



7TH FLOOR EBÈNE HEIGHTS BUILDING, PLOT 34, EBÈNE CYBERCITY, EBÈNE
TEL: 468 6209/10/11/12 – FAX: 468 6213 – EMAIL: beachauthority@intnet.mu

OPEN NATIONAL BIDDING

BIDDING DOCUMENTS

For

CONSTRUCTION OF NEW TOILET BLOCK AT MONT CHOISY PUBLIC BEACH

**Procurement Reference No:
BA/ONB/01/2022-23**

**Beach Authority
7th Floor Ebène Heights Building,
Plot 34, Ebène Cybercity,
Ebène
Email: beachauthority@intnet.mu
Tel No: 468 6209/10/11/12
Fax No: 468 6213/4686214
Date: 23 August 2022**

Foreword

The Standard Bidding Documents in this publication follow the Standard Bidding Documents of the World Bank and have been prepared pursuant to section 7(c) of the Public Procurement Act 2006 for use by public bodies for procurement of works of values up to 50 million rupees under Open National Bidding method. It has been simplified to facilitate participation of Small and Medium Enterprises.

Procurement proceedings for this standard bidding document have to be conducted as per the process specified in the Instructions contained below. Additionally, the principles governing standard clauses as contained in the Standard Bidding Document for Procurement of Works for values up to Rs. 300m shall apply to the this SBD as well.

Those wishing to submit comments or suggestions on the Bidding Documents or to obtain additional information on procurement in Mauritius are encouraged to contact:

Procurement Policy Office
Ministry of Finance, Economic Planning and Development
Level 8, Emmanuel Anquetil Building, Port Louis, Mauritius
Tel: No. (+230)201-3760 & Fax: No. (230)201-3758
Email: pposecretariat@govmu.org

Section I: Instruction to Bidders

1. Introduction

The **Beach Authority** also referred 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 are the Construction of **New Toilet Block at Mont Choisy Public Beach**.

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, Beach Authority, 7th Floor Ebène Heights Building, Plot 34, Ebène Cybercity, Ebène.**

The Employer will 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.

- 1.2 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 **90 days** from the date of bid submission deadline

3. Works Completion Period

The Intended Completion period is **150 days** from start date of works.

4. Site Visit

Bidders or their designated representatives are invited to attend a pre-bid meeting on **30 August 2022, at 10.00 hrs at Mont Choisy Public Beach**. The purpose of the pre-bid meeting will be to clarify issues and to answer questions on any matter that may be raised at that stage.

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 Bid Box located at **The Beach Authority, 7th Floor, Ebène Heights Building, Plot 34, Ebène Cybercity, Ebène** not later than **26 September 2022 by 10.30 hrs at latest**. 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 “Public body” at **Beach Authority 7th Floor Ebène Heights Building, Plot 34, Ebène Cybercity, Ebène on 26 September 2022 by 10.45 hrs at latest.** 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.

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(es) **Building Construction Works**.
- (b) experience in two works of a similar nature over the last 5 years, each of value not less than **RS 3M** ;
- (c) Site Agent having as minimum qualification: A diploma in construction related field and 10 years' experience in the construction sector
- (d) Foreman having as minimum qualification: 15 years' experience in the construction sector;
- (e) Electrician with at least 10 years' experience in similar works;
- (f) minimum amount of liquid assets and/or credit facilities net of other contractual commitments of the Bidder of *Rs 1.5 million*;
- (g) List of key equipment to be made available on the project.

11. Contents of bid

The Bid shall comprise the following:

- (a) duly filled Bid Submission Form;
- (b) duly filled Priced Bill of Quantities
- (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) Documentary evidences in the form of contract agreement or completion certificate to demonstrate compliance to experience criteria
- (g) Signed C.V of Site Agent, Foreman and Electrician;
- (h) Documentary evidence of liquid assets and/or credit facilities (Note 1);
- (i) List of key equipment to be made available on the project
- (j) 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:

- i. the Bid shall include all the information required as per the Qualification Information form for each joint venture partner;
- ii. the Bid shall be signed so as to be legally binding on all partners
- iii. 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 a joint 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;
- iv. 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
- v. the execution 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. 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 **exclusive of 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 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: (NOT APPLICABLE)

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 Bid price (exclusive of VAT), in accordance with the conditions of contract, using for that purpose the Performance Security Form included in Section V 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, 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 (NOT APPLICABLE)

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 V.

The Advance Payment shall be limited to 10% percent of the Contract Price, 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 **Beach Authority** reserves the right:

- (a) to split the contract as per the lowest evaluated cost per lot; and
- (b) 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.

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

The General Manager
Beach Authority
7th Floor Ebène Heights Building,
Plot 34, Ebène Cybercity,
Ebène
Tel No : 468 6209/10/11/12
Fax No: 468 6213/4686214
Email: beachauthority@intnet.mu

- (b) The address to file Application for Review is:

The Chairperson
Independent Review Panel,
5th Floor,
Belmont House
Intendence Street
Port Louis
Tel : +230 2602228
Emal : irp@govmu.org

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

Bid Submission Form

Date: _____

Bid's Reference No.: _____

Procurement Reference No.:.....

To:

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 following Works:
_____;
- (c) The total price of our Bid excluding VAT is: _____(MUR):
- (d) Our bid shall be valid for a period of _____ [*Public body to insert validity period as specified in ITB 2*] days from the date fixed for the bid submission deadline in accordance with the Bidding Documents or up to, whichever is later, 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 8;
- (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

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 Clause 6. 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 *two* 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.

Bill of quantities

This text hereunder is a guidance for the preparation of the Bill of Quantities and should not form part of the final document.

Objectives

The objectives of the Bill of Quantities are:

- (a) to provide sufficient information on the quantities of Works to be performed to enable bids to be prepared efficiently and accurately; and
- (b) when a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic valuation of Works executed.

In order to attain these objectives, Works should be itemized in the Bill of Quantities in sufficient detail to distinguish between the different classes of Works, or between Works of the same nature carried out in different locations or in other circumstances which may give rise to different considerations of cost. Consistent with these requirements, the layout and contents of the Bill of Quantities should be as simple and brief as possible.

Dayworks Schedule

A Dayworks Schedule should be included only if the probability of unforeseen work, outside the items included in the Bill of Quantities, is high. To facilitate checking by the Public Body of the realism of rates quoted by the bidders, the Dayworks Schedule should normally comprise the following:

- (a) A list of the various classes of labour, materials, and Constructional Plant for which basic day work rates or prices are to be inserted by the Bidder, together with a statement of the conditions under which the Contractor shall be paid for work executed on a day work basis.
- (b) Nominal quantities for each item of day work, to be priced by each Bidder at day work rates as Bid. The rate to be entered by the Bidder against each basic day work item should include the Contractor's profit, overheads, supervision, and other charges.

Provisional Sums

A general provision for physical contingencies (quantity overruns) may be made by including a provisional sum in the Summary Bill of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a provisional sum in the Summary priced Bill of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises. Where such provisional sums or contingency allowances are used, the Particular Conditions of Contract should state the manner in which they shall be used, and under whose authority (usually the Employer's Representative).

The estimated cost of specialized work to be carried out, or of special goods to be supplied, by other contractors (refer to GCC Clause 8) should be indicated in the relevant part of the Bill of Quantities as a particular provisional sum with an appropriate brief description. A separate procurement procedure is normally carried out by the Public Body to select such specialized contractors. To provide an element of

competition among the bidders in respect of any facilities, amenities, attendance, etc., to be provided by the successful Bidder as prime Contractor for the use and convenience of the specialist contractors, each related provisional sum should be followed by an item in the Bill of Quantities inviting the Bidder to quote a sum for such amenities, facilities, attendance, etc.

BILL OF QUANTITIES

Procurement Reference Number: BA/ONB/01/2022-23					
Construction of Toilet Block at Mont Choisy Public Beach					
Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price - (Rs)	Total Price (Rs)
1.0	Preliminary and General Items				
1.1	Cost of Insurance	Sum			
1.2	Allow for other preliminary items	Sum			
1.3	Testing of materials to specifications	Sum			
1.4	Allow for clearing of site, felling of any trees and relocation of existing trees as indicated by the Client's representative	Sum			
1.5	Allow for submission of programme of works prior to mobilisation	Sum			
1.6	Site mobilization costs	Sum			
1.7	Allow for all temporary hoardings, temporary access roads and all other works, construction plant for the completion of works, protection of existing services and making good for any damages.	Sum			
1.8	Provide and erect of signboard. Contractor shall indicate the Project Title, Name of Client, and Name of Contractor, clearly on the signboard and fix it in such a way that it is visible to the public.	Sum			
1.9	Allow for general cleaning of site on completion of works	Sum			
1.10	Demobilisation costs	Sum			
2.0	Substructure (Toilet Block)				
2.1	Excavation Excavation in sand or hard materials as defined, starting from stripped level, trenches to receive foundations. Rates shall include compaction of reduced levels to 95% MOD AASHTO to approval of the Client's representative and compaction tests for each column base & at 3m interval of strip footing.				
2.1.1	Excavation for strip footing not exceeding 450mm wide down to a maximum depth of approximately 1.2 m deep (To be confirmed on site)	Sum			
2.1.2	Columns bases starting from reduced level and to a depth of approximately 1.2 m deep (to be confirmed on site)	Sum			
2.1.3	Footpath around toilet block	m3	60		
2.1.4	Allow for keeping excavation free from any water.	Sum			
	TOTAL BILL A (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
2.2	Casting of Blinding Concrete C15 (1:2:4)				
2.2.1	Casting of concrete grade 15 in 50 mm blinding layer for strip footing	Sum			
2.2.2	Ditto for column base	Sum			
2.2.3	Ditto for base of step	Sum			
2.2.4	Ditto for drain at entrance of Toilet Block	Sum			
2.2.5	Ditto for ramp at entrance of disabled toilet	Sum			
2.3	Casting of vibrated reinforced concrete C30, 20 mm aggregate				
2.3.1	Casting of strip footing	Sum			
2.3.2	Ditto for column base	Sum			
2.3.3	Ditto for base of step	Sum			
2.3.4	Ditto for concrete drain at entrance of toilet block	Sum			
2.3.5	Ditto for columns below ground level	Sum			
2.4	Supply and prepare mild steel & high yield steel reinforcement from 8mm to 12mm including cutting, bending, spacers, tying wire and fixing to BS 4449 in, strip foundation, column base, footing, ramps and steps				
2.4.1	T12	Sum			
2.4.2	T10	Sum			
2.4.3	T8	Sum			
2.4.4	R6	Sum			
2.5	Supply and laying of Substructure hollow concrete blockwall in cement sand mortar (1:3) including reinforcement for wall ties				
2.5.1	150 mm blockwall	Sum			
2.6	Backfilling and Compaction				
2.6.1	Supply of selected hardcore filling (50 – 150 mm), compacted in layers of 150mm thick to make up levels to satisfaction of client	Sum			
2.6.2	Supply of Crusher Run (0-20mm), 150 mm thick layer and compacted to 95% MOD AASHTO to the satisfaction of the Client. Rate should include for 5 compaction test points.	Sum			
2.6.3	Supply, level and compact rocksand (04), 25 mm thick layer	Sum			
	TOTAL BILL B (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
2.7	Anti-Termite Treatment				
2.71	Supply, prepare and apply anti-termite product (subject to Client's approval) prior to construction of superstructure as per the manufacturer's specification.	Sum			
2.8	Damp-Proof Membrane (DPM)				
2.8.1	Supply and lay 0.23 mm polythene DPM laid on top of rocksand 04 backfill including 200mm side and end lap	Sum			
2.9	Casting of vibrated reinforced concrete C30, 20 mm aggregate				
2.9.1	125 mm ground floor slab	Sum			
2.9.2	Steps at entrance of Toilet block	Sum			
2.9.3	Ramp at disabled toilet entrance	Sum			
2.10	Supply and install Mild steel bar to BS 4449				
2.10.1	A142 weighing 2.22kg per square meter for ground floor slab including 150mm minimum end and side lap, bends, tying wires and spacer blocks	Sum			
2.11	Supply and installation of sawn formwork in class 2 finish, strutting from any level and including rebates or groove formers				
2.11.1	Sides of Bases & Strip footing	Sum			
2.11.2	Sides of Columns	Sum			
2.11.3	Sides of ground floor slab	Sum			
2.11.4	Sides of concrete steps	Sum			
2.11.5	Sides of concrete drain at entrance of toilet block	Sum			
3.0	Superstructure (Toilet Block)				
3.1	Casting of vibrated reinforced concrete C30, 20 mm aggregate				
3.1.1	Columns	Sum			
3.1.2	Beams	Sum			
3.1.3	150 mm Roof Slab	Sum			
3.1.4	Worktop for washhand basin	Sum			
	TOTAL BILL C (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
3.1.6	Cills and Lintels and the like	Sum			
3.1.7	Door & window jambs	Sum			
3.1.8	Wall ties	Sum			
3.2	Supply and prepare mild steel & high yield steel reinforcement from 6mm to 20mm including cutting, bending, spacers, tying wire and fixing to BS 4449 in, columns, beams, upstands, slabs, worktops, cills and lintels				
3.2.1	R6	Sum			
3.2.2	T8	Sum			
3.2.3	T10	Sum			
3.2.4	T12	Sum			
3.2.5	T16	Sum			
3.2.6	T20	Sum			
3.3	Supply and installation of sawn formwork in class 2 finish, strutting from any level and including rebates or groove formers. Rates to include braces to support formworks.				
3.3.1	Sides and soffit of beams	Sum			
3.3.2	Sides and soffit of roof slab	Sum			
3.3.3	Sides of columns	Sum			
3.3.4	Sides and soffit of worktop	Sum			
3.3.5	Sides and soffit of Cills and Lintels	Sum			
3.3.6	Sides of wall ties	Sum			
3.4	Supply and laying of Superstructure hollow concrete blockwall in cement sand mortar (1:3) including reinforcement for wall ties				
3.4.1	150 mm blockwall	Sum			
3.4.2	100 mm blockwall	Sum			
3.5	Internal Wall Finishes (Plastering)				
3.5.1	13mm thick cement sand plaster (1:3) to walls with a smooth sponge finish to receive paint	Sum			
	TOTAL BILL D (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
3.6	External Wall Finishes (Plastering & Stone Cladding)				
3.6.1	20mm thick cement sand plaster (1:3) to walls with a smooth sponge finish to receive paint	Sum			
3.6.2	Supply and fix demolition stone Cladding domino type at entrance of toilet block walls, to Client's Representative's approval. Rate to include supply of cement mortar, adhesive and pointing materials.	Sum			
3.7	Floor Finishes				
3.7.1	20 mm thick cement sand (1:3) screed for floor laid to level, to receive tiles	Sum			
3.8	Floor Tiles (anti-skid)				
3.8.1	Supply and fix ceramic tiles (300mm x 300mm x 6mm thick minimum) or approved equivalent to floor, steps and ramps including the supply of cement mortar, adhesive and pointing materials. Contractor to submit samples to the Client's Representative for approval prior to placing order. Tile to be fixed on screeded floor with approved floor tiles adhesive mixed and applied strictly in accordance with manufacturer's instruction and with all joints flush pointed with approved and matching colour tile grout adhesive and including all cutting, waste and cleaning on completion.	m ²	60		
3.9	Wall Tiles				
3.9.1	Supply and fix ceramic tiles (300mm x 600mm x 5mm thick minimum) or approved equivalent to walls up to a height of 1.8m including the supply of cement mortar, adhesive and pointing materials. Contractor to submit samples to the Client's Representative for approval prior to placing order. Tile to be fixed with approved floor tiles adhesive mixed and applied strictly in accordance with manufacturer's instruction and with all joints flush pointed with approved and matching colour tile grout adhesive and including all cutting, waste and cleaning on completion.	m ²	110		
	TOTAL BILL E (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
3.10	Internal Paint				
3.10.1	Prepare and apply one sealer coat, one coat binder and two full coats PVA emulsion paint BS colour to Client's representative's approval. Painting of surfaces of walls, columns, beams, returns, reveals, upstand, soffit of slab and the likes	Sum			
3.11	External Paint				
3.11.1	Prepare and apply one sealer coat, one coat binder and two full coats PVA antifungus emulsion paint BS colour to Client's representative's approval. Painting of surfaces of walls, columns, beams, returns, reveals, upstand, pump room, external PVC pipes and the likes	Sum			
3.12	Supply and installation of aluminium window, door openings & Roller Shutters; shall be type Technical or Schuco or equivalent to BS standards and to manufacturer's specification and all to Client's Representative's approval. All openings shall be in approved sections including all necessary mullion, transoms, beading, glazing beads and the like and glazed with a minimum of 8 mm thick laminated clear glass (where required) unless otherwise stated in accordance with British Code of Practice for 3 seconds gust wind speeds at of 280Km/hr. Contractor shall submit letter of compliance in this respect. Perimeter openings to be pointed with silicone mastic all round internally and externally. White powder coated finish shall be guaranteed for a minimum period of 10 years against defects (including the effects of salt spray). All joints are mitred and to be made weather tight with neoprene gaskets etc. as specified by manufacturers. Door installed shall be complete of all ironmongeries comprising of approved heavy-duty lock.				
3.12.1	Door D1 – W:850mm x H:2150mm. Door should be equipped with handle, lock and 3 spare keys.	Nr	3		
3.12.2	Door D2 – W:850mm x H: 1950mm. Door should be equipped with handle, door lock made from stainless steel and occupancy indicator (vacant(green)/engaged (Red))	Nr	12		
3.12.3	Door D3 – W:1000mm x H:2150mm opening both ways and with automatic door closer both ways. Door should be equipped with handle, door lock made from stainless steel and occupancy indicator (vacant(green)/engaged (Red))	Nr	1		
3.12.4	Manual Roller Shutter – W:1175mm x H:2250mm. Roller shutters should be equipped with locking mechanism and 3 spare keys	Nr	2		
	TOTAL BILL F (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
3.12.5	Window W1 – W:600mm x H:600mm. Window should be equipped with handle and locking mechanism	Nr	9		
3.12.6	Window W2 – W:1000mm x H:600mm. Window should be equipped with handle and locking mechanism	Nr	3		
3.12.7	Window W3 – W:1200mm x H:1400mm. Sliding window should be equipped with locking mechanism.	Nr	1		
3.12.8	Window W4 – W:600mm x H:400mm. Window should be equipped with handle and locking mechanism	Nr	5		
3.13	Burglar bars				
3.13.1	Manufacture, supply and install internal burglar bars for windows W1, W2 & W3 in 12mm round metal bars and flat iron bars of thickness 6mm and 50mm wide. Burglar bar design should be submitted to the Authority for approval prior to manufacture. Burglar bars should be manufactured black and hot dipped galvanized after manufacture. All burglar bars should be painted with 1 coat primer and 2 coats matt black paint.	Sum			
3.14	Concrete Countertop Table				
3.14.1	Supply and installation of granite sheets with rounded edges & corners with sealed surface (18-20mm thick) for the two countertop tables. Edge of granite should be above wash hand basins to allow for easy maintenance. Colour of granite to be approved by the Client's representative. Rate to also allow for the fixing of a splashback of height 200mm along whole length of the table.	Sum			
3.15	Roof Waterproofing				
3.15.1	Cement and sand (1:3) screed to a smooth trowelled finish laid on concrete including preparation of surfaces and dishing outlets and 10mm – 80mm thick average screed laid to falls and cross falls (of ratio 1:80) on concrete flat roof of building, upstand and the like	Sum			
	TOTAL BILL G (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
3.15.2	Supply and lay approved double layer bituminous waterproofing membrane on sealer coat and hot laid with melted oxidized bitumen by specialist all in accordance with the manufacturer's specifications to smooth trowelled surface roof of flat roofs and upstand	Sum			
3.16	Rainwater Installations (for concrete roof slab)				
3.16.1	Supply and lay approved double layer bituminous waterproofing membrane on sealer coat and hot laid with melted oxidized bitumen by specialist all in accordance with the manufacturer's specifications to smooth trowelled surface roof of flat roofs and upstand	Sum			
3.17	Rainwater Installations (for concrete roof slab)				
3.17.1	Supply and installation of PVC pipes, rainwater roof outlets and fittings to BS 4660 with ringseal and solvent welded joints, jointed in accordance with manufacturer's recommendation. Rainwater pipe works should be inclusive of 75 mm diameter pipes directed to soakaways, gargoyle, including standard PVC brackets, plugged to concrete/blockwall and all associated fittings	Sum			
4.0	Roof Structure				
4.1	Metal Connections				
4.1.1	Supply of hot-dipped galvanised C-purlins bolted to hot-dipped galvanized 150mm x 75mm x 4mm x L:200mm unequal angle. Fixing of unequal angle onto RC curved beam with 2 M12 Grade 4.6 galvanised anchor bolts. Contractor to cater for hot-dipped galvanizing of bolts, nuts, rawl/fix bolts and associated fittings, etc. Any welding to ground smooth and approved treatment be applied prior to paint. All to be as per drawings.	Sum			
4.1.2	All metals parts to be painted with 2 coats primer and 2 coats matt paint of approved colour	Sum			
4.1.3	All on-site welding parts or joints to be witnessed by the Client's representative and to be treated with 3 coats approved high zinc content paint	Sum			
	TOTAL BILL H (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
4.2	Iron Sheetings				
4.2.1	Supply and fixing of pre-painted (both sides) profiled roof sheeting of approved colour complete with all necessary fixing accessories and fittings, flashing gutter and bend to profile where necessary, fixed to purlins with rustproof screws, Malakoff metal and plastic washers including all necessary cutting, waste, painting and protection and insulation all to manufacturer's specifications and to Client's Representative's approval	Sum			
4.2.2	Supply and fix approved PVC Bird proof net with wooden frame to be fixed where required as directed by the Client's Representative	Sum			
4.3	Rainwater Installations (for iron sheetings)				
4.3.1	Supply and installation of PVC pipes and Gutter and fittings to BS 4660 with ringseal and solvent welded joints, jointed in accordance with manufacturer's recommendation. Rainwater pipe works should be inclusive of 75 mm diameter pipes directed to soakaways, pvc gutter 110 mm dia with end caps, outlets fixed on surface with and including standard PVC brackets, plugged to concrete/blockwall/flashing gutter and all associated fittings	Sum			
5.0	Soakaways				
5.1	Construction of soakaways for discharge of wastewater and rainwater. Rate shall include excavation in any material, supply & install aggregates 25-30mm wrapped in approved geotextile material, supply and install aggregates 12.5mm topping and supply & install kerbs K5 around the soakaway. All to be as per drawing.	Sum			
6.0	Sanitary Wares and Accessories				
6.1	Supply and fixing of sanitary appliances and accessories which shall be of quality as specified and briefly described below and, or approved equivalent (CE standards BS approved) and with and including fittings, accessories, all to manufacturer's specifications and to Client's Representative's approval.				
	TOTAL BILL I (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
6.1.1	Vitreous China close coupled wash down WC unit, with vitreous china 6.0 litres cistern with economic water system, side stainless steel armoured flexible hose & bidet sprayer and heavy-duty seat and cover; colour to Client's Representative's approval	Nr	7		
6.1.2	Vitreous China wall hung flat back bowl urinal inclusive of flush mechanism	Nr	3		
6.1.3	Vitreous China wall hung bowl urinal separator	Nr	3		
6.1.4	Vitreous China under counter wash hand basin with heavy duty tap	Nr	4		
6.1.5	Vitreous china paraplegic low level WC unit with vitreous china 6.0 lts cistern and inclusive of all grab bars/rails set, paraplegic wash hand basin and tap with side stainless steel armoured flexible hose & bidet sprayer.	Nr	1		
6.1.6	Allow for the supply and fixing of decorative mirrors 0.8m high x 0.6m wide to wall tiling. Rate to be all inclusive. The contractor shall allow in his rates for mirror of modern styles and these shall be approved by the Client's Representative prior to fixing.	Nr	5		
6.2	Plumbing Works & Water Storage				
6.2.1	Supply and fix all fittings, PVC pipes & water pipes (PN16) including all holes or casting in concrete/blockwall/floor where necessary and connected to all sanitary appliances (all plumbing materials & fitting shall be of European standard BS approved). Provision to be made for P-Traps, Floor traps and bottle traps (directed to soakaways) and a soap dispenser (one in ladies, one in gents and one in disabled unit) where required as per drawing and to the Client's Representative's approval.	Sum			
6.2.2	Supply and fixing of 1No. - 9000 lt fiberglass water tanks at ground level, construction of pump room, provision of automatic water pump & floating switch to Client's Representative's approval and construction of a reinforced concrete platform for water tanks. Rate shall include any excavation, installation of formworks and casting of in-situ concrete G30, installation of painted galvanized metal door for pumphoom, internal & external plastering of pumphoom, external painting of pumphoom with 1 coat sealer & binder and 2 coats antifungus paint all to the Client's representative's approval.	Sum			
	TOTAL BILL J (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
6.2.3	Supply and installation of Cladding with galvanized metal post frame of tube size 50mm x 50mm spaced at 1m horizontally and vertically and cladding in WPC of size 140mm x 4mm all to be fixed on concrete platform around 9000L water tank and provision be made for one door opening in same material to the Client's Representative's approval and satisfaction. Rate to include painting of metal posts with 1 coat primer and 2 coats matt black paint to Client's Representative's approval	Sum			
6.2.4	Supply and fix of 2000 Lts overhead fiberglass water tank inclusive of all plumbing works (including floating switch)	Sum			
6.2.5	Connection of toilet block plumbing system to existing CWA meter. Rate shall include excavation in any material to a depth of 600mm over a length of 30m and supply & laying of underground polyethylene pipe (PN16) of Ø20mm and backfill with selected material to the Client's Representative's approval.	Sum			
6.2.6	Testing and commissioning of plumbing system to the satisfaction of the Authority	Sum			
6.3	Interceptor Manhole & Manholes for outlets of Sanitary wares				
6.3.1	To construct manholes and interceptor manhole chamber including excavation, reinforcement, concreting and manhole & interceptor manhole chamber. All manholes shall be internally and externally plastered to a smooth trowelled finish. Manholes shall be covered with GRP manhole covers 450 mm x 450mm and Interceptor manhole chambers with 600mm x 600mm GRP manhole cover. Provision of Galvanized metal grid to be made inside interceptor chamber. Rate to include connection of all manholes and interceptor manhole chambers with PVC pipes 110mm upto septic tank connection, inclusive of excavation in any materials and backfill with selected fill.	Sum			
	TOTAL BILL K (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
6.4	Septic tank				
6.4.1	Supply and fixing of Polyethylene septic tank of minimum capacity 6 m ³ , sewer connections in 110mm diameter UPVC pipes upto leaching field. Rate quoted shall include excavation in soil, sand and rock, proper backfilling of excavated area with rocksand and crusher-run or selected fill as per Client's Representative's approval including all associated plumbing system, fittings, gluing, sealant solution.	Sum			
6.5	Leaching Field				
6.5.1	Construction of leaching field with manholes and perforated dia 110mm PVC pipes and aggregates 25mm – 30 mm wrapped in geotextile and topped with sand backfill to Client's Representative's approval. Rate should include excavation in any materials and backfill with selected fill, plastering of manholes internally & externally, internal benching and supply & install GRP manhole covers of size 450mm x 450mm to all manholes constructed.	Sum			
7.0	Electrical Works				
7.1	Internal & External Electrical Works - Sample of all electrical fittings, protective devices and floodlights shall be submitted for approval (certificate) by the Client's Representative prior to procurement and installation.				
7.1.1	Provision of electrical appliances and wiring in Toilet block and supply of all materials and completion of all electrical works in surface trunking and encased method in reinforced concrete roof slab, fixing of internal weatherproof fluorescent tubes, weatherproof bulkheads, recessed ceiling mounted LED lights with occupancy sensor , weatherproof external lighting points fitted with 20 W energy saving bulbs, provision of main distribution board (24 modules), circuit breakers, Isolator 63 A-2P, RCD 63A 30mA, waterproof twin socket 3 pin power point in store room, waterproof switches, earthing and associated works as per drawing and to Client's Representative's approval.	Sum			
	TOTAL BILL L (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
7.1.2	Supply and fix 2Nos wall mounted LED floodlight IP65 100 W each with motion sensor (vandal proof & waterproof on toilet block with control unit (RCD 25A 30mA, 2Nos circuit breaker 10A-2P, 1No timer analogue with back up, 1No Contacteur 40A 2pole).	Sum			
7.1.3	Excavation of trench in sand or hard materials not exceeding 600mm wide for underground CEB Armoured cable to a maximum depth of 0.6m from existing CEB meter to Toilet block new distribution panel. Provision to be made for yellow PVC duct high pressure pipe not exceeding 63 mm diameter with warning slab danger electric cable and yellow warning tape.	m	30		
7.1.4	Testing and commissioning of electrical system of Toilet block (including earthing) by a Registered Professional Electrical Engineer. Rate shall include all necessary equipment required for the tests and submission of a Test Certificate signed by the Electrical Engineer.	Sum			
8.0	Recycled Plastic Parapet				
8.1	Recycled Plastic Parapet around Leaching Field				
8.1.1	Supply and installation of Recycles plastic pole dia. 125 mm connected to recycled plastic handrail dia. 75 mm including, excavation in soil, sand and rock, concrete works, rate to be inclusive of sealing of any visible pores and painting with 2 coats matt paint of colour approved by the Client's Representative. All to be as per drawing.	m	40		
9.0	Pervious Concrete				
9.1	Footpath around Toilet block				
9.1.1	Construction of pervious concrete footpath around toilet block. Rate to include laying of lean mix (8-14Mpa), approved geotextile membrane and laying of 100 mm pervious concrete. Colour of pervious/permeable concrete to be approved by the Client's Representative.	m ²	100		
	TOTAL BILL M (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
9.1.2	Supply and installation of kerbs K5 around footpath. Rate shall include excavation in any material and casting of base for kerbs in mass concrete as per drawing.	m	80		
10.0	Utility Area				
10.1	Utility Area Separation				
10.1.1	Supply and installation of hot dipped galvanized metal tube columns of size 50mm x 50mm x 2.5mm fixed into a reinforced concrete beam of size 300mm x 200mm and clad with Wood Plastic Composite (WPC) blades on size 100mm x 25mm (or approved equivalent). Supply and installation of one door opening in Galvanised metal tube and WPC cladding of same dimensions complete with lock and key mechanism. Rate to include all fitting and other accessories, excavation in any material and backfilling, in-situ casting of ground beam, reinforcement bars for the RC ground beam and painting of metal posts with 1 coat primer and 2 coats matt black paint, all to Client's representative's approval.	Sum			
11.0	Entrance drain of Toilet block				
11.1	Grating				
11.1.1	Supply and installation of hot dipped galvanized metal grating as per drawing. Rate to include all fitting and accessories for installation. Contractor to also propose methodology for vandal proof and safe and easy maintenance installation of grating.	Sum			
11.1.2	Contractor to propose methodology for the provision of a catch basin to retain sand sediments prior to discharge used water into the soakaway and to implement the proposal after the Client's approval.	Sum			
	TOTAL BILL N (To be carried to Bill Summary Sheet)				

