, SPECIFICATIONS AND PERFORMANCE REQUIREMENTS

1. General

1.1. Brief description

Following the award of a grant by the European Union through the Global Climate Change Alliance Plus (GCCA+) flagship initiative to finance the implementation of several activities as action entitled towards: *"Improving Resilience of Small Holders to the effect of climate change",* the Irrigation Authority (IA), plans to use part of the grant for payments under the contract for rehabilitation of key components of drip irrigation system on three existing projects with the objective to increase efficiency of water distribution to small Planters and also gear towards building resilient irrigation infrastructure within the irrigation projects.

The three existing Drip Irrigation Projects as per context & location plan, drawing EU/W-2022/01R/ 01 included.

1.2. Scope of Works

The works under **CONTRACT: EU/W-2022/01R** shall consist of, inter alia:

(i) Supply, install and test new control valves to replace existing ones wherever specified including for provision of all ancillary fittings on pipelines.

(ii) Replacement of existing equipment within main filtration plant and existing head works inclusive of ancillary fittings as specified.

(iii) Reinstatement of existing reinforced concrete chambers including steel frame/cover, hinges and locking device wherever specified on the as directed by Project Manager.

(iv) Supply of compensated and non-compensated dripper lines as specified and same to be determined and confirmed by the Project manager.

(v) Supply all materials and goods required for construction of the project.

(vi) Temporary works where required.

The intended completion period shall be **One Hundred and Eighty (180) calendar days** from the Start Date.

The whole of the works shall be carried out in strict accordance with the Drawings, Scope of Works, Statement of requirement; and Conditions of Contract.

1.3. List and order of materials

Prior to order for local manufacture or shipment, the Contractor shall prepare and submit to the Project Manager for approval the lists of all pipes, fittings, control valves, flow meters, jointing materials, filtration system, etc. required for the construction of each component of the Works from the information given in the Drawings, Bill of Quantities, Statement of Requirement and through site investigation.

The Contractor is strongly recommended to confirm dimensions and quantities of items through site investigation and to notify the Project Manager in writing if there are any discrepancies between the Drawings, Bill of Quantities of the bidding document and site survey prior to ordering.

In order to better understand our requirement all bidders are requested to attend a site visit which shall be fixed by the Irrigation Authority during the bidding stage.

The Contractor shall satisfy himself as to the quantities of the materials required for the Works and shall notify the Project Manager in writing if he considers that there are any discrepancies between the Drawings and Bills of Quantities or deficiencies in the Quantities indicated in the Drawings.

The Contractor shall prepare schedules for each component of the Works, in tabular or graphical form, showing how the various items of each component fit with one another.

The Contractor shall satisfy himself that the various methods of connections, i.e. flexible couplings, stepped couplings, flanges, flange adaptors, joints, threading etc. match with

one another and he shall notify the Project Manager in writing of any discrepancy he may have discovered.

The aforesaid notifications shall be made two calendar weeks before work is scheduled to start on Site and an absence of notification within the prescribed period shall be deemed to be an absence of deficiencies or discrepancies in the Drawings and Contractual Documents.

The Employer or Project Manager will not be liable to the Contractor for any delay due to any deficit or discrepancy in the Drawings unless such deficiency or discrepancy is notified at that time.

1.4. Drawings of the works

All the Drawings of the Works are attached herewith in the Bidding Documents. It shall be the responsibility of the Bidder to check any information therein prior to submitting his bid and to start of works. Any modifications or assumptions made on these drawings shall be notified by the Bidder in the separate memorandum.

The Bidder shall submit with his bid any additional drawings which he has used for pricing his bid.

As-built drawings shall be supplied as specified hereinafter.

1.5. DETAILS OF EXISTING PIPELINES, CEB LINES AND OTHER INFRASTRUCTURES

The Contractor shall verify the presence of pipelines, electric cables, underground structures and other infrastructures prior to execution of works within immediate surroundings to the site, and execute works without disturbing and damaging any of these features. Any disturbance caused to such infrastructures shall be immediately notified to the Project Manager.

Prior to excavations, the Contractor shall dig out the number of trial pits he judges necessary for exact identification of location and depth of the existing buried pipes. He

shall submit to the Project Manager for approval of a methodology for excavation so as not to disturb or damage the existing components, prior to execute work.

1.6. PROGRAMME OF THE WORKS

a. The whole of the works shall be completed within 180 calendar days from start date.
b. The Contractor shall submit a programme of works to the Project Manager for approval within fourteen (14) days from the date of issue of the Letter of Acceptance.
c. The Contractor shall during execution of the contract, revise the programme of works every fortnight and in addition as and when requested and directed by the Project Manager.
d. The works shall be carried out according to the programme submitted by the Contractor and approved by the Project Manager. The Contractor shall take the following into consideration while preparing the Programme of Works:
    - Pipeline will be closed for a maximum of 2 days on a particular site to allow for connection works.
    - The Contractor shall ensure that track roads are not obstructed and shall remain accessible to planters and irrigation workers
    - The Programme of works shall show all resources (labour, plant and equipment and cash flow) necessary to plan the weekly and monthly progress between the commencement and completion dates. Additionally, it shall show the timing, order of procedure and general method for carrying out the works, with timing for mobilisation of plant and equipment and for the purchase/ordering of goods for different stages of works.
    - The critical path with all activities involved therein shall clearly be shown.

- The Programme of Works shall also take due regards of the time required for drawings approval, testing and inspection at the works, freight and delivery to the storage area.

1.7. STANDARDS

Except where otherwise specified, all materials to be supplied under the contract shall conform to the requirements of the relevant and latest standards issued by the International Standard Organisation and the workmanship shall conform to the requirements of the relevant and latest British Standard Codes of Practice issued by the British Standard Institution. Other equivalent national standard specifications may be used in the absence, or in the place of a relevant ISO or BSCP standard, at the sole discretion of the Project Manager and with his approval. The standards of workmanship and finish shall be uniform throughout the whole contract and shall be approved by the Project Manager. The standards mentioned herein are issued by the Organisations listed in table 1 where the abbreviations used are defined.

All materials and workmanship not fully specified herein or covered by the standards mentioned before shall be of such kind as is used in first class work. The Project Manager shall determine whether all or any of the materials offered for use in the works are suitable for the purpose for which they are intended and the Project Manager's decision in that respect shall be final.

The Contractor shall supply at his own cost and shall permanently keep on sites all the standard specifications and Codes of Practice. These documents shall be available at all times for inspection and use by the Project Manager's Representative and shall revert to the Contractor at the end of the Contract.

A list of these standards shall be supplied in the Separate Memorandum of the Bidder.

Table 1: List of standards

Name and Address	Abbreviation
International Standard Organisation Code Postale 56 1211 GENEVA 20, Switzerland	ISO
Mauritius Standard Bureau MOKA, Mauritius	MS
British Standard Institution 389 Chiswick High Road GB- London W4 4 AL	BS BSCP
Association Française de Normalisation 23, Rue Notre Dame des Victoires 75002 - PARIS, France	AFNOR
DeutschesInstitutfürNormung BenthVertrichStrasse 1 BERLIN 30, West Germany	DIN
American Water Works Associtation 6666 West Quincy Avenue DENVER CO 80197, USA	AWWA
American Society for Testing Materials 1916, Race Street PHILADELPHIAPA19103, USA	ASTM
International Electrotechnical Commission Boite Postale 56 1211 GENEVA 20, Switzerland	IEC
Standard ComiteEuropeen de Normalisation Rue de Stassart, 36 B 1050 Bruxelles	CEN
Normes Francaise, AFNOR Tour Europe, F92049 Paris- La Defense FRANCE	NFC
Union Technique de L'Electricite 33, Ave. du General Leclerc BP 23-92262 Fontenay-aux-Roses – CEDEX	UTE

Table 1: List of standards (cont.)

Name and Address	Abbreviation
European Norm ON-CEN, PO Box 130, A-1021 Wien AUSTRIA	EN
Indian Standard Bureau of Indian Standards ManakBhavan, 9 Bahadur Shah Zafar Marg New Delhi-110002 INDIA	ISI
American Petroleum Institute American Society of Mechanical Project Managers American Welding Society American National Standards Institute 1819 L Street NW WashingtonDC20036, USA	API, ASME AWS ANSI

1.8. QUALITY OF MATERIALS

All goods to be supplied under this contract (pipes, control valves, filtration system, jointing materials, nuts, bolts, gaskets & other fittings) shall be suitable for irrigation water purposes. The quality of materials and goods shall be of first grade and best quality. All goods supply shall be new, unused, free from any defects and conforming to BS, EN, ISO or other equivalent standards and shall be approved by the Project Manager. Inferior or low-grade supplies shall be rejected by the Project Manager.

Bidder shall submit a complete catalogue information, descriptive literature, specifications and technical data for pipes, fittings, filtration equipment and control valves proposed in their Bids to enable the Employer to access their proposal. The Bidder shall be specific as to the country of origin and manufacturing firm of the items intended to supply under this Procurement.

1.9. PLANT AND EQUIPMENT

Contractor shall provide and install all necessary plant and equipment (mechanical and otherwise) for all other trades and allow for altering, adapting and maintaining them as necessary for efficient and expeditious execution of the works and at or before completion clear same from the site and make all good, to the entire satisfaction of the Project Manager.

In addition to what has already been specified, all Plant and Equipment shall be designed to provide adequate protection against the entry of vermin and dust and to minimise fire risk and consequential fire damage.

All parts which can be worn or damaged by dust shall be totally enclosed in dust proof housings.

All equipment shall operate without excessive vibration and with minimum of noise.

All similar items of plant and equipment and their components together with spare parts shall be made from the same material and shall be fully interchangeable.

All manually operated plants and equipment not located inside a building shall be provided with facilities for making it tamperproof. This is in addition to any requirements of the specification for securing plant under operational conditions.

1.10. EXTERNAL ACTION FINANCIAL INSTRUMENTS AND EUROPEAN DEVELOPMENT FUND RULES ON PARTICIPATION IN PROCUREMENT PROCEDURES AND GRANTS

TABLE OF CONTENT

A. Part I: 2014-2020 instruments for external action

1) Eligible countries for DCI, ENI , PI, Greenland and INSC (CIR - Article 9)

Participation in the award of procurement contracts, grants and other award procedures for actions financed under **DCI, ENI, PI, Greenland** and INSC forthe benefit of third parties shall be open to all natural persons who are nationals of, and legal persons that are effectively established in, one of the following eligible countries/territories/beneficiaries:

a) *EU Member States* (appendix 1)

b) ***IPA II beneficiaries (listed in the Annex I of IPA II Instrument (***appendix 2***)***

c) *European Economic Area* (appendix 3)

d) Developing countries and territories, (includedin the OECD-DAC list of ODA recipients[1]), which are not members of the G20 group[2]:

   i. *Least Developed Countries* (LDCs) (appendix 4)

   ii. *Other Low Income Countries* (appendix 5)

   iii. *Lower Middle Income Countries and Territories* (appendix 6)

   iv. *Upper Middle Income Countries and Territories* (appendix 7)

e) *Overseas Countries and Territories* (OCTs) covered by Council Decision 2013/755/EU of 25 November 2013 on the association of the overseas countries and territories with the European Union (appendix 8)

f) *Member States of the OECD* (appendix 9) ***are also eligible when contracts are exclusively implemented in a*** Least Developed Country[3] or in a Highly ***Indebted Poor Country (HIPC)***[4]**.**

[1] Please check the DAC List of ODA Recipients, effective for reporting on 2018, 2019 and 2020 flows.

[2] Non eligible G20 Members developing countries are: India, Indonesia, Argentina, Brazil, China, Mexico, South Africa. South Africa will be eligible when the action will be co-financed with the EDF. *Turkey* is also a developing country (upper middle income) G20 Member but is eligible as a ***beneficiary listed in the Annex I of*** the ***IPA II.***

[3] See appendix 4 for the full list of LDCs.

[4]HIPCs are: Afghanistan, Benin, Bolivia, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Comoros, Côte d'Ivoire, Democratic Republic of Congo, Ethiopia, Ghana, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nicaragua, Niger, Republic of Congo, Rwanda, São Tomé & Príncipe, Senegal, Sierra Leone, Tanzania, The Gambia, Togo, Uganda, Zambia.

g) (i) *Developing countries, as included in the list of ODA recipients, which are members of the G20 group* (appendix 10);

(ii) *any other countries and territories* (ie. all countries of the world).

The entities of these countries can only participate in procedures, where the country itself is a beneficary of the action. This can happen in particular, in thematic programmes, programmes financed under the PI or where the success of a regional programme necessitates the participation of the said country.

h) any countries for which *reciprocal access* to external assistance is established by the Commission.

Currently there are no such countries.

i) **for ENI Instrument only:** in addition to the countries/territories/beneficiaries mentioned above that are eligible for ENI, the following countries/territories are also considered eligible for contracts financed under the ENI Instrument:

i. *Partner countries or territories covered by the Instrument* (annex I of the ENI Intrument) (appendix 11);
ii. in the case of relevant procedures taking place in the context of the multi-country and cross-border co-operation programmes in which it[5] participates: *the Russian Federation.*

j) **For DCI, ENI, PI, Greenland and INSC**: where an agreement on widening the market for procurement of goods or services to which the Union is party applies, the procurement procedures for contracts financed by the budget shall also be open to natural and legal persons established in a third country other than those specified in the basic instruments governing the cooperation sector concerned, under the conditions laid down in that agreement.

2) for IcSP and EIDHR (CIR – Article 11)

All countries are eligible for participation in contracts financed under these Intruments that are fully untiedwithout prejudice to the limitations inherent to the nature and the objectives of the action.

3) ForIPA II (CIR- Article 10)

[5]In line with the upcoming corrigendum of the CIR, regarding Article 9(1)(b) (OJ L 316, 4.11.2014, p. 69) (FR).

Participation in the award of procurement contracts, grants and other award procedures for actions financed under the CIR **for IPA II** for the benefit of third parties shall be open to all natural persons who are nationals of, and legal persons who are effectively established in, one of the following eligible countries/ territories/beneficiaries:

a) *EU Member States* (appendix 1)
b) ***Beneficiaries listed in the Annex I of the IPA II (***appendix 2***)***
c) *European Economic Area* (appendix 3)
d) *Partner countries and territories covered by ENI Instrument* (annex I of ENI Intrument) (appendix 11)
e) countries for which Commission has adopted a decision approving the request for *reciprocal access*to external assistance.

Currently there are no such countries

f) where an agreement on widening the market for procurement of goods or services to which the Union is party applies, the procurement procedures for contracts financed by the budget shall also be open to natural and legal persons established in a third country other than those specified in the basic instruments governing the cooperation sector concerned, under the conditions laid down in that agreement.

Part II: Rules on nationality and origin for public procurement, grants and other award proceduresfinanced under the ACP-EC Partnership Agreement, laid down in Annex IV to the latter Agreement as revised by Decision No 1/2014 of the ACP-EU Council of Ministers of 20 June 2014 (2014/428/EU)

Participation in procedures for the award of procurement contracts or grants financed from the multi-annual financial framework of cooperation under the ACP-EC Partnership Agreement is open to all natural persons who are nationals of, or legal persons who are effectively established in:

(a) *an ACP State*(appendix 12);
(b) *a Member State of the European Union*(appendix 1);
(c) *Beneficiaries of the Instrument for pre-accession assistance* ***(***appendix 2***)***;
(d) *a Member State of theEuropean Economic Area*(appendix 3);
(e) *Overseas Countries and Territories*(appendix 8);
(f) developing countries and territories, as included in the OECD-DAC list of ODA Recipients, which are not members of the G20 group, without prejudice to the status of the *Republic of South Africa*, as governed by Protocol 3 of the partnership Agreement (appendices 4, 5, 6 and 7);
(g) countries for which Commission has adopted a decision approving the request for *reciprocal access*to external assistance in agreement with ACP countries;Currently there are no such countries.

(h) *a Member State of the OECD* (appendix 9), in the case of contracts exclusively implemented in a Least Developed Country (LDC)[6] or a Highly Indebted Poor Country (HIPC)[7].

Part III: rules on nationality and origin for public procurement, grants and other award procedures for instruments for external action financed under the Overseas Association Decision.

From the publication of the COUNCIL DECISION 2013/755/EU of 25 November 2013 on the association of the overseas countries and territories with the European Union ('Overseas Association Decision') the following rules are applicable to calls financed under the financial assistance of the EDF:

1. Tenderers, applicants and candidates from the following countries and territories shall be eligible to funding under this Decision:

   (a) *Member States of the European Union*(appendix 1)

   (b) *candidate countries and potential candidates* as recognised by the Union ***(***appendix 2***)***

   (c) *members of the European Economic Area*(appendix 3)

   (d) *OCTs*(appendix 8)

   (e) developing countries and territories, as included in the OECD-DAC list of ODA Recipients, which are not members of the G-20 group (appendices 4, 5, 6 and 7)

   (f) countries for which *reciprocal access* to external assistance is established by the Commission. Reciprocal access may be granted, for a limited period of at least one year, whenever a country grants eligibility on equal terms to entities from the Union and from OCTs;Currently there are no such countries.

   (g) *Member States of the OECD*(appendix 9), in the case of contracts exclusively implemented in a Least Developed Country[8].

[6]See appendix 4 for the full list of LDCs.
[7]See full list of HIPCs in footnote 4
[8]See appendix 4 for the full list of LDCs.

APPENDICES

APPENDIX 1 : EU MEMBER STATES

Austria, Belgium, Bulgaria, Czech Republic, Croatia, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom[9].

APPENDIX 2 : IPA II BENEFICIARIES

Albania, Bosnia and Herzegovina, Kosovo*, Montenegro, Serbia, Turkey, Republic of North Macedonia.

* This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.

APPENDIX 3 : EUROPEAN ECONOMIC AREA

(only non-EU MS are mentioned) Iceland, Lichtenstein, Norway.

APPENDIX 4 : LEAST DEVELOPED COUNTRIES

Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Sao Tome & Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sudan, South Sudan, Tanzania, Timor-Leste, Togo, Tuvalu, Uganda, Vanuatu, Yemen, Zambia.

[9]The United Kingdom ceased to be an EU Member State on the 31 of January 2020. Pursuant to the Withdrawal Agreement concluded between the EU and the UK, references to the eligibility of 'Member States' for participation in programmes under the current 2014-2020 MFF and the EDFs also cover the United Kingdom (Article 127(6), Article 137 and Article 152(1) Withdrawal Agreement).

APPENDIX 5: OTHER LOW INCOME COUNTRIES

Democratic People's Republic of Korea, Zimbabwe.

APPENDIX 6 : LOWER MIDDLE INCOME COUNTRIES AND TERRITORIES

Armenia, Bolivia, Cabo Verde, Cameroon, Congo, Côte d´Ivoire, Egypt, El Salvador, Eswatini, Georgia, Ghana, Guatemala, Honduras, India, Indonesia, Jordan, Kenya, Kosovo, Kyrgyzstan, Micronesia, Moldova, Mongolia, Morocco, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Philippines, Sri Lanka, Syrian Arab Republic, Tajikistan, Tokelau, Tunisia, Ukraine, Uzbekistan, Vietnam, West Bank and Gaza Strip.

APPENDIX 7 : UPPER MIDDLE INCOME COUNTRIES AND TERRITORIES

Albania, Algeria, Antigua and Barbuda, Argentina, Azerbaijan, Belarus, Belize, Bosnia and Herzegovina, Botswana, Brazil, China (People's Republic of), Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, Equatorial Guinea, Fiji, Republic of North Macedonia, Gabon, Grenada, Guyana, Iran, Iraq, Jamaica, Kazakhstan, Lebanon, Libya, Malaysia, Maldives, Marshall Islands, Mauritius, Mexico, Montenegro, Montserrat, Namibia, Nauru, Niue, Palau, Panama, Paraguay, Peru, Saint Helena, Saint Lucia, Saint Vincent & the Grenadines, Samoa, Serbia, South-Africa, Suriname, Thailand, Tonga, Turkey, Turkmenistan, Venezuela, Wallis and Futuna.

APPENDIX 8 : OVERSEAS COUNTRIES AND TERRITORIES[10]

Anguilla (UK), Aruba (NL), Bermuda (UK), Bonaire (NL), British Antarctic Territory (UK), British Indian Ocean Territory (UK), British Virgin Islands (UK), Cayman Islands (UK), Curação (NL), Falkland Islands (UK), French Polynesia (FR), French Southern and Antarctic Territories (FR), Greenland (DK), Montserrat (UK), New Caledonia and

[10]OCTs listed in Annex II to the TFEU having special relations with the United Kingdom are covered by the scope of the EU-UK Withdrawal Agreement. Therefore, pursuant to the EU-UK Withdrawal Agreement, Union law as referred to in Articles 137 WA therefore includes the rules on financing of OCTs and eligibility under the current 2014-2020 MFF and the EDFs (Article 3(1)(e), Article 127(6), Article 137 and Article 152(1),(3) Withdrawal Agreement).

Dependencies (FR), Pitcairn (UK), Saba (NL), Saint Barthelemy (FR), Saint Helena, Ascension and Tristan da Cunha (UK), Sint Eustatius (NL), Sint Maarten (NL), South Georgia and South Sandwich Islands (UK), St. Pierre and Miquelon (FR), Turks and Caicos (UK), Wallis and Futuna Islands (FR).

APPENDIX 9 : OECD MEMBER STATES

Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

Australia, Canada, Chile, Iceland, Israel, Japan, Korea, Mexico, New Zealand, Norway, Switzerland, Turkey, United States of America.

APPENDIX 10 : G20 MEMBER DEVELOPING COUNTRIES

Argentina, Brazil, China, India, Indonesia, Mexico, South-Africa, Turkey.

APPENDIX 11 : ENI PARTNER COUNTRIES AND TERRITORIES

Algeria, Armenia, Azerbaijan, Belarus, Egypt, Georgia, Israel, Jordan, Lebanon, Libya, Republic of Moldova, Morocco, occupied Palestinian territory (oPt), Syria, Tunisia, Ukraine.

APPENDIX 12 : ACP COUNTRIES*

Africa:

South Africa**, Angola, Benin, Botswana, Burkina Faso, Burundi, Central African Republic, Cameroon, Cabo Verde, Chad, Comoros Islands, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Equatorial Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritius, Mauritania, Mozambique, Namibia, Niger, Nigeria, Uganda, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, , Tanzania, Togo, Zambia and Zimbabwe.

Caribbean:

Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Dominican Republic, Grenada, Guyana, Haiti, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Surinam, Trinidad and Tobago.

Pacific:

Cook Islands, East Timor, Fiji, Kiribati, Marshall Islands, Micronesia, Nauru, Niue, Palau, Papua New Guinea, the Solomon Islands, Western Samoa, Tonga, Tuvalu, Vanuatu.

** While natural and legal persons established in South Africa are eligible to participate in procedures financed by the 10th/ 11th EDF, South Africa cannot be a beneficiary of contracts financed by the 10th/11th EDF.

* Cotonou Partnership Agreement of 23 June 2000 (as amended by the provisional application of Decision No 1/2000 of the ACP-EC Council of Ministers of 27 July 2000, Decision No 1/2000 of the ACP-EC customs cooperation committee of 18 October 2000, Decision No 1/2001 of the ACP-EC customs cooperation committee of 20 April 2001, Decision No 2/2001 of the ACP-EC customs cooperation committee of 20 April 2001, Decision No 3/2001 of the ACP-EC customs cooperation committee of 10 May 2001, Decision No 4/2001 of the ACP-EC customs cooperation committee of 27 June 2001, Decision No 5/2001 of the ACP-EC customs cooperation committee of 7 December 2001, Decision No 2/2002 of the ACP-EC customs cooperation committee of 28 October 2002, Decision No 1/2003 of the ACP-EC Council of Ministers of 16 may 2003, Council Decision (EC) of 19 December 2002, Decision No 1/2004 of the ACP-EC Council of Ministers of 6 may 2004, Decision No 2/2004 of the ACP-EC customs cooperation committee of 30 June 2004 and Decision No 4/2005 of the ACP-EC customs cooperation committee of 13 April 2005).

2. The Sites

2.1. Site

The site location is indicated in Drawing No. EU/W-2022/01R/01

2.2. Inspection of site

The availability of data and drawings do not relieve the Contractor of his responsibility to inspect the Site for further investigations required for execution of the Works.

The Contractor is recommended to acquaint himself with the site locations. He shall assess the presence of all visible structures or obstacles, rock piles and ranges, trees, steep slopes, conditions of track roads, etc. The Contractor shall ascertain that the equipment he intends to propose is perfectly adapted to operate fully and satisfactorily under the topographical conditions of the site. He shall take into consideration all the above factors while pricing in the Bill of Quantities.

2.3. Access to site

- The Contractor shall give notice to the Employer prior to shipment and delivery of equipment and supplies to Site. The Employer shall grant possession of site or part of it to the Contractor as specified in Conditions of Contract and directed by the Project Manager taking into consideration the programme of work.
- The Contractor shall give notice to the Project manager prior to commence work.
- The Contractor shall be responsible for the reinstatement of existing roads if same were disturbed/damage at respective site and shall also be responsible for safe and easy passage of vehicles on the existing track roads.

2.4. Clearance of site

Site clearance shall be carried out over the areas to be occupied by the works and for working space and shall consist of removal and carting away of all trees, sugar cane bushes and other vegetation and the grubbing out of all roots and also rocks and boulders. Topsoil so removed shall be kept aside for reinstatement.

2.5. Site to be tidy

The site shall be maintained in a neat, tidy and healthy condition, and the Contractor shall remove all waste, debris and unwanted materials and other litter from site upon completion of works.

2.6. Safety on site

The Contractor shall adhere to all rules and regulations regarding health and safety of personnel as directed by the OSHA 2005 & regulations, the Irrigation Authority's Health and safety officer. The successful bidder shall take all necessary steps to ensure that the works are done in an orderly manner and that safety precautions are enforced to avoid accidents to the personnel of the successful bidder and to other parties working on Site.