Item No	Brief Description of Works	Unit of Measure	QTY	Unit Price (Rs)	Total Price (Rs)
12.0	Landscaping				
12.1	Planting of Duranta Gold of height 500 mm. Rate quoted shall also include for backfilling and levelling with sand, daily maintenance and watering of same over a duration of 6 months as from the completion date.	Nr	25		
13.0	Signages				
13.1	Supply and fixing of signages for Gents/Ladies/Disabled Unit Toilet including opening hours, Gents/Ladies Changing rooms & Utility Area. Signages shall be in PVC material and 3mm thick (or approved equivalent). Wordings shall be printed on the PVC panel and shall be to the approval of the Client's Representative. Rate shall include preparation of artwork, fixing of panels on walls/doors as instructed by the Client's Representative.	Sum			
	TOTAL BILL O (To be carried to Bill Summary Sheet)				

Construction of Toilet Block at Mont Choisy Public Beach

Bill Summary Sheet BA/ONB/01/2022-23

SN	Description	Amount
1	Total Bill A	
2	Total Bill B	
3	Total Bill C	
4	Total Bill D	
5	Total Bill E	
6	Total Bill F	
7	Total Bill G	
8	Total Bill H	
9	Total Bill I	
10	Total Bill J	
11	Total Bill K	
12	Total Bill L	
13	Total Bill M	
14	Total Bill N	
15	Total Bill O	
	SUB-TOTAL	
	CONTINGENCIES	75,000.00
	VAT @ 15%	
	TOTAL AMOUNT INCLUSIVE OF VAT	

Bill of Quantities Authorised By:

Name:		Signature:	
Position:		Date:	
Authorised for and on behalf of:			
Name of Company:			
Seal of Company:			

SECTION III: STATEMENT OF REQUIREMENTS

A. SCOPE OF WORKS, SPECIFICATIONS AND PERFORMANCE REQUIREMENTS

Project Title: Construction of New Toilet Block at Mont Choisy Public Beach

Project Brief

The Beach Authority is embarking on the Construction of a new Toilet Block at Mont Choisy Public Beach to cater for the high influx of beach users under the Implementation of Beach Management Plan (Phase 1) project.

Scope of works

The scope of works consists of the following:

- 1. Clear site of all weeds, undergrowth and carting away including felling/relocation of trees of any girth and height as required and removal of stumps (if any) and level area**
- 2. Construction of Toilet Block, septic tank and leaching field**
 - a. Construction of toilet block (gents, ladies, disabled, changing room, store and pump room), ramp access and pedestrian access around toilet block, connecting to existing parking area in pervious concrete.
 - b. Supply and installation of stone cladding at the entrance walls of toilet block.
 - c. Supply and fixing of roof structure (includes any welding works) including all steel materials and fittings for the roof (pre-painted zinc aluminium coated profiled sheeting and hot dip galvanized purlins and connections)
 - d. Supply and fixing of floor tiles and wall tiles
 - e. Internal and external plastering of walls, beams, columns, cills, lintels and the likes.
 - f. Painting of Toilet block, internally and externally with approved paint colour.
 - g. Supply and fixing of aluminium openings/ PVC openings/ metal openings, roller shutter and burglar bars
 - h. Supply of all lighting equipment (weather proof lighting and preferably of European Standards) and carry out all electrical installations including surface trunking for internal lighting and pipes for external lights.

- i. Connection of new toilet's distribution board to existing meter.
- j. Testing and commissioning of whole electrical network to the satisfaction of the Authority.
- k. Supply and installation of all sanitary equipment
- l. Supply of all plumbing equipment and fittings (Vandal proof and of European Origin) and carry out all plumbing installations
- m. Supply and installation of polyethylene septic tank of capacity 6m³
- n. Construction of concrete manholes, intercepting chamber which shall be equipped with glass-fibre reinforced polyester manhole covers (Class B125)
- o. Construction of leaching field including geo-textile wrapping and backfilling with gravel and top soil/sand)
- p. Construction of reinforced concrete platform for 1 No. 9000 lts water tanks
- q. Construction of pumphouse and installation of hot-dipped galvanized metal door with 1 coat primer and 2 coats paint.
- r. Supply and installation of water tanks (9000lts at ground level and 2000lts overhead) and water pump inclusive of all plumbing installations.
- s. Connection of new toilet's plumbing system to existing CWA meter.
- t. Testing and commissioning of whole plumbing system to the satisfaction of the Authority.
- u. Supply and installation of gargoyles, rainwater pipes and gutters
- v. Construction of cross drain at the front of toilet block and supply and installation of galvanized metal grating.
- w. Construction of soakaways for drainage of rainwater and washbasins of toilet block
- x. Supply and installation for enclosure of leaching field with recycled plastic pole dia. 125 mm & recycled plastic handrail dia. 75 mm including, excavation in soil, sand and rock and painting of same.
- y. Supply and installation of enclosure behind toilet block in hot-dipped galvanized metal tubes and wood plastic composite (WPC) cladding.
- z. Supply and installation of signages showing opening hours, signs for gents/ladies/changing rooms/utility area/disabled toilet all to be to Client's satisfaction.
- aa. Landscaping works around toilet block area including backfilling, levelling and daily maintenance & watering of the plants over a duration of 6 months after work completion.

3. The contractor shall secure the site by placing warning tape and hoarding of areas prior to commencement including appropriate safety/warning signages. The site should be properly cordoned and must be kept clean and safe during execution of works
4. The contractor shall comply with all health and safety regulations during execution of the works.
5. The Contractor shall ensure the safety of its employees and beach users during the felling of trees throughout the duration of the project.
6. No debris or wastes, including construction materials, should have access onto the beach zone and the lagoon. All construction wastes (except coral sand) should be carted away and disposed of during and after the works on a daily basis.
7. Excess excavated coral sand shall be laid on the public beach around the site area as directed by the Authority
8. **The contractor shall provide one signboard indicating; PROJECT TITLE, NAME OF CLIENT AND NAME OF CONTRACTOR.**
9. Approvals should be requested from the Contractor to the Client at every stage of construction and samples should be approved prior to installation.
10. 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. In case of any damage caused both on the beach and in the lagoon, the remedial works and costs involved thereon will have to be borne by the contractor.
11. The Contractor shall take all necessary precautions to prevent public to access the working zones.
12. The felling of any trees should be carried out in the presence of an officer from the Forestry Service and the Beach Authority.
13. The Contractor shall use the fell trees for construction of benches as detailed in the priced activity schedule
14. Upon completion of the works, and prior to handing over, the site shall be cleared of all debris and cleaned to the Engineer's satisfaction

SPECIFICATIONS AND COMPLIANCE SHEET

Procurement Reference Number: BA/ONB/01/2022-23

1.0 CONCRETE

1.1 Scope of Section

This section covers concrete and mortar required in the Permanent Works other than the special concretes and mortars specified in other sections of the Specification.

1.2 Definitions

Structural concrete is any class of concrete which is used in reinforced, prestressed or unreinforced concrete construction, which is subject to stress and which is required to comply with Clause 1.4.

Non-structural concrete is composed of materials complying with the Specification but for which no strength requirements are specified and which is used only for filling voids and similar purposes where it is not subjected to significant stress.

A formed surface is a face which has been cast against formwork. A free surface is a horizontal or nearly horizontal surface produced by screeding or trowelling to the level and finish required. A pour refers to the operation of placing concrete into any mould, bay or formwork, etc, and also to the volume which has to be filled. Pours in vertical succession are also referred to as lifts.

Water/cement ratio is the ratio by weight of the free water in the mix divided by the weight of cement in the mix. Free water is the water in the mix excluding water absorbed by the aggregate.

1.3 Materials for Concrete

1.3.1 General

The Contractor shall submit to the Employer's Representative full details of all materials which he proposes to use for making concrete. No concrete shall be placed in the Permanent Works until the Employer's Representative has approved the materials of which it is composed. Approved materials shall not thereafter be altered or replaced by other materials without the consent of the Employer's Representative.

1.3.2 Cement

(a) Cement shall comply with the appropriate Standards, which include the following: -

BS 12 Portland Cement BS 4027 Sulphate resisting Portland Cement BS 5075 Concrete Admixtures

Part 1: Accelerating admixtures, retarding admixtures and water reducing admixtures

Part 2: Air entraining admixtures

Part 3: Super plasticising admixtures

Cement shall be free flowing and free of lumps. It shall be supplied in the manufacturer's sealed unbroken bags or in bulk. Bagged cement shall be transported in vehicles provided with effective means of ensuring that it is protected from the weather. Bulk cement shall be transported in vehicles or in containers built and equipped for the purpose.

Cement in bags shall be stored in a suitable weatherproof structure of which the interior shall be dry and well ventilated at all times. The floor shall be raised above the surrounding ground level and shall be so constructed that no moisture rises through it.

Each delivery of cement in bags shall be stacked together in one place. The bags shall be closely stacked but shall not be stacked against an outside wall. If pallets are used, they shall be constructed so that bags are not damaged during handling and stacking. No stack of cement bags shall exceed 3 m in height. Different types of cement in bags shall be clearly distinguished by visible markings and shall be stored in separate stacks.

Cement from broken bags shall not be used in Permanent Works. Cement in bags shall be used in the order in which it is delivered. Bulk cement shall be stored in weatherproof silos which shall bear a clear indication of the type of cement contained in them. Different types of cement shall not be mixed in the same silo.

The Contractor shall provide sufficient storage capacity on Site to ensure that his anticipated programme of work is not interrupted due to lack of cement having due regard to factors outside the Contractor's control such as transport, weather conditions, holidays and breakdowns.

Cement which has become hardened or lumpy or fails to comply with the Specification in any way shall be removed from the Site.

All cement used in the Permanent Works shall be tested by the manufacturer or the Contractor in a laboratory acceptable to the Employer's Representative. The tests shall be in accordance with Test A1 in Appendix B, and the Contractor shall supply two copies of each test certificate to the Employer's Representative.

Each set of tests carried out by the manufacturer or Contactor shall relate to not more than one day's output of each cement plant, and shall be made on samples taken from cement which is subsequently delivered to the Site. Alternatively, subject to the agreement of the Employer's Representative, the frequency of testing shall be one set of tests for every 200 tonnes of cement delivered to Site from each cement plant.

Cement which is stored on Site for longer than one month shall be retested in a laboratory acceptable to the Employer's Representative at the rate of one set of tests for every 200 tonnes, and at monthly intervals thereafter.

Cement which does not comply with the Specification shall not be used in the Permanent Works.

The Contractor shall keep full records of all data relevant to the manufacture, delivery, testing and use of all cement used in the Permanent Works and shall provide the Employer's Representative with two copies thereof.

1.3.3 Aggregates for Concrete

Aggregates for concrete shall conform to the requirements for fine and coarse aggregates in BS 882. Fine and coarse aggregates shall separately conform to the requirements set out below: -

(a) General Requirements

Aggregate shall be clean, hard, durable and frost resistant and shall not contain iron pyrites, iron oxides (other than magnetite), mica, shale, coal or other laminar, soft or porous materials.

(b) Grading

Fine aggregate shall conform to BS 882 Table 5, Zones C or M. In order to achieve an acceptable grading, it may be necessary to blend materials from more than one source. Coarse aggregates shall be supplied in the normal sizes specified and shall be graded in accordance with BS 882 for single sized aggregates. A coarse aggregate shall be predominantly angular, rounded or irregular as defined in BS 812, part 1.

(c) Chlorides

The chloride content shall not exceed 0.03 per cent by weight expressed as chloride ion when tested in accordance with BS 812 subject to the further restriction on total chloride content hereunder.

(d) Sulphates

The sulphate content shall not exceed 0.4 per cent by weight expressed as SO₃ when tested.

(e) Total Chloride and Sulphate Content

The total chloride content arising from all ingredients in a mix including cement, water and admixtures shall not exceed the following limits, expressed as chloride ion and as percentage of the weight of cement in the mix: -

For prestressed concrete, steam cured concrete or concrete containing sulphate resisting or super sulphated cement: 0.05 per cent.

For any other reinforced concrete 0.3 per cent in 95 per cent of all test results providing no result is more than 0.5 per cent.

The total sulphate content expressed as SO₃ of all ingredients in a mix including cement, water and admixtures shall not exceed 4.0 per cent of the weight of cement in the mix.

(f) Soundness

As may be required, aggregates shall not show a weight loss of more than 18 per cent using magnesium sulphate.

(g) Alkali Reactive Minerals

No part of the aggregates shall contain any mineral known to have a potential to cause alkali silica, alkali silicate, alkali carbonate or any other damaging chemical reaction between alkalis and aggregates.

The minerals present should be determined as required, on a range of samples selected to include every mineral type present in the aggregate as a whole irrespective of the proportion of the mineral.

If during the course of the test it is concluded that an unequivocal identification of a potentially reactive mineral is not possible, alternative tests shall be carried out such as to provide the required identification

(h) Flakiness

Flakiness index of coarse aggregates when tested in accordance with BS 812 shall be as set out hereunder and not as given in BS 882 Table 1.

For nominal 40mm aggregate and above, not more than 40 For nominal 20mm aggregate and below, not more than 35.

(i) Shell Content

In addition to the requirements of BS 882, the content of hollow and flat shells shall not be such as will reduce the 28-day strength below the minimum average strength required or reduce the average 28 day strength by more than 5 percent when tested in accordance with BS 1881 when 10 cubes made of concrete with shells are compared with 10 cubes made of concrete with shells removed.

(j) Water Absorption

The coarse aggregate shall not have water absorption of more than 2.5 per cent when tested as set out in BS 812.

(k) Organic impurities

Fine aggregate shall be tested as set out in BS 1377 Test 8 and rejected if the percentage of organic matter exceeds 1 percent.

1.3.4 Aggregates for Mortar

Aggregates for mortar shall conform to BS 1200

1.3.5 Testing Aggregates

(a) Acceptance testing

The Contractor shall deliver to the Employer's Representative samples containing not less than 50 kg of any aggregate which he proposes to use in the Permanent Works and shall supply such further samples as the Employer's Representative may require. Each sample shall be clearly labelled to show its origin and shall be accompanied by all the information called for in BS 882.

Tests to determine compliance of the aggregates with all the requirements of Clauses 1.3.3 or 1.3.4 shall be carried out by the Contractor in a laboratory acceptable to the Employer's Representative. If the tested materials fail to comply with the Specification, further tests shall be made in the presence of the Contractor and the Employer's Representative and acceptance of the material shall be based on such tests.

The acceptance tests carried out by the Contractor shall generally be on three representative samples of fine and coarse aggregates taken in the presence of the Employer's Representative. Total numbers of tests required for acceptance are as follows:

-

Test	Fine Aggregates	Coarse Aggregates
Water absorption	-	3*
Flakiness Index	-	3*
Shell Content determination	-	3*
Test for shell content (Where required)	-	1
10% Fines test or aggregate impact value	-	3*
Grading	3*	3 on each nominal size
Chloride content	3*	3*
Sulphate content	3*	3*
Soundness	-	3*
Petrographic examination	As required, minimum 3	As required, minimum 3
Clay, silt and dust determination	3	3
Organic impurities	3	3

* One test on each sample

If at any time a significant physical or chemical change in the nature of the coarse or fine aggregate occurs, or a new source of aggregate is used, the Employer's Representative may direct that some or all of the acceptance testing is repeated.

(b) Routine Testing

The Contractor shall carry out routine testing of aggregates for compliance with the Specification during the period in which concrete is being produced for the Permanent Works. The tests set out below shall be performed on aggregates from each separate source on the basis of one set of tests for each day on which aggregates are delivered to Site provided that no set of tests shall represent more than 250 tonnes of fine aggregate nor more than 500 tonnes of coarse aggregate, and provided also that the aggregates are of uniform quality. If the aggregate from any source is variable, the frequency of testing shall be as instructed by the Employer's Representative.

Grading	BS 812
Silt and clay content	BS 812
Moisture content	BS 812

In addition to the above routine tests, the Contractor shall carry out the following tests at the frequencies stated:

Moisture content: As frequently as may be required in order to control the water content of the concrete as required by the Specification.

Chloride content: As frequently as may be required to ensure that the proportion of chlorides in the aggregates does not exceed the limit stated in the Specification.

The Contractor shall take account of the fact that when the chloride content is variable it may be necessary to test every load in order to prevent excessive amounts of chloride contaminating the concrete. For this purpose, the Contractor shall use the rapid field test (the Quantab test). In the event of disagreement regarding the results of the field test, the chloride content of the aggregate shall be determined in the laboratory as described in BS 812 (the Volhard test).

1.3.6 Delivery and Storage of Aggregates

Aggregates shall be delivered to Site in clean and suitable vehicles. Different types or sizes of aggregate shall not be delivered in one vehicle.

Each type or size of aggregate shall be stored in a separate bin or compartment having a base such that contamination of the aggregate is prevented. Dividing walls between bins shall be substantial and continuous so that no mixing of types or sizes occurs.

The storage of aggregates shall be arranged so that as far as possible rapid drying out in hot weather is prevented in order to avoid sudden fluctuations in water content. Storage of fine aggregates shall be arranged so that they can drain sufficiently before use in order to prevent fluctuations in water content of the concrete.

1.3.7 Water for Concrete and Mortar

Water for mixing or curing concrete or mortar shall not contain more than the following concentrations of impurities: -

	Max ppm
The sum of sulphates, alkali carbonates and bicarbonates	1000
Chlorides	500
Suspended solids	2000
Other dissolved solids	2000
Seawater or brackish water shall not be used	

At the commencement of the Works the Contractor shall send a sample of the water proposed for concrete and mortar to an accredited laboratory capable of carrying out the full analysis of potable water in accordance with either the "Analysis of Raw, Portable and Waste Waters" published by Her Majesty's Stationery Office (HMSO) or "The Standard Method of Examination of Water and Waste Waters" published by the American Water Works Association (AWWA). The results of the analysis shall be submitted to the Employer's Representative. The sample of water sent for analysis shall be taken in the presence of the Employer's Representative. If the water selected comes from a reliable portable water source the Contractor shall obtain a copy of a recent analysis from the chemist of the Water Authority. If the Employer's Representative considers this satisfactory the tests required above need not be carried out.

If the source of water is changed it shall be tested as above. If water contains 80 percent of the maximum concentration of impurities properties given above it shall be retested at two monthly intervals.

1.3.8 Admixtures

(a) General

The use of admixtures in concrete may be required under the Contract to promote special properties to the concrete or may be proposed by the Contractor to assist compliance with the Specification.

In all cases the Contractor shall submit to the Employer's Representative full details of the admixture he proposes to use and the manner in which he proposes to add it to the mix. The information provided shall include:

- i. The typical dosage and the detrimental effects of an excess or deficiency in the dosage
- ii. The chemical names of the main active ingredients in the admixture
- iii. Whether or not the admixture contains chlorides, and if so, the chloride ion content expressed as a percentage by weight of admixture
- iv. Whether the admixture leads to the entrainment of air when used at the manufacturer's recommended dosage, and if so, the extent to which it does so
- v. Long- and short-term effects of the admixture on concrete including the effects on different types of cement and aggregates
- vi. Storage life
- vii. Safety precautions required in handling
- viii. Compatibility with other additives
- ix. Compliance with Standards.

The chloride ion content of any admixture shall not exceed 2 per cent by weight of the admixture nor 0.03 per cent by weight of the cement in the mix.

Admixtures shall not mix together without the consent of the Employer's Representative.

(b) Super Plasticizing Admixtures

Super plasticizing admixtures shall comply with BS 5075 Part 3.

If the Drawings specify or the use of super plasticizing admixtures is subsequently authorised by the Employer's Representative, the Flow Table test carried out in accordance with BS 1881 Part 105 shall be used to control and record workability.

Test cubes shall be made in accordance with BS 1881 except that the concrete shall be placed in the cubes and compacted to the same degree as the concrete placed in the works. In addition to the normal trial mix cubes required an additional set of cubes shall be made with 1.5 times the intended super plasticizing admixture addition to assess the effect of overdosage on the concrete.

If the super plasticizing additive is not specified but the Contractor requests permission to use it the Employer's Representative shall not approve its use unless full particulars including chemical constituents of the admixture are submitted and the additional trial mixes mentioned above have been carried out and all are considered satisfactory.

The Employer's Representative reserves the right to refuse the use of super plasticizing admixture for concrete required for particular structures.

(c) Air Entraining Agents

In addition to the general requirements, air entraining agents shall be capable of producing an air content in concrete mixes within the limits stated on the Drawings without any tendency to produce excessive air content in the event of prolonged mixing times

The effect of a proposed air entraining agent shall be tested by the Contractor in trial mixes produced in the plant which he proposes to use for the Permanent Works

Air entraining agents shall comply with BS 5075.

(d) Workability Agents

Subject to the agreement of the Employer's Representative, admixtures may be used by the Contractor to assist in meeting the requirements of the Specification or to aid the placing of concrete.

Workability agents shall comply with BS 5075 and shall not have any adverse effect on the properties of the concrete. If a reduction in strength of the concrete is caused, the Contractor shall counteract this by a reduction in water cement ratio or by an increase in cement content.

1.3.9 Other Cementitious Components

(a) Pulverised Fuel Ash

Pulverised Fuel ash shall comply with the requirements of BS 3892 and shall have a carbon content not exceeding seven per cent by weight

The maximum sulphate content of PFA expressed as SO_3 shall be 2.5 per cent by weight of PFA but if the weight of PFA in the mix exceeds the weight of cement in the mix, the maximum content of SO_3 shall be 1.5 per cent.

The maximum SO_3 content of the mix shall not exceed the limit given in clause 1.3.3
The fineness as expressed by the specific surface shall be within the range of Zones B or C in BS 3892, and not more than one test in ten shall show a result falling outside this range.

Pulverised fuel ash shall only be used in conjunction with cement complying with BS 12 and the total sulphate content of the mix from all sources, expressed as SO_3 shall not exceed that stated in Clause 1.3.3(e).

1.4 Design of Concrete Mixes for Structural Concrete

1.4.1 Classes of Concrete

The classes of structural concrete to be used in the Permanent Works shall be those shown on the Drawings. The classes are designated in Table 1.1

Table 1.1

CONCRETE CLASSES

Class of Concrete	Minimum Cement Content Kg/m ³	Maximum Water/Cement Ratios		150mm cubes Required Minimum Average 28 day strength (M.A.S) N/mm ²
C20	180	0.61	-	20
C25	200	0.59	-	25
C30	230	0.57	-	30
C35A	325	0.53	0.50	35
C40	350	0.49	0.46	40

M.A.S = Required Minimum Average 28-day Strength

Concrete for water retaining shall have a maximum cement content of 400 kg/m³ and maximum water/cement ratios as column B above or as shown on the Drawings.

Concrete for other structures shall have maximum water/cement ratios as column A above or as shown on the Drawings.

The coarse aggregate maximum size shall be 20 mm unless 10 mm or 40 mm are shown on the Drawings.

1.4.2 Design of Proposed Mixes

The Contractor shall design the mixes which he proposes to use in the Permanent Works to achieve acceptable workability and resistance to segregation during handling and placing. Mixes shall be designed in accordance with the requirements of BS 5328 and shall also comply with the following requirements:

- The aggregate portion shall be well graded from the nominal maximum size of stone down to the 150-micron size.
- The cement contents shall be as designated in Table 1.1 unless a higher cement content is required to meet the strength requirement
- The water/cement ratio shall be the minimum consistent with adequate workability but in any case, not greater than that shown in Table 1.1 taking due account of any water contained in the aggregates. The Contractor shall take into account that this requirement may need the inclusion of a workability agent in the mix.

- (d) The workability shall be consistent with ease of placing and proper compaction having regard to the presence of reinforcement and embedded items.
- (e) The crushing strength at 28 days as determined in accordance with Sub-Clause 7.4.3 shall not be less than the minimum average strength given in Table 1.1 plus 2 N/mm²
- (f) The drying shrinkage determined in accordance with BS 1881 shall not be greater than 0.05 per cent.
- (g) Blinding concrete shall be Class C 15 unless otherwise indicated on the drawings.

The Contractor shall submit full details of all the mixes he proposes to use to the Employer's Representative.

1.4.3 Trial Mixes with 150 mm test cubes

For each mix of concrete the Contractor shall in the presence of a representative of the Employer's Representative prepare three separate batches of concrete using the materials which have been approved for use in the Permanent Works and the mixing plant which he proposes to use for the Permanent Works.

Six test cubes shall be cast from each batch. The making, curing and testing of all test cubes shall comply with the requirements of BS 1881. The slump of the concrete carried out in accordance with BS 1881 shall be recorded.

Three cubes from each batch shall be tested for compressive strength at seven days and the remaining three at 28 days. The density of all the cubes shall be determined before the cubes are crushed.

The average value of the crushing strength of the nine cubes tested at 28 days less 2 N/mm² shall be greater than the Minimum Average Strength given in Table 1.1 for the class of concrete tested.

If the 28-day strength determined as above is less than the minimum average strength shown in Table 1.1 plus 2 N/mm² the mix shall be adjusted in order to comply. If adjustment of aggregate proportions does not increase the strength the water cement ratio shall be reduced.

If it is then necessary to increase the workability the use of plasticity additive will be accepted. An increase in cement content will not normally be acceptable.

The average strength of the final nine trial mix 28-day cubes accepted by the Employer's Representative shall be referred to thereafter as the 'final trial mix strength'. The Contractor shall carry out tests to determine the drying shrinkage of the concrete.

If the Employer's Representative does not agree to a proposed concrete mix for any reason, the Contractor shall amend his proposals and carry out further trial mixes. No mix

shall be used in the Permanent Works without the written consent of the Employer's Representative.

Based on the results of the tests on the trial mixes, the Contractor shall submit full details of his proposals for mix design to the Employer's Representative, including the type and source of each ingredient, the proposed proportions of each mix and the results of the tests on the trial mixes

1.4.4 Quality Control of Concrete Production (150 mm cubes)

For each class of concrete in production at each plant for use in the Permanent Works, samples of concrete shall be taken at the point of mixing or of deposition as instructed by the Employer's Representative and in the presence of a representative of the Employer's Representative, all in accordance with the sampling procedures described in BS 1881.

The slump of each sample carried out in accordance with BS 1881 shall be determined at the time of sampling.

Samples shall be taken on the basis of one for each 20 m³ of concrete placed but, in any case, not less than one sample per day or one sample for each pour of concrete placed, whichever is the more frequent.

Three 150 mm test cubes shall be cast from each sample, cured and tested as set out in BS 1881. One cube shall be tested at seven days and two at 28 days.

The average strength of the two cubes crushed at 28 days shall be referred to as one test result.

Concrete shall be deemed to comply with the strength specified if the average strength of any four consecutive test results (8 cubes) exceeds the final average trial mix strength minus 2 N/mm² for the Class of concrete with no single test result (2 cubes) being less than the final average trial mix strength minus 6 N/mm²

1.4.5 Failure to Comply with Requirements

The Contractor shall take any action instructed by the Employer's Representative to remedy concrete that fails to comply with the Specification. Such action may include but is not necessarily confined to the following:

- (a) Adjusting the mix proportions until the concrete again complies with the Specification
- (b) Cutting test cores from the failed concrete and testing in accordance with BS 1881
- (c) Carrying out additional works to overcome the effect of the failed concrete
- (d) Removing the failed concrete
- (e) Increasing the frequency of sampling until control is again established.

1.5 Mixing Concrete

Before any plant for batching, mixing, transporting, placing, compacting and finishing concrete is ordered or delivered to Site, the Contractor shall submit to the Employer's Representative full details including drawings of all the plant which he proposes to use and the arrangements he proposes to make.

Concrete for the Permanent Works shall be batched and mixed in one or more central plants unless the Employer's Representative agrees to some other arrangement.

Batching and mixing plants shall be modern efficient equipment complying with the requirements of BS 1305 and capable of producing a uniform distribution of the ingredients throughout the mass. Truck mixers shall not be used unless the Employer's Representative agrees otherwise, in which case they shall comply with the requirements of BS 4251.

If the plant proposed by the Contractor does not fall within the scope of BS 1305, it shall have been tested in accordance with BS 3963 and shall have a mixing performance within the limits of Table 6 of BS 1305.

Unless the Employer's Representative agrees otherwise, each mixing plant shall be tested for mix variability as set out in Test A 8 in Appendix B before it is used to mix concrete for

the Permanent Works. All mixing operations shall be under the control of an experienced supervisor.

The aggregate storage bins shall be provided with drainage facilities arranged so that drainage water is not discharged to the weigh hoppers. Each bin shall be drawn down at least once per week and any accumulations of mud or slit removed.

Cement and aggregates shall be batched by weight. Water may be measured by weight or volume. The weighing and water dispensing mechanisms shall be maintained in good order. Their accuracy shall be maintained within the tolerances described in BS 1305 and checked against accurate weights and volumes when required by the Employer's Representative.

The weights of cement and of each size of aggregate indicated by the mechanisms employed shall be within a tolerance of plus or minus two per cent of the respective weights per batch agreed by the Employer's Representative.

The Contractor shall provide standard test weights at least equivalent to the maximum working load used on the most heavily loaded scale and other auxillary equipment required for checking the satisfactory operation of each scale or other measuring device. Tests shall be made by the Contractor at intervals to be determined by the Employer's Representative and shall be carried out in his presence.

For the purpose of carrying out these tests, there shall be easy access for personnel to the weigh hoppers. The Contractor shall furnish the Employer's Representative with copies

of the complete results of all check tests and shall make any adjustments, repairs or replacements necessary to ensure satisfactory performance.

The nominal drum or pan capacity of the mixer shall not be exceeded. The turning speed and the mixing time shall be as recommended by the manufacturer, but in addition, when water is the last ingredient to be added, mixing shall continue for at least one minute after all the water has been added to the drum or pan.

If the Employer's Representative has reason to doubt the adequacy of the mixing, he may order a variability test as set out in Test A8 in Appendix B and the Contractor shall forthwith carry out such tests, the results of which shall comply with the requirements shown in Appendix B.

The blades of pan mixers shall be maintained within the tolerances specified by the manufacturer of the mixer and the blades shall be replaced when it is no longer possible to maintain the tolerances by adjustment.