2.7. First aid outfit

The Contractor shall provide and maintain on Site in readily available positions near the sites of work, adequate first aid outfit and have experienced first aid man available for attending minor accidents. Fire extinguishers shall also be kept on site.

2.8. Reinstatement of sites, tracks and estate roads

Upon completion of Works the successful bidder shall reinstate the Sites, Tracks and Estate roads in a condition not less satisfactory than they were prior to commencement of work.

2.9. Maintenance of services and structures

The Contractor shall ascertain the location of all watercourses, sewers, drains, water pipes, electricity, telecommunication cables, other services and structures which may be encountered during the construction of the Works. He shall temporarily support or divert and subsequently reinstate all such services and structures as necessary and to the satisfaction of the Project Manager.

As soon as any such service or structure is encountered on, over, under, in or through the Site during the performance of the Contract, the Contractor shall make a record of the location and detailed description of such service or structure and shall send the same forthwith to the Project Manager.

Where permanent diversion or support of such service or structure is rendered necessary as the unavoidable result of the construction of the Works in accordance with the Contract, the Project Manager - after consultation with the Employer will instruct the Contractor as to the diversion or support to be provided and the Contractor shall be paid the costs thereof in accordance with Clause 40 of the General Conditions of Contract.

2.10. Site records

Where specified or ordered by the Project Manager, the Contractor shall take and test samples of the materials and water in and about the excavations and in the fill. The Contractor shall make records of the position and extent in the excavations of every type of service, stratum and ground water encountered during the construction of the Works and of samples taken and results of tests of such materials and water.

The Contractor shall also make records of the labour, plant and material employed on site. The plant schedules and labour time sheets shall be submitted for approval to the Project Manager's Representative on every working day.

The records shall be prepared in a form to the approval of the Project Manager and shall be submitted to him in duplicate as soon as practicable after the events and observations which they record.

2.11. Pipes, fittings, irrigation equipment and store yard

All pipes, fittings, equipment and other materials to be used in temporary or permanent works shall be delivered from ships or local suppliers to a store yard approved by the Project Manager. No equipment shall be stored directly on site of works without approval from the Project Manager. The programme of delivery of these pipes, fittings, control valves and equipment to site shall be supplied by the Contractor in his separate memorandum.

The Contractor shall make his own arrangements for all land, store yards, stores, workshops, offices, etc. and for all services in connection therewith. The storage of the fittings and irrigation equipment shall be to the satisfaction of the Project Manager. The Project shall have access to the store yard to inspect the all pipes, control valves, fittings, pumps and equipment by the Project Manager prior to acceptance.

At time of delivery and acceptance, the equipment to be incorporated in the Works shall be inspected by the Contractor who shall thereafter be responsible for their storage, stock control and safe keeping. The Employer or the Project Manager shall be in no way responsible for breakages or losses of equipment and such items shall be replaced or repaired by the Contractor to the satisfaction of the Project Manager at no cost to the Employer.

The Contractor shall keep structured records on all items available in the store, i.e date of shipment, date of delivery, date of issue to be incorporated in Works, quantity used/left in stock, quantity damaged, etc. Such records shall be made available to the Project Manager on a regular basis.

2.12. Restrictions on use of roads

a. Traffic Restrictions

The Contractor shall not run tracked vehicles or tracked plant on any public or private road without the written approval of the Project Manager and the responsible authority or owner and subject to such conditions as each may reasonably require.

The Contractor shall observe all weight and dimensions restrictions which apply to road and tracks in Mauritius and he shall comply with all restrictions which may from time to time be imposed by the Project Manager, Employer, Police, responsible authority or owner. Where damages to roads and tracks are caused by the Contractor this shall be repaired at the Contractor's expense. In particular the Contractor shall fill potholes in roads with road stone when these are deepened by his plant.

The Project Manager shall have the power to restrict the Contractor's use of any roads, either in direction of traffic, speed of traffic or numbers of vehicles in order to preserve such roads or to make such roads safe for use by the general public.

Where other Contractors require the use of these roads or tracks, the Project Manager may prescribe times of usage, or any other form of control, which shall be executed by the Contractor, including the supply of traffic lights, flagmen, or any other thing.

b. Pipe work adjacent to Public Roads

Notwithstanding requirements stated elsewhere in the Specification, the Contractor shall comply with the additional requirements contained in this Clause whenever carrying out any work in connection with pipe laying in or adjacent to public roads.

The Contractor shall at all time carry out any work in or adjacent to public roads in a manner to the approval of the Project Manager and the responsible authorities and only at such times and during such hours as may be agreed by the competent authority. The Contractor shall obtain any permits from authorities that are required.

At no time shall the Contractor commence work in or adjacent to any public road without prior approval of the Project Manager.

The Contractor shall, when working in or adjacent to any public road, cause the least interference possible to the flow of traffic and shall at all times, maintain unimpeded sufficient width of the carriageway to permit single lane traffic.

The Contractor shall control the flow of traffic past restrictions caused by his operations by means of stop/go boards or traffic signals positioned at both ends of the restricted section of road. Traffic control shall be to the approval of the Ministry of Public Infrastructure and Public Safety, the police and the Project Manager and be in operation at all times and for as long as any restrictions caused by the Contractor's operations exist. They shall be continuously attended by flagmen. Warning signs shall be posted well in advance of any section of restricted road.

All sections of roadway affected by the Contractor's operations shall be bounded by barriers, tapes, bunting or similar means to afford adequate and effective warning to all road users.

The Contractor shall arrange his work in or adjacent to public roads in such a way that the length of road restricted by his operations shall at no time exceed 50 m without the written consent of the Project Manager and restricted sections of road shall be separated by at least 500 m of clear unrestricted roadway.

c. Flagging, Lighting, Watching and Traffic Control

The Contractor shall be responsible for watching and lighting the Works and for the flagging and control of traffic and he shall comply with the requirements of the Employer and Police and the relevant authority in these matters.

d. Access Roads

All surfaced roads, tracks and surfaced areas used by the Contractor shall be continually maintained by him in good condition. Immediately after ceasing to use any road, track or surfaced area the Contractor shall restore it to the satisfaction of the Project Manager and the responsible authority or owner. The provision of this Clause shall

apply also to the shoulders and verges of any existing sealed road used by the Contractor and affected by his operations.

2.13. Site office and services provided to project manager

a. Site Office

Project Manager shall use Office at Solitude I and II for supervision and contractual meeting.

b. Assistance to the Project Manager

The Contractor shall make available such labour and materials as the Project Manager may require for survey work in connection with the works. The Contractor shall provide at his own expense any necessary tackle, test equipment, access, labour, staff and any other thing the Project Manager may reasonably require in order that he may 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.

2.14. Contractor's staff, communication, offices etc.

a. General

The Contractor shall advise the Project Manager at which of his offices any notices may be served.

b. Language of Correspondence and Records

All communications between the Contractor, the Project Manager and the Employer shall be in the English language. All books, time sheets, records, notes, drawings, documents, specifications and manufacturers' literature etc. shall be in the English language.

If any document is in a language other than English a certified translation to English by an approved translator shall be submitted to the Project Manager or his Representative.

c. Contractor's Duty Staff & Offices

The Site Agent of the Contractor shall be permanently on the Site during normal working hours and immediately available at all other times. He shall be delegated full authority to act upon instructions given by the Project Manager or his authorised staff and shall be fluent in the spoken and written English language.

The Contractor shall provide at its own cost and maintain at the site, offices for the use of his representative and to which written instructions by the Project Manager can be delivered. Any instructions delivered to such offices shall be deemed to have been delivered to the Contractor.

d. Public Relations

The Contractor shall designate within his site organisation competent staff whose responsibility shall be to ensure good public relations.

The Contractor shall provide and maintain suitable and sufficient shelters and mess rooms for his workmen and supervisory staff.

The Contractor shall provide sufficient closets or latrines and washing facilities to the satisfaction of the relevant authority. They shall be properly screened and maintained in a clean and sanitary state at all times.

The mess rooms, closets and latrines shall be located in positions to be approved by the Project Manager. The Contractor shall be responsible for making all arrangements for the disposal of waste from mess rooms, closets and latrines.

The Contractor shall satisfy the Project Manager or his representative that all his personnel working on the site are medically fit.

2.15. Demolition of contractor's temporary buildings

The Project Manager may at any time before the end of the Defects Liability Period give the Contractor notice in writing to demolish and remove those Temporary Works which are no longer required, whereupon the title to such Temporary Works shall revert to the Contractor. After the demolition and removal of the Temporary Works as required by the Project Manager, the Contractor shall level, clear, restore and make good the sites and surrounding ground and after emptying them shall fill in all latrines, drains, pits and similar items leaving the whole area in a neat and tidy condition to the satisfaction of the Project Manager and the relevant authority.

2.16. Inspections by project manager during defects liability period

The Project Manager 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 an authorised representative acceptable to the Employer to be present at the times and dates named by the Project Manager. This representative shall render all necessary assistance and take note of all matters and things to which his attentions is directed by the Project Manager.

2.17. Progress photograph

The Contractor shall provide progress photographs, illustrating each stage of the work being effected to the Project Manager. Photos shall be colored and of minimum size A6 (105mm*148mm). Photos are to be supplied in hardcopy and soft copy in USB pen drive.

The location, date when taken and the direction in which the camera was facing shall be inscribed on the back of each photograph. The photographs shall be submitted to the Project Manager in an album.

2.18. Notice of operation

The Contractor shall give full and complete written notice of all important operations to the Project Manager to make such arrangements as the Project Manager may consider necessary for the inspection of works and for any other purpose. The Contractor shall not start any important operation without the written approval of the Project Manager.

2.19. Progress meetings

The Contractor's Contract Manager shall attend regular progress meetings on Site which will be convened by the Project Manager. The Contractor shall also attend any other meetings requested by the Project Manager.

2.20. As-built drawings

The Contractor shall supply copies of the as built drawings for the project for:

- All hydraulic control valves and equipment installed;
- All Chamber details and pipe installation inside the chambers;
- Other drawings as requested by the Project Manager.

The number of copies and date by which "as built" drawings are to be submitted by the Contractor are as follows:

a. **Draft**:

One (1) hardcopy to be submitted two (2) weeks before requesting the Completion Certificate under Clause 53 of GCC. The Project Manager shall scrutinize adequacy of submission and may request modification/corrections prior to its approval.

b. **Final**:

Three (3) hardcopies, duly approved by the Project Manager, upon completion of the project. One set of final as built drawings shall also be submitted on USB pen drive in AutoCAD drawing format.

2.21. Conditions of site and wayleave

Before carrying out work on site, the site shall be inspected by the Contractor in conjunction with the Project Manager to establish its general condition which shall be agreed and recorded in writing, and where in the opinion of the Project Manager it is deemed necessary, by means of photography.

The damaged caused to existing plantation within the permitted wayleave zone shall be borne by the employer and shall be paid under the contract. The Contractor shall be required to effect payment to planters following approval of their claims for crops compensation by the employer and shall be reimbursed under the contract by the Employer

Any damage caused as a result of the Contractor's operation to plantation beyond the permitted wayleave mentioned above shall be made good (site reinstatement, crop compensation, and other damages) at the Contractor own expense within two weeks after receipt of the Project Manager's instruction.

Two weeks prior to start of survey or any physical works the exact boundaries of the permitted wayleave zones will be established on site jointly by the Project Manager and the Contractor. The Contractor shall provide erect and maintain in position, from commencement to final completion of the works, in every section substantial timber stakes or similar approved markers not less than 1.5m high indicating the limit of site. The Employer shall be responsible to obtain wayleave before the Contractor commences work on particular site.

In the event of any planter's boundary/cornerstone or other survey mark established for the purpose of land title being disturbed or displaced as a result of the contractor's operations the contractor shall forthwith replace the beacon and shall employ the services of an approved licensed surveyor for this purpose.

2.22. Work through private and public property and serving of notices

Where Works are to be executed in private or public property, the Contracting Authority will be responsible for negotiating and obtaining rights of way and the serving of all notices as may be required upon the owners and/or occupiers of the land and it shall be the obligation of the Contractor to keep the Contracting Authority and the Project Manager fully informed concerning the rate of progress and of his intention to enter and begin work. The Contractor shall give the Contracting Authority 28 days' notice of his intention to execute Works in each section of private or public property.

2.23. Sign boards

The contractor shall erect two (2) sign boards at the start of construction works. Figure 1 show a sample of signboard. The boards shall be weather proof and mounted on stout post so as to withstand strong winds associated with cyclones.

The boards shall indicate relevant information about the project such as the Project Name, the Funding Agency, the Employer, the Engineer and the Contractor, with lettering shown in blue on white background and in sizes not less than 50mm high.

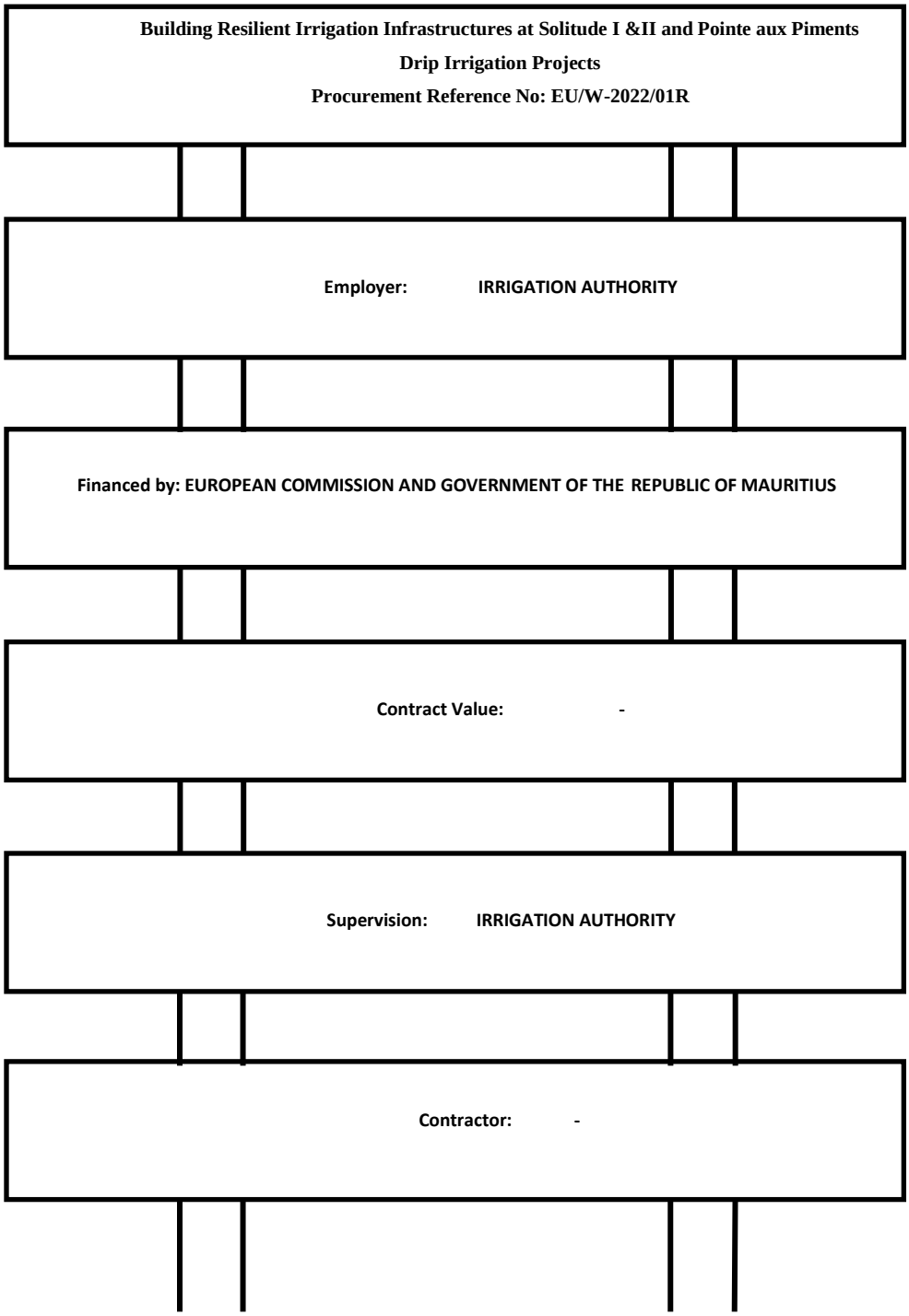

Figure 1: Sample Signboard

3. Pipes, Control Valves, Filtration system, Fittings and Pipework

3.1. General description

In this Section "Goods" refers to pipes, control valves, filtration unit and pipe fittings. All goods to be supplied shall be suitable for waterworks purposes in the conditions prevailing in Mauritius and particularly in the location of the works, for the conveyance of water. All pipes, fittings and control valves shall have a pressure rating of 16 bars unless otherwise specified.

Alternative bids are permitted and alternative pipe material offered should be equivalent to the Original Bid requirement. Equivalent means similar quality, durability and reliability. This means that the Manufacturer of alternative material should show that his material should have the same levels of quality, durability and reliability as the item specified.

The manufacturing process should have a quality control and assurance program which is ISO 9001. The manufacturing of goods, which fails to meet these criteria will lead to a non-responsive bid and shall no longer be taken into consideration.

In order to better understand our requirement all bidders are requested to attend a pre-bid meeting/site visit which shall be fixed by the Irrigation Authority during the bidding stage.

In addition, the Bidder shall submit a complete original catalogue, descriptive literature, specifications and technical data for pipes, control valves, fittings and filtration unit proposed in their Bids to enable the Employer to assess their proposal. The Bidder shall be specific as to the country of origin and manufacturing firm of the items intended to supply under this Procurement.

3.2. Periods for delivery

In order to comply with the requirements of the installation programme, the Contractor shall arrange his delivery programme to meet the stage delivery periods stated in the Programme of Works or Program of Shipment/Delivery calculated from the date of the Letter of Acceptance.

The Contractor may be required to concentrate his earliest deliveries in order to meet the programme for installation and due flexibility should therefore be allowed for in manufacturing.

3.3. Approval of drawings

The Contractor shall submit to the Project Manager for approval within 7 days of the Project Manager's order to commence the Works detailed drawings of the Goods and a general arrangement of a typical installation, including critical dimensions for associated civil works. They are to be accompanied, if required, by calculations and explanations to show that they comply with all requirements of these Specifications.

Two weeks shall be allowed for approval by the Project Manager following receipt of drawings. Alteration to approved drawings shall only be made with the written consent of the Project Manager.

3.4. Installation, Operation and maintenance manuals

The Contractor shall supply to the Project Manager with the material, plant or/and equipment, all the manuals and drawings describing the recommended procedures for their assemblies, dismantling, installation and operation. These documents shall give the dimensions, weight and space required for the operation and maintenance of the said plant and equipment. A draft of these documents shall first of all be submitted for approval by the Project Manager one month prior to delivery to Site. After approval by the Project Manager, the Contractor shall submit within two (2) weeks two (2) copies of the approved documents suitably bound under hard cover to the Project Manager.

3.5. Inspection and testing at works

Details of the type of manufacturing process shall be submitted for the Project Manager's approval. Independently of the tests to be made on the constituent materials and on the Goods in accordance with the provisions of the Specification the Project Manager will have the right to ask that factory checks be made concerning either the ways in which materials are used or on the manufacturing processes such as casting, founding, cooling, annealing, burring, welding, riveting, centrifuging, machining, drilling of flanges or any other process.

In this respect, the Contractor shall authorise the Project Manager to carry out the corresponding inspections at the various stages of manufacture.

The Project Manager reserves the right to inspect all or part of the stages of manufacture of components at any Sub-Contractors factory under the same conditions as those applied for inspection at the Contractor's factory.

All Goods shall be tested at works in accordance with relevant standards under this Specification.

All Goods shall be subject to inspection prior to packing for shipment. Such inspection shall include visual inspection, compliance with the Specification, checking of test results as required by the Specification and appropriate Standard or other superior internationally recognized standard and witness testing as required. An inspection of packing and marking of all items may also be undertaken prior to shipment.

For all tests and inspections, the Contractor shall also provide the Project Manager prior to dispatch with test and inspection certificates from an Independent Inspection Agency approved by the Project Manager. The test and inspection certificates shall pertain to actual witness of test and physical inspection by the Agency on the particular consignment. Inspection by the Independent Inspection Agency shall not, however,

relieve the manufacturer of his responsibility to furnish material and perform work in accordance with this specification and the relevant standards.

For the items tested, inspected and found to be satisfactory a Project Manager's approval will be issued allowing the Contractor to proceed with arrangements to deliver the materials.

The Contractor shall furnish the Project Manager with a manufacturer's certificate in respect of every consignment of the goods confirming that all items of goods comprising the consignment comply in all respects with the specified standard. The original and one copy of such manufacturer's certificate shall be delivered to the Project Manager not later than 7 days prior to the intended date of delivery of the Goods to the storage area.

3.6. Marking

Except where expressly agreed between the Contractor and the Project Manager all components of the Goods shall be marked in a clear and lasting manner with the following information:

- Symbol of factory where component was manufactured;
- Date of manufacture
- Nominal diameter, pressure class in metric unit;
- Symbol designating quality of material;
- Direction of flow (where applicable).

3.7. Packing, transportation and handling

All materials and goods are to be properly packed and clearly marked:

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All sensitive materials such as gaskets etc., shall be fully protected by means of a moisture-excluding coating or a drying agent or a plastic sealant or plastic covers and/or wooden crates as appropriate to the approval of the Project Manager.

The Contractor shall provide all necessary means of protecting the Goods during loading, transit, unloading and re-handling and delivery. The measures adopted by the supplier at the port of shipment, at the port of unloading and for the transport to the site of work shall be to the approval of the Project Manager. Likewise, the methods adopted by the civil works Contractor on site will be subject to the approval of the Project Manager. No unprotected hooks or wire slings will be permitted. Any damages cause due to transportation and handling shall be made rejected and replaced with new one at the Contractor's expenses.

All packing shall be suitable for unpacking and repacking during inspection and for storing the Goods at the site in the open air at the Contractor's storage area.

All flange connections shall be fitted with protective covers. Nuts, bolts and washers shall be properly labelled and packed in cases. Sealing gaskets shall be fully protected against moisture and properly labelled and packed in cases.

All spare parts which are ordered shall be delivered with the main order and shall be adequately labelled, protected and packed in a suitable container or containers complete with three copies of a detailed inventory.

The Contractor shall supply all necessary materials and equipment for making good, where instructed by the Project Manager, any damage to coatings of pipes, fittings and control valves. In the event of any damage, the Contractor shall be liable for the cost of repairs or replacement and the cost of any delays. The Project Manager shall determine whether the damage shall be repaired or replaced.

3.8. Design, Workmanship and Material

a. <u>Design</u>

The Contractor shall ensure that the Goods comply with the duties stated in this Specification, to the Project Manager's satisfaction and in accordance with modern

practice and it shall be such as will facilitate inspection, cleaning, maintenance and repair and ensure satisfactory operation under all conditions.

b. Standards of Workmanship

The standard of workmanship shall be of the best quality and to the satisfaction of the Project Manager and shall comply with the requirements of the standards or codes of practices issued by any recognized organisations.

The Contractor may propose other internationally recognised codes of practice or regulations equivalent to those specified for approval by the Project Manager. Such approval to these alternative standards must be obtained prior to start work under this Contract. Two copies of such alternatives standards are to be supplied in English to the Project Manager when required.

c. Materials

All materials used in the manufacture of the Goods shall be approved by the Project Manager.

All materials shall be new and of first-class quality, free from imperfections and selected for long life and minimum maintenance. Particular attention shall be paid to the prevention of corrosion either due to the proximity of dissimilar metals or due to severe ambient conditions. All parts shall be corrosion resistant or adequately protected against corrosion.

They shall have no modifying effect whatsoever on the physical, chemical bacteriological or organoleptical qualities of the water normally conveyed in the system under consideration, either by reason of the materials construction or leaching from protective coating and painting system. All materials shall be such as have been proved under working conditions to be the most suitable for the purpose for which they are used.

Low grade goods shall be rejected. All goods supply shall be new, free from any defects and conforming to BS, EN, ISO or equivalent standards and shall be approved by the Project Manager.

The manufacturing process should have a quality control and assurance program which is ISO 9001 certificate and same shall be submitted to the Project Manager.

Materials shall also meet the following conditions:

- Materials shall be of the best quality and design.
- They shall be for long time durability with a minimum maintenance;
- They shall be suitable for conveyance of raw or treated water under pressure;
- They shall be watertight under all operation and testing pressure prescribe by respective standards; and
- They shall be capable of withstanding without damage all stresses that will be induced during handling, fixing, testing and operation.

The Contractor shall supply the following information for each nominal diameter of Control valves:

- Nominal bore (DN)
- Flange to flange length of valve
- Weight of valve
- Nominal pressure (PN)
- Typical detailed drawings, including cross sections for each diameter.

The Contractor shall state the conditions of storage required for all couplings. Restrictions regarding temperature, humidity, orientation etc. shall also be stated.

3.9. Reliability of equipment

The Goods shall be so manufactured as to ensure the highest standards of operational reliability. All Goods shall be capable for long life with a minimum of maintenance and to meet the following conditions:

- Materials shall be of the best quality and design.
- They shall be for long time durability with a minimum maintenance;
- They shall be suitable for the conveyance of raw or treated water under pressure;
- They shall be capable of withstanding without damage all stresses that will be induced during handling, testing and operation;
- They shall be watertight under all operating and testing pressure prescribed by the respective Standard;
- They shall have long-term resistance to all external factors by virtue of the nature of the materials used in their manufacture as far as water action is concerned and, in a more general manner, the surrounding environment;

3.10. Pipes general

The Contractor shall supply the following information for each nominal diameter of pipe viz Ductile Iron (DI), Unplasticised Polyvinyl chloride pipe (UPVC) and Galvanised Steel Pipes.

a. External diameter
b. Internal diameter
c. Overall length per unit
d. Effective length per unit
e. Unit weight
f. Thickness

3.11. Fittings general

Pipe fittings shall be to the diameters and classes indicated in the Bill of Quantities and in accordance with the specified standards. Note that the pressure and flowrates provided in bill of quantities will be subjected to a variation of ± 10 %.