Mixers shall be fitted with an automatic recorder registering the number of batches discharged. The water to be added to the mix shall be reduced by the amount of free water contained in the coarse and fine aggregates. This amount shall be determined by

the Contractor by a method agreed by the Employer's Representative immediately before mixing begins each day and thereafter as the Employer's Representative directs.

When the correct quantity of water, determined as set out in the Specification, has been added to the mix, no further water shall be added, either during mixing or subsequently. After mixing for the required time, each batch shall be discharged completely from the mixer before any materials for the succeeding batch are introduced.

Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before any fresh concrete is mixed and thereafter the first batch of concrete through the mixer shall contain only half the normal quantity of coarse aggregate. This batch shall be mixed for one minute longer than the time applicable to a normal batch. Mixers shall be cleaned out before changing to another type of cement.

1.6 Transport of Concrete

1.6.1 Site Batched Concrete

The concrete shall be discharged from the mixer and transported to the Works by means which shall prevent adulteration, segregation or loss of ingredients, and which shall ensure that the concrete is of the required workability at the point and time of placing. The loss of slump between discharge from the mixer and placing shall not exceed 25mm.

The time elapsing between mixing and placing a batch of concrete shall be as short as practicable and, in any case, no longer than will permit completion of placing and compaction before the onset of initial set. If the placing of any batch of concrete is delayed beyond this period, the concrete shall not be placed in the Permanent Works.

1.6.2 Transport and Delivery of Ready Mixed Concrete

(a) Quantity of Concrete

The basis of supply shall be by the cubic metre of fresh, fully compacted concrete. The volume of a given batch of concrete shall be calculated from the total mass of the batch divided by the mass per cubic metre of fresh, fully compacted concrete determined in accordance with BS 1881. The total mass of the batch shall either be calculated as the sum of the masses of all materials used including water, or determined from the gross and tare weights of the vehicle on a weighbridge.

(b) Transport of Concrete

Concrete shall be transported in a truck mixer complying with the requirements of BS 4251 unless the Employer's Representative agrees to the use of non-agitating vehicles. When non-agitating vehicles are used, the mixed concrete shall be protected from the gain or loss of water.

(c) Delivery Time

Concrete shall be discharged from the delivery vehicle within 2 hours after the time of loading, when concrete is transported in truck mixers or agitators, or within 1 hour after the time of loading when non-agitating equipment is used.

The time of loading, defined as the time of contact between cement and aggregates or, when these are surface dry, between cement and added water, shall be recorded on the delivery ticket.

NOTE: the delivery times indicated are arbitrary; the requirement is that concrete has the required workability at the time of discharge. A longer time may be appropriate in cool, humid weather or when retarding admixtures have been used, but a shorter time may be essential in hot weather with rich mixes, or where accelerating admixtures have been used.

(d) Additional Water

No additional water, other than any amount required to produce the specified workability, shall be added to the truck mixer drum before discharge unless specifically required and signed for by the Contractor and as agreed by the Employer's Representative.

(e) Delivery Ticket

Before discharging the concrete at the point of delivery, the supplier shall provide the Contractor with a delivery ticket for each batch of concrete on which is printed, stamped or written the following minimum information:

- name and location of ready-mixed concrete depot;
- serial number of tickets
- date;

- truck number;
 - name of purchaser;
 - name and location of site;
 - grade or mix description of concrete, including minimum cement content if specified;
 - specified workability;
 - type of cement;
 - nominal maximum size of aggregate
 - type of name of admixture, if included,
 - quantity of concrete in cubic metres;
 - time of loading
- Space shall be provided for any additional items that have been specified and for the following to be completed on site:

- arrival and departure times of the truck;
- time of completion of discharge;
- extra water added under supervision at the request of the Contractor, or his representative, and his signature, and as agreed by the Employer's Representative.

A copy of each delivery ticket shall be given to the Employer's Representative

1.7 Placing of Concrete

1.7.1 Consent for Placing

Concrete shall not be placed in any part of the Permanent Works until the Employer's Representative's consent has been given in writing, and the Contractor shall give the Employer's Representative at least 18 hours' notice of his intention to place concrete.

If concrete placing is not commenced within 24 hours of the Employer's Representative's consent, the Contractor shall again request written consent as specified above.

1.7.2 Preparation of Surfaces to Receive Concrete

Excavated surfaces on which concrete is to be deposited shall be prepared as set out in Section 3 of the Specification.

Existing concrete surfaces shall be prepared as set out in Clause 1.13. Before deposition of further concrete, they shall be clean, hard and sound and if required by the Employer's Representative shall be wet but without any freestanding water.

Any flow of water into an excavation shall be diverted through proper side drains to a sump, or be removed by other suitable methods which will avoid washing away the freshly deposited concrete or any of its constituents. Any underdrains constructed for this purpose shall be completely grouted up when they are no longer required by a method agreed by the Employer's Representative.

If so instructed by the Employer's Representative rock surfaces against which concrete is to be placed shall receive a prior coating of mortar mixed in the proportions similar to those of the fines portion in the concrete to be placed. The mortar shall be kept ahead of the concrete. The mortar shall be well worked into all parts of the excavated surfaces and shall be not less than 5mm thick.

If any fissures have been cleaned out as described in Section 3, they shall be filled with mortar or with concrete as instructed by the Employer's Representative.

The amount of mortar placed at any one time shall be limited so that it does not dry out or set before being covered with concrete.

1.7.3 Placing procedures

The concrete shall be deposited as nearly as possible in its final position. It shall be placed so as to avoid segregation of the concrete and displacement of the reinforcement, other embedded items, or formwork. It shall be brought up in layers approximately parallel to the construction joint planes and not exceeding 500 mm in compacted thickness unless otherwise permitted or directed by the Employer's Representative, but the layers shall not be less than four times the maximum nominal size of aggregate in thickness.

Layers shall not be placed so that they form feather edges nor shall they be placed on a previous layer which has taken its initial set. In order to comply with this requirement, a layer may be started before completion of the preceding layer.

All the concrete in a single bay or pour shall be placed as a continuous operation. It shall be carefully worked round all obstructions, irregularities in the foundations and the like so that all parts are completely full of compacted concrete with no segregation or honeycombing. It shall also be carefully worked round and between waterstops, reinforcement, embedded steelwork and similar items which protrude above the surface of the completed pour.

All work shall be completed on each batch of concrete before its initial set commences and thereafter the concrete shall not be disturbed before it has set hard. No concrete that has partially hardened during transit shall be used in the Permanent Works and the transport of concrete from the mixer to the point of placing shall be such that this requirement can be complied with.

Concrete shall not be placed during rain which is sufficiently heavy or prolonged to wash mortar from coarse aggregate on the exposed faces of fresh concrete. Means shall be

provided to remove any water accumulating on the surface of the placed concrete. Concrete shall not be deposited into such accumulations of water.

In drying weather, covers shall be provided for all fresh concrete surfaces which are not being worked on. Water shall not be added to concrete for any reason.

When concrete is discharged above its place of final deposition, segregation shall be prevented by the use of chute, downpipes, trunking, baffles or other appropriate devices.

Forms for walls, columns and other thin sections of significant height shall be provided with openings or other devices that will permit the concrete to be placed in a manner that will prevent segregation and accumulations of hardened concrete on the formwork or reinforcement above the level of the placed concrete

When it is necessary to place concrete under water the Contractor shall submit to the Employer's Representative his proposals for the method and equipment to be employed. The concrete shall be deposited either by bottom-discharging watertight containers or through funnel-shaped tremies which are kept continuously full with concrete up to a level above the water and which shall have the discharging bottom fitted with a trapdoor and immersed in the concrete in order to reduce to a minimum the contact of the concrete with the water. Special care shall be taken to avoid segregation.

If the concrete in a tremie pipe is allowed to fall to such an extent that water enters the pipe, the latter shall be removed from the pour and filled with concrete before being again lowered into the placing position. During and after concreting under water, pumping or de-watering in the immediate vicinity shall be suspended if there is any danger that such work will disturb the freshly placed concrete.

1.7.4 Interruptions to Placing

If concrete placing is interrupted for any reason and the duration of the interruption cannot be forecast or is likely to be prolonged, the Contractor shall immediately take the necessary action to form a construction joint so as to eliminate as far as possible feather edges and sloping top surfaces and shall thoroughly compact the concrete already placed in accordance with clause 1.8

All work on the concrete shall be completed while it is still plastic and it shall not thereafter be disturbed until it is hard enough to resist damage. Plant and materials to comply with this requirement shall be readily available at all times during concrete placing.

Before concreting is resumed after such an interruption the Contractor shall cut out and remove all damaged or uncompacted concrete, feather edges or any other undesirable features and shall leave a clean sound surface against which the fresh concrete may be placed.

If it becomes possible to resume concrete placing without contravening the Specification and the Employer's Representative consents to a resumption, the new concrete shall be thoroughly worked in and compacted against the existing concrete so as to eliminate any cold joints.

1.7.5 Dimensions of Pours

Unless otherwise agreed by the Employer's Representative, pours shall not be more than two metres high and shall as far as possible have a uniform thickness over the plan area of the pour.

Concrete shall be placed to the full planned height of all pours except in the circumstances described in Sub-Clause 1.7.4. The Contractor shall plan the dimensions of pours in such a way that thermal or shrinkage stresses are minimized.

1.7.6 Placing Sequence

The Contractor shall arrange that as far as possible the intervals between placing successive lifts of concrete in one section of the Permanent Works are of equal duration.

This duration shall normally be not less than three or more than seven days under temperate weather conditions unless otherwise agreed or instructed by the Employer's Representative.

Where required by the Employer's Representative to limit the opening of construction joints due to shrinkage, concrete shall not be placed against adjacent concrete which is less than 21 days old.

If concrete has to be placed against recently cast concrete within a period of less than 21 days, the pour shall be carried out as early as possible after the adjacent pour but precautions shall be taken to minimise shrinkage.

The methods described in Clause 1.9.3 can be used to that effect. However, the contractor shall submit for approval his proposed method and programme for placing of concrete.

When the Drawings call for contraction gaps in concrete, these shall be of the widths and in the locations shown on the Drawings and they shall not be filled until the full-time interval shown on the Drawings has elapsed.

1.8 Compaction of Concrete

The concrete shall be fully compacted throughout the full extent of the placed layer. It shall be thoroughly worked against the formwork and around any reinforcement and other embedded items, without displacing them. Particular care shall be taken at rises and other confined spaces. Successive layers of the same pour shall be thoroughly worked together.

Concrete shall be compacted with the assistance of mechanical immersion vibrators, unless the Employer's Representative agrees another method.

Immersion vibrators shall operate at a frequency of between 7000 and 10 000 cycles per minute. The Contractor shall ensure that vibrators are operated at pressures and voltages not less than those recommended by the manufacturer in order that the compactive effort is not reduced.

A sufficient number of vibrators shall be operated to enable the entire quantity of concrete being placed to be vibrated for the necessary period and, in addition, stand-by vibrators shall be available for instant use at each place where concrete is being placed.

Where the concrete contains aggregate with a nominal size of 75 mm or more, vibrators with a diameter of 100mm or more shall be used.

Vibration shall be continued at each point until the concrete ceases to contract, a thin layer of mortar has appeared on the surface and air bubbles have ceased to appear. Vibrators shall not be used to move concrete laterally and shall be withdrawn slowly to prevent the formation of voids.

Vibration shall not be applied by way of reinforcement nor shall vibrators be allowed to touch reinforcement or other embedded items. The vibrators shall be inserted vertically into the concrete to penetrate the layer underneath at regular spacing which shall not exceed the distance from the vibrator over which vibration is visibly effective.

1.9 Curing of Concrete

1.9.1 General

Concrete shall be protected during the first stage of hardening from loss of moisture and from the development of temperature differentials within the concrete sufficient to cause cracking. The methods used for curing shall not cause damage of any kind o the concrete.

Curing shall be continued for as long as may be necessary to achieve the above objectives but in any case, for at least ten days or until the concrete is covered by later construction whichever is the shorter period.

The above objectives are dealt with in sub-clauses 7.9.2 and 7.9.3, but nothing shall prevent both objectives being achieved by a single method where circumstances permit.

The curing process shall commence as soon as the concrete is hard enough to resist damage form the process, and in the case of large areas or continuous pours shall commence on the completed section of the pour before the rest of the pour is finished.

Details of the Contractor's proposals for curing concrete shall be submitted to the Employer's Representative before the placing of concrete commences in the Permanent Works.

1.9.2 Loss of Moisture

Exposed concrete surfaces shall be closely covered with impermeable sheeting, properly secured to prevent its removal by wind and the development of air spaces beneath it. Joints in the sheeting shall be lapped by at least 300 mm.

If for some reason it is not possible to use impermeable sheeting, the Contractor shall keep the exposed surfaces continuously wet by means of a water spray or by covering with a water absorbent material which is kept wet, unless this method conflicts with Clause 1.9.3.

Water used for curing shall be of the same quality as that used for mixing as stated in Clause 1.3.7. Formed surfaces may be cured by retaining the formwork in place for the required curing period.

If the use of the foregoing methods is inappropriate, surfaces which will not have further concrete bonded to them and which are not to receive an application of a finish may be cured by the application of a curing compound having an efficiency index of at least 90 per cent when tested in accordance with Test A9 in Appendix B. Curing compounds shall contain a fugitive dye to enable the extent of the spread to be seen easily.

Curing compound used on surfaces exposed to the sky shall if instructed by the Employer's Representative, contain sufficient finely divided flake aluminium in suspension to produce a complete coverage of the surface with a metallic finish when applied at the rate recommended by the manufacturer.

Curing compounds shall become stable and impervious to the evaporation of water from the concrete surface within 60 minutes of application. The material shall not react chemically with the concrete and shall not crack, peel or disintegrate within three weeks after application.

If instructed by the Employer's Representative, the Contractor shall, in addition to the curing provisions set out above provide a suitable form of shading to prevent the direct rays of the sun reaching the concrete surfaces for at least the first four days of the curing period.

1.9.3 Limitation of Temperature Differentials

The Contractor shall limit the development of temperature differentials in concrete after placing by any means appropriate to the circumstances as accepted by the Employer's Representative which shall include the following: -

- a. Limiting concrete temperatures at placing as set out in Clause 1.11.2;
- b. Use of low heat cement, subject to the agreement of the Employer's Representative;

- c. Insulation of exposed concrete surfaces by insulating blankets. Such blankets shall have a thermal conductance C value less than 1.0 W/m²°C;
- d. Leaving formwork in place during the curing period. Steel forms shall be suitably insulated on the outside;
- e. Preventing rapid dissipation of heat from surfaces by shielding from wind;
- f. Avoiding the use of water sprays when such use would cause rapid cooling of the surface;

1.10 Protection of Fresh Concrete

Freshly placed concrete shall be protected from rainfall and from water running over the surface until it is sufficiently hard to resist damage from this cause.

No traffic shall be allowed on any concrete surface until such time as it is hard enough to resist damage by such traffic.

Concrete placed in the Permanent Works shall not be subjected to any structural loading until it has attained at least its minimum average strength as defined in Clause 1.4.

If the Contractor desires to impose structural loads on newly-placed concrete, he shall make at least three test cubes and cure them in the same conditions as the concrete they represent. These cubes shall be tested singly at suitable intervals in order to estimate the time at which the minimum average strength is reached.

1.11 Concreting in Hot Weather

1.11.1 General

The Contractor shall prevent damage to concrete arising from exposure to extreme temperatures, and shall maintain in good working order all plant and equipment required for this purpose.

In the event that conditions become such that even with the use of the equipment the requirements cannot be met, concrete placing shall immediately cease until such time as the requirements can again be met.

1.11.2 Concrete Placing in Hot Weather

During hot weather the Contractor shall take all measures necessary to ensure that the temperature of concrete at the time of placing in the Permanent Works does not exceed 30°C and that the concrete does not lose any moisture during transporting and placing. Such measures may include but are not necessarily limited to the following:

- a. Shielding aggregates from direct sunshine.

- b. Sun shields on mixing plants and transporting equipment.
- c. Cooling the mixing water. If ice is used for this purpose, it shall be in flake form. Lump ice shall not be allowed to enter the tank supplying the mixer drum.
- d. Covering skips closely with polythene sheet so that the latter is in contact with the concrete.
- e. Painting all equipment and sunshields white.
- f. Nightwork, provided that the Employer's Representative has no other reason for refusing permission for nightwork.

Areas in which concrete is to be placed shall be shielded from direct sunshine and rock or concrete surfaces shall be thoroughly wetted if instructed by the Employer's Representative to reduce absorption of water from the concrete placed on or against them.

After concrete in any part of an area has been placed, the specified curing process shall be commenced as soon as possible. If any interval occurs between completion of placing and start of curing, the concrete shall be closely covered during the interval with polythene sheet to prevent loss of moisture.

The Employer's Representative shall have power to order the suspension of concrete production and/or laying when the shade temperature exceeds 30°C if he is not satisfied that the precautions being taken or intended by the Contractor are adequate to prevent the temperature of the concrete rising above 30°C. The possession of this power by the Employer's Representative shall not relieve the Contractor of any of his responsibilities.

1.11.3 No Additional Payment

Under no circumstances will the Contractor be entitled to receive any additional payment for complying with the requirements of this Clause of the Specification.

1.12 Finishes on Free Surfaces

Horizontal or nearly horizontal surfaces which are not cast against formwork shall be finished to the class shown on the Drawings and defined hereunder.

1.12.1 U1 Finish

All surfaces on which no higher class of finish is called for on the Drawings or instructed by the Employer's Representative shall be given a U 1 finish.

The concrete shall be levelled and screeded to produce a uniform plain or ridged surface, surplus concrete being struck off by a straightedge immediately after compaction.

1.12.2 U2 Finish

The surface shall first be treated as a Class U 1 finish and after the concrete has hardened sufficiently, it shall be floated by hand or machine sufficient only to produce a uniform surface free from screed marks.

1.12.3 U3 Finish

This is hard trowelled surface for use where weather resistance or appearance is important, or which is subject to high velocity water flow. The surface shall be floated as for a U2 finish but to the tolerance stated below. When the moisture film has disappeared and the concrete has hardened sufficiently to prevent laitance from being worked to the surface, it shall be steel-trowelled under firm pressure to produce a dense, smooth uniform surface free from trowel marks.

1.12.4 U4 Finish

The requirement is similar to a U3 finish but the permissible tolerances are smaller

1.12.5 U5 Finish

The concrete surface shall firstly be prepared as a U2 finish and then lightly brushed with a stiff brush to produce a textured finish. The brush used, once approved, shall be kept for the brushed finish only and not used for any other purpose.

1.12.6 Tolerances

The permissible tolerances are on free surfaces shall not exceed the values given in Table 1.2

Table 1.2

Surface Tolerances

Class of Finish	Tolerance in mm See notes		
	A	B	C
U1	Not applicable	10	+20 or -10
U2	Nil	10	+20 or -10
U3	Nil	5	+12.5 or -7.5
U4	Nil	2	+6 or -4

Notes:

1. Col. A is the maximum allowable value of any sudden change of level in the surface
2. Col.B is the maximum allowable value of any gradual irregularity of the surface, as indicated by the gap between the surface and a three-metre-long straightedge or correctly shaped template placed on the surface

3. Col.C is the maximum allowable value of the difference in level or position between a straightedge or correctly shaped template placed on the surface and the specified level or position of that surface.

Where dimensional tolerances are given on the Drawings or elsewhere in the Specification, they shall take precedence over those given in Table 1.2.

1.13 Construction Joints

Whenever concrete is to be bonded to other concrete which has hardened, the surface of contact between the sections shall be deemed a construction joint.

Where construction joints are shown on the Drawings, the Contractor shall form such joints in those positions. The location of joints which the Contractor requires to make for the purpose of construction shall be subject to the agreement of the Employer's Representative and details shall be submitted with the Programme of Works required by the Conditions of Contract.

The exact location of all construction joints shall be submitted to the Employer's Representative at least four weeks prior to the start of construction of the relevant part of the works. Construction joints shall be in vertical or horizontal planes except in sloping slabs where they shall be normal to the exposed surface or elsewhere where the Drawings require a different arrangement.

Construction joints shall be so arranged as to reduce to a minimum the effects of shrinkage in the concrete after placing, and shall be placed in the most advantageous positions with regard to stresses in the structures and the desirability of staggering joints.

Feather edges of concrete at joints shall be avoided and any feather edges which may have formed where reinforcing bars project through a joint shall be cut back until sound concrete has been reached.

The intersections of horizontal or near horizontal joints and exposed faces of concrete shall appear as straight lines produced by use of a guide strip fixed to the formwork at the top of the concrete lift, or by other means acceptable to the Employer's Representative.

Construction joints formed as free surfaces shall not exceed a slope of 20 per cent from the horizontal. The surface of the fresh concrete in horizontal or near horizontal joints shall be thoroughly cleaned and roughened by means of high-pressure water and air jets when the concrete is hard enough to withstand the treatment without the leaching of cement. The surface of vertical or near vertical joints shall be similarly treated if circumstances permit the removal of formwork at a suitable time.

Where concrete has become too hard for the above treatment to be successful, the surface whether formed or free is to be thoroughly scabbled by mechanical means or wet sand blasted and then washed with clean water. The indentations produced by scabbling shall be not less than 10 mm deep and shall not extend closer than 40 mm to a finished face.

If instructed by the Employer's Representative the surface of the concrete shall be thoroughly brushed with a thin layer of mortar complying with Clause 1.17, all as set out in Clause 1.7.2 immediately prior to the deposition of fresh concrete. The mortar shall be kept just ahead of the fresh concrete being placed and the fresh layer of concrete shall be thoroughly and systematically vibrated to full depth to ensure complete bond with the adjacent layer.

No mortar or concrete may be placed in position on or against a construction joint until the joint has been inspected and passed by the Employer's Representative.

1.14 Expansion and Contraction joints

Expansion and contraction joints are discontinuities in concrete designed to allow for thermal or other movements in the concrete.

Expansion joints are formed with a gap between the concrete faces to permit subsequent expansion of the concrete. Contraction joints are formed to permit initial contraction of the concrete and may include provision for subsequent filling.

Expansion and contraction joints shall be formed in the positions and in accordance with the details shown on the Drawings or elsewhere in the Specification.

1.15 Records of Concrete Placing

Records, in a form agreed by the Employer's Representative, shall be kept by the Contractor of the details of every pour of concrete placed in the Permanent Works. These records shall include class of concrete, location of pour, date of pour, ambient temperature and concrete temperature at time of placing, moisture contents of aggregates, details of mixes, batch numbers, cement batch number, results of all tests undertaken, location of test cube sample points and details of any cores taken.

The Contractor shall supply to the Employer's Representative four copies of these records each week covering work carried out the preceding week. In addition, he shall supply to the Employer's Representative monthly histograms of all 28 day cube strengths together with accumulative and monthly standard deviations and any other information which the Employer's Representative may require concerning the concrete placed in the Permanent Works.

1.16 Mortar

This clause covers mortar for use ahead of concrete placing, and other uses not covered elsewhere in the Specification.

Mortar shall be composed of fine aggregate complying with Clause 1.3.3 and the type of cement specified in Section 2.0. The mix proportions shall be as stated on the Drawings or if not stated shall be one part of cement to two parts of fine aggregate by weight.

Small quantities of mortar may hand mixed but for amounts over 0.5m³a mechanical mixer shall be used. The water content of the mortar shall be as low as possible consistent

with the use for which it is required but, in any case, the water/cement ratio shall not be more than 0.5.

Mortar which is specified as 'dry pack' shall be mixed with sufficient water for the mix to become cohesive but not plastic when squeezed in the hand. Dry pack mortar shall be rammed into the cavity it is required to fill, using a hand rammer with sufficient force to ensure full compaction.

1.17 Concrete for Non-Structural Purposes

Non-structural concrete (NS concrete) shall be used only for non-structural purposes where shown on the Drawings.

NS concrete shall be composed of aggregates complying with all-in aggregate within the grading limits of Table 3 of BS 882, Clause 1.3.3 and the type of cement specified in Section 2.0 or on the Drawings.

The weight of cement mixed with 0.3 cubic metres of combined or all-in aggregate shall not be less than 50 kg. The mix shall be proportioned by weight or by volume. The maximum aggregate size shall be 40 mm nominal.

The concrete shall be mixed by machine or by hand to a uniform colour and consistency before placing. The quantity of water used shall not exceed that required to produce a concrete with sufficient workability to be placed and compacted where required. The concrete shall be compacted by hand or by mechanical vibration.

1.18 Grouting of Pockets and Holes and Underpinning of Baseplates

Pockets and holding-down bolt holes shall be thoroughly cleaned out using compressed air and water jet. Holes drilled by a diamond bit shall be roughened. The pockets and holes shall be filled with grout consisting of cement and clean fresh water mixed in proportion of two parts by weight of cement to one part by weight of water. The pouring of liquid grout shall cease as soon as each hole is filled and any excess grout on the surface of the concrete foundation shall be completely removed and the surface dried off before the next operation proceeds.

The space between the top surface of foundation concrete and the underside of baseplates shall be filled with a special mortar made up in the following proportions: -

Portland cement	50 kg
Fine aggregate.....	50 kg

An additive acceptable to the Employer's Representative shall be added to counteract shrinkage in proportions recommended by the manufacturer.

The special mortar shall be mixed with the lowest water-cement ratio which will result in a consistency of mix of sufficient workability to enable maximum compaction to be achieved.

The special mortar shall then be well rammed in horizontally below the baseplate and from one edge only until it is extruded from the other three sides. The mortar which has extruded shall then be rammed back to ensure complete support without voids.

1.19 Protection of Concrete

Surfaces of concrete which are to be buried shall be protected by an asphaltic material coat approved by the Employer's Representative and applied in accordance with the manufacturer's instructions.

1.20 Hand Mixed Concrete

Concrete for structural purposes shall not be mixed by hand. Where non-structural concrete is required, hand mixing may be carried out subject to the agreement of the Employer's Representative. The mixing shall be done on a hard impermeable surface.

The materials shall be turned over not less than three times dry, water shall then be sprayed on and the materials again turned over not less than three times in a wet condition and worked together until a mixture of uniform consistency is obtained.

For hand mixed concrete not more than 0.5 cubic metre shall be mixed at one time. During windy weather efficient precautions shall be taken to prevent cement from being blown away during the process of gauging and mixing.

1.21 Protection of Buried Concrete

1.21.1 Materials

- (a) Plastic sheeting where specified shall be polythene sheeting 250 microns minimum thickness to BS 743 to the approval of the Employer's Representative. The Contractor shall provide suitable samples for approval before any concreting works shall begin.

All joints in the plastic sheeting shall be made with an approved polythene based adhesive tape. This tape shall also be used where tailoring of the sheeting to complicated shapes is necessary, e.g gullies, pipe ducts, etc.

Bitumen coating shall consist of one priming coat and one finishing coat of an approved bitumen filled liquid coating.

1.21.2 Concrete in Contact with Ground

Where directed by the Employer's Representative or shown on the Drawings concrete work which will be placed directly against rock or soil or which will subsequently have backfill placed against it will be protected in the following way from the aggressive action of salts contained in rock, soil or groundwater:

- a. Concrete placed directly against cut-face shall be protected by a layer of plastic sheeting laid over the area to be concreted. All laps shall be at least 300mm wide and sufficient surplus sheeting shall be left to enable a margin of at least 300 mm

width to project above the ground/concrete interface to be sealed onto the adjacent finished concrete surface with the bitumen coating. Special care shall be taken to avoid damage to the plastic sheeting during concreting.

- b. Formed or free concrete surfaces against which backfill will subsequently be placed will be protected by the application of bitumen coating.

No protection will be applied to surfaces against which concrete will subsequently be placed, except as described in the following sub-clause.

1.21.3 Ground Floor Slabs

A layer of plastic sheeting will be laid over the blinding concrete and below the ground floor slab. Laps in the plastic sheeting shall not be less than 300mm and adjacent sheets shall be securely taped down to prevent movement during concreting operations. Care shall be taken to avoid damage to the plastic sheeting during concreting. In the case of ground floor slabs no protection shall be applied to the underside of the blinding layer.

Engineer's specifications

1. GENERAL

1.1 Scope

This specification shall apply to:

- (a) Excavation to foundations
- (b) Reinforced concrete
- (c) Formwork
- (d) Masonry works
- (e) Door frames and Linings
- (f) Doors
- (g) Working Procedure
- (h) Ironmongery
- (i) Metal works
- (j) Windows & Doors
- (k) Welding (Flash Butts or Tunsten Argon- Arc)
- (m) Floor, wall and ceiling finishes
- (n) Glazing
- (o) Painting
- (p) Plumbing and drainage work
- (q) Electrical work
- (r) Site works
- (s) Steel Works

1.2 Responsibility

No approval or acceptance by the Engineer or his representative shall in any way relieve the contractor of his responsibility for the quality of materials, the standard of workmanship, or the strength, durability and appearance of the concrete works and works in general.

2. EXCAVATION

2.1 Excavate to Reduce Level & to Dimensions

Excavate site as shown on drawings to form the foundations to width and depths indicated, the bottom of all excavation to be clean and perfectly level.

2.2 Bottoms of Excavations to Receive Foundations

Excavations must be inspected by the Engineer before any work is to be executed. The surface of the bottoms to excavation shall be surfaced with 50 mm blinding layer of grade 15 concrete and wood floated.

3. CONCRETE

3.1 All workmanship, materials, tests and performance in connection with the concrete work shall be in conformity with the British Standard Code of Practice BS 8110 Part 1 1985 for the design, materials and workmanship for “The Structural Use of Concrete”

3.2 Mixing Water

The water in be used for mixing concrete shall be clean and free from harmful matter, in suspension or solution which significantly affects the setting time or strength or durability of the concrete.

3.3 Reinforcement

Steel reinforcements shall be plain mild steel bars or high yield deformed bars complying with MS 10. At the time of incorporation in the works the reinforcement shall be clean and free from loose rust. Bending and cutting shall be in accordance with BS 4466.

The Contractor shall supply the Engineer with the certificates of the manufacture issued in compliance with MS 10 for the required tests.

3.4 Fixing Reinforcements

Reinforcements shall be accurately placed in position as shown on the drawings and shall be secured against displacement and supported by concrete or metal supports, steel chairs, spacers to ensure the correct position and cover before concreting. No concreting shall be done until the Engineer has inspected the reinforcement and approved the same.

4. FORMWORK

4.1 Materials & Workmanship

Prior to the start of the works the Contractor shall put forward, for approval by the Engineer, the method or system of formworks he proposes to use for the main structural members. Generally, all formworks shall be sufficiently strong to carry the loads which will occur before, during and after concreting. All propping shall be at regular intervals and carried by adequate bearers resting on firm ground. Lateral supports shall be sufficiently closely spaced to prevent lateral deflection of the formwork under the effect of vibration and hydraulic pressure of the wet concrete. All joints in the formwork shall be such as to prevent the loss of grout.

4.2 Stripping Formwork

Formwork shall be removed without undue vibration or shock and without damage to the concrete. No formwork shall be removed without the prior consent of the Engineer and the minimum periods that shall elapse between the placing of the concrete and the striking of the formwork will be as follows:

Beam sides, walls and columns	1 day
Slab soffits (with props left under)	7 days
Beam soffits (with props left under)	10 days

Contractor shall be responsible for consequent of damage arising from early stripping of formwork.

5. MASONRY WORKS

5.1 Cement and Sand

Cement and sand for this trade shall be as specified for "Concrete".

5.2 Mortar for Masonry Work

Mortar for bedding and jointing of stonework shall comprise 1 part of cement to 3 parts of sand by volume.

5.3 Stonework in Walls

All stones for use in walling shall be approved local fieldstone of blue or other colour basalt stone carefully selected according to the type of walling required. Walls to be built to the thickness shown on the drawings and the stones shall be well bonded and all voids filled in solid mortar as described. Wall to be laid at random, i.e uncoursed.

Mortar joints shall be raked to depth of 12mm from free of stone work ready for painting.

5.4 Pointing

All joints shall be raked out and pointed with cement and sand (1.3). The pointing will either be recessed; weather struck or flushes as shown on the drawings.

5.5 Cleaning of Stonework

The contractor shall protect the stonework from mortar droppings and wire brush and wash down all walls on completion.

6. WORKING PROCEDURE

6.1 Measurement for joinery

The Contractor is to take all measurements for joinery works on to the building and not the drawing except where the work is specified to be “built-in”.

6.2 Fixed in Joinery

Where joinery works are specified to be “fixed-in” or inserted in the positions they are to occupy after the surrounding or enclosing carcass has been constructed, it shall be the responsibility of the Contractor to ensure that the necessary fixings are incorporated in the carcass, alternatively, the Contractor shall construct such ground works as are required to provide a suitable base and fixing for the joinery works. The spaces enclosed in the ground works and behind joinery works shall be filled in solid with plaster. The Contractor is to secure “fixed-in” joinery works so that they are plumb and true to the shapes and dimensions shown on the working drawings and details. Vertical junctions shall be solidly bedded with mortar, wedged or otherwise secured, as may specified or as is most appropriate in the circumstances but a clearance is to be maintained in all overhead junctions so that the settlement in the building carcass may take place without the stressing or otherwise loading the joinery works.

Joinery works shall not be fixed in position until all floor, wall and ceiling surfaces have been formed or constructed, unless otherwise specified.

6.3 Joinery assemble in-situ

Where joinery works are specified to be “assemble in-situ” and all stresses of support and fixing are to be engaged in the building, it shall be the responsibility of the Contractor to ensure that the necessary fixings are incorporated in the carcass; alternatively, the contractor shall construct such ground works as are required to provide a suitable base for the joinery works.

The spaces enclosed in the ground works and behind the joinery works shall be filled in solid with plaster or weak concrete.

In situ joinery works shall not be executed until after all floor, wall and ceiling surfaces have been formed or constructed, unless otherwise specified.

6.4 Drawings

Work is not to commence until the Engineer’s has approved the manufacture full-size setting out drawings. Suggestions which the manufacturer may wish to make for modifying the construction and joints shown on the Engineer’s drawing will be considered when the shop drawings are examined.

6.5 Inspection

Facilities are to be given for the Engineer to inspect all work in progress in shops and on the site.

6.6 Time for delivery

None of the joinery is to be delivered until it is required for fixing in the building. Joinery which does not require to be built as the work proceeds is not to be brought to the site and fixed until the building is enclosed.

6.7 Transport and Protection

The joinery is to be kept under a waterproof cover during transit and it is to be similarly covered and kept clear of the ground on the site. It is to be handled and stacked carefully to avoid damage.

6.8 Plugging and Screwing

Where items are described as plugged or plugged and screwed this shall mean plugging, plugging and screwing to concrete block walling, concrete walling, stone walling to the approval of the Engineer.

7. IRONMONGERY

7.1 Butts and hinges shall be of sizes and types specified and fixed with the full number of screws and on no account shall nails be used.

7.2 All locks and ironmongery shall be fixed before the woodwork or metalwork is painted. Handles shall be removed, carefully stored and re-fixed after completion of painting. Locks shall be oiled and left in perfect working order. All locks to include two keys and all keys shall be labelled with door references marked on plastic labels before handing to the Engineer on completion.

8. METAL WORKS

8.1 Oiling of locks etc

All locks, ironmongery and hinges including the moving parts of metal doors and windows to be well oiled and all necessary adjustment made before handing over the works.

8.2 Metal Straps, Shoes and Plates

The Contractor shall provide all necessary metal straps, shoes and plates for the fixing of the timber structure; all such items to be galvanized before handing over the works. Sample of all such items to be submitted to the Engineer for approval prior to galvanizing.

8.3 Ironmongery

Provide all mortice lock, dead lock, cylindrical lock sets as specified. Provide all necessary additional framing and thickening of framing to receive locks. Each lock shall be supplied with 2 keys.

Each door shall have different keys. When handing over the keys to the Employer, a plastic tag shall be attached to each key and on which shall be marked the door reference. Contractor to submit samples for approval at his cost before placing orders.

9. WINDOWS & DOORS

9.1 Doors shall be provided and fixed to the sizes and details shown on the drawings. Doors shall free from all blemishes and shall be rubbed down to a satin like finish.

9.2 Butts and hinges shall be to the sizes and type specified and fixed with the full number of screws and on no account shall nails be used.

9.3 All windows and external doors are to be in aluminium extruded profile white powder coated 25 microns as specified in the drawings.

9.4 Aluminium Windows and Doors

- (1) Aluminium shall be from extruded aluminium to B.S 1474 and of quality approved by the Engineer.
- (2) Anodisation to aluminium profiles and extrusion shall be not less than 25 microns.
- (3) Powder coated aluminium shall be to the approximate B.S
- (4) All accessories such as bolts, screws etc shall be in stainless steel and other fixing accessories such as spigots etc in aluminium alloy.

9.5 Frames, Bars, Weather-strips and Sheet

Extruded aluminium members shall be formed treated alloys HE8 TF, in accordance with BS 1470 or higher strength material.

9.6 Design Criteria

The windows and doors are required to withstand cyclonic storm conditions with wind speeds

up to 77m/sec and pressures or suctions of 3640/N/m² and to remain watertight in these shoring where the wind often blows the water up the window panes. The maximum air infiltration rate shall be 12m²/h/m.

The glass thickness shall be 8 mm unless otherwise agreed.

9.7 Weather Stripping

Weather stripping shall not be made from materials which do not react in contact with aluminium nor shall weather stripping have any adverse effect on aluminium. The weather stripping shall not shrink, expand, warp or lose adherence to the Aluminium frames to which it is attached and shall not impair the performance of the window.

The weather stripping shall be capable of being renewed without disturbing the glazing system and without removal of the outer frame from the structure.

10. WELDING (FLASH BUTTS OR TUNGSTEN ARGON -ARC)

10.1 All materials used in welding or brazing shall be compatible with the parent alloys which are to be jointed.

Where welding is employed the system of welding shall be clearly stated. If mechanical joints are formed full details for approval shall be provided.

Joints, before welding, shall be accurately mitred, halved or tenoned, or butted as the case may be and edges or metal shall be properly prepared and cleaned before welding.

Tungsten-Argon Arc welding shall comply with the recommendations contained in the ADA information Bulletin No 19.

Gas welding will not be permitted.

The corrosion resisting properties and strength of the alloys shall not be unduly impaired by the process of welding and care shall be taken to avoid high residual welding stresses.

10.2 Cleaning

All aluminium work shall be cleaned or protected as necessary so that it is in a clean and perfect condition and free from corrosion when the building is handed over. Any cement or lime split or otherwise deposited upon the surface shall immediately be washed off.

10.3 Tests

As requested, and when required by the Engineer, the Contractor shall carry out the following tests in accordance with the relevant British Standards:

- a) Tests as per BS 4873
- b) Tests as per BS 5368
- c) Tests as per BS 4315

10.4 Protection

All aluminium surfaces which are to be fixed in contact with brick work, concrete, render, any other corrosive material shall be protected from deterioration by painting with a suitable bituminous or other approved coating or by the use of adhesive protective mastic or tape.

10.5 Dimensions

Clear bay dimensions are given in Architect's Drawings. Contractor is requested to abide by the dimensions even if it implies asking main contractor to modify brick work openings.

10.6 Shop Drawings

Detailed shop drawings are expected from contractor before starting any fabrication which should be based on approved drawings.

11. FLOOR, WALL AND CEILING FINISHES

11.1 General

The rendering is to be carried out so that the finished surfaces appear without visible joints or patches. The rendering of wall surfaces, reveals of openings and cills are to be carried out in one operation and each day's work stopped at a suitable point where it can be picked up again

on the following day without noticeable joints. The quality and mixing of the materials are to be consisted throughout so that there is no variation in colour and texture.

The finished coat to be brushed down and left clean to receive decoration. In any continuous face of a wall the rendering shall be carried out continuously and day to day breaks made to coincide with architectural breaks in order to avoid unsightly junctions.

11.2 Preparation of Surfaces for Rendering

All faces of concrete work shall be well hacked to form a good key and in the case of block or stone walls the joints shall be raked out.

Concrete floors and roofs receiving screeds shall be hacked to form a good key, well washed and wire-brushed perfectly, well wetted and painted with a cement and sand (1:1) grout immediately before commencing screeding work.

All surfaces for rendering shall be well wetted with a hose before rendering is applied.

11.3 Application of Rendering

All surfaces shall be rendered in one coat unless otherwise described.

The rendering shall be applied with wooden float to an even thickness of not less than 15mm unless otherwise stated.

All rendered surfaces shall be kept damp for at least two days after the final coat has been applied.

Rendered surfaces shall be finished with a wood float and to a sponge textured finish.

11.4 Roof Screed

Provide for laying a cement sand screed 1:3 mix and to which shall be added an approved quality waterproofing compound in accordance with manufacturer's specification.