The Contractor shall supply the following information for each nominal diameter of fittings:

a. External diameter
b. Internal diameter
c. Overall length per unit
d. Effective length per unit
e. Weight
f. Thickness

3.12. Gate valves

Gate valves shall conform to relevant clauses of BS 5163-1, and BS EN 1074-1:2000 and BS EN 1074-2:2000 or BS EN 1171:2015 or other equivalent standards. Gate valve shall also conform to BS EN 1092-1:2018 for flanges dimension and drills and to BS EN 558:2017 for face to face (flange to flange) length. Also, it shall comply with BS 12266-1 for pressure test.

Unless otherwise specified by the Project Manager, all Gate valves shall be doubled flanged, non-rising spindle type and be of Wedge type. The wedge shall be clear of the water way when in the fully open position. Unless otherwise specified Gate valves DN 400 and above shall be metal seated and gate valves of diameter less than DN 400 shall be resilient type.

The valves shall have inside screw spindles and shall close clockwise. The spindle shall be shouldered to allow repacking of the gland whilst the pipeline remains in service. The spindle (stem) shall be made of stainless steel X20Cr13 or higher grade stainless steel or

bronze of gun metal. Also, they shall withstand a nominal pressure 16 bars and shall have a low operating torque and be easily actuated.

Gate valves body and bonnet shall be of ductile iron or cast iron. The wedge (disc) shall be solid of ductile iron or stainless steel. The wedge facing ring and body seats shall be made of stainless steel or alternatively of bronze of gun metal. The stem nut shall be made of bronze of gun metal or equivalent copper alloy.

The extension spindles shall be equipped with square headed cap for all sizes of valves. Bypass of gate valves shall be supplied with hand wheel for opening and closing.

The valves to be installed in chambers shall be supplied with either a cast iron or malleable iron hand wheel.

All Gate Valves shall be coated with a protective coating, fusion bonded epoxy having minimum thickness of 250 microns or equivalent coating, for maximum corrosion protection.

Note that flanged to flanged length of gate valve to be supplied and installed shall be such as to fit inside existing chamber.

3.13. Air valve

Air release valves/air valves shall have a pressure rating of 16 bar and conform to BS EN 1074-4 or equivalent standards and be either

- *Single orifice /one way air valves (single function) which automatically release air from a pressure pipeline to the atmosphere during normal operation, or*
- *Double orifice/ two way air valves (triple function) which release large volume of air during pipe filling, intake large volume of air into the pipe during emptying or in case of pipe burst and automatically release air from a pressure pipeline to the atmosphere during normal operation, as specified in the Bill of Quantities.*

Single and Double orifice air valves shall be supplied with surge protection system (non-slam/anti-slam) resulting from sudden filling of the drained air pocket by the flow water.

All air valves shall have a low operating pressure that is less than 0.5 bar.

The body shall be made of ductile iron or cast iron and the float(s) shall be of plastic (ABS, HDPE, polypropylene, etc.) or stainless steel or steel coated with EPDM rubber.

Air Valves shall be coated with a protective coating, fusion bonded epoxy having minimum thickness of 250 microns or equivalent coating, for maximum corrosion protection.

Air valves shall be flanged and conform to BS EN 1092-1:2018 for flange dimensions and drills. Air valves shall be mounted on an isolating valve (gate valve) as specified to allow safe and easy dismantling during maintenance.

The Contractor shall indicate in writing to the Project Manager the manufacturer's recommended maximum pipe diameter on which each size of air valve can be mounted.

3.14. Pressure control valve/ pressure regulating valve

The Pressure Control valves shall be a downstream pressure stabiliser and piston actuated type for size above DN 350 unless otherwise specified. It shall automatically reduce the upstream pressure to a preset but adjustable downstream pressure so that the downstream pressure is maintained during operation whatever the variations of the upstream pressure above the preset value and whatever the variation in flow rate between zero flow to the maximum flow rate.

The range of the downstream pressures of the Pressure Control valve shall be adjustable as specified in Bill of Quantities.

The maximum pressure variation in the regulated downstream pressure shall not exceed 10% of the preset regulated pressure.

The Valve shall be fitted with a drain plug and with two pressure gauges (glycerin type manometer), one upstream and one downstream of the Pressure Control Valve. These manometers shall be mounted through three-way valves.

Pressure control valves body of shall be of ductile iron, bronze cast-iron, cast iron or gun metal. PCV shall be flanged and conform to BS EN 1092-1:2018 for flanges dimension and drills.

All Pressure relief valve shall be coated with a protective coating, fusion bonded epoxy having minimum thickness of 250 microns or equivalent coating, for maximum corrosion protection.

3.15. Surge vessel

Upon power failure, the vessel injects water into the pipeline thus preventing very low pressure from occurring. When the positive return surge water reaches the vessel, water enters the vessel thus contributing further to reduce the amplitude of the waves. The surge vessels shall limit the surge pressures to a minimum of -2 m

The surge tanks provided shall be suitable for the following operating conditions

- Maximum pressure of 10 bars.
- Test pressure of 15 bars.
- Maximum temperature of 40°.
- Nature of gas shall be Nitrogen or air.
- Capacity of tanks shall be as specified in BOQ.
- Fluid for system shall be irrigation water.

3.16. Flow meter

Flow meter under this contract shall be either electromagnetic or ultrasonic type as specified in the Bill of Quantities.

<u>Ultrasonic Flow Meters</u>

Flow meter shall be double flanged. It shall conform to ISO 12242:2012(en) or equivalent acceptable standard. The ultrasonic flowmeter shall consist of transducers,

meter body with ultrasonic path configuration and electronic data processing and presentation unit. The flow meter shall be intended for liquid application.

Bidder is requested to ensure that the new flow meter and associated fittings shall fit inside the existing chambers.

Electromagnetic Flow Meters

Flow meter shall be double flanged. It shall conform to ISO 4064 or equivalent acceptable standard. It shall measure the instantaneous flow rate in litre per second and total volume in cubic meter. The flow meter shall be robust and intended for raw irrigation water and partially muddy water. A calibration Certificate for each flow meter shall be submitted by the Contractor by the Manufacturer or by an accredited body.

Flow meters shall be coated with a protective coating, fusion bonded epoxy having minimum thickness of 250 microns or equivalent coating, for maximum corrosion protection.Electromagnetic flow meters are to be located inside chamber. It is to be noted that electricity will be provided for the normal running of the system, however, the system shall be self-powered by battery for at least 48 hr in the event of power cut and same shall to be able to feed both the Electromagnetic Flow Meter. Works shall include associated electrical works and supply of other materials for the successful operation of the flowmeter.The Contractor shall design, supply, fix, test and commission all components, of the best quality and durability, to suit the above-mentioned criteria.

3.17. Flow control valve

Flow Control Valve shall be an automatic control valve designed to maintain a constant preset rate of flow regardless of changing system pressures and demand. It shall be pilot controlled, hydraulically operated, diaphragm actuated globe valve in either the oblique (Y) or angle pattern design. The body and cover shall be cast iron, ASTM A 126 Class B, with Bronze seat. The internal & external surfaces of the valve body shall be fusion bonded coated. End connections shall meet the ANSI, ISO, DIN, JIS or other internationally recognised standard required.

The body shall have a replaceable non threaded seat ring that is held in place by set screws which tighten into a body groove. This seat should be accessible and serviceable without removing the valve from the pipeline.

3.18. Non-return valves/check valve

Non-return valves shall be double-flanged and made of a corrosion resistant material. They must be designed and manufactured to prevent the return of fluid in a direction opposite to the normal flow direction.

The non-return valves shall be water-tight when closed and, when opened, the fluid shall flow through the valve without turbulence. The operation shall be silent. The Non-return valve shall be swing type unless otherwise specified.

3.19. Volumetric Valve

The volumetric valve shall discharge a pre-set volume of water as described in bill of quantities and shut-off automatically when the volume has been delivered. It shall also act as a flow meter. The valve shall consist of a flow meter and a diaphragm-actuated automatic closing mechanism.

The meter shall be fitted with a setting knob mounted on a dial to enable the setting of the exact volume to be discharged during operation. The opening of the valve shall be under the control of that knob. The meter shall also be fitted with a flow integrator and a flow indicator which shall be displayed on the same panel as the setting dial.

The flow totaliser shall be of the cumulative type (with no resetting to zero at each operation) and it shall be fitted with a 5-digit display. It shall have a device to enable the initialisation of the display from time to time. The flow indicator shall enable the determination of the rate of flow at any time when the valve is in operation.

The closure of the valve shall be initiated automatically when the valve has delivered the pre-set volume and the setting know has metered back to zero. The closing of the valve shall be slow to prevent the formation of water hammer in the distribution main. The

closing mechanism shall operate on the hydraulic pressure in the headwork. The valve shall be drop-tight when closed.

The body of the valve shall be in ductile or cast iron and it shall preferably be fitted with a drain plug. The valve mechanism shall be totally enclosed and properly protected. The metallic parts of the mechanism shall be in stainless steel. The diaphragm shall be made of a strong elastomeric material resistant to chemicals in the water. The direction of flow in the valve shall be marked on the external part of the body. Threaded connections shall be to BS 21 or ISO 7/1 and flanged connections shall be to BS 4505. The bottom part of the valve shall have a pedestal.

3.20. Filter System

i. Pointe Aux Piments Filtration plant

The filter system shall be threaded and the filter housing and filter lid shall be made of polypropylene. The filter shall have the following specifications:

- Maximum flow rate of 50 m^3/hr
- A screen type Standard filtration degrees of 50 ± 10% micron
- An Auto cleaning system by differential switch
- Maximum operating pressure of 8 bar

ii. Headworks

The filter system shall be threaded and shall have a filtration grade of 100 microns ±10 %.

3.21. Drip System

The in-field irrigation system shall be suitable for the irrigation of food crops mainly. At least two different types of tickle irrigation laterals shall supplied for the Project and the following types of laterals shall be considered:

a) Non-compensated drippers;

b) Compensated drippers;

The trickle irrigation laterals shall be durable, leakproof and shall not be susceptible to deterioration by ants and termites. The Contractor shall guarantee the quality and performance of the laterals. The laterals shall be fixed to the blind tubes (risers) at their upstream ends through straight connectors and to end sleeves at their downstream ends. The specifications shall be as described in bill of quantities.

3.22. Flexible couplings and flange adaptor

The Contractor shall supply the following information for each nominal diameter of flexible coupling and flange adaptor:

- Nominal bore (or bores in the case of stepped coupling)
- Coupling length
- Weight
- Nominal pressure
- Typical detailed drawings, including cross sections for each diameter of offered couplings.

The Contractor shall state the conditions of storage required for all couplings and flange adaptors. Restrictions regarding temperature, humidity, orientation etc. shall also be stated.

Flexible couplings, straight or steeped coupling and flange adaptorsshall be made of ductile iron.

Couplings and flange adaptors shall be coated with a protective coating, fusion bonded epoxy having minimum thickness of 250 microns or equivalent coating, for maximum corrosion protection.

The bolts of the coupling and flange adaptors shall be of either galvanised or stainless steel. Contactor shall assume full responsibility for compatibility of coupling/flange adaptor with existing pipe. Coupling and flange adaptors shall withstand a nominal pressure of 16 bar. Flexible couplings shall be supplied without a locating stud.

Stepped couplings shall be suitable for connecting difference types of pipes.

Flanged adaptors shall be suitable for connecting PN 10, PN 16 or PN 25 drilled flanges to BS 4504 to ductile iron or steel pipes as indicated in the Bill of Quantities.

3.23. Bolts, nuts, washers and gaskets

New and unused bolts, nuts and gaskets are to be supplied for the replacement and installation of control valve under this contract.

All bolts, nuts and washer for flange connection shall be of Grade A-2 stainless steel unless otherwise specified or directed by the Project Manager. Bolts and nuts shall be hexagonal. All bolts and nuts size for connections shall be in accordance with BS EN 1092-1:2018.

The tightening of the bolts shall be carried out in the crisscross sequence and to the torque recommended by the manufacturer. A torque wrench shall always be used and in no case shall excessive tightening be exerted on any nuts or bolts.

The successful bidder shall list all bolts with respect to their grade and diameter which shall be used for the purpose of the work on each valve and fitting and same should be duly checked and endorsed by the Project Manager.

Gaskets shall be made of reinforced type EPDM rubber, in accordance with BS EN681-1 and duly certified as suitable for raw water supply (irrigation water), by one of the International regulations or as recommended by the manufacturer of particular valve and fitting.

3.24. Manometer

Manometers shall be male threaded and of glycerine type with the indicator graduated in ‘bar’ or combination of ‘bar’ and ‘psi’ with intervals of 0.2 or 0.5 and shall be have at least 0 to 20 bars reading unless otherwise specified.

3.25. Other proposed valves and fittings

The Bidder shall furnish suitable element and fittings acceptable to the Project Manager and complying with norms EN, ISO or equivalent standards, to ensure compatibility of piping system with valves. Ancillaries shall withstand a nominal pressure of 16 bars and be of the best quality material and design.

3.26. Flanges & bolting for pipes, valves and fittings

Flanges and bolting for pipes, valves and fittings shall all be to BS EN 1092-1:2018 or alternatively to AFNOR NF E 29-201 or ISO 2084 or to other standard to the approval of the Project Manager, provided that they are each compatible with the other for the purposes of jointing like-sized components and are such that corrosion by galvanic action shall be avoided. The rating and test pressure of the flanges shall not be less than the rating and test pressure of the pipeline specified.

3.27. Cutting pipes

All pipes shall be cut with an approved mechanical pipe cutter and in conformity with the pipe manufacturer's recommendations. The edges of the cut shall be clean, true and square. The use of an oxyacetylene flame cutter will not be permitted in any circumstances. 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, if damaged, to the approval of the Project Manager. When the cut pipe is to be inserted in a "Tyton" type joint it shall be bevelled for 10mm at 30° to pipe axis to remove sharp or rough edges.

3.28. Proprietary joints and couplings

Proprietary joints and couplings shall be assembled in accordance with the manufacturer's instructions. The Contractor shall be responsible for obtaining such copies of the manufacturer's instructions as he requires, at his own expense.

The Contractor shall be responsible for obtaining all the necessary special tools, lubricants and appliances necessary for making the joints.

Where pipes are laid above ground and jointed with bolted flexible couplings the nuts bolts and gaskets shall be protected against vandalism by sheathing with an approved heat-shrink moulding as manufactured by Raychem of Swindon UK or similar approved.

3.29. Grouting in ironwork & pipes

All brackets, anchor bolts and other ironwork for which holes have been boxed out or left in the concrete of a structure shall be carefully grouted into their correct positions in all particulars. The grouting in shall be carried out with cement and sand grout in such a manner that there shall be no apparent difference in the texture or colour throughout the face or seepage of water either between the iron work and set grout or between the set grout and the surrounding structures.

The above instructions shall apply also to the building in of pipes except that the class of concrete used for that part of the structure shall be used in lieu of cement grout.

3.30. Fixing valves

Valves and other fittings shall be securely fixed and where required extension spindles and headstocks shall be properly aligned and fixed in vertical position and valve caps shall be fixed securely using the locking nut. They shall be tested for ease of operation and water tightness. Any damaged protective coating shall be made good and they shall be left clean in all respects.

3.31. Thrust blocks

Concrete thrust blocks shall be formed at bends, tees and valves as directed by the Project Manager. The additional excavation shall be made after the bends, etc. have been jointed and the concrete shall then be placed with all possible speed. The back of

supports and blocks shall abut on to solid ground with all loose material being removed before concreting.

The concrete used for thrust shall be Grade C20 or as shown on the Drawings and after placing shall be kept in view for not less than six hours. No pressure shall be applied in any section of main until the concrete has had at least three day's curing.

Flexible joints shall not normally be cast into thrust blocks. Where the size of thrust block does not make this possible, additional flexible joint shall be provided no greater than half the pipe diameter beyond each face of the block.

3.32. Support blocks

Where control valves are placed on support block, the concrete used for support blocks shall be of Grade C20. After pouring of fresh concrete, the latter shall be kept in view for not less than six hours. Where new concrete is to be cast and place on existing support block, Contractor shall use an approved high-grade bonding agent prior of placing new concrete. The method of application of the bonding agent shall be applied as per manufacturer's guideline. Existing concrete surfaces shall be clean from wax, grease, oil, dust, loose concrete, etc. prior to apply bonding agent.

4. Earthworks

4.1. Conditions of site and wayleave

Before carrying out any work on the Site, the Site shall be inspected by the Contractor in conjunction with the Project Manager to establish its general condition which shall be agreed and recorded in writing, and where in the opinion of the Project Manager it is deemed necessary, by means of photography.

The damage caused to existing plantation within the permitted wayleave zone shall be borne by the Employer and shall be paid under the Contract: the Contractor shall be required to effect payment to planters following approval of their claims for crop compensation by the Employer and shall be reimbursed under the Contract.

Any damage caused as a result of the Contractor's operations to plantations beyond the permitted wayleave mentioned above shall be made good (site reinstatement and others damages) at the Contractor's own expense within two weeks after receipt of Project Manager's instruction.

Two weeks prior to start of survey or any physical works the exact boundaries of the permitted wayleave zones and will be established on site jointly by the Employer and the Contractor. The Contractor shall provide erect and maintain in position, from commencement to final completion of the Works, in every section substantial timber stakes or similar approved markers not less than 1.5m high indicating the position of the boundary at 100m or other such intervals as the Project Manager may require.

In the event of any planter's boundary/cornerstone or other survey mark established for the purpose of land title being disturbed or displaced as a result of the Contractor's operations the Contractor shall forthwith replace the beacon and shall employ the services of an approved licensed surveyor for this purpose.

4.2. Notice to be given before commencing earthworks

The Contractor shall give to the Project Manager at least seven days written notice of his intention to commence earthworks on any part of the Site so as to enable the Project Manager to be furnished with all ground levels and other particulars he may require for the purpose of measurement. The earthworks shall not be commenced until written approval has been received by the Contractor from the Project Manager.

The Project Manager shall have the right to direct the Contractor as to the length or location of portions of excavation which shall be opened at any one time, in addition to the normal limits to lengths of open excavation imposed by the local authorities.

4.3. Location of existing services

The location of existing services shown on the Drawings is approximate only. Before carrying out any demolition or excavation for construction purposes the Contractor

shall, at his own cost, accurately locate in both line and level all existing services within the Site of the Works whether indicated on the Drawings or not, and furnish the Project Manager with 3 copies of the relevant information in the form of AutoCad drawings.

4.4. Site clearance and topsoil removal

Site clearance shall be carried out over the areas to be occupied by the Permanent Works and for working space. The site clearance shall be carried out before beginning excavation or other work, and shall include the clearance of all trees, stumps, bushes and other vegetation and the grubbing out of all roots and the removal of all boulders and rock heaps. The limits of the areas to be cleared shall be as indicated on the Drawings or as will be defined by the Project Manager.

Following the establishment of ground levels, the Contractor shall strip topsoil over the width of the trench and to a depth of up to 300mm. The topsoil so removed shall be set aside separately for re-use or disposal as directed by the Project Manager.

Topsoil is defined as the surface layer of soil which by its humus content supports vegetation. This layer of soil is unsuitable, due to weathering and vegetable content, as a formation to roads and concrete structures or as a backfill or bedding material. The presence, extent and depth of topsoil that needs removal shall be agreed with the Project Manager.

Subject to the requirements of this clause all other materials arising out of site clearance shall be disposed by the Contractor off the Site, or on the site in a manner and place approved by the Project Manager.

Where shown on the Drawings or directed by the Project Manager, trees shall be uprooted or cut down as near to the ground level as possible and all timber shall be deemed to become the property of the Employer. The Contractor shall cut and stack such timber as is salvable as directed by the Project Manager.

Bushes, undergrowth, small trees, stumps and tree roots shall, where directed by the Project Manager, be grubbed out, burnt and deposited off the site in dumps to be

provided by the Contractor. All holes left by the stumps or roots shall be backfilled with suitable material in a manner approved by the Project Manager.

The Project Manager may require that individual trees, shrubs and hedges are to be preserved and the Contractor shall take all necessary precautions to prevent their damage.

In the case of wayleaves for mains, pipelines and the like, the area to be cleared shall extend over the full width of the wayleave but the Contractor shall preserve as far as practicable all grass and other vegetation outside the limits of trenches and permanent works within the wayleave and shall not unnecessarily destroy crops or any vegetation whose removal would not be essential to his operations.

Before beginning clearance within any wayleave the Contractor shall give seven days written notice of his intention to the Project Manager who will determine the extent and limits of such clearance having regard to the Contractor's requirements, the rate of Contract progress, the reasonable wishes of owners and occupiers, weather conditions and other factors which in the opinion of the Project Manager may affect or be affected by the Contractor's proposals.

Where the pipeline crosses plantations the top soil shall be reinstated to the satisfaction of the Project Manager to permit replanting.

4.5. Ground levels

Following the completion of Site clearance and before the commencement of any earthworks or demolition, the sites shall be surveyed in conjunction with the Project Manager to establish existing ground levels and these agreed ground levels shall form the basis for the calculation of quantities of any subsequent excavation and filling. These levels shall be taken before any topsoil is removed.

4.6. Trial pits

The Contractor shall, at his own cost, excavate refill and restore in advance of his programme such trial pits as he may require for the location of existing underground services and obstructions.

4.7. Demolition and reinstatement

Where the pipeline crosses roadside drains the Contractor will be required to demolish any concrete slab or stone kerb and to reinstate the drain after pipelaying. Reinstatement of the drains shall be paid under dayworks

4.8. Excavation generally

Excavation shall be made in open cutting unless tunnelling or heading is specified or approved by the Project Manager and shall be taken out as nearly as possible to exact dimensions and levels so that the minimum of infilling will afterwards be necessary.

It shall be the Contractor's responsibility at all times to ensure the stability and safety of excavations and the Contractor shall take all measures necessary to ensure that no collapse erosion or subsidence occurs.

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. All supports shall be of sound design and construction and shall be sufficiently watertight to permit excavation, concreting and other work to be completed satisfactorily.

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.

If the Contractor encounters any unsound material in the formation, he shall immediately inform the Project Manager who will instruct the Contractor in writing as to whether or not the said material shall be treated as unsound. Unsound material shall

be removed and disposed of to the satisfaction of the Project Manager. Unless otherwise specified or ordered by the Project Manager, the voids so formed shall be filled with concrete Grade 10 in the formations to structures, with the same material as that which comprises the fill in the formation to embankments, with compacted granular material in the formation of pipelines and with concrete Grade 10 filling approved by the Project Manager in the formation to roads. If, in the opinion of the Project Manager, the unsoundness is due to failure of the Contractor to comply with the Specification including keeping the excavation free from water, the cost of dealing with the unsound material shall be borne by the Contractor.

The Contractor shall not deposit excavated materials on public or private land except where directed by the Project Manager in writing 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.

4.9. 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 Project Manager may require.

In pipe trenches where the pipe is not bedded on or surrounded with concrete, the excess excavation shall be filled with compacted granular material. Excess excavation in rock trenches shall be filled with Grade C15P concrete up to 150mm below the pipe invert.

4.10. Mechanical excavation

Mechanical excavation shall be employed by the Contractor only if the subsoil is suitable and will allow the timbering of the trenches or other excavations to be kept sufficiently

close up to ensure that no slips, falls or disturbance of the ground take place or there are no pipes, cables, mains or other services or property which may be disturbed or damaged by its use.

When mechanical excavators are used a sufficient depth of material shall be left over at the bottom of the excavation to ensure that the ground at formation level is not damaged or disturbed in any way. The excavation shall then be completed to formation level by hand.

4.11. Excavation for pipe laying

Excavations for pipelines shall be to the gradients indicated on the Drawings or as directed by the Project Manager. Curves, where necessary, shall not involve angular deviations at any pipe joints greater than those recommended by the Manufacturer and approved by the Project Manager

The width of trench excavated for any size of pipe shall be the minimum required for efficient working after allowance has been made for any timbering and strutting, and shall be to the approval of the Project Manager or as shown on the Drawings.

The maximum width of the trench shall be:

a)	for pipes equal or less than 150 mm ND	Maximum width of trench = 450 mm
b)	for pipes greater than 150 mm ND	Maximum width of trench = OD of pipe + 400 mm

For pipes greater than 150 mm ND, the maximum distance between the sides of the trench and the barrel of the pipes shall be 200 mm inclusive of any allowance required for trench support.

The minimum depth between the original ground level and crown of the main pipeline shall be 920 mm unless otherwise specified. In the event that the pipe is exposed over

ground or lacks the minimum cover, concrete surrounded or compacted earth fill shall be supplied as instructed by the Project Manager.

Properly painted sight rails and boning rods of predetermined measurement shall be supplied as specified in the Specification for pipe-laying. They shall be used to ensure that the excavation is to a true and even gradient.

The maximum length of open excavation ahead of pipelaying shall not, except with prior written approval of the Project Manager, exceed 500 metres.

The Contractor shall excavate the pipe trench to a depth of 150 mm below the invert of the pipe.

If the trench formation becomes weathered prior to the laying of the pipes the Contractor shall excavate the weathered soil and replace it with compacted granular fill to the original formation level at no extra cost.

The materials excavated from trenches shall be laid compactly at the sides of the trench except where in the opinion of the Project Manager this would so obstruct any road or footpath as to prevent the passage of traffic or pedestrians.

In such cases the Contractor shall excavate the trench in such lengths and keep the excavated materials at such distance as the Project Manager may require.

Where excavation for pipe laying is carried out behind thrust blocks on existing pipelines adequate support arrangements shall be provided to transfer thrusts to the surrounding ground.