Minimum screed thickness shall be 20mm, maximum thickness to be as necessary to provide adequate falls to rainwater outlets and to ensure that no water ponds on the roof. All loose screed will be removed by the contractor and a new screed laid on epoxy compound.

Screed shall be laid to falls and cross falls and shall be dished towards rainwater outlets.

Where roofs are to be waterproofed, provide for inspection of roof waterproofing specialist and obtain signed statements that roof falls are acceptable. No waterproofing work should be allowed to commence before the waterproofing specialist approves the standard of the roof screed in writing.

11.5 Waterproofing

When specified provide for supply and laying self-adhesive and rubberises asphalt waterproofing membrane with granulated paving finish or other specified finish.

Application to be carried out by a specialist firm approved by the Product Manufacturer. The roof shall be thoroughly cleaned before application of the roof membrane.

Application shall be strictly in accordance with manufacturer's instruction i.e by application of necessary primer and mastic and shall carry a ten year guarantee against leaks and other defects.

The waterproofing treatment shall include all expansion joints treatment and all flashing parapet and rainwater head dressing details.

11.6 Ceramic Tiles

Floor Tiles Code: CT

Ceramic floor tiles should be made from fine fully anti-skid ceramic with through body colour and should have the following technical characteristics:

Water absorption	-	0.10 o/o
Bending resistance	-	50 – 60 N/mm ²
Resistance to scratching	-	6-7MOHS
Abrasion resistance	-	130 mm ³
Linear thermal expansion	-	6.6 – 6.7 x 10
UPEC	-	U4 P3 E3 C2

In addition, they should be resistant to acids and alkalis and their colour should be uniform and should not change when exposed to sunlight.

They should be laid using cement-based adhesives 3 to 6mm thick directly on a concrete or screed or concrete based provided the concrete is 6 weeks old and the screed 3 weeks old on clean and flat surfaces.

Movement joints 6mm wide should be provided around the perimeter and left unfilled when masked by skirting. Intermediate joints 10mm wide should be provided at least 4.5 metres and sealed with a rigid sealant such as epoxy – polysulphide. Normal joints should be 3mm wide and jointing grouts should be cement based 5% of the total tiles used be handed over to client for eventual repairs.

Interior glazed wall tiles Code: CT

Should have the following technical characteristics:

Firing temperature	-	1020° C
Water absorption	-	0.15 to 0.17 o/o
Bending resistance	-	20 – 25 N/mm ²
Resistance to scratching	-	2-5MOHS

In addition, they should be resistant to acids and alkalis and their colour should be uniform and should not change when exposed to sunlight. They should conform to EN105 for resistance to abrasion and EN 98 as regards to dimensional characteristics.

They should be laid to a cement rendered background with should be stable, have adhered well to the substrate, have taken up their initial shrinkage, and present a flat surface for tiling. The bedding material should be a cement-based adhesives 3 to 6mm thick and joints 6mm wide should be provided at perimeters.

Normal joints should be 2mm wide and jointing grouts should be cement based. 5% of the total tiles used should be handed over to client for eventual repairs.

Tiles should be soaked in water 24 hours before laying and shall be thoroughly scrubbed to remove all traces of cement after laying and protected with sawdust or sacking and not used for at least 10 to 14 days.

The surface shall be polished on completion of the contract.

11.7 Arises

Vertical and horizontal arises shall be formed to beams, columns, openings and the like and shall be rounded. Particular care shall be taken to ensure that the rendering is strong and sound at the corners.

11.8 Cracksand Blisters Etc

The Contractor shall make good all cracks, blisters and other defects and leave the whole of the plaster, tyrolean, bush-hammered finish perfect at completion. When making good, defects in place shall be cut out to rectangular shapes with edges undercut to form dove-tailed key and all finishes flush with face of surrounding plaster all at the Contractor's own expense.

12. GLAZING

12.1 Quality of Glass

All the glass to be of the best quality obtainable free from all defects and imperfections and of minimum 8mm thickness and subject to the approval of the Engineer.

12.2 Translucent Glass

Windows requiring obscure vision shall be glazed with translucent glass of approved texture or pattern.

12.3 Glazing

All glass to be cut accurately in one piece, to fix easily into their rebates and to be well puttied, back puttied and secured with sprigs in the case of fixing to wood or with metal clips in the case of metal. Care must be taken to ensure that the putty does not show beyond the sight lines of panes and that the putty is neatly cut off internally and neatly splayed off externally, all mitres and angles left clean and sharp.

12.4 Acrylic Seals

To all external windows and doors surrounds provide for gun application of acrylic sealer or similar approved.

12.5 Silicon Mastic

All joints around wash basins and walls, sink and wall, etc shall be sealed with silicon mastic or similar approved.

12.6 Glazing Work at Completion

All glass broken, cracked or scratched during the progress of the works to be reinstated at the sole cost of the Contractor and all glazing to be left clean and perfect at the completion of the contract.

13. PAINTING

13.1 Generally

All work shall be carried in strict accordance with schedule of colours to be obtained from the Engineer.

Samples of colours if requested by the Engineer shall be painted on the wall 1.00m x 1.00m square and approval obtained from the Engineer before proceeding with the work.

13.2 Materials

All oil paints, emulsion paints, varnish and other materials shall be of an Approved Manufacture and to Mauritius Standards Bureau or any other approved standard and shall be used strictly in accordance with the manufacturer's printed instructions. The Contractor will only be allowed to use materials which are brought to the site in sealed cans not exceeding one gallon capacity, bearing the name of the manufacturer and properly labelled as to quality. Exterior quality paints only shall be used both internally and externally. All cans of paint must be kept well stirred before and during use. The only addition to the paint which will be allowed shall be approved pure turpentine and this shall be added only in accordance with the Engineer's Instructions. All coats of paint applied over each other shall be from the same manufacturer and the type recommended by the manufacturer.

Well before commencing the painting work, the Contractor shall submit to the Engineer for approval a list of all brands of paint and finishing including the necessary primers and undercoats be intends to use and immediately upon being so approved orders shall be placed and total requirements obtained for the works.

Once approved no other brand of material shall be used without the express permission of the Engineer in writing.

13.3 Preparation of Surfaces

All surfaces to be painted shall be thoroughly cleaned down and surfaces of wood to be sandpapered and to be twice knotted and stopped before applying the priming coat which shall be regarded as additional to the undercoat. All surfaces of framework to be

thoroughly cleaned at all scale and every particle of rust, dirt or grease removed by scrappers and wire bushes or other approved method Galvanised, sherardised or zinc sprayed metal to be painted shall be treated with mordant solution. Copper pipes specified to be painted shall be rubbed down with coarse emery, cleaned with a solution of one part acetone to two parts of benzene and left to dry.

13.4 Wood Preservative

Treat all timber built in or in contact with walling and concrete with 2 coats of approved type of wood preservative.

13.5 Galvanised Metal Surfaces

Clean down, treat with galvanized iron cleaner 13700, two packs of etch primer, one coat of Universal undercoat 4000 and two coats of hard gloss enamel paint 5000.

13.6 Iron Work

Clean down, remove every trace of rust and paint one coat of red lead primer, one coat of undercoat and two coats of finishing gloss.

13.7 Rendered Surfaces

Brush down to remove dirt and dust, prime with alkali primer as specified by the suppliers of the emulsion paint to be used and paint three coats of approved paint. Emulsion paint (external quality) both internally and externally strictly in accordance with the manufacturer's instructions. The walls are not to be pumiced down.

13.8 Lime Wash

Rub down thoroughly by brushing, scraping or sand papering, remove dust, fill cracks and imperfections with emulsion filler.

Whenever stated, lime wash shall be applied in three full coats to concrete or block surfaces. Lime wash shall be applied in accordance with manufacturers' instructions and to Engineer's approval.

13.9 Painting Externally

Rub down thoroughly by brushing, scraping or sand papering, remove dust, fill cracks and imperfections with emulsion filler to Engineer's approval.

Apply three coats of rubber-based paint wherever indicated having excellent alkali and fungus resistance to Engineer's approval.

13.10 Cleaning on Completion

All floors to be twice washed, all marks of paint to be sponged off, windows cleaned, the works generally to be touched up after all the other trades are finished and the whole of the building left clean and perfect on completion to the satisfaction of the Engineer.

14. PLUMBING AND DRAINAGE WORK

14.1 General

All materials and workmanship shall comply with the latest editing of the British Standard Specifications, Codes of Practice, By Laws and Regulations of all Statutory Authorities concerned.

The Contractor shall include for producing all working drawings, details, builder's work and holes drawing necessary to carry out the work and as required by the Architect. The drawings shall be based upon the Engineer's diagrammatic drawings and shall be submitted in duplicate progressively at least one month prior to the programmed commencement of work, for coordination and approval of the Engineer. All alterations to drawings, whether due to coordination or otherwise, shall be carried out by the Contractor. The Contractor shall provide the Engineer with four copies of each approved drawing in addition to those required for his own use.

At completion of the Contract, the Contractor shall provide the engineer with one complete set of negatives indicating the "As completed" installation and three prints of the said drawing complete with all operational and maintenance instructions, value charts and test certificates. These drawings shall be provided to the engineer as practical completion of the works, failing which the engineer reserves the right to without an appropriate portion of the retention money.

All work shall be tested in sections as required and before covered up for the engineer and statutory authorities. Before any test is carried out, a minimum of seven day's notice shall be given to the engineer.

Where access is indicated to soil, waste and rainwater pipe fittings, the Contractor shall ensure that all access doors and rodding eyes are so positioned as to be accessible. Before testing, all access doors shall be removed, inspected, the washer greased and then reassembled by the Contractor.

14.2 Soil Ventilating Pipes

Soil ventilating pipes shall not be less than 63mm internal diameter PVC non-pressure pipes or approved equivalent and fitted with the necessary junctions and bends. All joints shall be made with solvent weld system. The pipes shall be secured to the wall with approved holder-bats which shall be securely fixed to the wall with rawl bolts.

Ventilating pipes shall be carried up at least 900mm above eaves level and shall be fitted with approved coated wire balloon.

14.3 Rising Main

The Contractor shall include for all charges for tapping and connection to public water main where applicable, including all necessary excavation and reinstatement of public roads.

14.4 PVC pipework etc

Pipes & Fittings

PVC pipes and fittings have been sized on their External Diameter per catalogue of Plastic Pipes and Products Ltd of Bell Village, Port Louis.

Pipe work and fittings for conduits, sleeves, drainage, soil and waste overflows and rainwater are generally of the Non-pressure Type.

Concrete Encasing or Surround

Concrete encasing or surround for pipes, sleeves, bends, traps, gulleys etc shall not be less than 100mm thick at any point.

Granular Bed

Granular bedding for pipes shall extend a minimum of 100mm on each side of the external diameter of the pipes.

14.5 Water taps

All bib, pillar, globe and stop taps shall be of the screw down pattern and comply in every respect with BS 1010. The size specified or shown on the drawing shall mean the maximum bore of the seating.

14.6 Waste pipes

Waste from sinks and shower to be in 38mm bore pipe and from lavatory basins to the 31mm. All wastes to be pitted with C.P bottle traps. All waste pipes shall at each change of direction of pipe, be fitted with a tee, one end with screwed plug for cleaning purposes. All laid to fall.

14.7 Overflow pipes

Overflow pipes are to be fitted to all W.C Cisterns, tanks and in each case the overflow pipe shall be 6mm larger in diameter than the water supply to the unit. Overflow pipes to W.C cisterns shall be taken through an external wall finish 150mm beyond the face of the wall.

14.8 Supply of Sanitary Wares

W.Cs, basins, sinks and other sanitary unit shall be of approved manufacture and shall comply with the relevant B.S.S. They shall be of a type and design approved by the Engineer. The whole of the units shall be properly fixed and connected to the water service complete with wastes and overflows as described.

14.9 Rainwater pipes

Rainwater pipes shall be approved rigid P.V.C rainwater pipes to B.S.S unless otherwise described. Pipes shall be properly fixed to walls with approved clips at distances recommended by the pipe manufacturer. Provide galvanized wire balloon to each rainwater outlet.

14.10 Testing

The whole of the water installations must be tested by the Contractor and any defective work or part made good or replaced immediately and shall be re-tested until found satisfactory.

Testing should be carried out in whole or in sections as the works proceed by means of adequate test pump in accordance with CP 310 1965.

14.11 Commissioning

Upon completion of the works, the Contractor shall issue a certificate stipulating that the installation has been examined and tested, that it is according to specification and that it will operate and can be maintained efficiently.

When handing over the Contractor shall demonstrate to the Employer the methods of operation, the maintenance requirements and the safety precautions to be observed.

Over handing over, the Contractor shall provide the Employer with operation and maintenance instructions and any other documents or information appropriate to the installation.

14.12 Drainage Excavations Generally

All relative clauses in "Excavation" and "Concrete work" shall apply to Drainage Installation.

All excavations shall be kept free of water at all times by means of pumping or baling and where the ground is loose or the sides of the excavation are liable to collapse, they shall be securely supported with planking or sheeting properly strutted and maintained as long as necessary. In the event of the excavation being taken out deeper or wider than is necessary they shall be filled in the Contractor's expense with 1:3:6 concrete mix. All surplus excavation arising from the construction of any drainage works shall be spread and levelled to the Architect's requirements or removed from the site.

14.13 Excavation for Pipe Trenches

The excavation shall be taken out to such lengths at one time as the Architect shall approve and no pipes shall be laid until the excavation has been approved.

The bottom of all excavations shall be of such a width so as to provide at least 150mm clearance between the outside of the barrel of the pipe and the face of the excavation and/or timbering. The bottom of all trenches shall be trimmed to the correct so that all pipes shall rest upon the full length of the pipe and hand holes shall be excavated for all sockets except where pipes are laid in concrete.

After the drains have been laid and tested the trenches shall be carefully filled in and great care must be taken to see that the drain pipes are not disturbed or damage by stones and rocks. The drains shall be first covered with soil free from stones and rocks and the remainder of the filling shall be made in 300mm layers, each layer well consolidated and rammed. Any depressions arising at or before the expiry of the contract period shall be made up.

14.14 Pipes

Pipes for foul and storm drainage shall be rigid PVC or approved manufacture or approved equivalent, cut, laid, jointed and handled strictly in accordance with the makers' instructions with a necessary bend, angles, collars etc. Diameters of foul drains shall be as shown on drawings with falls as follows:

100mm diameter	-	1:40
120mm diameter	-	1:50
150mm diameter	-	1:60

Storm water drains shall be 100mm diameter laid to falls of 1:100.

14.15 Drain Pipes for soil drainage

All pipes for soil drainage which include the conveyance of discharges from W. Cs, basins, sinks, urinals, baths and showers shall be PVC or approved equivalent pipes, bands, junctions and taper complying in all respects with BS 4660 and BS 5481.

14.16 Drain pipes for water drainage

Pipes conveying storm or surface shall be non-pressure PVC type or approved equivalent.

14.17 Laying of drain pipes

The pipes to be laid in straight runs to even and regular falls and put together with great care strictly in accordance with the manufacturer's instructions.

14.18 Fall in Drain

All pipes except where otherwise shown shall be to the diameter and laid to falls as shown on the drawings.

14.19 Concrete bed to drains

Concrete (1:3:6) shall be laid 150mm thick to form bed for drains where the soil is found to be soft. After the pipes have been tested it shall be hunched up on both sides to a height of $\frac{3}{4}$ th of the internal diameter of the pipe.

14.20 Concrete cover to drains

All pipes passing under buildings or under roadways shall in addition have a 150mm concrete bed under, be completely surrounded in concrete (1:3:6) of the same thickness.

14.21 Gully traps

Provide trapped gullies, complete with gratings in positions shown on drawings and set on and surrounded in concrete and jointed to drain as described.

14.22 Manholes

Manholes are to be constructed in the positions shown on the drawings. The internal dimensions of the manholes shall vary according to their depth and shall be as follows:

Depth of manhole from top of invert to finish ground level	Internal dimensions of manhole shall not be less than
Up to 600mm	600 x 450mm
Up to 900mm	750 x 600mm
Up to 1200mm	825 x 675mm
Up to 1500mm	900 x 750mm

Exceeding 1500mm depth the Contractor shall apply to the Engineer for details.

Manholes shall be constructed in concrete (1:3:6) cast in situ, hacked for key and finished above benching with 6mm thick rendering or cement and sand mixed in the proportion of 1 to 2. The thickness of the concrete wall shall vary according to the depth and shall be as follows:

Depth of manhole from top of invert to finish ground level	Thickness of concrete to manhole walls shall not be less than
Up to 600mm	100mm thick
Exceeding 600mm but not exceeding 1500mm	150mm thick
Exceeding 1500mm depth the Contractor shall apply to the Engineer for details.	

The floor of manholes shall be 150mm thick and the channels and bending shall be formed above level of the floor in fine concrete (1:2:4) average 225mm thick with a polished fall and carried up 450mm above invert level and finished off at angle 45° rounded off and dished to main and branch channels. The cement for benching to the sulphate resisting cement. Step irons shall comply with BS 1247 and shall be placed at intervals of 450mm vertically with 300mm offset between alternative steps.

Manhole covers other than those in roadways shall be 600 c 450mm cast iron medium weight with frame set flush in 125mm concrete cover slab mix C, reinforced in cases where the manhole is situated inside the building, bedded in grease and shall be of an approved type fixed with bolts and screws. Manhole covers for manholes in roads or drives shall be of an approved heavy iron pattern and the Contractor shall apply to the Engineer for details including the construction of the manholes.

14.23 Soakaways

Construct soakaways not less than 1500mm away from the building in position approved by the engineer. Water from rainwater pipes to be first taken into a trapped gulley below rainwater pipes and thence by 100mm diameter pipe to soakaway. The soakaways are to be 900mm x 900mm x 1500mm deep filled with stones and finished with a 300mm layer of 38mm macadam.

Cast concrete kerb around gulley and soakaway in mix B concrete 100mm thick and 225mm deep project 125mm above ground level. Render kerb with a 1:3 cement and sand and finish with slight rounded edges.

14.24 Intercepting Chamber

Intercepting chamber shall be constructed as described for manholes with an approved salt glazed earthenware intercepting trap with rodding arm fitted with standard jointed stopper set and surrounded in concrete mix C and jointed to drain.

14.25 Fresh Air Inlet

Build into the side of the intercepting chamber a 100mm diameter cast iron pipe with bend to terminate not less than 750mm above ground level jointed to an approved 100mm galvanized fresh inlet valve with cast brass flap and hinged mica flap.

14.26 Drain Testing

All drainage runs shall be tested before trenches are filled up and afterwards when the drainage system is complete in the presence of the Architect. The Contractor shall apply all necessary equipment and labour for carrying out the tests. The air test shall be carried out by plugging all openings with standard air test apparatus to one end. The air pressure in pipes to be built up by means of a suitable pump until a head of 100mm is reached and the test continued until approved by the Engineer. The maximum lost allowed shall be a fall of 25mm over a period of 5 minutes after pumping has ceased. If the fall exceeds 25mm a smoke test shall be

immediately carried out to locate defects and all such defects shall be made good and further tests carried out at no extra cost to the Employer.

15. ELECTRICAL INSTALLATION

15.1

Electrical conductors should be single phase system and main feeder cable with 6 mm².

Fittings to be used should be of U.K or from EEC countries and approved by the Engineer.

16. SITE WORKS

16.1 Landscaping

The ground shall be levelled to form gently merging surfaces. Where bankings are required, these shall be formed at a slope not exceeding 1 in 2.

Grass planting shall be on existing or overlaid rotovated top soil. Rotovating shall include turning over and breaking up the soil to form soft friable ground free from stones or lumps. The planting area shall be sprayed with approved herbicide as recommended by specialist. Grass for planting should be of the selected variety free from weed. Planting shall be in small prepared bundled at centres not exceeding 150mm each way.

Watering, fertilization, replanting (repiquage), weeding are to be effected at and such intervals as to produce completely grassed areas and moved before delivery the works at the end of maintenance period.

16.2 Interlocking Concrete Blocks

Blocks/pavers: Specification may be by reference to a standard, by proprietary name, or both for clay pavers to BS 6677 Part 1 (Claude 120) pavers suitable for areas trafficked by pedestrians, motor cars and light vans.

Size: Common work sizes are 200 x 100mm (concrete and clay) and 215 x 102.5 or 210 x 105 (Clay)
Typical thickness are: 50mm – Pedestrian/light vehicular use

Colour/Patterns: Charcoal – Chequer surface pattern

Natural red – dimpled face with chamfered edge

Chamfered edges should be used in paving subject to vehicular traffic.