4.12. Boulders along pipe alignment

Rock in the form of boulders predominantly above ground level and located along the pipeline shall be removed, if required by the Project Manager, who shall determine in each case whether the removal of the boulder is necessary to achieve the required alignment or profile or to ensure the future safety of the pipeline.

4.13. Headings

Where excavation for pipes in heading is specified or shown on the Drawings or permitted by the Project Manager it shall be carried out to the approval of the Project Manager 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 Grade C15P concrete. After the pipe has been laid, jointed and tested the heading shall be filled in short lengths not exceeding 1 metre with Grade C15P concrete or as directed. Great care shall be taken to ensure that the heading is 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. The Contractor shall allow for leaving in all timbering.

The Contractor shall be responsible for the proper restoration of any road surfaces, pipes, cables or other things or property which may be damaged.

4.14. Slips, falls and excess excavation

Slips and falls of material from the sides of the excavation and embankments shall be prevented.

In the event of slips or falls occurring in the excavations and where excavations are made in excess of the dimensions of the permanent works, the voids so formed shall be filled as specified below. When such voids in the opinion of the Project Manager may affect the stability of the ground for the support of the Works or of the adjacent structures and services, they shall be filled solid with concrete Grade 10. In other cases, they shall be filled with selected excavated material placed and compacted to the approval of the Project Manager.

4.15. Crossing roads and providing trench bridges

The Contractor must allow in his rates in the excavation section of the Bill for the additional work of every kind involved in crossing main roads. Work of this kind shall be carried out entirely in accordance with all requirements of the appropriate Public or Statutory Authority, whether these relate to method or to timing.

At all road crossings the Contractor shall provide uninterrupted passage for vehicles and pedestrians and will be entirely responsible for making all necessary arrangements with the Authorities concerned. Any interruption of traffic, however brief, shall be permitted only with the express permission of the Project Manager.

To allow vehicles to cross trenches, steel trench bridges of minimum span of 6 m are to be provided. The bridges are to be suitably constructed out of steel plate and sections pegged to prevent movement. There are to be sufficient bridges available to suit the lengths of trench to be opened at any one time. The extent of each vehicular crossing is to be clearly demarcated by means of drums or handrails painted white.

4.16. Excavation for foundations of structures

The Contractor shall give sufficient notice to the Project Manager to enable him to examine foundations well in advance of concrete being placed and no placement shall occur until such inspection shall have been carried out and the formation approved.

If the formation has become weathered prior to the placing of concrete the Contractor shall remove the weathered material and replace it with Grade C15P concrete at his own cost as directed by the Project Manager.

If the Project Manager so 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. Similarly, where concrete or other materials is to be placed in contact with the side face of an excavation the Contractor shall, if the

Project Manager so directs, leave undisturbed the last 75mm thickness of the excavation to that face until it is taken out neatly to profile by hand immediately before the concrete is placed.

Areas of excavation which are to receive a layer of concrete blinding or drainage layer under structural concrete shall be covered with such blinding or layer immediately the excavation has been completed and inspected and approved by the Project Manager.
All surfaces shall be free of oil, water, mud or any material which in the opinion of the Project Manager is not desirable.

Excavations for foundations and for thrust and anchor blocks shall be to such depth as shown on the Drawings or as the Project Manager may direct and no concrete or other materials shall be placed until the formation has been examined and approved. Due notice shall be given to the Project Manager to enable him to examine the formation well in advance.

4.17. Explosives

The use of explosives for rock blasting will not be permitted.

4.18. Excavated materials suitable for re-use

In so far as they may be suitable and comply with the Specification, materials arising from excavations may be used in the Works.
During excavation, the Contractor shall ensure that all material suitable for re-use and which he intends 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.

In particular, 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 excavation shall be agreed with the Project Manager.

In verges and other grass surfaces the grass and top soil shall be stripped and separately stacked.

4.19. Disposal of surplus excavated material

All surplus excavated material shall be disposed of by the Contractor to tips provided by the Contractor and approved by the Project Manager.

The Contractor shall not sell any materials arising from excavation, demolitions and the like carried out on the site.

The Contractor shall not deposit excavated materials on public or private land except where directed by the Project Manager in writing or with the consent in writing of the relevant authority, 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.

Surplus material may not be tipped on the site without the written permission of the Project Manager. In the event of such permission being granted the Contractor shall observe all conditions attached thereto.

4.20. Backfilling of excavations

All backfilling of excavations shall be thoroughly compacted in layers not exceeding 300 mm compacted thickness and by means which will not damage the Works.

Backfilling of excavations for reinforced concrete structures shall be with suitable material approved by the Project Manager.

"Granular material" as backfill is defined as decomposed basalt, crushed stone, quarry dust, gravel, sand or similar in which the clay or silt content is not predominant. Topsoil shall not be classified as granular material.

4.21. Pipe beddings

Granular bedding material shall be 4 – 6mm aggregates to BS 882.

Class A bedding shall comprise 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 granular bedding, with selected backfill material to a depth of 150mm above the crown of the pipe.

Class S bedding shall comprise a complete surround of single-size aggregates to a depth of 150mm above the crown of the pipe.

Granular bedding and selected backfill material, placed around and to a thickness of 150mm 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 the 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 Project Manager, be over-excavated by 150mm and shall be backfilled using compacted granular material in accordance to the description mentioned above.

4.22. Selected backfill material

The initial backfill in contact with the pipes shall be selected material and shall not contain large 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 from material larger than 75mm or stones larger than 20mm.

If the quantity of suitable material which can be obtained from the excavations is insufficient, the Contractor shall either screen the excavated material without additional cost or transport suitable material which has been screened from other excavations on the site without additional cost. In cases where no sufficient material exists on the site, the Contractor shall import suitable material after obtaining the written approval of the Project Manager.

4.23. Backfilling of pipe trenches

The trench above pipe surround level (300mm above the crown of the pipe) shall be filled with approved back fill material obtained from the trench excavations, free from boulders or 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 on the site without additional cost. In cases where no sufficient material exists on the site, the Contractor shall import suitable material after obtaining the written approval of the Project Manager.

Across roadways the material shall be placed in layers not exceeding 300mm thickness and compacted by the use of rammers 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 Test to BS 1377.

The density of the compacted fill shall be determined by the Contractor by using the "sand replacement" method when directed by the Project Manager.

For trenches in fields and open areas where agreed by the Project Manager 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 BS1377.

Before backfilling trenches the Contractor shall obtain approval from the Project Manager of the methods he proposes to use and he 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 Project Manager.

4.24. Making good of subsidences after refilling

All refilling, whether over foundations or in pipe trenches, shall be thoroughly compacted by ramming and any subsidences due to consolidation shall be made up with extra compacted material.

Should subsidences 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 at the Contractor’s own expense and to the full satisfaction of the Project Manager.

4.25. Reinstatement of surfaces

All surfaces whether public or private which are affected by the Works shall be reinstated temporarily by the Contractor in the first instance and in due course when the ground has consolidated fully, he shall reinstate the surfaces permanently.

The temporary reinstatement and maintenance and permanent reinstatement and maintenance of all surfaces of roads, tracks, paths, fields, verges and any other surfaces which have been affected by the operations of the Contractor shall be his sole liability and shall be carried out to the satisfaction of the Project Manager and of the responsible authority or owner.

5. Concrete for Minor works

5.1. Scope

This specification deals with reinforced and unreinforced concrete works, formwork and falseworks of any kind, and the reinforcement. It applies to structural concrete in chambers, walls, concrete for thrust blocks, support blocks, blinding etc.

5.2. Concrete

The concrete used in the Works shall be of the grade shown on the Drawings or detailed in the Bill of Quantities. Except where otherwise specified herein, the concrete ingredients, manufacture, testing and workmanship shall conform to the recommendations of Sections 6 and 7 of BS8110 Part 1 and 2.

This specification includes 4 grades of concrete,

- Grade C15
- Grade C20
- Grade C25
- Grade C30

The grade number refers to the 28-days characteristic strength in N/mm².

The concrete composition shall generally conform to the requirements of the prescribed mix design, as set out in Table 5: Prescribed Mixes. Small quantities of concrete may with the approval of the Project Manager be batched in accordance with Table 4: Nominal Mixes.

Table 2: Nominal Mixes

Grade of Concrete	Approx. volume of aggregate (m³) per m³ concrete		Approx. cement per m³ finished concrete, in bags (each 50kg)	Remarks
	Fine	Coarse		
C15N	0.450	0.900	6	Aggregate max. Size to be 20mm. Fine aggregate to Zone 2 of BS 882. Water not to exceed 28 litres per 50kg of cement
C20N	0.400	0.875	7	
C25N	0.375	0.825	8	
C30N	0.350	0.725	10	

Prescribed Mixes

Mass of Dry Aggregate to be used with 100 kg of Cement

Table 3: Prescribed Mixes

	Aggregate	Nominal Maximum Size of Aggregates (mm)							
		40		20		14			10
	Workability	Medium	High	Medium	High	Medium	High	Medium	High
	Range for standard sample (mm)	50-100	80-170	25-75	65-135	5-55	50-100	0-45	15-65
	Range for sample taken in accordance with Clause 9.2 of BS 5328 (mm)	40 - 110	70-180	15-85	55-145	0-65	40-110	0 - 55	5 - 75
Grade concrete	Material	Weight in kg							
C15P	Total Aggregate	790	690	680	580	N/A	N/A	N/A	N/A
C20P	Total Aggregate	660	600	600	530	560	470	510	420
C25P	Total Aggregate	560	510	510	460	490	410	450	370
C30P	Total Aggregate	510	460	460	400	410	360	380	320
Percentage by Mass of Fine Aggregate to Total Aggregate									
C15P		30	45	35	50	N/A	N/A	N/A	N/A
C20P	Grading Zone 1	35	40	40	45	45	50	50	55
C25P	2	30	35	35	40	40	45	45	50
C30P	3	30	30	30	35	35	40	40	45
C30P	4	25	25	25	30	30	35	35	40

N/A not applicable

Notes on the use of table 5

- Note 1.The proportions given in the tables will normally provide concrete of the strength in N/mm2 indicated by the grade except where poor control is allied with the use of poor materials.
- Note 2.For grade C15P a range of fine-aggregate percentages is given; the lower percentage is applicable to finer materials such as zone 4 sand and the higher percentage to coarser materials such as zone 1 sand.
- Note 3.For all grades, small adjustments in the percentage of fine aggregate may be required depending on the properties of the particular aggregates being used.
- Note 4.For grades C20P,C25P and C30P and where high workability is required, it is advisable to check that the percentage of fine aggregate stated will produce satisfactory concrete if the grading of the fine aggregate approaches the coarser limits of zone 1 or the finer limits of zone 4.

6. Miscellaneous Works

6.1. Cement mortar

Cement, water and aggregate used for mortar, rendering, grout, screeding and other construction work shall be in accordance with Section 5.

Cement mortar for block work, rendering, tiling and screeding shall consist of ordinary Portland cement and approved natural sand mixed by hand or an approved mechanical mixer.

The cement and sand shall first be mixed dry until the cement colour can no longer be distinguished from the sand in any part of the mass and the whole shall then be uniformly wetted by approved means while undergoing further mixing. The water content shall be just sufficient to ensure mixing. The water content shall just be sufficient to ensure a dense mortar of stiff consistency and adequate workability to permit trowelling or floating into place. The workability of cement mortar to be used for rendering may be improved by adding an approved plasticiser in the proportions recommended by the supplier of the plasticiser.

Mortar shall be prepared and used as rapidly as possible after mixing. Under no circumstances shall any mortar be used that has stiffened by commencing to set. Fresh mortar shall not be mixed with mortar prepared earlier and all batches shall be used entirely separately.

6.2. Blockwork

Precast concrete blocks for block works shall be cellular block or hollow type as indicated in the Bill of Quantities, and manufactured from ordinary Portland cement and aggregatescomplying with BS6073 Part 1 and 2 “Specification for the precast concrete masonry units”. The concrete blockshall be cured for not less than 28 days before they are used in the works. The Contractor shall supply a certificate from the supplier for each consignment of block received to the effect that the blocks meet the requirements and

strength of the latest relevant BS. No broken block or block or improper quality shall be used.

The blocks to be used under this contract is 8'' hollow concrete block and 6" cellular block as specified in the Bill of Quantities.

The compressive strength of blocks shall be in accordance with BS6073 Parts 1 and 2.

The minimum compressive strength of blocks shall be as specified below.

Structural block work units: 3.5N/mm²

Mortar to be used for block laying shall be composed of 1 part of cement to 3 part of sand. The cement and sand shall first be mixed dry until the cement colour can no longer be distinguished from the sand in any part of the mass. The latter shall then be uniformly wetted by approved means while undergoing further mixing. The water content shall just be sufficient to ensure a dense mortar of stiff consistency and adequate workability to permit troweling and floating into place.

Every batch of mortar shall be used within 30 minutes of mixing. No partially or wholly set mortar will be allowed to be used or re-mixed.

Laying of blocks

All blocks shall be wetted with water before being bedded and jointed to minimize absorption of water from the mortar and tops of walls where work has been left off shall be thoroughly wetted and raked back before block laying. Block shall be bonded in accordance with the best constructional practice with vertical joint staggered. Where required for bond, blocks shall be carefully cut to size. Laying of blocks shall be carried up evenly in courses, no portion shall rise more than one metre above adjacent portion and at such changes in levels work shall be stepped back. Courses shall be properly levelled and perpendicular joints, quoins, and angles shall be plumbed as the work proceeds. No joint, horizontal or vertical shall exceed 12 mm thickness. Joint shall be raked out for rendering.

The inside walls of blockwork chambers housing valves or ancillary fittings and equipment shall be rendered. Blockwork to be rendered shall have the joints raked out to a depth of 10 mm as work proceeds to form an adequate key. Blockwork to be left unrendered shall be faced with selected blocks, built with a fair face and pointed as the work proceeds with a neat flush joint.

Blockwork and concrete columns shall be bonded by approved galvanised metal ties cast into the concrete spaced at alternate courses and extending not less than 150mm into the block joints.

The Contractor shall protect and keep clean the facework.

6.3. Rendering

Rendering shall be carried out in a mix consisting one part cement and four parts of sand gauged by dry volume unless otherwise directed by the Project Manager. Rendering shall be in two coats of 20mm total thickness and is to be finished with a wood float.

The undercoat which shall have a thickness of 12mm shall be roughened to provide an adequate key for the finishing coat.

Surfaces to receive rendering shall be thoroughly cleaned. Concrete surfaces shall be roughened either by hand by treating the formwork with an approved retarder and wire brushing after removing the formwork whilst the concrete is still green to form an adequate key or by treating with an approved cement bonding agent in accordance with the manufacturer's recommendation. Otherwise the surfaces shall be well hacked to form a good key. The joints of block or stone walls shall be racked. All surfaces shall be dampened as necessary and the rendering applied immediately afterwards.

The finishing coat shall be applied with a wood skimming float and afterwards trimmed with a feather edge rule to a true and even surface. Arises shall be rounded and lineable. A hollow fillet shall be formed at internal angles. Any inequalities shall then be

thoroughly scoured with a hand float and filled in. Overworking of the surface shall be avoided to reduce the tendency of surface crazing.

All rendering shall be protected from the sun and rain by adequate and suitable coverings and the rendering shall be kept damp while setting. Any cracks or parts which sound hollow when tapped or other defects in the rendering shall be cut out and re-rendered.

6.4. Fix and build into concrete

Openings left in concrete for the subsequent fitting and concreting in of pipework and fixtures shall have the soffit of the opening inclined at not less than one in four to the horizontal. The periphery of the opening shall be formed as specified for construction joints.

After placing the pipe or fixture the remaining void shall be carefully packed with concrete of the appropriate grade to produce a water tight joint. The concrete shall be retained by a shutter which shall be built up as concrete filling proceeds. The Contractor shall ascertain from the suppliers of prefabricated or manufactured goods any special fixing instructions and shall refer them to the Project Manager for approval.

Where fixing bolts are positioned by means of a template they shall be supported and braced to remain in perfect alignment during the setting of the concrete or grout. Where it is necessary to drill holes for fixing, the holes shall be of the correct size and they shall be grouted solid with cement mortar.

Frames and flanges to be fixed against concrete or blockwork shall be supported against the face of the concrete or blockwork and separated from it by packings. Immediately before fixing the frame or flange, the face of the concrete or blockwork shall be carefully cleaned and roughened over the whole area to be covered. The nut securing each point shall be lightly tightened to hold the frame or flange in its correct position without distortion. The space between the face of the concrete or blockwork and the frame or flange shall then be filled with a stiff sand cement grout firmly rammed into the space

with the edges neatly finished off to a 45° level. Alternatively, a hard setting resin compound may be used. After the filling has hardened, the nuts shall be finally tightened in a sequence to prevent distortion and to ensure equal bearing.

Except where otherwise specified, when a metal is fixed permanently to metal or any other surface, the metal in the contact surface shall be painted on Site with two coats of bituminous paint immediately prior to fixing.

All steel fixings inclusive of nuts and bolts shall be galvanised in accordance with BS 729 unless otherwise specified.

Electrical apparatus to be fixed to the walls and soffits of structures below ground level, and otherwise when likely to be subjected to damp conditions, shall be fixed 10 mm clear of the surface by means of barrel or other suitable spacing devices.

6.5. Steelwork - general

All steel excluding pipes and pipe fittings shall be hot dipped galvanised in accordance with Clause 6.6 of this Specification after fabrication.

Where welding, cutting or drilling is carried out on Site the surrounding area shall be thoroughly cleaned by grinding, wire brushing or other method approved by the Project Manager. The area shall then be painted accordingly as specified under this specification.

6.6. Galvanising

Where steel or wrought iron is specified to be galvanised the galvanising shall be executed after all fabrication has been completed. Galvanising method shall be in accordance with British standard or equivalent standards. Metal surfaces shall be evenly covered and the additional weight thereof, after dipping, shall be not less than 0.6 kg per square metre (two ounces per square foot) of surface galvanised except in the cases of tubes to British Standard 1387, where it shall be 0.45 kg per square metre (one and a half ounces per square foot). Edges shall be clean and surface bright.

6.7. Painting

Unless otherwise specified, the workmanship and quality of materials for painting shall comply with BSCP 231.

The Contractor shall regard the preparation of surfaces to be painted as work of fundamental importance.

(1) **Galvanised Surfaces**

All surfaces shall be thoroughly cleaned of all scale, and every particle of rust, dirt or grease removed by scrapers, wire brushes, or other approved method. Painted surfaces or bituminous surfaces shall be removed. Galvanised surfaces shall be treated before painting with an approved etching primer (other than a mordant containing copper), which shall be supplied in two parts for mixing at Site in accordance with the manufacturer's instructions. The surface shall afterwards be thoroughly rinsed with clean water and allowed to dry.

The metal surfaces shall be painted with one undercoat a high-quality rust inhibitive primer approved by the Project Managerand at least 2 coats of bitumen paint as per instruction of the manufacturer to the satisfaction of the Project Manager. Each coat of paint must be allowed to dry before another coat is applied.

Application of primer and bitumen paint shall be as per instruction of Manufacturer.

(2) **Concrete and Blockwork**

After preparation of the concrete surfaces and blockwork of the building works shall be treated with a fungicidal wash. Subject to the approval of the Project Manager the fungicidal wash may be omitted if the first or priming coat of paint to be applied incorporates suitable fungicides.

The Contractor shall clean surfaces (removal of dirt, dust and loose paint) prior to apply a sealer/primer recommended by manufacturer prior to application of paint. Exterior quality paints only shall be used, both internally and externally. Painting shall be done as

per manufacturer guidelines with sufficient coats to the satisfaction of the Project Manager.

Rendered surfaces shall not be painted until the surfaces have fully hydrated and dried.

6.8. Cover

Chambers in open areas shall have access covers constructed of mild steel to BS 4360 Grade 43A and fabricated to comply with the requirements of BS 5950. The covers shall be hot dip galvanised after manufacture in accordance with BS 729 having a surface coating of not less than 800 g/sqm of zinc steel access covers shall be fixed to the cover slabs with M10 galvanised fixing bolts.

Chambers under paved areas subject to foot traffic only shall have light duty cast iron or steel covers, complying with BS 497, Grade C.

Chambers under paved areas subject to light traffic with wheel loadings not exceeding 3 tonnes shall have medium duty cast iron or steel covers complying with BS 497 grade B.

Chambers under roads shall have heavy duty cast or ductile iron covers complying with BS 497, Grade A2, minimum size 600mm x 600mm clear openings.

All frames shall be solidly bedded in cement mortar so that the covers when in position are fair and even with the adjacent surfaces. Where required the frames shall be bedded in Grade 20 concrete not exceeding 250mm thick where padlocks are required for lockable type covers they shall be five pin tumbler type in a long shackled 63mm solid brass or bronze case with two keys.Two sets of the appropriate lifting keys shall be provided for the cast iron and pressed steel recessed type covers. Burglar proof material for cover, if any, shall be considered instead of galvanised steel covers subject to approval from Project Manager.

6.9. Headwork cover

Chamber covers shall be constructed with thick mild steel plate of at least 4mm thick unless otherwise directed by the Project Manager. Covers shall be hot dip galvanised after manufacture with a zinc coating not less than 800g/m2in accordance with BS 729.

Prior to manufacture of the covers, the Contractor shall install on a chamber a sample cover complete with frame and locking system for approval by the Project Manager.

Hinges shall be of heavy-duty type of galvanized steel and shall be approved by the Project Manager.

Where frames are to be replaced, removal of old frames shall be carried out so as not to damage the structure of the chamber and the new frames (50mm*50mm*6mm) with fish tails shall be solidly bedded in cement mortar (1:3) so that the frame edge is fair and even with the adjacent surface. Where indicated the frames shall be bedded in Grade 30 concrete not exceeding 250mm thick with appropriate bonding agent for adhesion of the fresh concrete with the existing concrete. Frame shall be made of galvanized steel angle bar of size 50*50*6mm. Moreover, the handle lift shall be made with galvanized steel bar of at least 10mm dia. The eye lock shall be enclosed with a semi-circular cap both made of galvanized steel.All covers shall have labels/references marked in red paint.

Burglar proof material for cover, if any, shall be considered instead of galvanised steel covers subject to approval from Project Manager.

6.10. Welding

Welding shall be metal-arc welding complying with the requirements of BS 5137. All welds shall be continuous. Workmanship for welding shall be of the best quality.

6.11. Warning tape

The marker (warning) tape shall be made with plastic. The width of the tape shall be 300 mm and minimum thickness shall be 100 microns.

6.12. Step irons

Step irons shall have a minimum width of 350 mm unless otherwise specified by Project Manager.

B. SPECIFICATION AND COMPLIANCE SHEET

Procurement Reference Number: EU/W-2022/01R

(Bidders should complete columns C and D with specifications and performance of the Works offered. Also, state "comply" or "not comply" and give details of any non-compliance/deviation to the specifications required. Attach detailed technical literature if required. Authorize the specifications offered in the signature block below)

Item No.	Specifications and Performance Required	Compliance of specifications and Performance Offered	Details of Non-Compliance/Deviation (if applicable)
A	B	C	D
1.	Building Resilience Irrigation Infrastructure at Solitude I & II and Pointe aux Piments Drip Irrigation Project		
2	1.Surge Vessel		
	2.Air Valve		
	3.Pressure Regulating/ Flow Sustaining Valve		
	4.Flexible Flange adaptor		
	5.Non Return Valve		
	6.Flowmeter		
	7.Gate Valve		
	8.Filter Units		
	9. Volumetric Valve		
	10.Dripperlines		
	11. Any other items (to be specified by bidder)		

Specification and Compliance Sheet Authorized By:

Name:		Signature:	
Position:		Date:	
Authorized for and on behalf of:		Company:	

Section IV:

General Conditions of Contract and Particular Conditions of Contract

Any resulting contract shall be placed by means of a Letter of Acceptance and shall be subject to the General Conditions of Contract (GCC), **(Ref: W/GCC10/12-21**)[1]*, for the Procurement of Works (available on website *ppo.govmu*.org) except where modified by the Particular Conditions of Contract below.

Particular Conditions of Contract

Procurement Reference Number: **EU/W-2022/01R**

The clause numbers given in the first column correspond to the relevant clause number of the General Conditions of Contract.

A. General	
GCC 1.1 (o)	The Defects Liability Period is 6 months from the Completion Date.
GCC 1.1 (r)	The Employer is: Irrigation Authority 5th Fon Sing Building 12 Edith Cavell Street Port Louis The Authorised representative is Mr. G. SEETAH who is also the General Manager
GCC 1.1 (v)	The Intended Completion Date for the whole of the Works shall be **One hundred and Eighty (180) calendar days** calculated from the start date. The Start date shall be 7 days from the date of issue of the Order to Commence works to be issued by the Project Manager
GCC 1.1 (y)	The Project Manager shall be a representative of the Irrigation Authority
GCC 1.1 (aa)	The Site is located at Solitude and Pointe aux Piments and is defined in drawings No. EU/W-2022/01R/01
GCC 1.1 (dd)	"The Start Date shall be seven (7) days from the issue of Order to Commence works to be issued by the Project Manager
GCC 1.1 (hh)	The Scope of Works under Contract EU/W-2022/01R shall consist of viz.: (i) Dismantling of existing control valves and to replace them with the supply, installation and testing of new control valves in existing reinforced chambers wherever specified on the delivery main and distribution main including for provision of all ancillary fittings. (ii) Dismantling of existing equipment within main filtration plant and existing headworks and to replace respective existing equipment with the installation, testing of new equipment and ancillary fitting as specified.