Bond: If a shaped block/paver can be laid in only one way the item should be deterred, insert e.g 45° herringbone.

Herringbone bond gives the maximum amount of restraint to individual blocks/pavers and should be used in areas subject to regular vehicular traffic.

Types of Paving

Paving should be set above drainage outlets to allow for future consolidated of the paving by traffic.

Laying

Laying generally:

- Ensure that sub-bases are suitably accurate and to specified gradients before laying paving.
- Cut blocks/pavers neatly and accurately without spalling to give neat junctions at edge restraints and changes in bond.
- Select blocks/pavers vertically from at least 3 separate packs in rotation, or as recommended by manufacturer, to avoid colour banding.
- Lay blocks/pavers on a well graded sand bed and vibrate to produce a thoroughly interlocked paving of even overall appearance with regular sand filled joints and accurate to line, level and profile.

Samples: Before placing order submit for approval representative samples. Ensure that delivered materials match samples.

Sand for bedding:

- Naturally occurring clean sharp sand or crushed rock graded as for laying course sand to BS 6717: Part 3, Table 2.
- Clay, silt and fine dust contents not more than 3% by mass.
- Free from deleterious salts, contaminants and cement.
- Obtain from only one source and ensure that all sand supplied has consistent grading.
- Maintain at an even moisture contents which will give maximum compaction during any laying period.

Sand for jointing:

- Clean dry sand graded to BS 6717: Part 3, Table 2.
- Do not use sand that will stain paving blocks.

Compacting and jointing

- o Thoroughly compact blocks/pavers with vibrating plate as laying proceeds but after infilling edges.

- Apply the same compacting effort over the whole surface.
- Do not compact within 1 m of the working face.
- Do not leave uncompacted areas of paving at the end of working periods, except within 1m of unrestrained edges.
- Check paving after compacting first few metres, then at frequent intervals to ensure that surface levels are as specified: if they are not, lift blocks/pavers and relay.
- Brush sand into joints, re-vibrate surface and repeat as required to completely fill joints.
- Avoid damaging kerbs and adjacent work during vibration: Do not begin vibration until kerbs have matured.

Levels of Paving:

Permission deviation from specified levels to be $\pm 6\text{mm}$ generally. Paving at drainage outlets to set 6mm above outlet.

Remedial works: During the contract and Defects Liability Period

- Any areas of paving which settle must be re-laid as specified

Where early trafficking leads to settlement of the joining sand, refill the joints as specified.

17.

STEEL WORKS

17.1 MATERIALS

Materials shall comply with the appropriate British Standards listed below:

BS 4	Structural Steel sections: Part 1: Hot rolled sections
BS 11	Specification for railway rails
BS 1449	Steel plate, sheet and strip. Part 1 – Carbon Steel Plate, Sheet and strip
BS 1494	Coach Screws
BS 1663	High Tensile Steel chain
BS 2902	High Tensile Steel chain rings and links
BS 2989	Continuously hot-dip zinc coated and iron-zinc alloy coated steel wide strip, sheet/plate and slit wide strip
BS 3032	High Tensile steel chain rings & links
BS 3692	ISO metric precision hexagon bolts, screws and nuts
BS 4190	ISO metric black hexagon bolts, screws and nuts
BS 4320	Metal washers for general engineering purposes
BS EN 10 025	Weldable structural steels
BS 4395	High strength friction grip bolts and associated nuts and washers for structural Employer's engineering. Part 1 - General grade and Part 2 - Higher grade bolts
EN 10210: Part 2	Hot rolled structural steel sections. Parts 2 – Structural hollow sections and Part 4 - equal and unequal angles
BS 4464	Spring washers for general Employer's engineering and automobile

	purposes. Metric Series
BS 4933	ISO metric black cup and countersunk head bolts and screws with hexagon nuts
BS 6323	Specification for seamless and welded steel tubes for automobile, mechanical and general Employer's engineering purposes
BS 2994	Cold rolled steel sections

The Contractor shall provide information on material quality. The Contractor shall also carry out additional testing as the Engineer may require to determine compliance with the Specification.

17.2 FABRICATION

General

Steel shall be Grade 43A to BS 4360 unless otherwise indicated on the Drawings.

Steelwork shall be fabricated to comply with BS 5950 and with the following further requirements:

- a) All members shall be accurately cut square or to the required angle neatly dressed.
- b) All burrs and fins along sawn, sheared, cropped or flame cut edges shall be removed and all sharp edges shall be radiused to at least 1mm.

Welding

- (a) All welding shall be carried out using a metal -arc process complying with BS 5135 by operators approved in accordance with BS 4871: Part 1 working to approved welding procedures meeting the requirements of BS 4870: Part 1. Welding procedures and consumables and all associated testing shall comply with the appropriate British Standards.
- (b) Welding shall be carried out only under the direction of an experienced and competent supervisor.
- (c) The sequence of welding operations shall be arranged to minimize distortions and residual stress during fabrication and in the structure after erection.
- (d) Testing of welds shall be carried out by the Contractor to the extent set out in the Drawings or instructed by the Engineer. Such testing shall comply with the requirements of the appropriate British Standards where applicable.
- (e) Welds shall comply with the acceptance criteria set out in Tables 18 and 19 of BS 5135, quality Category B.
- (f) Any area of weld which is found to be unacceptable shall be ground out and re-welded. Such grinding shall be done with a tapering transition from the unacceptable to the acceptable part of the weld.

ELECTRODES, FILLER RODS AND WIRES FOR WELDING

- a) Electrodes, filler rods and wires for welding shall be compatible with the grade of steel to be welded.

- b) Electrodes for the manual metal arc welding of carbon and carbon manganese steel shall comply with the relevant provisions of BS 639 and BS 2926 respectively.
- c) Electrode wires and fluxes for the submerged arc welding of carbon steel and mild steel shall comply with the relevant provision of BS 4185.

17.3 PROTECTIVE TREATMENT

Special treatments shall be as defined on the Drawings.

17.4 GALVANISING

Steel shall be hot dip galvanised in accordance with BS 729. Galvanising shall be carried out after drilling, cutting and welding are complete.

- a) For sections not less than 5mm thick, a minimum mean zinc coating weight of 610 g/m², equivalent to a coating thickness of 85 microns shall be obtained.
- b) Holes, threads in cuts, etc., shall be cut oversize to allow for the thickness of galvanising on bolts, bolt holes and threads.

17.5 COATINGS

- (a) Galvanised steel surfaces shall be thoroughly cleaned to remove all grease, dirt, dust, etc.
- (b) New hot dipped galvanised surfaces shall be treated with special approved primer before any protective coating is applied.
- (c) Welds shall be free of all flux residues and weld spatter before application of protective coating. Appropriate primer to the approval of the Engineer shall be used to protect the welds from rusting.
- (d) Parts of the structure which are to be encased in concrete shall be left bare (i.e. without any paint coating) unless otherwise indicated, and shall be free of grease and any deleterious matter.

17.6 DELIVERY TO SITE

- (a) The Contractor shall ensure that all steelwork is handled, transported and stored to prevent damage to the steelwork and any protective coatings.
- (b) Steelwork shall be stacked and stored at places of manufacture and on site to prevent distortion and damage. Suitable bearers shall be provided and measures taken to allow free drainage and ventilation and to prevent contamination.

17.7 SCHEDULE

Types and Grades of Steel

All structural hollow sections shall be grade 43C to BS 4360.

17.8 NON-DESTRUCTIVE TESTING OF WELDS AND ACCEPTANCE CRITERIA

General

- a) Evidence of Welder's competence to undertake specified work to be provided by the Contractor.
- b) Welding operators shall be tested as detailed in BS 4872: Part 1

17.9 ACCEPTANCE CRITERIA

All metal and welding shall comply with the acceptance criteria set out in Tables 18 and 19 of BS 5135, quality category B.

The Contractor shall comply with all the manufacturer's safety requirements for any weld testing equipment used in the Works, including safe working distances to radiographic sources.

Unacceptable defects shall be repaired and retested by similar non-destructive means.

Specification and Compliance Sheet Authorised By:

Name:		Signature:	
Position:		Date:	
Contact Number:		Email Address:	
Authorized for and on behalf of:			
Name of Company:			
Seal of Company:			

Procurement Reference: BA/ONB/01/2022-23

B. DRAWINGS

BA/MC/TB/01
BA/MC/TB/02
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BA/MC/TB/05
BA/MC/TB/06
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BA/MC/TB/33

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/ONB1/12-21**)^{1*}, for the Procurement of Works (available on website ppo.govmu.org) except where modified by the Particular Conditions of Contract below.

Procurement Reference Number: **BA/ONB/01/2022-23**

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

Particular Conditions of Contract

A. General	
GCC 1.1 (r)	<p>The Employer is The Beach Authority</p> <p>Street: Plot 34, Ebene Cybercity</p> <p>Floor number: 7th Floor, Ebene Heights Building</p> <p>City: Ebene</p> <p>Country: Mauritius</p> <p>Telephone: 468 6209/10/11/12</p> <p>Facsimile number: 468 6213</p> <p>Electronic mail address: beachauthority@intnet.mu</p>
GCC 1.1 (v)	<p>The Intended Completion Date for the whole of the Works shall be: 150 days from the start date</p>
GCC 1.1 (y)	<p>The Project Manager is the Technical Manager of the Beach Authority or his representative.</p>
GCC 1.1 (aa)	<p>The Site is located at Mont Choisy Public Beach and is defined in the site plan.</p>
GCC 1.1 (dd)	<p>“The Start Date shall be within 7 days as from date of signature of contract agreement.</p>

¹ * Public Body to insert complete reference of the document applicable as at this date by consulting PPO's website.

GCC 1.1 (hh)	The Works consist of the construction of a toilet block at Mont Choisy public beach and associated civil, electrical, plumbing, mechanical and embellishment works
GCC 2.2	Sectional Completions are: <i>Not applicable</i>
GCC 2.3(i)	<p>The following documents also form part of the Contract:</p> <ol style="list-style-type: none"> 1. Scope of works 2. Insurance Policies 3. Addendum (if any) 4. The Contract Agreement 5. The Letter of Acceptance 6. The Letter from the Bidder 7. The Bid Submission Form 8. The General Conditions of Contract 9. The Particular Conditions of Contract 10. The Employer's Requirements 11. Filled Priced Activity Schedule 12. Specifications 13. Drawings 14. The Bidder's Qualifications
GCC 3.1	<p>The language of the contract is English</p> <p>The law that applies to the Contract is the law of Mauritius.</p>
GCC 5.1	The Project manager <i>may</i> delegate any of his duties and responsibilities.
GCC 8.1	Schedule of other contractors: <i>Not applicable</i>
GCC 13.1	<p>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:</p> <ol style="list-style-type: none"> (a) for the Works, Plant and Materials: <i>(for the full amount of the works including removal of debris, professional fee etc...)</i> (b) for loss or damage to Equipment: <i>(for the replacement value of the equipment that the contractor intends to use on site until the taking over by the Employer. Rs 4M</i>

	<p>(c) for loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract: Rs 2M</p> <p>(d) for personal injury or death:</p> <p>(i) of the Contractor's employees: Rs 5M</p> <p>(ii) of other people: Rs 5M</p> <p>(e) for loss or damage to materials on-site and for which payment have been included in the Interim Payment Certificate, where applicable.</p> <p>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.</p>
GCC 14.1	Site Data are: <i>Not applicable</i>
GCC 20.1	The Site Possession Date(s) shall be: the start date.
GCC 23.1 & GCC 23.2	Appointing Authority for the Adjudicator: No Adjudicator shall be appointed for this Contract.
GCC 24.	<p>In case a dispute of any kind arises between the Employer and the Contractor in connection with, or arising out of, the contract or the execution of works or after completion of works and whether before or after repudiation or other termination of Contract, including any dispute as to any opinion, instruction, determination, certificate or valuation of the Employer's Representative, the matter in dispute shall, in the first place, be referred in writing to the employer's representative, with a copy to the other party.</p> <p>The Employer and the Contractor shall make every effort to resolve the dispute amicably by direct informal negotiation. If, after twenty-eight (28) days, the parties have failed to resolve their dispute or difference by such mutual consultation,</p> <p>then either the Public Body or the Contractor may give notice to the other party of its intention to refer the matter to</p> <p>“the competent courts of Mauritius”</p>
B. Time Control	
GCC 25.1	The Contractor shall submit for approval a Program for the Works within 28 days from the date of the Letter of Acceptance.
GCC 25.3	<p>The period between Program updates is 14 days.</p> <p>The amount to be withheld for late submission of an updated Program is Rs 2,000</p>
C. Quality Control	
GCC 33.1	The Defects Liability Period is: 365 days

GCC 34.1	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 monies due to the contractor or from the Performance Security.
GCC 39.7	Interim Payment for Plant and Material on site is not applicable.
D. Cost Control	
GCC 40.1	Amend clause 40.1 by replacing 21 days by 7 and 42 days by 28 days.
GCC 41.1 (l)	<p>The term "exceptional adverse weather conditions" is hereby defined as any one of the following events:</p> <p>(i) Wind - Cyclone Warning Class 3 or 4 prevailing in Mauritius;</p> <p>(ii) Rainfall - An intensity equal to or exceeding 25 mm rainfall per 24 hours measured;</p> <p>(iii) Rainfall - Continuous rainfall on Site, causing an interruption of work exceeding 4 hours; or</p> <p>(iv) Torrential rainfall warning</p> <p>Extensions of time without costs (if any) will be granted for consequential delays as a result of exceptionally adverse climatic conditions which give rise to situations whereby it would be impossible or impractical for the Contractor to carry out works on site.</p> <p>The Contractor will be required to submit all relevant justifications to substantiate any disruption of works on site and shall provide rainfall records from the closest Meteorological recording station to the Site obtained from the Meteorological Services attesting the date(s) and amount(s) of rainfall for any such particular compensation event. Such justifications shall be provided not later than 14 days from the date of occurrence of the events."</p>
GCC 43.1	The currency of the Employer's country is: Mauritian Rupees.
GCC 44.1	The Contract is not subject to price adjustment.
GCC 45.1	GCC Clause 45 is not applicable.
GCC 46.1	<p>The liquidated damages for the whole of the Works are Rs 5000(excl vat) per day.</p> <p>The maximum amount of liquidated damages for the whole of the Works is 10% of the value of works <u>completed</u> excluding VAT</p>
GCC 47.1	The Bonus for the whole of the Works is not applicable.

GCC 48.1	The Advance Payments shall be: No advance payment shall be made.
GCC 49.1	The Performance Security : No performance security is required.
E. Finishing the Contract	
GCC 56.1	The date by which operating and maintenance manuals are required is <i>[insert date]</i> . The date by which “as built” drawings are required is <i>[insert date]</i> .
GCC 57.2 (g)	The maximum number of days is: 60 days
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 30%

Section V- Contract forms

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)]*

Note –

All italicized text is for guidance on how to prepare this demand guarantee and shall be deleted from the final document.

1 The Guarantor shall insert an amount representing the amount of the advance payment denominated either in the currency(ies) of the advance payment as specified in the Contract, or in a freely convertible currency acceptable to the Employer.

2 Insert the expected expiration date of the Time for Completion. The Employer should note that in the event of an extension of the time for completion of the Contract, the Employer would need to request an extension of this guarantee from the Guarantor. Such request must be in writing and must be made prior to the expiration date established in the guarantee. In preparing this guarantee, the Employer might consider adding the following text to the form, at the end of the penultimate paragraph: “The Guarantor agrees to a one-time extension of this guarantee for a period not to exceed [six months][one year], in response to the Employer’s written request for such extension, such request to be presented to the Guarantor before the expiry of the guarantee.”

Letter of Acceptance

[on letterhead paper of the Employer]

..... *[date]*

To: *[name and address of the Contractor]*

Subject: *[Notification of Award Contract No]*.

This is to notify you that your Bid dated *[insert date]* for execution of the
..*[insert name of the contract and identification number, as given in the Appendix to Bid]* ..
..... for the Accepted Contract Amount of .Rs*[insert amount in numbers and*
words and name of currency], exclusive of VAT, as corrected and modified in accordance
with the Instructions to Bidders is hereby accepted by *(insert name of Public Body)*.

You are requested to furnish the Performance Security in accordance with the General
Conditions of Contract, using for that purpose of the Performance Security Form included in
Section V (Contract Forms) of the Bidding Document.

Authorized Signature:

Name and Title of Signatory:

Name of Agency:

Attachment: Contract Agreement

Contract Agreement

THIS AGREEMENT made the day of,, between
[*name of the Employer*]. (hereinafter “the Employer”), of the one part, and
[*name of the Contractor*]. (hereinafter “the Contractor”), of the other part:

WHEREAS the Employer desires that the Works known as [*name of the Contract*]. . . .
.should be executed by the Contractor, and has accepted a Bid by the Contractor for the execution
and completion of these Works and the remedying of any defects therein,

The Employer and the Contractor agree as follows:

1. In this Agreement words and expressions shall have the same meanings as are
respectively assigned to them in the Contract documents referred to.

2. The following documents shall be deemed to form and be read and construed as part of
this Agreement. This Agreement shall prevail over all other Contract documents.

- (a) the Letter of Acceptance
- (b) the 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 Specification
- (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 covenants 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 covenants to pay the Contractor in consideration of the execution
and completion of the Works and the remedying of defects therein, the Contract Price or such
other sum as may become payable under the provisions of the Contract at the times and in the
manner prescribed by the Contract.