	(iii) Repair of existing reinforced concrete chambers including steel frame/cover, hinges and locking device wherever specified on the delivery/distribution main and as directed by Project Manager. (iv) Supply of compensated and non-compensated dripper lines as specified. (v) Supply of all materials and goods required for works. (vi) Temporary works where required. The completion period shall be **One hundred and Eighty (180) calendar days** from the Start Date. The whole of the works shall be carried out in strict accordance with the Drawings, Scope of Works; Statement of Requirements; and Conditions of Contract.
GCC 2.2	Sectional Completions are not applicable to this Contract
GCC 2.3(i)	The following documents also form part of the Contract: 1) Pre-award correspondences 2) Post- award Submissions: (a) Performance Security (b) Insurance policies (c) Joint Venture Agreement (if any) (d) Programme of Works 3) Technical Documents including all catalogues and brochure of control valves supplied under this Contract 4) Any other document submitted by the Bidder which the Employer considered to be necessary for inclusion in the Contract
GCC 3.1	The language of the contract is English The law and regulations that apply to the Contract are those of Mauritius.
GCC 4.1	The Project Manager shall obtain specific approval from the Employer before carrying out any of his duties under the Contract which in the Project Manager's opinion will cause the amount finally due under the Contract to exceed the Contract Price or will give entitlement to extension of time. This

	requirement shall be waived in an emergency affecting safety of personnel or the Works or adjacent property.
GCC 5.1	The Project Manager may not delegate any of his duties and responsibilities without the approval of the Employer.
GCC 6	Any notice shall be sent to the following addresses: The Acting General Manager, **Irrigation Authority**, 5th Floor Fon Sing Building, 12 Edith Cavell Street Port Louis. For the Contractor, the address shall be as given on the first page of the Letter of Acceptance and the contact name shall be _____.
GCC 8.1	Schedule of other contractors is not applicable.
GCC 9.1	To add under Key Personnel: (i). One Contract Manager (part time), holding at least a Degree in Civil Engineering from a recognised institution. He shall have at least 5 years of experience in civil engineering works or Building construction works. (ii). Site agent (full-time) holding at least a Degree in Civil Engineering from a recognised institution and shall be registered with the Council of Registered Professional Engineer of Mauritius. He shall have at least 3 years post registration experience in civil engineering works. (iii). One foreman having at least 3 years of experience in pipe laying works and installation of water works. (iv). At least one qualified plumber/pipe fitter having minimum 3 years experience related to installation of water works.
GCC 13.1	Except for the cover mentioned in (d)(i) hereunder, the other insurance covers shall be in the joint names of the Contractor and the Employer and the minimum insurance amounts shall be: (a) for the Works, Plant and Materials: **Contract Price plus 15%**

	(b) for loss or damage to Equipment: **Cost of equipment plus 15% of its value** (c) for loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract: MUR **1,000,000.00** (One Million Rupees) (d) for personal injury or death: (i) of the Contractor's employees: As per Law of Mauritius (ii) of other people: **MUR 2,000,000** (Two Million Rupees) This cover shall be in the joint name of the two parties covering any third party and extended to the site representatives of the Irrigation Authority**.** (e) for loss or damage to materials on-site and for which payment have been included in the Interim Payment Certificate, where applicable. The Contractor shall choose to take the insurance covers indicated above as separate covers or a combination of the Contractor's All Risks coupled with the Employer's liability and First Loss Burglary, after approval of the Employer. All insurance covers shall be of nil or the minimum possible deductibles at sole expense of the contractor. All insurance covers shall be valid from commencement of works until the end of the defects liability period and shall be approved by the Project Manager.
GCC 14.1	Site Investigation Reports are: There are no Site Investigation Reports available for this project. Bidders are however advised to visit the site prior to submission of bid. They should acquaint themselves with the nature of the site, extent of the work, means of access, general nature of the soil and all other matters which may influence preparation and execution of their bid. All costs incidental thereof shall be at the Bidder's own expense. No claim due to ignorance of these factors as mentioned in the preceding paragraph shall be entertained from the contractor.
GCC 16.1	The intended completion date shall be One hundred and Eighty (180) calendar days from the Start Date.

GCC 20.1	The Site Possession Date shall be stated by the Project Manager in the order to commence work and based on the Programme of Works to be approved by the Project Manager as stated in GCC 25.1. The Contractor shall be responsible for obtaining a site for his camps, offices, stock pile of aggregates, constructional plant and other temporary works and for making all payment in connection therewith.
GCC 23.1 & GCC 23.2	Appointing Authority for the Adjudicator: **No Adjudicator shall be appointed for this Contract.**
GCC 24.	No Adjudicator shall be appointed under the contract and arbitration shall not apply. If any dispute arises between the Employer and the Contractor in connection with or arising out of the Contract, the parties shall seek to resolve any such dispute by amicable agreement. If the parties fail to resolve such dispute by amicable agreement, within 14 days after one party has notified the other in writing of the dispute, then the dispute shall be referred to court by either party.
B. Time Control	
GCC 25.1	The Contractor shall submit for approval a Programme for the Works within 7 days from the date of the Letter of Acceptance.
GCC 25.3	Program updates shall be required and the period between Program updates is fourteen (14) days. The amount to be withheld for late submission of an updated Program is **MUR 1,000** per day delayed.
C. Quality Control	
GCC 33.1	The Defects Liability Period is 6 months calculated from the date of completion of the works certified by the Project Manager in accordance with Clause 53.
GCC 34.1	Delete sub-clause 34.1 and replace by the following: Should any defect arise during the contractual period and up to the end of the Defects Liability Period and the Contractor fails to correct the Defect within the time specified in the Project Manager's notice, this shall constitute a breach of the Contractor's obligations under the contract. The Project Manager shall assess the cost of having the defect corrected and recover the money from the Performance Security.
GCC 37.1	To add:

	Prior to issue of any Variation Order (VO) involving cost implication, the Project Manager shall assess the variation and seek the approval of the Employer.
GCC 37.2	To add: The Project Manager shall assess all quotations and submit recommendation to Employer for approval prior to issue of the VO.
GCC 39.7	Payment shall be made as per progress of works without payment for materials on site.
D. Cost Control	
GCC 40.1	Replace second sentence "The Employer shall pay the Contractor the amounts certified by the Project Manager within 21 days of the date of each certificate … with supporting documents from the Contractor" by "The Project Manager shall certify the amount after verification within fourteen (14) days from the receipt of an invoice supported by an interim payment application from the Contractor and the Employer shall pay the Contractor for the amount certified by the Project Manager within 56 days of receipt of the certified interim payment certificate from the Project Manager." To add: Minimum amount of Interim Payment shall be MUR 500,000.
GCC 41.1 (l**)**	The term "exceptionally adverse weather conditions" is hereby defined as any one of the following events: (i) 100 mm rainfall or above recorded in one day of the nearest rain station; (ii) An official declaration of 'Torrential Rain' by meteorological Department of Mauritius; and (iii) Cyclone warning Class II or above.
GCC 43.1	The currency of the Employer's country is: **Mauritian Rupees.**
GCC 44.1	The Contract is not subject to price adjustment. It shall be a fixed price which shall not revised or adjusted for any fluctuations in the cost of inputs.
GCC 45.1	10% of the amount shall be retained from any payment in respect of the value of work certified. Half of the retention money will be released after formal taking over of the Works and the remaining shall be released after the Defect Liability Period subject to the Contractor making good all defects.

	The Limit of Retention Money shall be 5% of Contract Price.
GCC 46.1	The liquidated damages for the whole of the Works shall be MUR 5,000 per calendar day beyond the Intended Completion Date. The maximum amount of liquidated damages for the whole of the Works is 10% of the Contract Price.
GCC 47.1	The Bonus for the whole of the Works is not applicable.
GCC 48.1	The Advance Payments shall be: 15 % of the Contract Price excluding VAT and shall be paid to the Contractor within 14 days after signature of the Contract and submission of the Advance Payment security by the contractor.no later than 7 days from the signature of the Contract.
GCC 49.1	The Performance Security amount is 10% of Contract price excluding VAT.

E. Finishing the Contract	
GCC 56	The date by which operating and maintenance manuals are required is two weeks before the intended completion date. The date by which "as built" drawings are required is two weeks before the intended completion date. "As built" drawings shall be worked out by the Contractor and submitted for approval by the Project Manager in case of changes to drawings of the bidding document, failing which these drawings shall be drawn by the Employer at the cost of Rs 1000 per drawing which will be deducted from the final payment to the contractor.
GCC 57.2 (g)	The maximum number of days shall be computed based on the maximum amount of liquidated damages for the whole of the Works.
GCC 59.1	The percentage to apply to the value of the work not completed, representing the Employer's additional cost for completing the Works, is 25%.

Section V

PREAMBLE TO BILL OF QUANTITIES

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PREAMBLE

1. General

1.1. The Bill of Quantities is not and does not purport to be either exhaustive or explanatory of all the obligations and duties of the Contractor who shall be deemed to have satisfied himself as to the correctness and sufficiency of the rates and prices stated in the Bill of Quantities all of which shall cover all his obligations under the Contract (including those in respect of the supply of goods, workmanship, materials, Plant or services or of contingencies for which there is a Provisional Sum) and all matters and things necessary for the proper execution and completion of the Works.

1.2. The bidder shall name in his separate memorandum the percentage overhead, preliminary and general items of cost applied to his direct costs in the rates entered in the Bill of Quantities. This percentage shall be deemed to represent all the indirect costs and profit recoverable by the Contractor on the Contract sum, provided always that the bidder shall not apportion indirect costs on all items in the Bill of Quantities which is either a provisional sum or a provisional quantity.

1.3. A detailed description of the Bill items and of the conditions under which and the manner in which the work is to be done is not set out in each item of the Bill of Quantities, and reference should be made to this Preamble, Specifications and all other documents forming the Contract.

1.4. Rates and prices are to cover fixing and/or finishing the work completely. Fixing, laying, jointing, building in or finishing works are therefore not usually specifically mentioned in the Bill of Quantities. Rates and prices shall include for all building in of valves, pipes, ladders, walkways or similar and for all necessary brackets, gaskets, bolts, nuts, fittings and fixtures whether or not they are mentioned in the Bill of Quantities.

1.5. The Contractor shall be deemed to have inserted against each Bill item such rates and prices as he may deem necessary to cover the requirements of the Contract including all conditions, obligations and liabilities. Where no rate or price is inserted against any item

in the Bills the cost of the work for such item shall be deemed to be spread over and have been included in rates and prices for other items priced by the Contractor.

The Bill of Quantities has been divided into sections for convenience of measurement and pricing.

1.6. Each Bill item shall be duly rated and priced by the Contractor with the exception of the items for which a rate only is required or which already have Provisional Sums affixed thereto. Unless otherwise stated, all items shall be fully inclusive of all that is necessary to fulfill the liabilities, obligations and risks either expressly stated or implied arising out of the Contract and shall be deemed to include all of the following: -:

i. Labour and all associated costs.

ii. Materials, goods, plant and all associated costs.

iii. Contractor's Equipment.

iv. Temporary Works.

v. Superintendence of the Works.

vi. Establishment charges, overheads and profit.

1.7. The rates and prices inserted by the Contractor are to be the full and inclusive value of the work described. They must include all plant, tools, materials, transport of men and materials, insurance and labour of every description. They must also take into account the conditions referred to in the General Conditions of Contract and other documents on which the tender is based, and include the time lost due to weather, payment of guaranteed minimum and holidays with pay. The cost of any travelling time, subsistence and incentives such as overtime, etc. must be included in the rates and prices. Where any special risks, liabilities and obligations mentioned above or otherwise, cannot be dealt with in the rates, then the price thereof is to be separately stated in an item or items provided for the purpose or added by the Contractor

1.8. Unless otherwise specified, all measurements in the Bill of Quantities are taken as net. The principle of net measurement shall apply to all Works executed. All quantities measured for payment will be measured by the Project Manager on the basis of actual quantities in place of accepted Works executed according to the principle of net measurement. Items not used shall not be measured or included by the Contractor in his statements.

1.9. The quantities given in the Bill are only approximate. In no sense shall such quantities be considered as limiting or extending the amount of the work to be done by the Contractor and of the materials to be supplied by the contractor. They are given so that bids can be both made out and compared on equal basis. Work will be measured on completion and the Contractor will be paid on the actual measurement of work agreed by the Project Manager.

1.10. Subject to the provisions of the Conditions of Contract, the Contractor shall value the Permanent Works executed at the rates in the Bill of Quantities.

1.11. Where the Bill of Quantities does not include separate items for the Contractor's Equipment, Plant and Temporary Works the Contractor shall be deemed to have covered his obligations in these respects in the rates and prices for Permanent Works. Other than the items provided in the BOQ, no additional payment or any claims for the cost of temporary works shall be allowed.

1.12. All rates and sums of money quoted in the Bill of Quantities shall be in Mauritian Rupees.

1.13. The Contractor shall be deemed to have visited the Site before preparing his bid and to have examined for himself the conditions under which the work will proceed and all other matters affecting the carrying out of the Works and the costs thereof.

1.14. "Instructed", "directed" or "approved" shall mean the instruction, direction or approval of the Project Manager in writing.

1.15. The Contractor shall not be automatically entitled to receive payment for any item for work that has not been carried out or on any items that are not used. Payment will be made only on the basis of re-measurement of work actually done.

2. Excavation

2.1. The rates and prices for excavation, whether included in another item or separately itemised, shall include for all types of ground encountered and for all ground conditions above or below water level. The Contractor must make due allowance that permission will not be granted for the use of explosives for blasting and other operations. All excavation measured by volume shall be measured net to the dimensions specified or as shown on the Drawings. No allowance shall be made for bulking or for any extra transport required due to bulking.

The rates and prices for excavation shall include, but not by way of limitation, for:

- all necessary excavations to formation levels, including refilling, backfilling, ramming and disposal of surplus;
- excavating to the correct depth and preserving the bottoms of excavations in a state suitable for the reception of concrete, pipes or pipe bedding, and for filling over-excavated volumes or disturbed areas to the net dimensions as indicated on the Drawings;
- any additional excavation required for formwork, working space, temporary or permanent shoring, and subsequent refilling and ramming and disposal of surplus;
- provision of storage areas for the temporary storage of any material required for backfilling which cannot be stored alongside the excavation for any reason, together with the cost of transporting, loading and unloading such material and all other charges incurred in this respect;

- trimming the bottoms including bottoming to falls, and trimming to sloping surfaces where required or indicated on the Drawings;
- taking all precautions by supporting faces of excavation to ensure the safety of the workmen and to prevent damage to adjacent walls, buildings and all other structures and services and to prevent damage to road and other surfaces by slip or breaking away of trench sides or other cause, including permanent and/or temporary shoring of trenches;
- de-watering of trench in waterlogged areas.
- keeping the site and trenches and all other excavations free from water from whatever cause arising;
- all temporary and permanent measures required to protect and support all existing pipes, cables and services; including all chambers, culverts, gullies, and foundations thereto, or repair or replace them should they become damaged due to the Contractor's activities;
- all barriers, warning tapes, lighting, warning signs, traffic controls and any other measures necessary to ensure complete safety around the area of the works; and
- selected fill, screened fill and compact with material not exceeding 10 mm to trenches to depth of 300mm above top of pipe;
- leaving open the pipe sockets till approval of testing
- Compacted fill over selected fill layer up to ground level/hump
- reinstatement
- Excavation in rock shall be measured by volume obtained by multiplying the horizontal area of the rock in the excavation by the average thickness of the rock above the required formation level or other excavation level ordered by the Project Manager.

2.2. The quantities for trench excavation shall be measured in successive horizontal bands along the centre line of the pipe. The term 'depth to invert' means depth to the lowest internal surface of the barrel of the pipe, the term 'cover' means the distance from original ground level to the highest external surface of the barrel of the pipe, enlargements of pipes at sockets and the like being disregarded.

For the purposes of measuring excavation in trench and rock excavation by volume the trench width shall be taken as the outside diameter of the pipe plus 400 mm and the depth from ground level to the formation level except where otherwise stated.

Rates for imported selected fill shall include for compaction as specified and for disposal of an equivalent volume of any surplus excavated material including boulders accumulated as a result of the use of imported selected fill.

2.3. Rates for the filling of the troughs/depressions under the pivot paths with surplus excavated materials obtained from the construction of delivery main, submains, laterals and cutting work shall include handling of stack materials, filling, compacting, levelling and double handling where required.

3. Concrete work

3.1. Rates for blinding concrete, whether included in another item or separately itemised, shall include for all additional excavation, disposal of surplus and all necessary sawn formwork.

3.2. All concrete measured by volume shall be measured net but holes and box-outs for pipes, mortices and the like shall not be deducted.

The rate and prices for all grades of concrete and reinforced concrete whether included in another item or separately itemised, shall include, but not by way of limitation, for:

- all design of concrete mixes and testing as specified;
- all formwork including stop ends, splays, chamfers, rebates holes, throatings, openings, box-outs, cut-outs, slots mortices and like items. (Formwork shall be

'sawn' finish to all buried external faces of concrete below a line 250mm below ground level and shall be 'wrought' finish to all other faces);

- forming of chamfers (25mm x 25mm) to all exposed external angles of concrete structures whether indicated on the Drawings or not;
- forming expansion, contraction, movement and construction joints and for all waterstops, jointing materials, sealing compounds and formwork necessary for forming such joints;
- the building in of all pipes and fittings, bolts, frames for covers, iron and steelwork etc. and making good;
- the finishing of all concrete surfaces to falls and levels as indicated on the Drawings and the trowelling smooth (steel float finish) of all surfaces exposed to view or in contact with water;

3.3. The rates for reinforcement in reinforced concrete, whether included in another item or separately itemised, shall include, but not by way of limitation for supplying, handling, cutting, bending, distribution, cleaning, fixing and provision of spacers, supports and lacings, etc. and all soft iron tying wire or fixing clips.

3.4. The rates and prices for precast concrete units, whether included in another item or separately itemised, shall include but not by way of limitation for all concrete, reinforcement, ties, formwork, chamfers, recesses and other features as shown on the Drawings.

3.5. Rates for concrete benching and screeding, whether included in another item or separately itemised, shall include for finishing to a steel trowelled finish and to the contours as indicated on the Drawings.

3.6. Rates for thrust and anchor blocks shall include for concrete and all additional excavation, trimming and sawn formwork as necessary. The concrete is to be placed on the full extent of the excavation as detailed in the Drawings but the blocks shall be the minimum size consistent with the Drawings.

3.7. Rates for marker posts shall include but not by way of limitation for all excavation, refilling, ramming, disposing of surplus, concrete, formwork, reinforcement, making good ground surface, plates, numerals, lettering and painting.

3.8. All thickness stated are minimum finished and compacted thickness and the prices and rates shall include for any extra thickness necessary to obtain these minimum.

4. Miscellaneous

4.1. Permanent reinstatement of trench and surfaces, whether included in another item or separately itemised, shall include, but not by way of limitation, for:

- obtaining a permit to work from the relevant authority;
- temporary reinstatement of asphaltic surfaces in accordance with the Specification;
- permanent reinstatement by the Contractor or by the relevant authority;
- trench widenings for chambers and other ancillary structures;
- the removal and subsequent replacement of all kerb stones, paving stones, street lamps, road signs and safety barriers and other street furniture and all other costs and charges in connection therewith;
- forming and reinstating all openings on the line of a pipeline in fencing, hedging, walling or similar feature;
- breaking and opening trench surfaces, including subsequent restoration and reinstatement in road and elsewhere including the removal of any form of foundation thereto;
- Crossing and reinstatement of all lined open drains, culverts, ditches, water-courses and similar items.

The term 'temporary' restoration or reinstatement as applied to surfaces other than roads shall be deemed to include for all works necessary to return the surface to its original or similar condition.

4.2. The rate for the construction of temporary access roads through and around the site shall include for all costs incurred by the Contractor for providing and maintaining such access and for reinstatement of the area to its original condition. Rates for pipe bedding shall include, but not by way of limitation, for importation of satisfactory materials including any crushed rock and disposal of surplus excavated material.

4.3. Rates for Compacted Crushed Stone, Hardcore, or Compacted Granular Material shall include for compacted material as specified and for disposal of an equivalent volume of surplus excavated material. The rates shall include for blinding with fine material as necessary and finishing to the levels, slopes or falls required.

4.4. Rates for Compacted Selected Excavated Material shall include for compacted material as specified to the levels, slopes or falls required and finishing where exposed with fine topsoil 200mm thick. The rates shall include for material excavated from any part of the works.

4.5. The quantities for pipelines and pipework shall be measured along the centre line of the pipe through all fittings, chambers etc.

4.6. No separate payment shall be made for complying with the requirements necessary for the cleaning of the pipelines. All the costs of these operations shall be incorporated in the rate for laying and testing of the pipelines.

4.7. Rates and prices for pipeline construction and pipework shall include, but not by way of limitation for:

- supply, storing, handling, distributing, protecting and maintaining in good condition, cutting, turning, laying at any depth, jointing, protecting, testing and cleansing the pipelines and pipework, together with the installation and incorporation of all joints, bends and tees, branch and in-line valves, air and

washout valves, hydrants and all other fittings, except where separate items are included, necessary to produce a complete and continuous pipeline;

- protecting all buried metal pipes, fittings, flange joints and couplings;
- painting exposed valves and fittings as specified;
- temporary and permanent support blocks to pipes;
- supply and placing of warning tapes.

4.8. The rates and prices for all testing, whether included in another item or separately itemised, shall include, but not by way of limitation, for providing all consumables, water, transport of water, labour and equipment and for furnishing all specified test reports and certificates.

4.9. The rates and prices for connecting a pipeline to or into an existing pipeline shall include, but not by way of limitation for:

- any necessary trial holes to locate the existing pipeline;
- all additional excavations;
- Interruption and resumption of water supply.

4.10. Any work performed in excess of the requirements of the specification, Bill of Quantities and drawing such as over depth excavation, extra thickness of sub-base layer or surfacing, etc. shall not be paid for unless ordered in writing by the Project Manager.

5. Schedules or Sub-Bills

5.1. Where in the Bill of Quantities there is a Schedule or subsidiary bill setting out the quantities of component materials and work which comprise a unit of work measured under a single item in a Bill, the total price of the Schedule or subsidiary bill shall be the rate for the appropriate items ordered by the Project Manager shall be valued by deducting from or adding to the said total price, amounts in respect of reductions or adding to the said total price, amounts in respect of reductions or increases in quantity

valued at the rates set out in the said Schedule or subsidiary bill or in the absence of such appropriate rates at rates fixed in accordance with the provisions of Clause 40 of the Conditions of Contract.

6. Provisional Sums

6.1. No item for which a Provisional Sum is inserted shall be purchased by the Contractor until the Project Manager has given written instructions to this effect and it shall be the duty of the Contractor to make an application to the Project Manager sufficiently in advance of the progress of the work for instructions with regard to each such items. The Contractor shall obtain competitive quotations and samples if required and shall submit these to the Project Manager for approval.

6.2. The Contractor shall produce to the Project Manager the receipted accounts for all articles purchased under Provisional. No payment to the Contractor shall be made in respect of the items until the said receipts have been presented to the Project Manager.

6.3. The Contractor shall enter the percentage mark up of corresponding items described as Provisional Sum.

6.4. Provisional sums inserted in the Bill of Quantities in respect of materials to be specially imported for the Contract by the Contractor shall be deemed to include insurance, freight, dock and all other charges. In the case of imported materials obtained through a manufacturer's agent in Mauritius the sum shall be deemed to include the agent's fees and charges.

6.5. The Bill of Quantities include items in respect of the Provisional Sums for materials and sub-contracts given in the form of a percentage of the sums to be expended to cover the Contractor's profit and overheads, including but not limited to the costs of obtaining quotations for, and the placing of orders or awarding sub-contracts, and all expenses in connection with administering such orders or sub-contract and financing cost for payment of these sums until recovery from Interim Certificates.

6.6. Items described as **Provisional Sum** or **Prov. Sum** or **Provisional** in the column of Description or Unit of the Bill of Quantities shall be subject for approval from the Project Manager prior of executing the items of work. Such items may be used in whole or in part, or not at all as instructed by the Project Manager

7. Dayworks

7.1. The Dayworks Bill is provided for the valuation of Work executed on a Daywork basis pursuant to Clause 50 of the Conditions of Contract, and

7.2. No work shall be carried out as Daywork except on the written order of the Project Manager.

7.3. Rates in the Dayworks bill will apply for the duration of the Contract.

7.4. The chargeable time shall be the actual time for which the labour or plant is used on the works.

7.5. The rates and valuation of works ordered by the Project Manager to be executed on a Daywork basis shall be made in accordance with the following:

(A) Labour

- Rates for all categories and classes of labour in the Dayworks Bill shall cover all the Contractor's obligations whatsoever in providing and maintaining such labour at the place of work including wages, payment for conditions and for skill, bonus, travelling and subsistence allowances and expenses, guaranteed time, holidays with pay, insurances of all kinds, pensions, site supervision, watching, administrative and welfare charges, the use and maintenance of stagings, scaffolding, portable electric tools, non-mechanical plant and hand tools of every kind, overheads, profit and all incidental expenses.
- The cost of supervisors, foremen and working gangers employed in a supervisory capacity or site supervision shall be deemed to be included in the Daywork rates and shall not be paid for separately. The rates shall cover for the supply,

transport about the Site, use, maintenance and renewal of all hand tools and equipment available on site and used on Dayworks, such as wheelbarrows, spades, picks, crowbars, hammers, ropes, chains, hooks, blocks, pulleys, scaffolding, timber putlogs, running planks, ladders, hand operated jacks, hand pumps, lamps, timber runways or platforms, tarpaulins and all other like hand tools and general equipment not specifically referred to under the listed plant hire for Dayworks.

- Rates for labour are for units of man-days and shall be deemed to be a normal working day of 8 hours.
- If overtime on work being carried out by Daywork is authorised by the Project Manager, the Contractor shall be paid for such overtime in the same proportion as it is paid to the workmen. Thus, if a man works for ten hours for which he is paid eleven hours, the Contractor shall be paid eleven hours (i.e. 1.375 days) for such a man.
- The cost of plant operators is included in the plant Daywork rates and are not paid separately under labour Dayworks.
- Rates for all classes of labour items are Provisional Sum.

(B) Plant

- Rates for all items of plant listed in the Dayworks Bill shall be inserted. Rates for all plants whether belonging to the Contractor or hired by him shall cover all the Contractor's obligations whatsoever in providing and maintaining such plant at the place of work including all fuel, lubricants, oil, grease, spare parts, insurance, operator’s cost, superintendence, maintenance cost, operating cost overheads, profits and all auxiliary equipment necessary for efficient operation and use of the plant.

- Payment for plant on Daywork shall be limited to items listed in the Dayworks Bill or added thereto by the Contractor when tendering, unless otherwise agreed by the Project Manager.
- Idle time shall not be paid for.
- Plant rates shall be paid only for the time during which the plant is actually working on Daywork as authorised by the Project Manager in writing. Plant rates shall not be paid for periods of breakdown, inefficiency or unsuitability of the plant.

(C) Materials

- Rates shall be inserted against all items for materials listed.
- Payment for materials executed on Daywork basis will be made on the net quantity used.
- Rates shall cover for loading, transport, unloading, storage, double handling, insurance, wastage, overhead and profit, and other on-costs from whatever cause arising.
- The materials shall in all instances conform to the qualities and descriptions stated in the Specifications.

8. METHOD RELATED CHARGES

In order that the Contractor may cover his costs in executing the whole of the Works in conformity with the contract documents, where those costs are not properly attributable to the quantity of permanent works to be executed, he may cover such costs in the Bills of Quantities as method related charges.

A bidder may insert in the Bills of Quantities and in the space provided such items for Method Related Charges as he may decide to cover items of work relating to his intended method of executing the works, the costs of which are not to be considered as proportional to the quantities, rates and prices for the other items.

Each item for a Method Related Charge inserted by the Bidder shall be fully described so as to define precisely the extent of work covered and to identify the constructional resources (plant, equipment etc.) to be used and the particular items of permanent or temporary works to which the items relate.

Abbreviations

The following abbreviations are used in the document:

NPIP	:	Northern Plains Irrigation Project
P.A.P	:	Pointe aux Piments
B/F	:	Brought forward
C/F	:	Carried forward
%	:	Percent
BOQ or BoQ	:	Bill of Quantities
No. or no	:	Number
Nos. or nos	:	Numbers
Galv.	:	Galvanised
D/S	:	Downstream
U/S	:	Upstream
PCV	:	Pressure Control valve or Pressure Reducing valve
PRV	:	Pressure Relief valve
IA	:	Irrigation Authority
CH.	:	Chainage
DN	:	Nominal Diameter in mm
OD	:	Outer Diameter in mm
PN	:	Nominal Pressure in bar
Lin m or m	:	metre
mm	:	millimetre
m^2	:	Square Metre
m^3	:	Cubic Metre
ha	:	Hectare(s)
kg	:	Kilogram
T	:	Metric Tonne
D/F	:	Double flanged

Abbreviations

F/F	:	Flange to Flange
D.I.	:	Ductile Iron
G.S	:	Galvanised steel
P.V.C	:	Polyvinyl Chloride
Prov.	:	Provisional
MUR	:	Mauritian Rupees
RC	:	Reinforced concrete
P.C	:	Precast Concrete

Section VI

Bill of Quantities

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS (Contract No: EU/W-2022/01R)

SUMMARY OF BILL OF QUANTITIES

S.N	General Summary	Amount
	Solitude I Drip Irrigation Project	
1	Bill No. 1: Filtration Plant	
2	Bill No. 2: Distribution Main	
3	Bill No. 3: Distribution Junction	
4	Bill No. 4: Headworks	
5	Bill No. 5: Flowmeters and Fertigation system	
	Solitude II Drip Irrigation Project	
6	Bill No. 6: Tapping point to Filtration Plant	
7	Bill No. 7: Filtration Plant and Headworks	
	Pointe Aux Piments Drip Irrigation Project	
8	Bill No. 8: Filtration Station	
9	Bill No. 9: Headworks	
	Supply and Installation of Dripper lines and Manifolds	
10	Bill No. 10: Supply of dripper line	
11	Bill No. 11: Supply and Installation of Manifolds	

Subtotal 1	
Contingencies	500,000.00
Subtotal 2 (Carried forward to Bid Submission Form)	
VAT @15%	
Total	

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS

DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

SOLITUDE I DRIP IRRIGATION PROJECT

Bill No. 1: Filtration plant

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
1	**Surge Vessel 2000L**				
1.1	Excavate to locate existing pipe connections of surge vessel. (Works to include breaking of support blocks, backfilling and carting away of surplus soil)	m^3	15		
1.2	Dismantle existing surge vessel and associated fittings	Sum	-		
1.3	Supply, lay, joint and test all flanged tee DN 400x250x400, PN 10.	No.	1		
1.4	Supply, install and test flexible flanged adaptor DN 400, PN 10	No.	2		
1.5	Supply, install and test surge vessel of volume 2000 L with associated works and fittings to connect Tee under item 1.3	No.	1		
1.6	Concrete works for support of new surge vessel inclusive of formworks and reinforcement as directed by Project Manager.	Prov. Sum	-	-	45,000.00
2	**Air Valve**				
2.1	Dismantling of existing air valve DN 60 and carry out maintenance as directed by Project Manager.	Sum	-		
2.2	Supply, install and test new threaded isolating valve ND 60mm	No.	1		
2.3	Install and test air valve DN 60	No.	1		
3	**Valves in Chamber**				
3.1	Dismantle existing Double flanged DN 400 butterfly valve, strainer DN 400 and pressure regulating/ Flow sustaining valve	Sum	-		
	TOTAL C/F				

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
	TOTAL B/F				
4 4.1	**Strainer** Carry out maintenance on existing strainer DN 400 and install and test same.	 Sum	 -		
5 5.1	**Pressure Regulating / Flow Sustaining Valve** Supply, install and test new Double FlangedPressure Regulating / Flow Sustaining ValveDN 400, PN 10and all associated fittings to maintain a downstream pressure of 4 bar and a flow of 220 l/s inclusive of2 manometers.	 No.	 1		
6 6.1	**Flexible flange adaptor** Supply, install and test Flexible flanged adapter DN 400mm, PN 10.	 No.	 2		
7 7.1 7.2 7.3 7.4	**Non-return Valve DN 400** Dismantle existing double flanged Non-return valve DN 400, PN 10. Supply, install and test new double flanged non- return valve DN 400, PN 10 inclusive of associated works. Supply, install and test flexible flanged adaptor DN 400, PN 10. Breaking And Reinstatement of existing concrete chamber to accommodate new double flange Non return valve DN 400 and flexible flanged adaptor as directed by Project Manager. Works are to include excavation, backfilling and fixing of cover, frame, hinges and locking device.	 Sum No. No. Prov. Sum	 - 1 1 -		 50,000.00
	TOTAL C/F				

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
	TOTAL B/F				
8	**Flow meter**				
8.1	Dismantle existing Flowmeter mounted on DN 300 pipe.	Sum	-		
8.2	Supply, install and test an automated electromagnetic/ ultrasonic flow meter with totaliser and instantaneous flow indicator for a flow rate of 220L/s on DN 300 pipe inclusive of all associated works and fittings.	No.	1		
9	Reinstatement of all existing concrete chambers including covers, frame, hinges and locking devices inside filtration plant as directed by Project Manager.	Prov.Sum	-	-	75,000.00
10	Commissioning of all control valves.	Sum	-		
	TOTAL C/F TO BILL No. 1 OF SUMMARY OF BOQ				

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BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

Bill No. 2: Distribution Main

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
1	**Air Valves in existing chambers**				
1.1	Supply, install and test double orifice air valve DN 60, PN 10 inclusive of all associated works	No.	2		
1.2	Supply, install and test isolating valve DN 60 mm, PN 10	No.	2		
2	**Air valve Chambers**				
2.1	Reinstatement of chambers including cover, hinges, frame and locking device as directed by Project Manager	Prov. Sum	-	-	70,000.00
3	**Drain valve Chambers**				
3.1	Reinstatement of chambers including cover, hinges, frame and locking device as directed by Project Manager	Prov. Sum	-	-	50,000.00
	TOTAL C/F TO BILL NO 2 OF SUMMARY OF BILLS				

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BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

Bill No. 3: Distribution Junction

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
1	**Main 1/ Gate valve in chamber**				
1.1	Dismantle existing Double flanged gate valve DN 300 and VJ coupling DN 300.	Sum	-		
1.2	Supply, install and test new Double flanged Gate valve DN 300 , PN 10 inclusive of all associated works	No.	1		
1.3	Supply, install and test new VJ coupling DN 300, PN 10 inclusive of all associated works.	No.	1		
2	**Main 3/ Gate valve in chamber**				
2.1	Dismantle existing gate valve DN 200and VJ coupling DN 200.	Sum	-		
2.2	Supply, install and test new Double flanged DN 200 Gate valve assembly, PN 10 inclusive of all associated works	No.	1		
2.3	Supply, install and test new VJ coupling DN 200, PN 10 inclusive of all associated works.	No.	1		
3	**Concrete Works**				
3.1	Breaking up and reinstatement of concrete chambers as directed by Project Manager.	Prov. Sum	-	-	25,000.00
3.2	Supply, place and compact concrete Grade 20 to existing support block to accommodate new gate valves including the use of bonding agent, formwork and all associated works as directed by Project Manager.	Prov. Sum	-	-	1,500.00
4	Commissioning of all equipment	Sum	-		
	TOTAL C/F TO BILL NO 3 OF SUMMARY OF BILLS				

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

Bill No. 4: Headworks

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
1	**Headworks' chamber**				
1.1	Supply, install and fix the items specified below inclusive of all associated works				
	(i) Hot dipped galvanised steel covers or any other burglar proof material for chambers of width 1330 mm x length 1800 mm inclusive of lifting handle as directed by Project Manager	Prov. Sum	-	-	320,000.00
	(ii) Hinges 2 Nos. for each cover inclusive of bolts as directed by Project Manager	Prov. Sum	-	-	25,200.00
	(iii) Locking devices for cover	Prov. Sum	-	-	18,400.00
	(iv) Frame to accommodate cover	Prov. Sum	-	-	8,000.00
1.2	Reinstatement of chamber as directed by Project Manager	Prov. Sum	-	-	100,000.00
2	**Filter unit in chamber**				
2.1	Reinstatement of existing filter unit in chamber as directed by Project Manager	Prov. Sum	-	-	50,000.00
2.2	Supply, install and test afilter unit on existing arrangement of fittings with a filtration grade of 100 microns ±10 %.	Nos.	92		
3	**Volumetric Valve**				
3.1	Dismantle existing Volumetric valve	No.	15		
3.2	Supply, install and test female threaded Volumetric valve to be mounted on existing arrangement of DN 40 uPVC pipe including all associated works with a volume ranging between 0 to 60 m^3 within four (4) hours.	No.	15		
4	**Air Valve**				
4.1	Dismantle existing Air valves.	No.	15		
4.2	Supply, install and test air valve DN 25, PN 6 in chamber inclusive of all associated works.	No.	15		
	TOTAL C/F				

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
	TOTAL B/F				
5	Modification of pipe network and fittings inside headworks to accommodate new filtration unit and volumetric valve.	Prov. Sum	-	-	100,000.00
6	**Connection Socket in headwork in chamber**				
6.1	Dismantle existing damaged ball valve $^1/_2$'' used as tapping point as directed by Project Manager.	No.	15		
6.2	Supply, install and test uPVC ball valve $^1/_2$'' on existing uPVC arrangement in headwork for tapping point (for Chlorine and fertilizer injection) inclusive of associated uPVC fittings as directed by Project Manager.	Prov. Sum	-	-	8,000.00
7	Commissioning of all equipment	Sum	-		
	TOTAL C/F TO BILL NO 4 OF SUMMARY OF BILLS				

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BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

Bill No. 5: Flowmeters

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
1	**Pipe works in Stop cock chamber**				
1.1	Dismantle existing arrangement of fittings as directed by Project Manager.	Sum	-		
2	**Quarter turn valve**				
2.1	Supply, install and test quarter turn valve 1" inclusive of associated fittings	No.	45		
3	**Fittings**				
3.1	Supply, lay, joint and test DN 32 equal uPVC tee, PN 10 for tapping point for manometer.	No.	45		
3.2	Supply, lay, joint and test DN 32 PE male threaded adaptor compression type.	No.	180		
4	**Flowmeter**				
4.1	Supply, install and test propeller type flowmeter on existing pipeline DN 32/ 40, PN 10, inclusive of all associated works.	No.	46		
5	**Stop cock Chamber**				
5.1	Reinstatement of stop cock chambers of dimensions 900 mm x 560 mm including cover, hinges, frame and locking device as directed by Project Manager.	Prov. Sum	-	-	100,000.00
6	Commissioning of all equipment	Sum	-		
	TOTAL C/F TO BILL NO 5 OF SUMMARY OF BILLS				

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

SOLITUDE II DRIP IRRIGATION PROJECT

Bill No. 6: Tapping point to Filtration Plant

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
1	Maintenance of control valves in chamber inclusive of replacement of rusted bolts, nuts, gaskets, galvanized steel covers (or any other burglar proof material), hinges, frames, locking device as directed by Project Manager.	Prov. Sum	-	-	75,000.00
2	**Flowmeter (CH 1235)**				
2.1	Dismantle existing Flowmeter DN 200.	Sum	-		
2.2	Supply, install and test an electromagnetic/ ultrasonic flow meter with totaliser and instantaneous flow indicator on DN 200 pipe for a flow rate of 63 l/s inclusive of all associated works as directed by Project Manager.	No.	1		
2.3	Supply, install and test DN 200 flexible Flanged adaptor.	No.	1		
3	Commissioning of all equipment	Sum	-		
	TOTAL C/F TO BILL NO 6 OF SUMMARY OF BILLS				

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

Bill No.7: Filtration Plant and Headworks

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
1	**Filtration Plant**				
1.1	Maintenance of main filtration plant as directed by Project Manager.	Prov. Sum	-	-	90,000.00
2	**Headworks' chamber**				
2.1	Supply, install and fix the items specified below inclusive of all associated works				
	(i) Hot dipped galvanised steel covers (or any other burglar proof material) for chambers of width 1700 mm x length 2330 mm inclusive of lifting handle as directed by Project Manager	Prov. Sum	-	-	250,000.00
	(ii) Hinges for each cover at chambers inclusive of bolts as directed by Project Manager	Prov. Sum	-	-	10,000.00
	(iii) Locking devices for covers at chambers	Prov. Sum	-	-	12,000.00
2.2	Reinstatement of chambers as directed by Project Manager	Prov. Sum	-	-	100,000.00
3	**Filtration system in headwork**				
3.1	Reinstatement of existing filter unit as directed by Project Manager	Prov. Sum	-	-	50,000.00
3.2	Supply, install and test afilter unit on existing arrangement of fittings with a filtration grade of 100 microns ±10 %.	Nos.	30		
4	**Volumetric Valve**				
4.1	Dismantle existing Volumetric valve	No.	15		
4.2	Supply, install and test female threaded Volumetric valve to be mounted on existing arrangement of DN 40 uPVC pipe including all associated works with a volume ranging between 0 to 60 m^3 within four (4) hours.	No.	15		
	TOTAL C/F				

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
	TOTAL B/F				
5	Modification of DN 50 pipe network and fittings inside headworks to accommodate new filtration unit and volumetric valve.	Prov. Sum	-	-	100,000.00
6	**Connection Socket in headwork chamber**				
6.1	Dismantle existing damaged ball valve $^1/_2$'' used as tapping point as directed by Project Manager.	No.	23		
6.2	Supply, install and testuPVC ball valve $^1/_2$'' on existing uPVC arrangement in headwork for tapping point (for Chlorine and fertilizer injection) inclusive of associated uPVC fittings as directed by Project Manager.	Prov. Sum	-	-	25,000.00
7	Commissioning of all equipment	Sum	-		
	TOTAL C/F TO BILL NO 7 OF SUMMARY OF BILLS				

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

POINTE AUX PIMENTS DRIP IRRIGATION PROJECT

Bill No. 8:Filtration Plant

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
1	Clearing of site at Filtration plant.	m^2	88		
2	**Air Valve**				
2.1	Dismantle existing air valve DN 60	Sum	-		
2.2	Maintenance of existing air valve and isolating valve inclusive of replacement of rusted bolts, nuts and gaskets.	Sum	-		
3	**Flow meter**				
3.1	Dismantle existing Flowmeter.	Sum	-		
3.2	Supply, install and test electromagnetic/ ultrasonic flowmeter with totaliser and instantaneous flow indicator for an average flow rate of 25 L/s on pipeline DN150, inclusive of all associated materials and works.	No.	1		
3.3	Supply, install and test DN 150 flexible flanged adaptor.	No.	1		
4	**Main Filtration System**				
4.1	Dismantle the existing filter with all associated fittings.	Sum	-		
4.2	Supply, lay, join and test DN 63 uPVC pipe piece, PN 10	m	1		
4.3	Supply, install and test DN 63 uPVC bend 90 (Socket type)	No	2		
4.4	Supply, install and test DN 63 uPVC isolating valve, PN 10	No	2		
	TOTAL C/F				

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
	TOTAL B/F				
4.5	Supply, install and test DN 63 Tee for 1 /4 '' tapping for manometers	No	2		
4.6	Supply, install and test oil type manometer inclusive of associated works.	No	2		
4.7	Supply, install and test filter for a flow of 8 L/s on existing pipe DN 63 including all associated pipe works. Filtration system to be auto cleaning by a differential switch as directed by Project Manager.	No.	1		
5	Reinstatement of existing concrete chambers including covers, hinges, frame, locking device and handle as directed by Project Manager.	Prov. Sum	-	-	60,000.00
6	Commissioning of all equipment.	Sum	-		
	TOTAL C/F TO BILL No.8 OF SUMMARY OF BOQ				

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

Bill No. 9: Headworks

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
1	**Headworks**				
1.1	Reinstatement of existing headwork chambers inclusive of supply of galvanised steel covers (or any other burglar proof material), frames, hinges, locking devices and ancillaries as directed by Project Manager.	Prov. Sum	-	-	100,000.00
2	**Pipes and Fittings**				
2.1	Dismantle existing arrangement of pipes and fittings inside headwork chamber	No.	12		
2.2	Supply, install and test new arrangement of pipe and fittings DN 40 to include ball valve, tapping points (fertigation unit and chlorine and fertiliser injection), volumetric valve, air valve, filter unit of filtration grade 100 microns ±10 % and other associated fittings as directed by Project Manager.	Prov. Sum	-	-	280,000.00
3	Commissioning of all equipment.	Sum	-		
	TOTAL C/F TO BILL No.9 OF SUMMARY OF BOQ				

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

Drip Irrigation Project

Bill No. 10: Supply of dripper lines

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
1	**Dripperlines**				
1.1	Supply ofNon pressure compensating dripper lines having a minimum wall thickness of 0.8 mm				
	a) DN 12 dripper line with 2 l/hr emitters spaced 1 m apart	m	24,000		
	b) DN 16 dripper line with 2 l/hr emitters spaced 1 m apart	m	114,000		
1.2	Supply ofPressure compensating dripper lines having a minimum wall thickness of 0.8 mm				
	a) DN 16 dripper line with 2.2 l/hr emitters spaced 1 m apart	m	43,000		
2	**Fittings**				
2.1	Supply, joint, fix and test				
	(i) 12 mm straight connectors	No.	700		
	(ii) 16 mm straight connectors	No.	4,000		
2.2	Supply, joint, fix and test:				
	(i) 12 mm end sleeves	No.	700		
	(ii) 16 mm end sleeves	No.	4,000		
	TOTAL C/F TO BILL NO 10 OF SUMMARY OF BILLS				

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

Drip Irrigation Project

Bill No. 11: Supply and installation of Manifolds

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
1	**Site clearance**				
1.1	Site clearing over a width of 1 m along the whole length of pipe.	m	200		
2	**Earthworks**				
2.1	Excavate trench for DN 40 pipe to replace existing manifolds. Materials to be part return and compact, part stack to be reused and part cart away to spoil	m	200		
2.2	Supply, place and compact Class B bedding to DN 40 PE pipe	m	200		
2.3	Supply, place and compact imported selected backfill materials as directed by Project Manager.	m	200		
2.4	Supply, place and compact final backfilling material as directed by project Manager	m	200		
3	**Pipe Works**				
3.1	Supply, lay, joint and test DN 40 PE pipe, PN 6.	m	200		
3.2	Supply, fix, joint and test				
	a)DN 12 blind tubes	m	150		
	b) DN 16 blind tubes	m	150		
	TOTAL C/F				

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
4	**Fitting**				
4.1	Supply, fix, joint and test the following to OD 40 mm UPVC pipe:				
	a) 12 mm start connectors.	No.	185		
	b) 16 mm start connectors	No.	185		
4.2	Supply, fix, joint and test:				
	a) 12 mm grommet	No.	185		
	b) 16 mm grommet	No.	185		
4.3	Supply, fix, joint and test DN 40 End cap	No.	8		
4.4	Provide for connection of new manifold to existing manifold as directed by Project Manager.	No.	8		
	TOTAL C/F TO BILL NO 11 OF SUMMARY OF BILLS				

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II AND POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

Contract No: EU/W-2022/01R

Schedule 1

Daywork Rates

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
	Plant				
1.0	Water Browser (500L)	hr			
1.2	Concrete Mixer (1 m^3)	hr			
1.3	Concrete Vibrator (50 mm)	hr			
1.4	Tipper Truck (7 tonne)	hr			
1.5	Crane	hr			
1.6	Dumper (0.76 m^3)	hr			
1.7	Compressor & Tools (3 m^3/min)	hr			
1.8	Hydraulic Excavator	hr			
1.9	360^o Backhoe Excavator (0.76m3)	hr			
1.1	Bobcat	hr			
1.12	D8 Bulldozer	hr			
1.13	D4 Bulldozer	hr			
1.14	4 KVA generator and electric drill welding set	hr			
1.15	100 m dia pump	hr			

Item	Description	Unit	Qty	Rate (MUR)	Amount (MUR)
	Labour **All supervision and transport to site include rates**				
1.16	Labourer	hr			
1.17	Pipelayer	hr			
1.18	Carpenter	hr			
1.19	Mason	hr			
1.20	Fitter	hr			
1.21	Driver	hr			
1.22	Plant Operator	hr			
	Material				
1.23	Crusher run 100 mm down	m2			
1.24	Reinforced concrete, class 25, including formwork, finishing etc.	m3			
1.25	Class B bedding material	m3			
1.26	Crushed Basalt Sand	m3			
1.27	Stone pitching	m2			
	Equipment Survey				
1.28	Engineers automatic level and staff	day			
1.29	Theodolite, vernier reading to 1 second	day			
1.30	Laser leveling device for pipe laying	day			
1.31	Electronic distance measuring device including theodolite	day			
1.32	Ranging rod and pole	day			

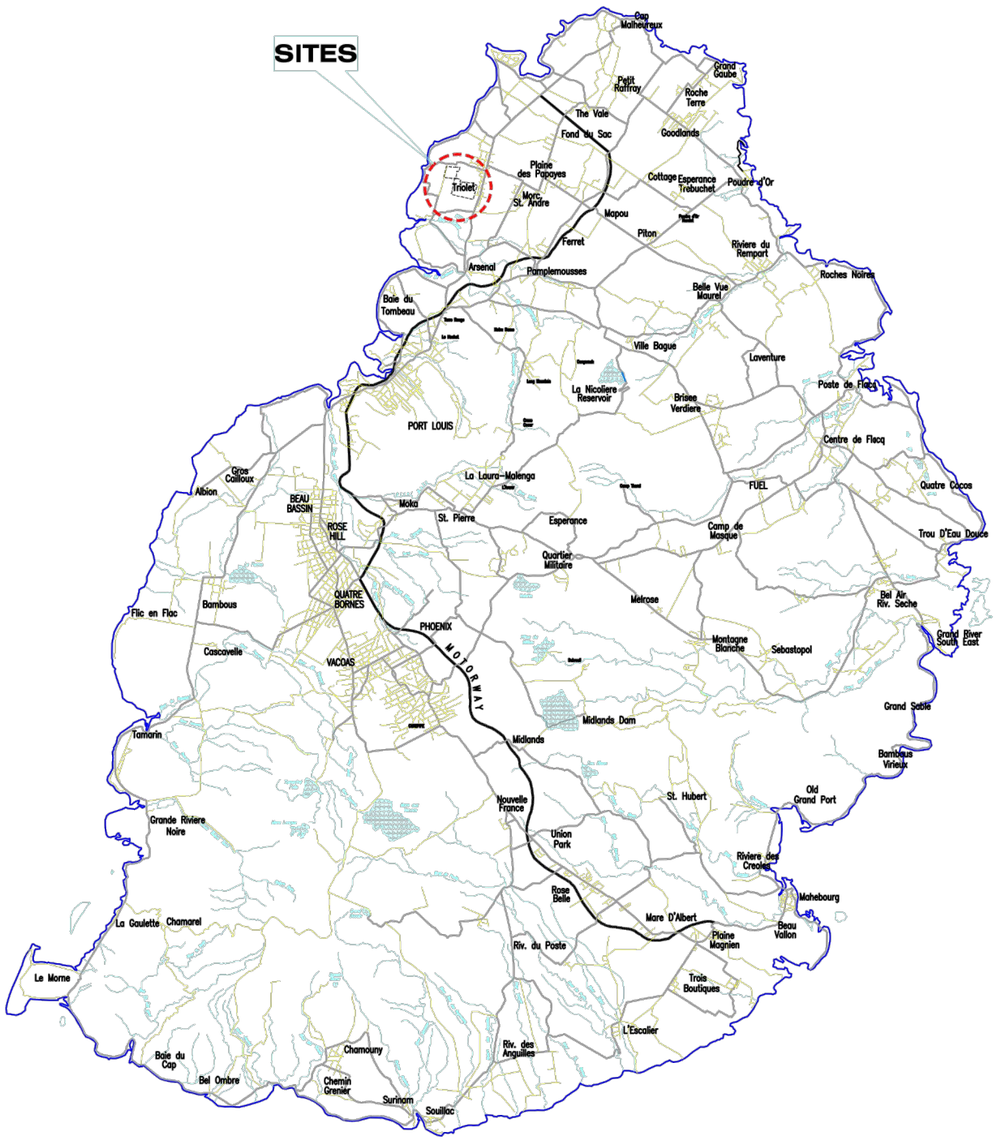
Section VII
DRAWINGS

The list of drawings under this Contract is:

(Procurement Reference: **EU/W-2022/01R)**

SN	Drawing title	Drawing Number
1	Context Location plan	EU/W-2022/01R/01
2	Solitude I Layout of existing filtration plant	EU/W-2022/01R /02
3	Details of existing surge vessel 2000L Solitude I	EU/W-2022/01R /03
4	Air Valve assembly Solitude I	EU/W-2022/01R /04
5	Details of existing butterfly valve, pressure control valve and strainer box DN 400 assembly inside chamber Solitude I	EU/W-2022/01R /05
6	Existing Non Return Valve Solitude I	EU/W-2022/01R /06
7	Existing Flowmeter assembly inside chamber Solitude I	EU/W-2022/01R /07
8	Pointe aux Piments Layout of existing filter station	EU/W-2022/01R /08
9	Existing Air Valve assembly (Pointe aux Piments)	EU/W-2022/01R /09
10	Detail of existing flow meter assembly inside chamber Pointe aux Piments	EU/W-2022/01R /10
11	Detail of existing surge vessel (500L connections) Pointe aux Piments	EU/W-2022/01R /11
12	Existing filtration chamber Pointe aux Piments	EU/W-2022/01R /12
13	Layout Plan for Solitude II	EU/W-2022/01R /13

REPUBLIC OF MAURITIUS



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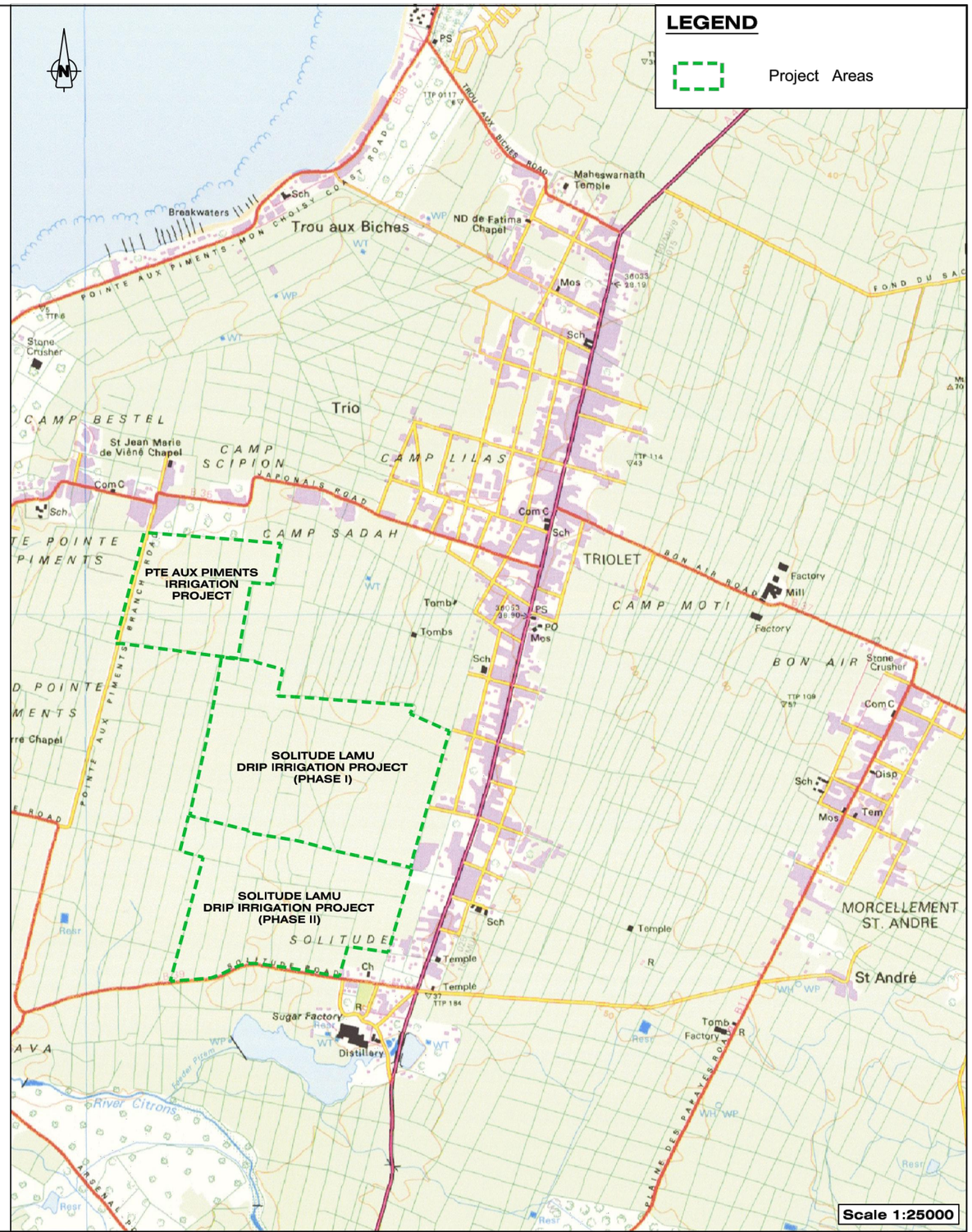


MARK	REVISION	DATE		
			DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)
			SCALE : AS SHOWN	SURVEYED :
			DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)
			FILE NAME : Context-Location Plan....	APPROVED : G.S (H.C.S)

PROJECT

IRRIGATION AUTHORITY

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

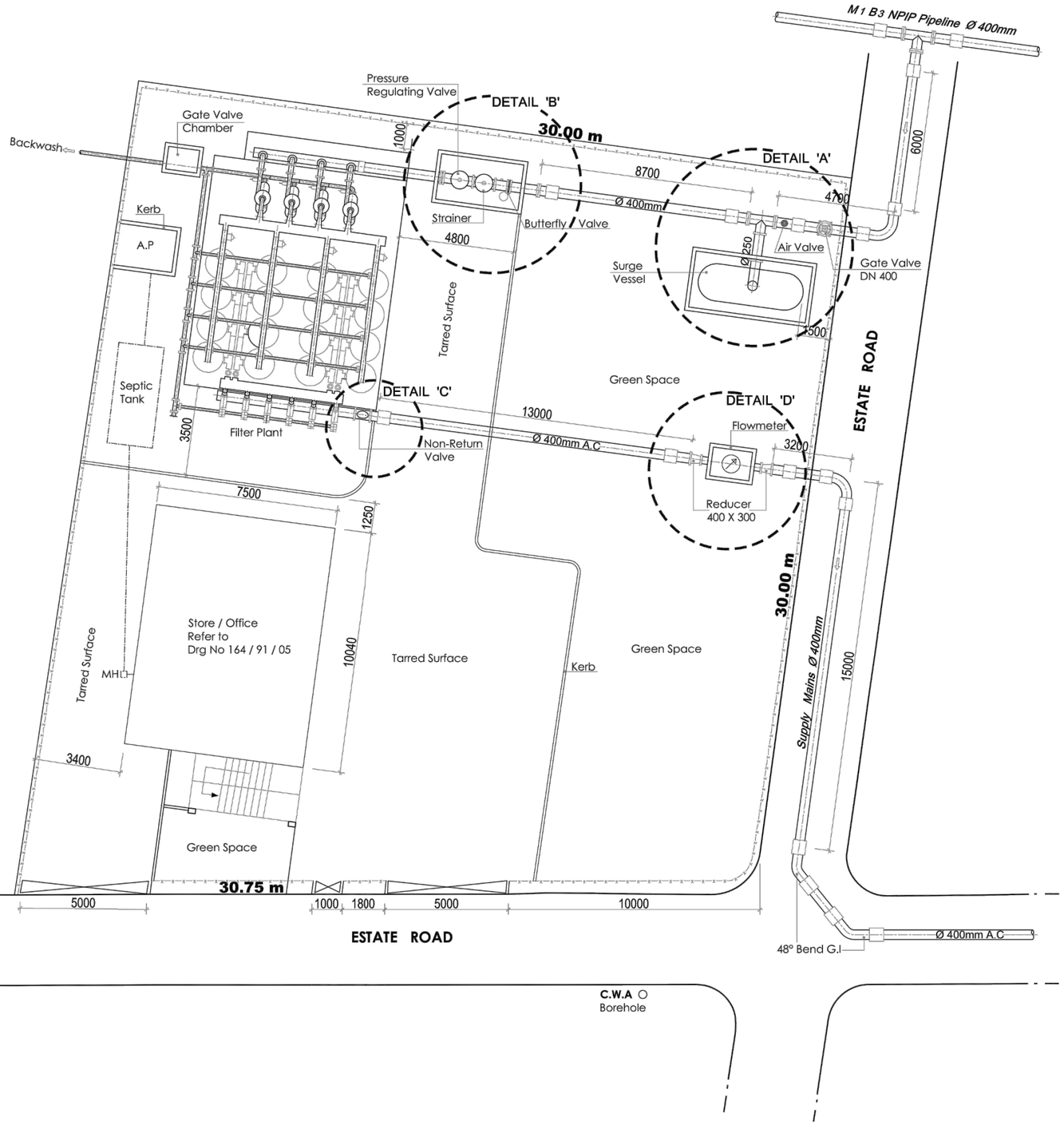
CONTRACT NO:EU/W-2022/01R

TITLE

Context-Location Plan

DRG No. **EU/W-2022/01R/01**

ISSUE



NOTE: Works Shall be Executed at Location '**A**', '**B**', '**C**' and '**D**'

MARK	REVISION	DATE

DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)
SCALE : N.T.S	SURVEYED :
DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)
FILE NAME : EU Det....	APPROVED : G.S (H.C.S)

PROJECT

IRRIGATION AUTHORITY

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

CONTRACT NO:EU/W-2022/01R

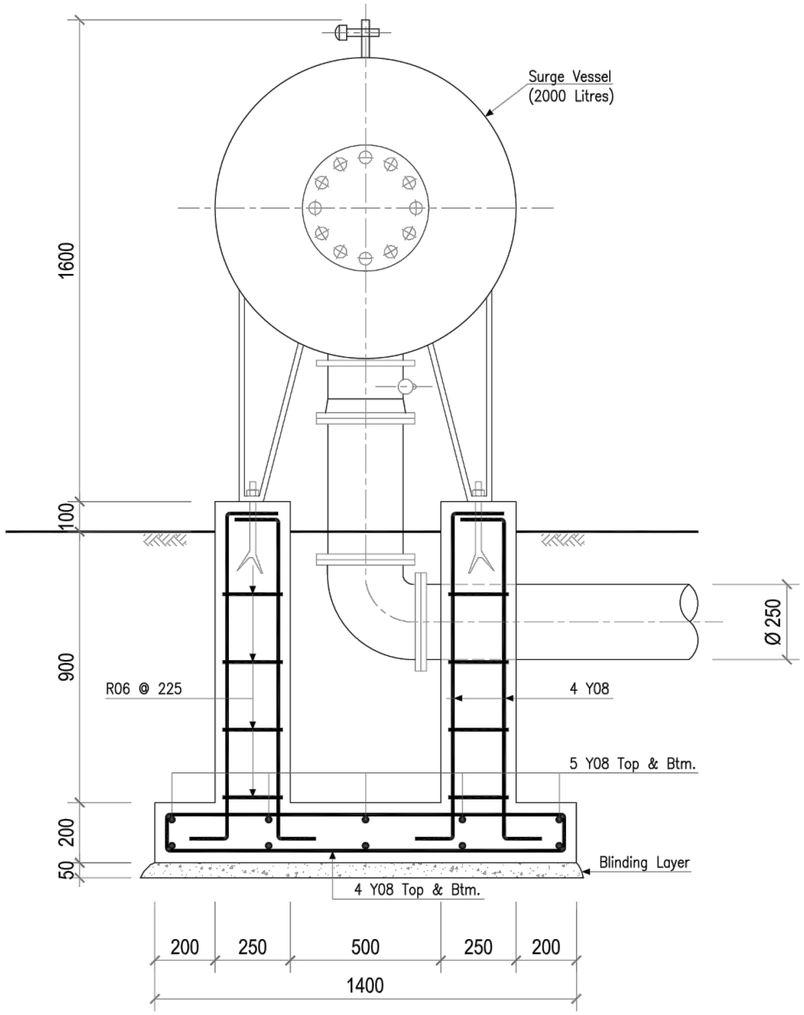
TITLE

SOLITUDE I LAYOUT OF EXISTING FILTRATION PLANT

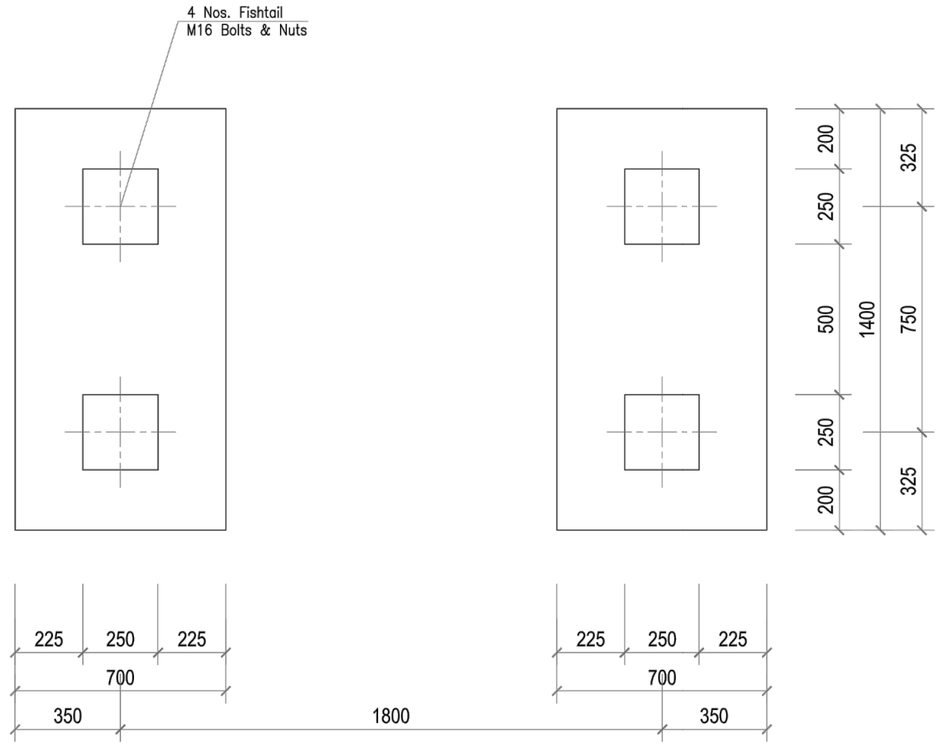
DRG No. **EU/W-2022/01R/02**

ISSUE

Detail at Location '**A**'



SECTION



PLAN OF SUPPORT BLOCK TO AIR VESSEL

MARK	REVISION	DATE		
			DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)
			SCALE - N.T.S	SURVEYED :
			DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)
			FILE NAME : EU Det....	APPROVED : G.S (H.C.S)

PROJECT

IRRIGATION AUTHORITY

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

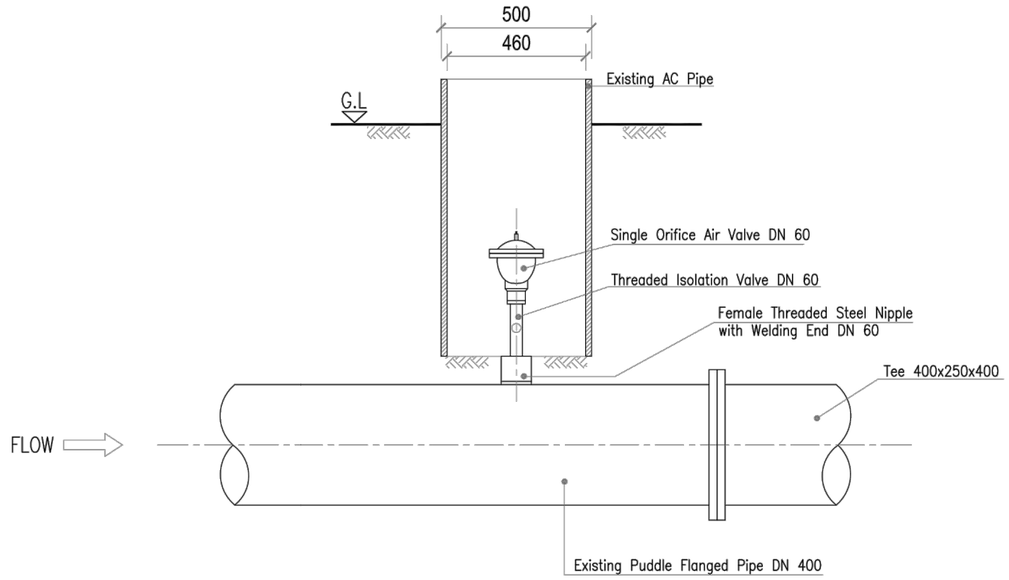
CONTRACT NO:EU/W-2022/01R

TITLE: Detail of Existing Surge Vessel (2000 L) (Solitude I)

DRG No. **EU/W-2022/01R/01/03**

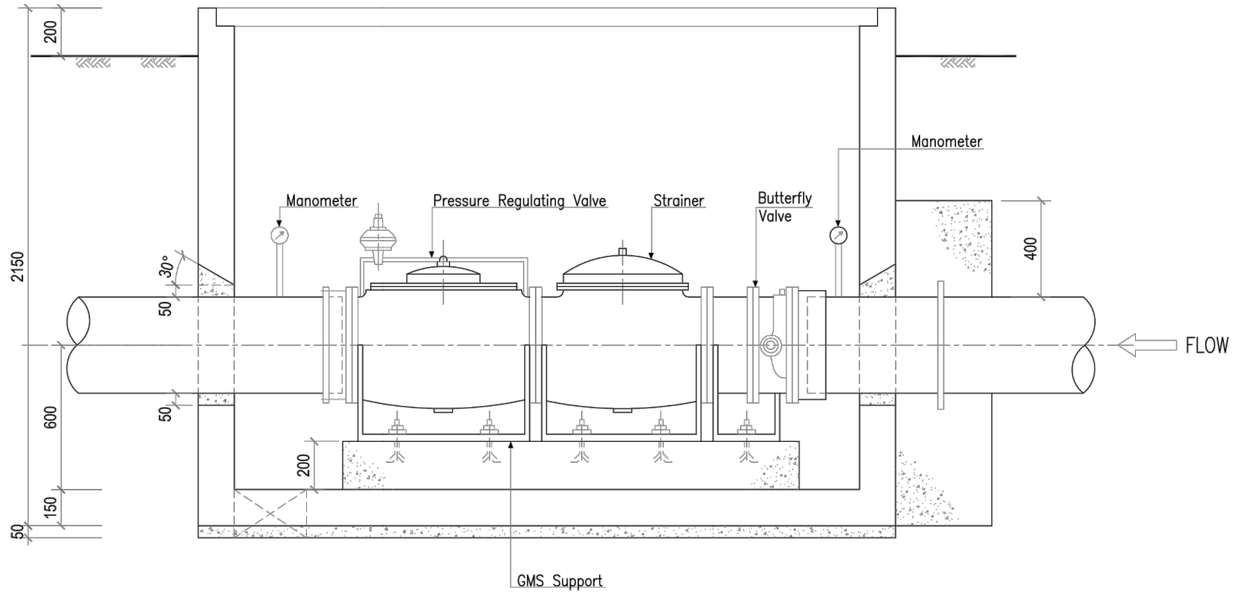
ISSUE

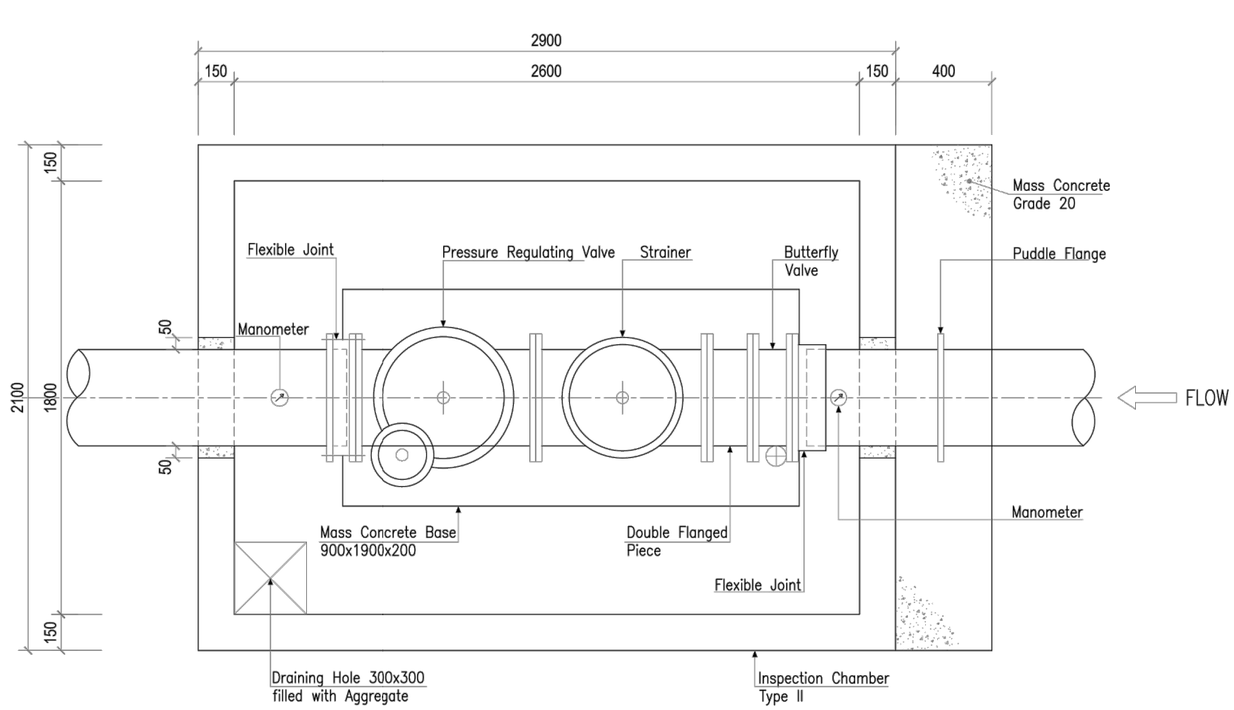
Detail at Location '**A**'



MARK	REVISION	DATE				
			DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)	PROJECT	TITLE
			SCALE - N.T.S	SURVEYED :	**IRRIGATION AUTHORITY**	Air Valve Assembly (Solitude I)
			DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)	**BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS**	DRG No. **EU/W-2022/01R/01/04**
			FILE NAME : EU Det....	APPROVED : G.S (H.C.S)	**CONTRACT NO:EU/W-2022/01R**	ISSUE

Detail at Location '**B**'





MARK	REVISION	DATE		
			DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)
			SCALE - N.T.S	SURVEYED :
			DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)
			FILE NAME : EU Det....	APPROVED : G.S (H.C.S)

PROJECT

IRRIGATION AUTHORITY

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

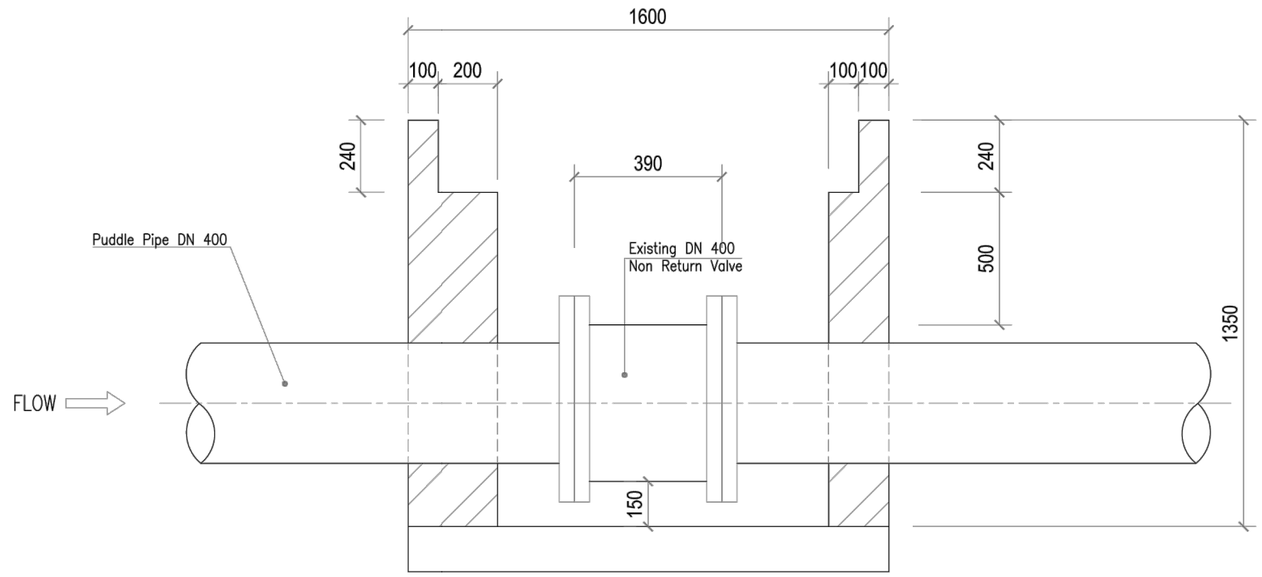
CONTRACT NO:EU/W-2022/01R

TITLE Detail of Existing Butterfly Valve, Pressure Control Valve & Strainer Box DN 400 Assembly Inside Chamber (Solitude I)

DRG No. **EU/W-2022/01R/01/05**

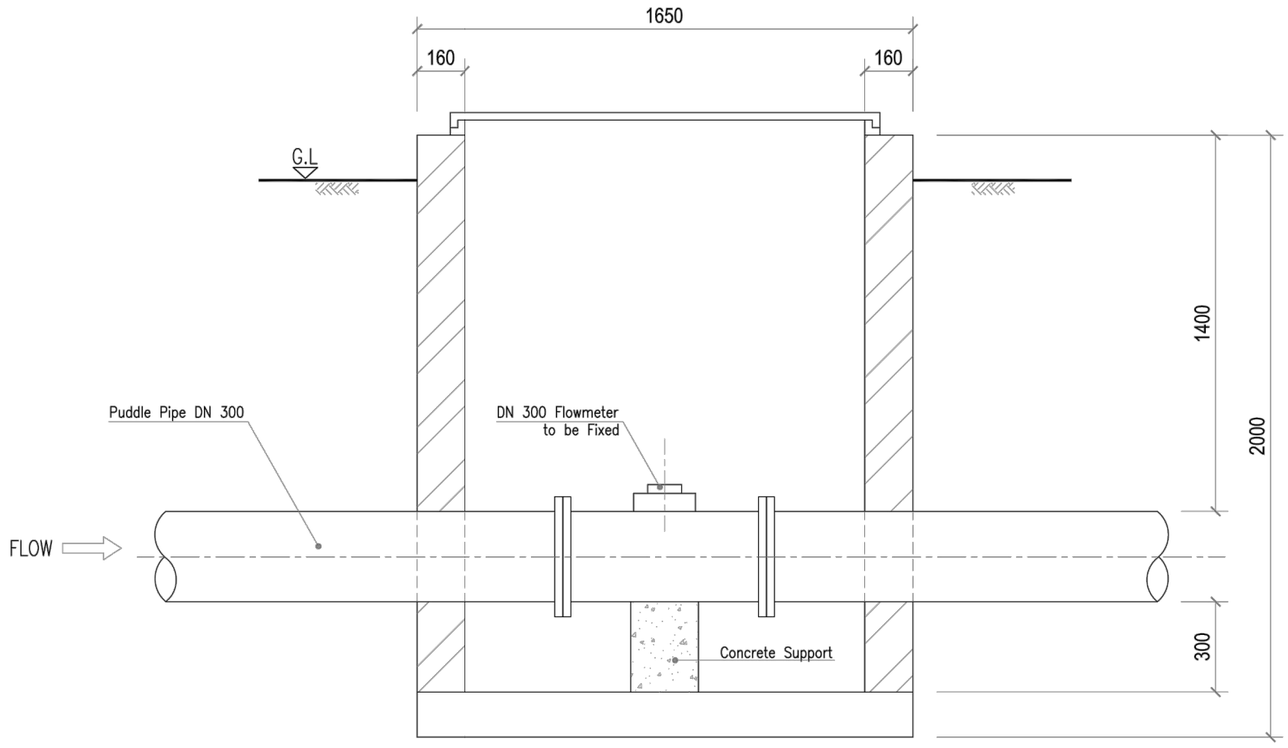
ISSUE

Detail at Location '**C**'



MARK	REVISION	DATE			PROJECT		TITLE	
			DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)		**IRRIGATION AUTHORITY**		Existing Non Return Valve Inside Chamber (Solitude I)
			SCALE - N.T.S	SURVEYED :		**BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS**		
			DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)		**CONTRACT NO:EU/W-2022/01R**	DRG No.	**EU/W-2022/01R/01/06** ISSUE
			FILE NAME : EU Det....	APPROVED : G.S (H.C.S)				

Detail at Location '**D**'



MARK	REVISION	DATE		
			DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)
			SCALE - N.T.S	SURVEYED :
			DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)
			FILE NAME : EU Det....	APPROVED : G.S (H.C.S)

PROJECT

IRRIGATION AUTHORITY

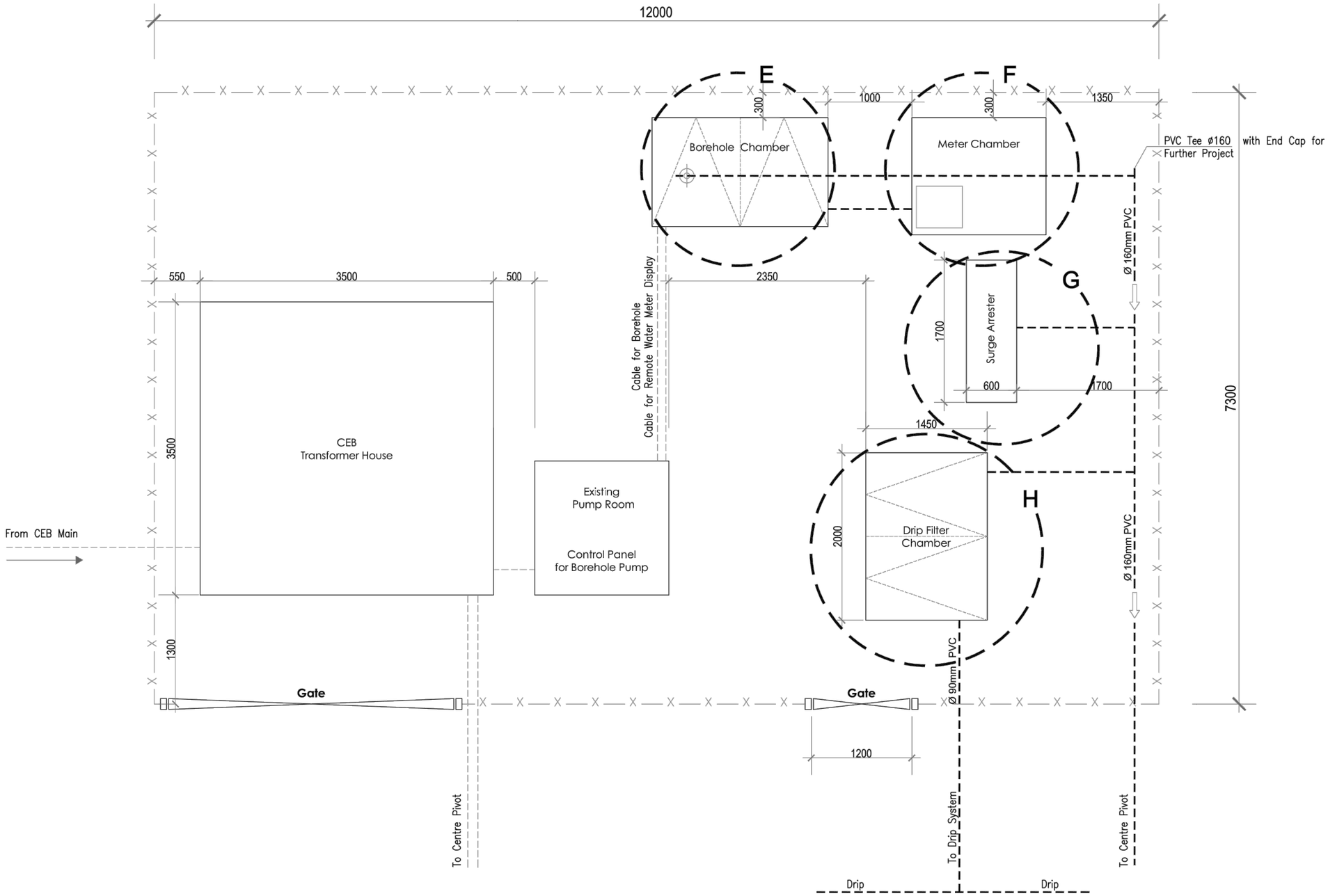
BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

CONTRACT NO:EU/W-2022/01R

TITLE Existing Flowmeter Assembly Inside Chamber (Solitude I)

DRG No. **EU/W-2022/01R/01/07**

ISSUE



NOTE : Works to be Executed at Locations E, F,G & H

MARK	REVISION	DATE

DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)
SCALE - N.T.S	SURVEYED :
DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)
FILE NAME : EU Det....	APPROVED : G.S (H.C.S)

PROJECT

IRRIGATION AUTHORITY

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

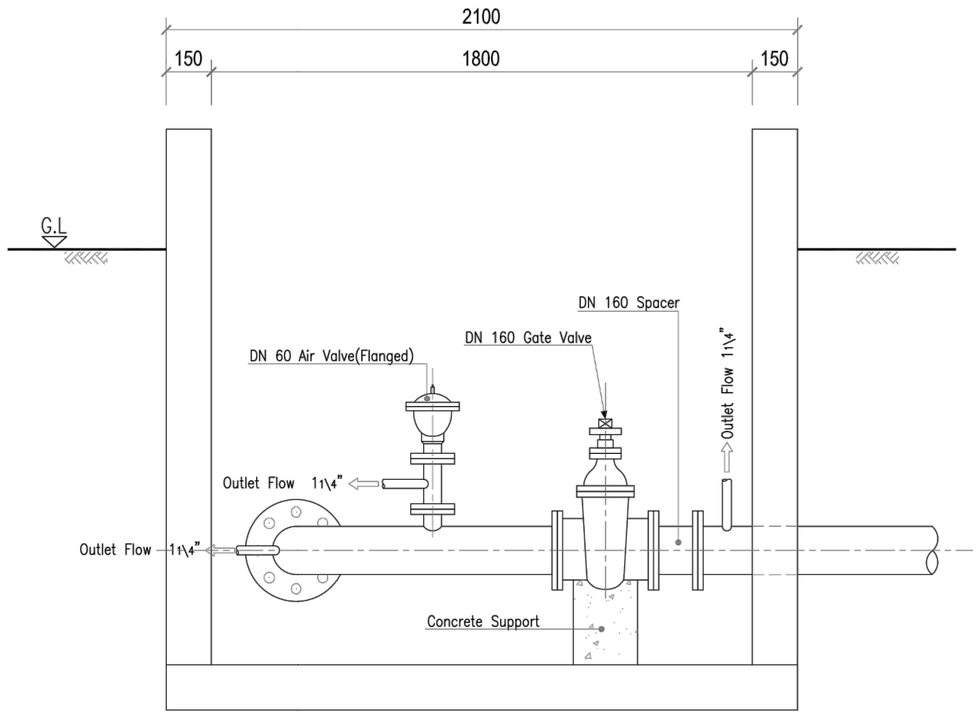
CONTRACT NO:EU/W-2022/01R

TITLE

Pointe aux Piments, Layout of Existing Filtration Station

DRG No. **EU/W-2022/01R/01/08**

ISSUE



MARK	REVISION	DATE		
			DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)
			SCALE - N.T.S	SURVEYED :
			DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)
			FILE NAME : EU Det....	APPROVED : G.S (H.C.S)

PROJECT

IRRIGATION AUTHORITY

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

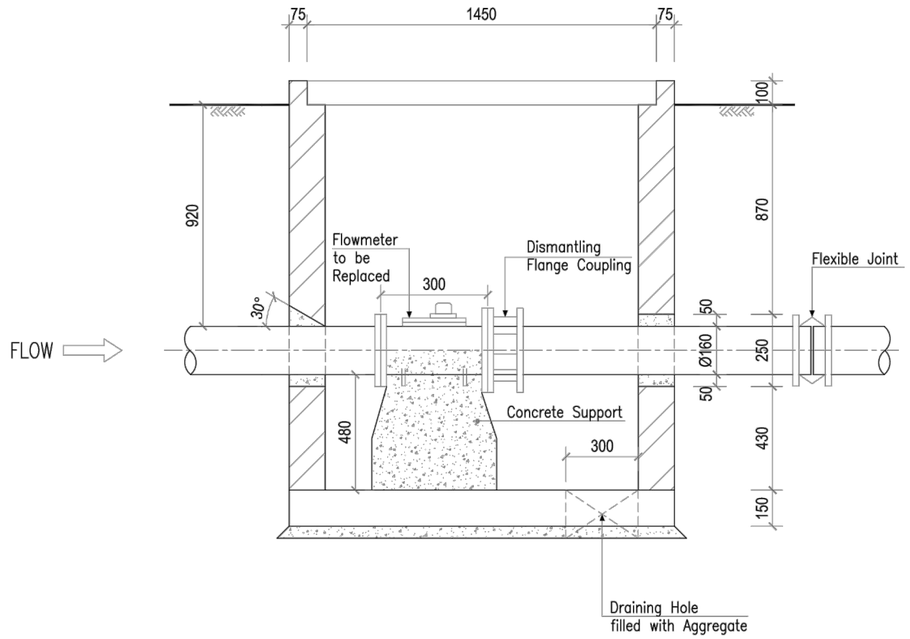
CONTRACT NO:EU/W-2022/01R

TITLE: Existing Air Valve Assembly in Chamber (Pointe aux Piments)

DRG No. **EU/W-2022/01R/01/09**

ISSUE

Detail at Location '**F**'



MARK	REVISION	DATE		
			DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)
			SCALE - N.T.S	SURVEYED :
			DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)
			FILE NAME : EU Det....	APPROVED : G.S (H.C.S)

PROJECT

IRRIGATION AUTHORITY

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

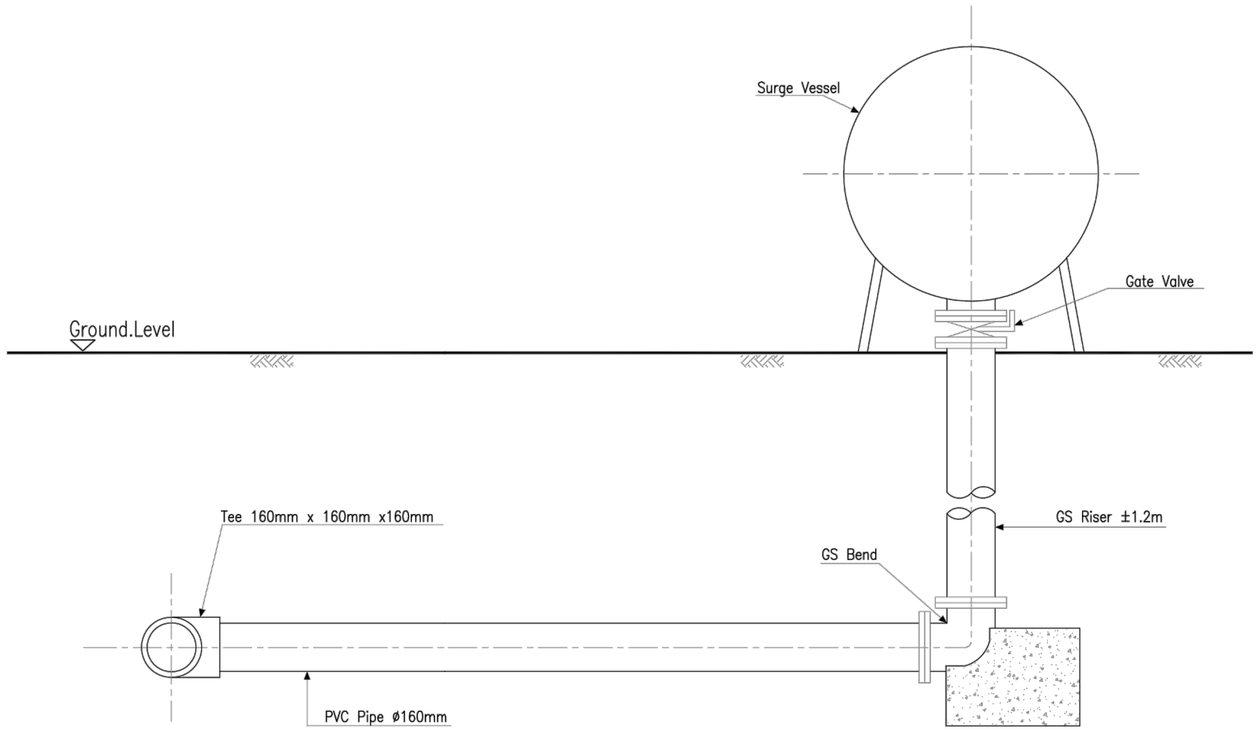
CONTRACT NO:EU/W-2022/01R

TITLE Detail of Existing Flowmeter Assembly Inside Chamber (Pointe aux Piments)

DRG No. **EU/W-2022/01R/01/10**

ISSUE

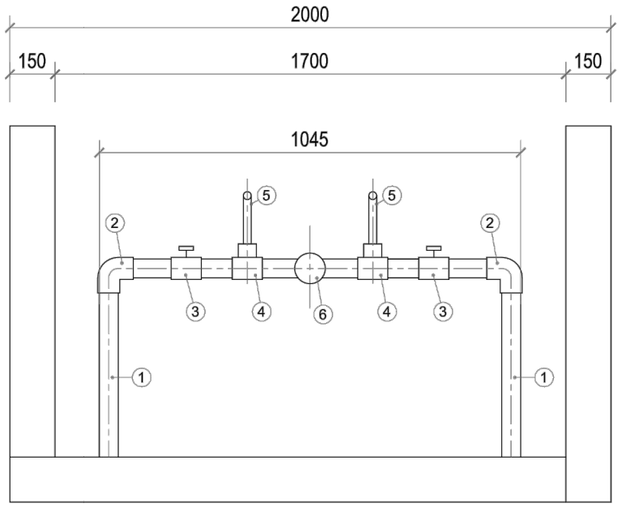
Detail at Location '**G**'



MARK	REVISION	DATE				
			DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)	PROJECT	TITLE
			SCALE - N.T.S	SURVEYED :	**IRRIGATION AUTHORITY**	Detail of Existing Surge Vessel (500 L) Connection (Pointe aux Piments)
			DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)	**BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS**	DRG No. **EU/W-2022/01R/01/11** ISSUE
			FILE NAME : EU Det....	APPROVED : G.S (H.C.S)	**CONTRACT NO:EU/W-2022/01R**	

Detail at Location '**H**'

Item No.	Item Description
1	DN 63, PVC Pipe PN10
2	DN 63, PVC Bend 90° Socket Type, PN 10
3	DN 63, PVC Isolating Valve, PN 10
4	DN 63, Equal PVC Tee
5	Tapping(1 1\4") for Manometer
6	Drip Filter



REVISION	DATE		
		DRAWN : W.R (S.T.D.O)	DESIGNED : G.S (H.C.S)
		SCALE - N.T.S	SURVEYED :
		DATE : DECEMBER 2021	CHECKED : G.S (H.C.S)
		FILE NAME : EU Det....	APPROVED : G.S (H.C.S)

PROJECT

IRRIGATION AUTHORITY

BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS

CONTRACT NO:EU/W-2022/01R

TITLE: Existing Filtration System in Chamber (Pointe aux Piments)

DRG No. **EU/W-2022/01R/01/12**

ISSUE

ANNEX 2

IRRIGATION AUTHORITY

Project: **BUILDING RESILIENT INFRASTRUCTURE AT SOLITUDE I, SOLITUDE II and POINTE AUX PIMENTS DRIP IRRIGATION PROJECTS** CONTRACT NO:EU/W-2022/01R			Title: Layout Plan		
			Drg No. EU/W-2022/01R/01/13	File Name sol 2 for Eu.	Issue
Designed by G.S (H.C.S)	Checked by G.S (H.C.S)	Approved by G.S (H.C.S)	Drawn by: W.R (S.T.D.O)	Date Dec 2021	Scale N.T.S

Rev	Revision note	Date	Done By

LEGEND

- PROJECT BOUNDARY
- EXCISED PLOTS
- AREA GRANTED LAND CONVERSION
- PLOTS WITHIN SOLAR PV PROJECT
- DISTRIBUTION MAINS
- HEADWORK

SOLITUDE PHASE I

SOLITUDE PHASE II

Plot No. 72
Found in Solitude Phase I

DELIVERY MAIN to M1B3

SN 23 Unuth Lekha Devi
SN 21 Pandoo Taramati Unuth
SN 22 Basant Roi Nundlall
SN 25 Unuth Lekha Devi
SN 28 Aumeer Lilawtee
SN 26 Sairally Muhammed Jalaad
SN 27 Aumeer Lilawtee
SN 24 Unuth Lekha Devi
SN 29 Chuturdharee Vijaye
SN 30 Beeharry Giandeo
SN 32 Juleeman Kavita
SN 31 Beeharry Giandeo
SN 19 Sepayl Ghyantee
SN 18 Mahaboob Anoobar Rayfak
SN 17 Ahmed Nasser Mahaboob
SN 16 Ahmed Nasser Mahaboob
SN 14 Unuth Bhardwaz
SN 13 Peerally Ibrahim
SN 12 Peerally Ibrahim
SN 15 Unuth Bhardwaz
SN 11 Sewlall Chitlall
SN 10 Mojee Lavindra
SN 1 Dayamantee Devi Issur
SN 2 Anita Devi Churriter
SN 3 Vishwahdass Ramdhan
SN 4 Nemwantee Devi Autar
SN 5 Raj Kishore Ramdhan / Amita Ramdhan
SN 6 Ramdhan Vishwadass Ramdhan
SN 7 Poorundass Ramdhan
SN 8 Dosieah Surekha Devi
SN 9 Nitish Kumar Jowaheer
SN 20 Bissessur Sanjeev Singh

Ramdhun Chaitandass
Ramdhun Gianydass
Ramdhun Hemanitdass
Occupied by Gamma Civic
Deewan Ramdhan Comawtee
Boolaky Taroondeo
Abbanah Soonita Bolaky
Boolaky Prithviraj
Sookun Soonil
Nundlall Mudhaj
Gungabissoon Sharda Devi Unuth
Basant Roi Nundlall
Paraickee Ishwaree
Mohamed Joowi-Kamul Mohamed Ali Haukhory
Aukhez Aum Kumar
Aukhez Ramesh Kumar
Bissessur Khemraj
Gungeea Taranee
Sonun Bilawutty Sookun
Seegoolam Swaree
Ramessur Dharmavasgee
Ramessur Vijay
Ramessur Vikash
Rajkoomar Mooneswaree
Joseph Guillyano Zamir
Noruttun Haymuntkumar
Woodhoo Narainee
Sookun Anupa
Koonjah Dhunwuntee
Woodhoo Pockraz
Ramdhan Tarramuthee
Jeetun C.D.R Vishwadass
Huneewooth Pooniawatee Ww
Huneewooth
Ramothar Vijaye Coomarsingh
Callychurn Jaywantee
Ramothar Rajcoomarsingh
Mandalia Dineshkumar Prabhudas
Ajodha Chundradutt
Chicoree Beeswadath
Nundlall Mahabeer
Nundlall Jayesh
Nundlall Boodram Ww
Nundlall Poorun
Nundlall Vishnudial
Ram Bhrambhanand Brizmohun
Mohamed Joowi-Kamul Mohamed Ali Haukhory
Woodhoo Jugnah Dharmdutt Parmowtee
Mootia Krishnaduth
Nabeebaccus Bibi Saberah
Demka Umeshwaree
Jeenally Swaleha Bibi
Peerun Sahera Bibi
Nundlall Vishnudial
Rostom Goolam Hossen
Nabeebaccus Abdool Mobarah Ahmad
Agawon A.Caffoor
Nabeebaccus Bibi Saberah
Ramdhun Ramsurn
Ramsurn Dhunwantee
Indurdut
Ramsurn Taramatee
Filtration Plant
Sukai
Sukraj Roopnarain (2A 00)
Noobnarain Seebaluck
Leendiya (5A 78)
Woozerally Asgar Ww
Jaffar Aisha
Jaffar Azad
Boojhowon Balram
Jeenally Abdool Fareed
Coopoosamy Maxime Lyndon Mike
Lawtun Mamood Issa
Ujoodha Dharumdeo
Ram Geerjanand
Toolsee
Jeesoo
Ootmee
Bissessur Shamprabha
Jeebod Mahendranath
Joomun Bibi Soorma
Moidin Sitarah
Sewtohul Abhivrat
Joulim Mehboob
Gabin Dogendraduth
Kallooa Neerunjand
Noruthun Deodut
Somaroo Kessree Ww
Gangoo Dewesraj
Mamode Emrith
Kodaruth Haroon Rassid
Bhantoo Prema
Ranee Mossai Radha
Foo Fat E Adelita (Orchard)
Dowlut Bhanu Prakash
Ram Brambhanand Brizmohun
Sunhoon Garghee
Sanjeeawon Deoduth
Seeputty Parmaoty
Bahadoor Jayantee
Ravindranath Dreepaul
Ref: Mac/17489/85/5230
Roopun Bibi Laufa
LCP 3043
Ref: Mac/17489/85/6170
LCP 3452
Residential Area
Church
FOOTBALL PLAYGROUND
Excised Plots as per Board Peer No.207
Toolsee Ootmee
Toolsee Jeesoo
Ramchurn Tamoonee
Aumeer Leelawtee
Aumeer Chintamanee
Aumeer Indrawtee
Persand Krenjus Dein
Aumeer Taramati
Aumeer Sakumbala
Gate
CH 546.80 Drain Valve
CH 282.50 Air Valve
CH 210.70 Drain Valve
CH 12.30 Air Valve
CH 152.60 Gate Valve
CH 969.00 Air Valve on Saddle
CH 400.00 Drain Valve
CH 385.20 Air Valve
CH 1252.00 Pressure Relief Valve
CH 1230.00 Flow Meter (Ø 200mm)
CH 1146.40
CH 8.00 Air Valve
CH ?? Air Valve
CH ?? Drain Valve
CH 160.00 Drain Valve
CH 149.70 Air Valve
D1 D2 D3 D4 D5 D6
E1 E2 E3 E4 E5 E6 E7
C1 C2 C3 C4 C5 C6
A1 A2 A3 A4 A5 A6 A7
B1/B2 B3/B4 B5 B6 B7 B8 B9 B10 B11 B12
P I P E L I N E
A U X
P O I N T E
B R A N C H
R O A D
Delivery Main
To Balaclava
To Solitude