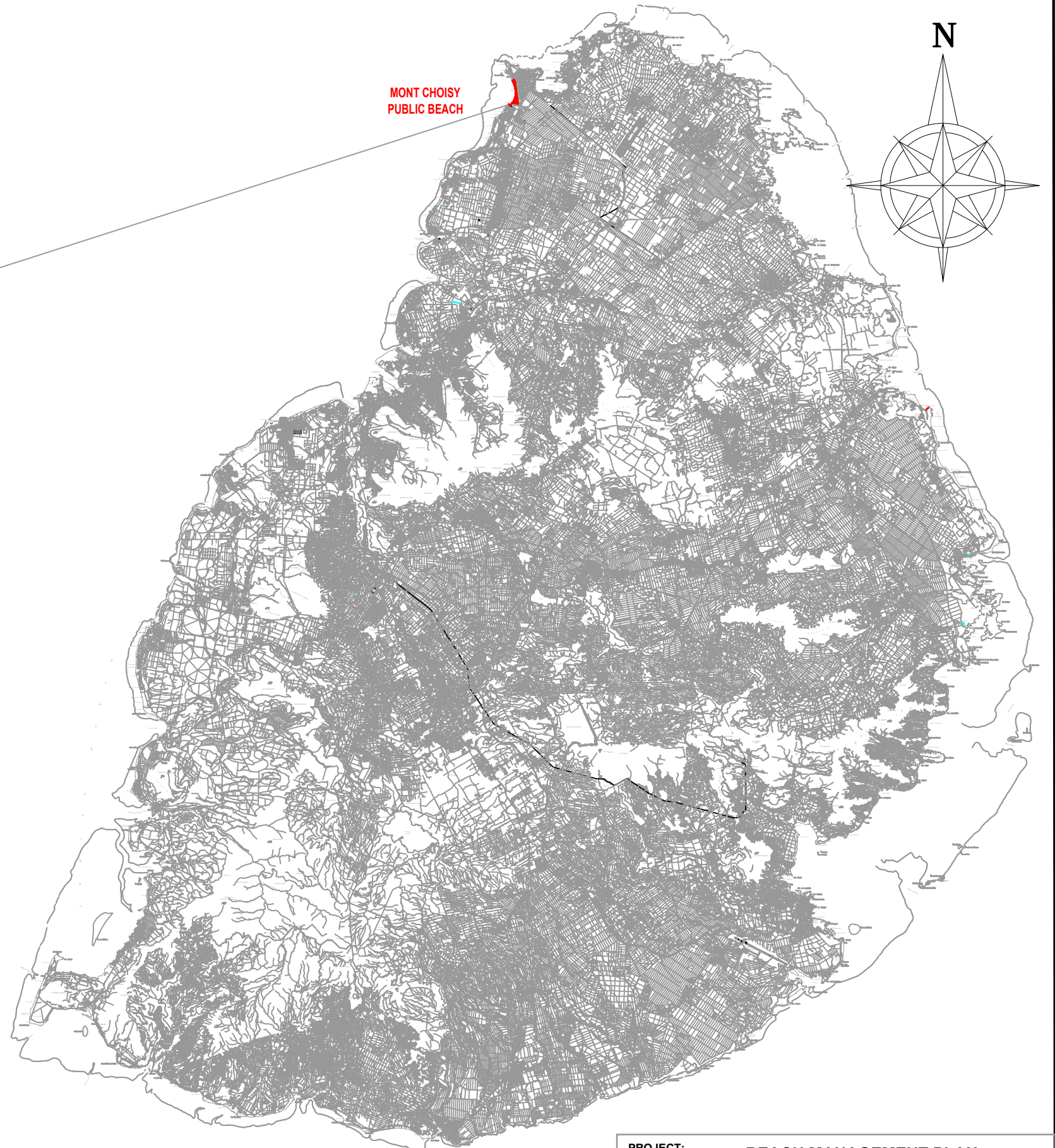
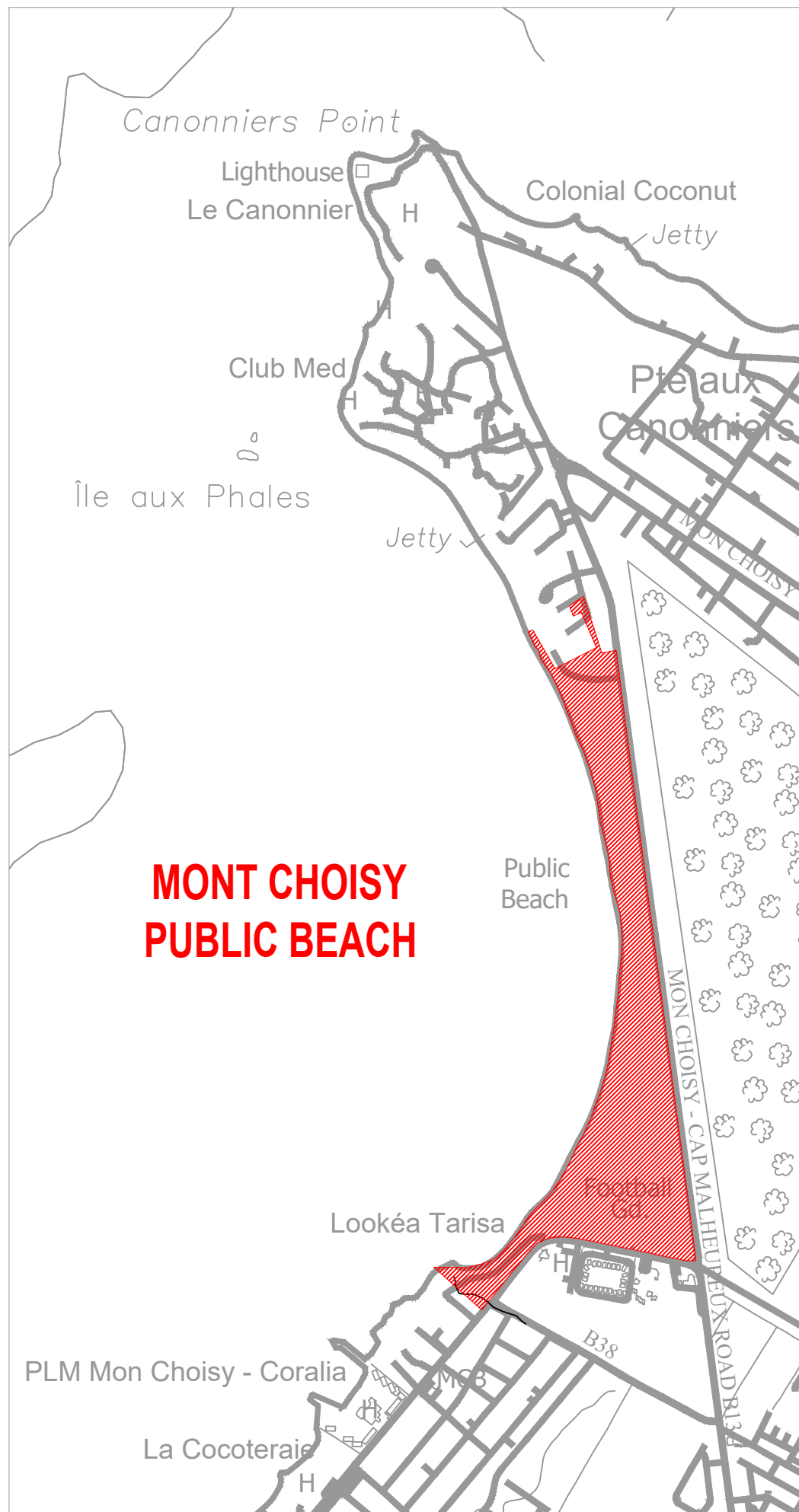
IN WITNESS whereof the parties hereto have caused this Agreement to be executed in
accordance with the laws of Mauritius on the day, month and year indicated above.

Signed by: _____
for and on behalf of the Employer

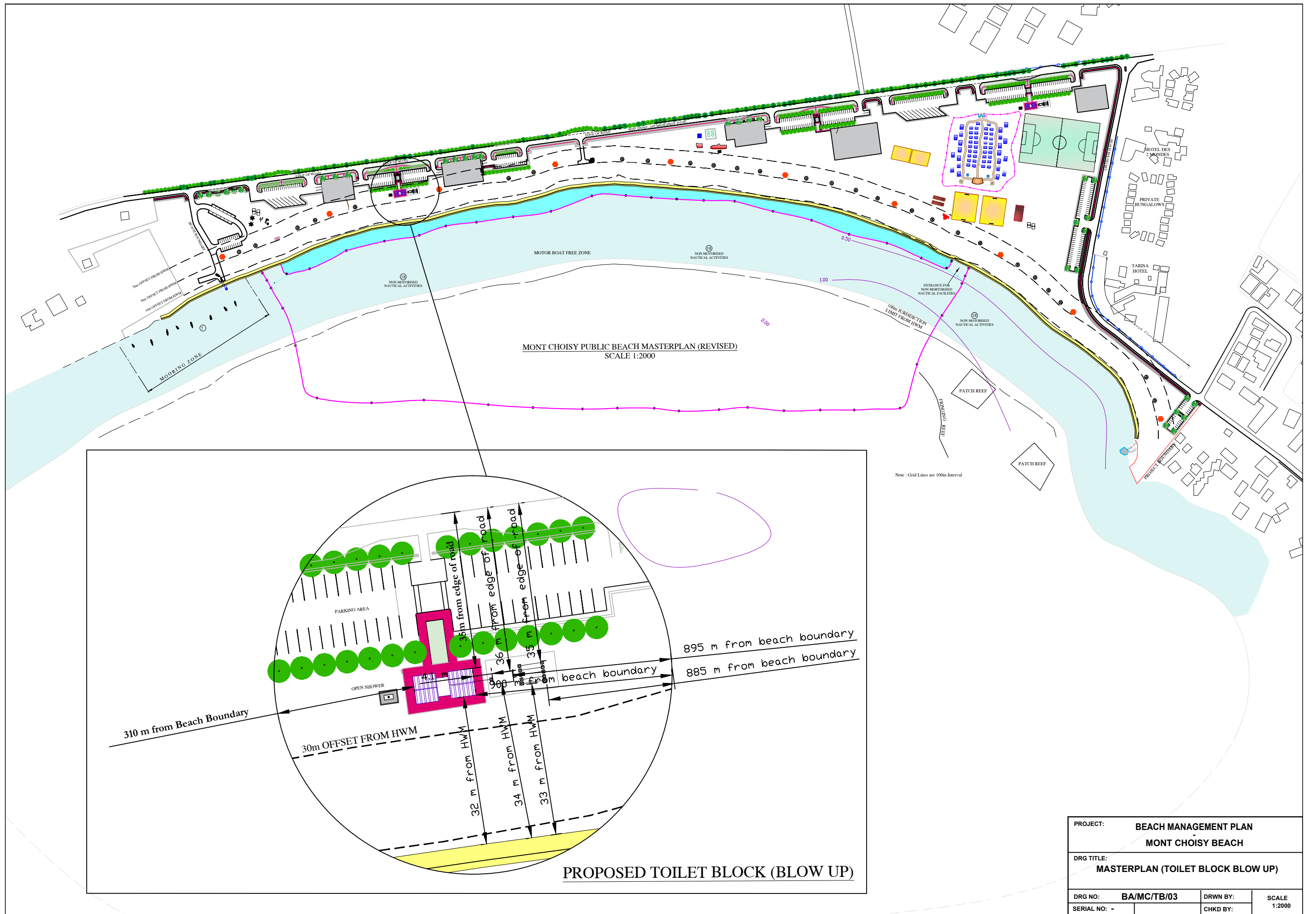
Signed by: _____
for and on behalf the Contractor

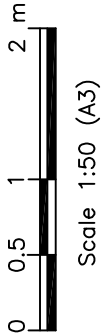
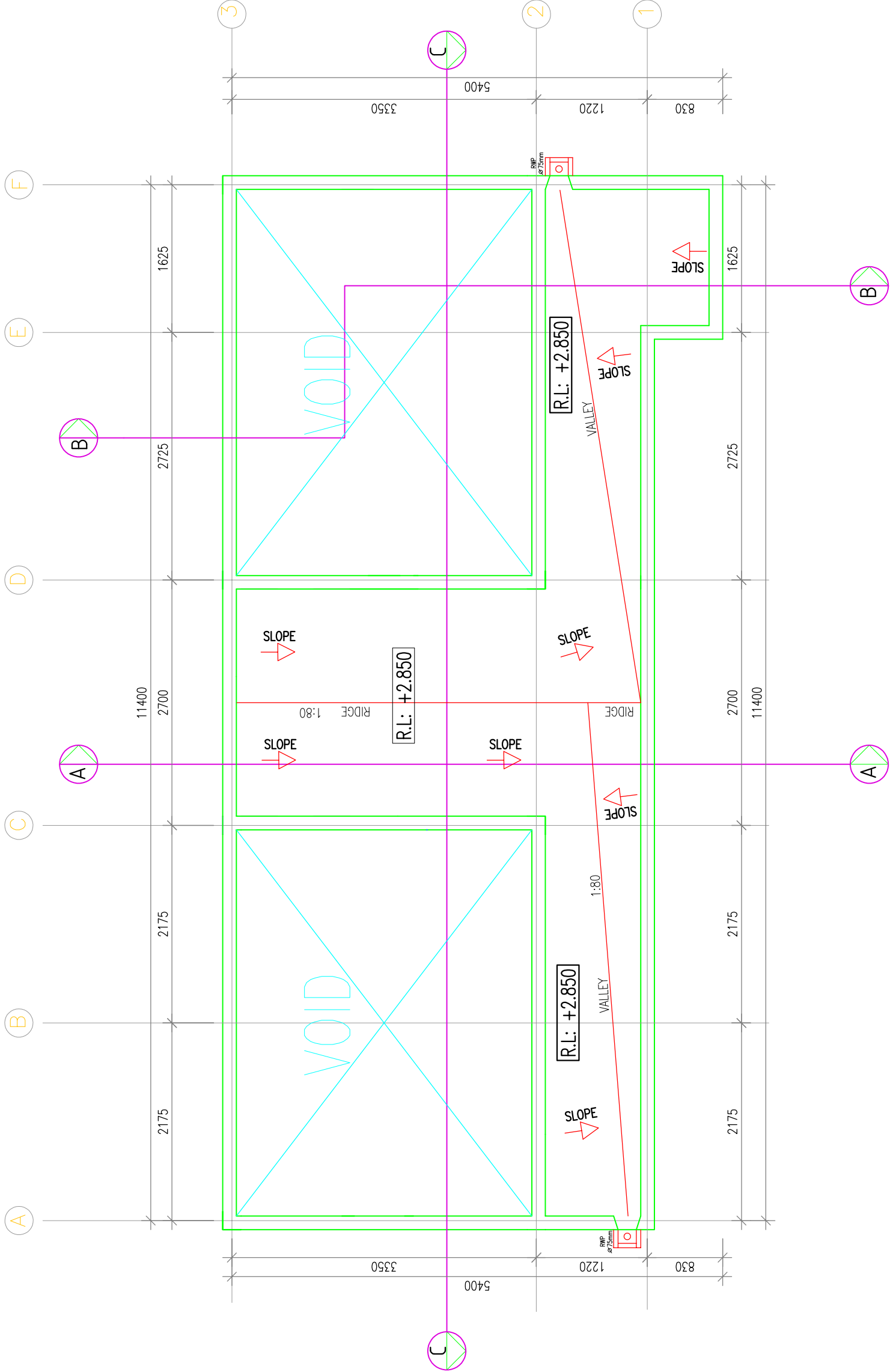
in the
presence of: _____
Witness, Name, Signature, Address, Date

in the
presence of: _____
Witness, Name, Signature, Address, Date



PROJECT:		BEACH MANAGEMENT PLAN	
DRG TITLE:		LOCATION PLAN	
		MONT CHOISY PUBLIC BEACH	
DRG NO:	BA/MC/TB/01	DRWN BY:	SCALE
SERIAL NO: -	REVISION NO:	CHKD BY:	NTS

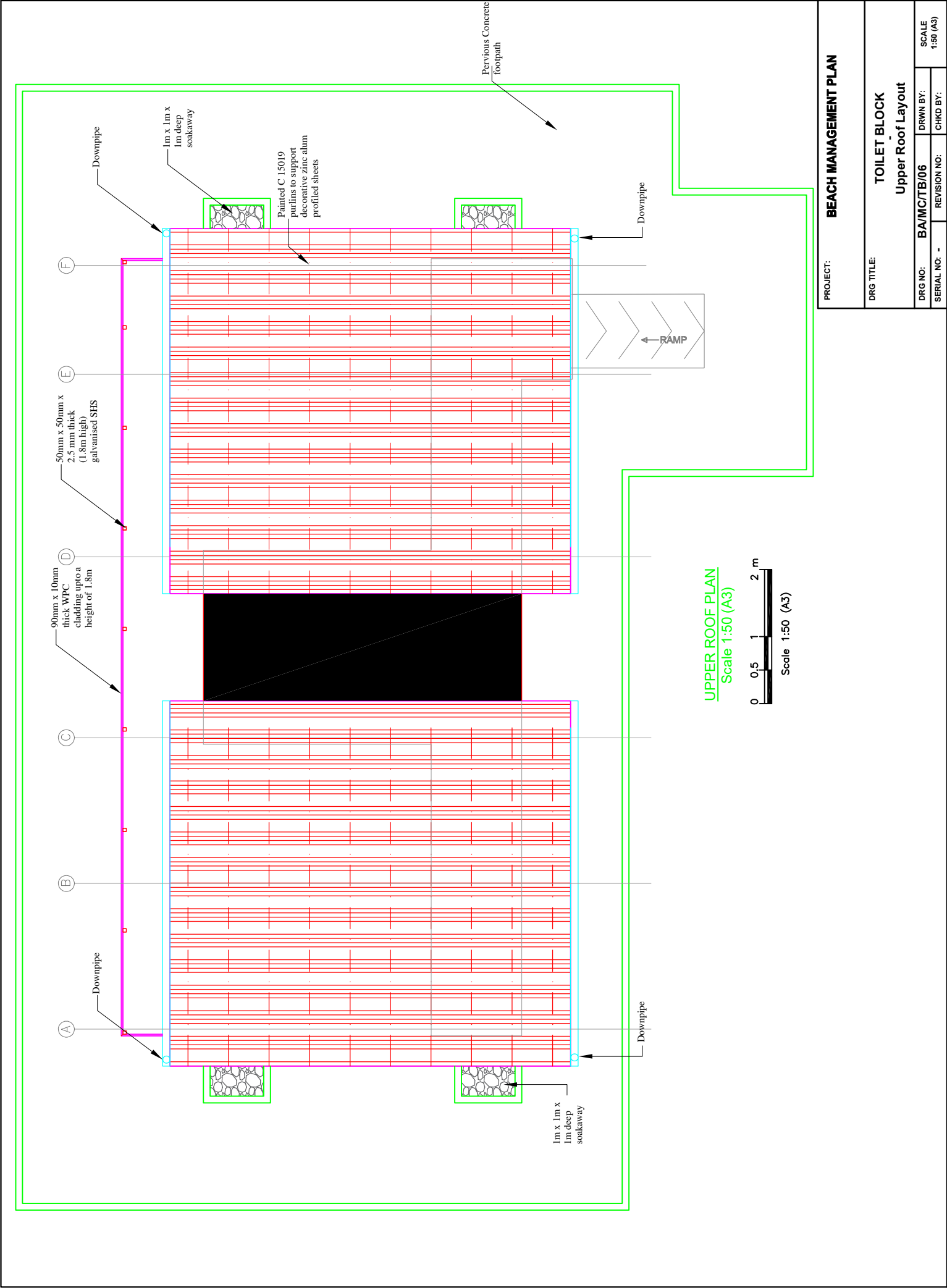


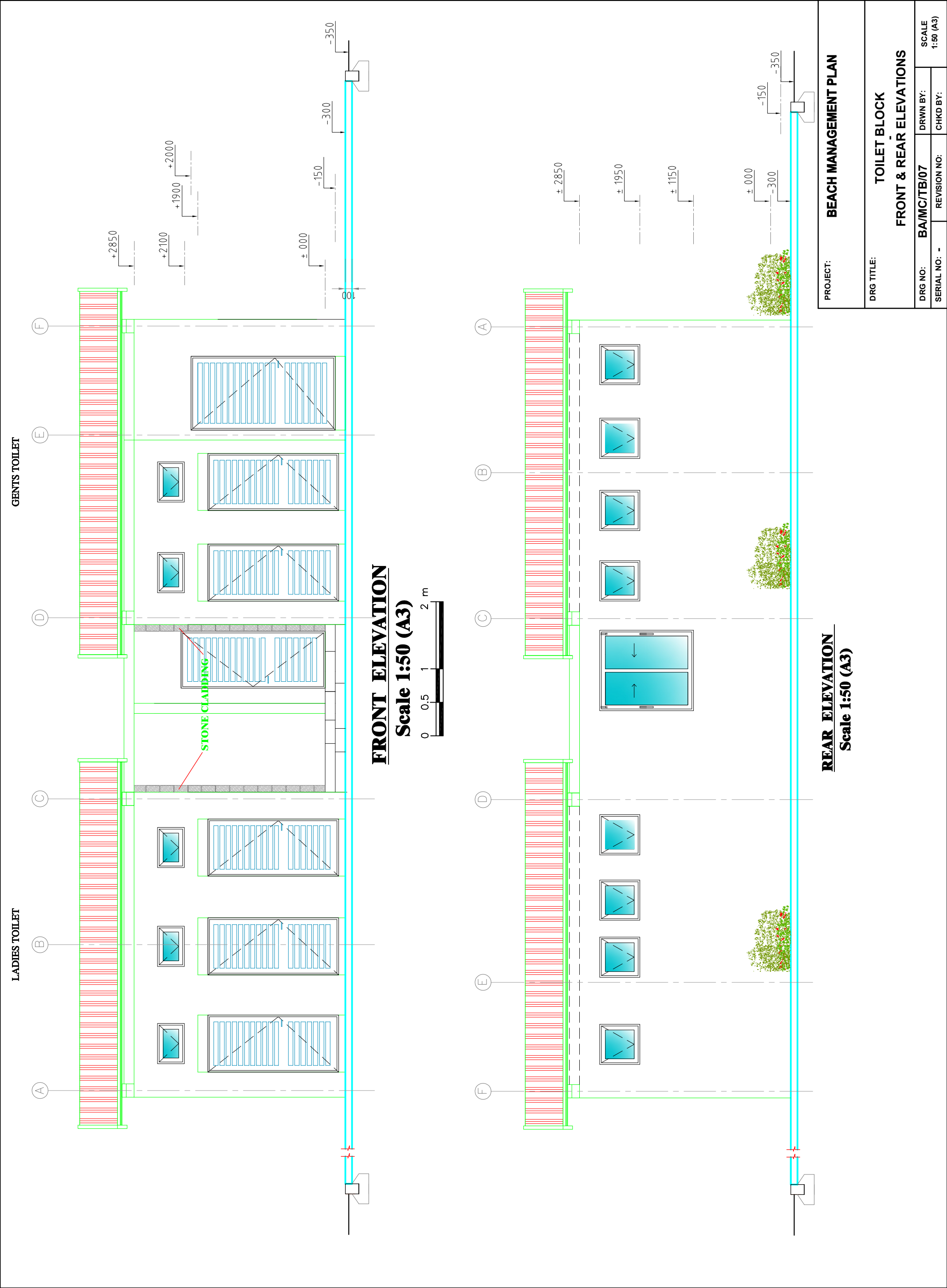
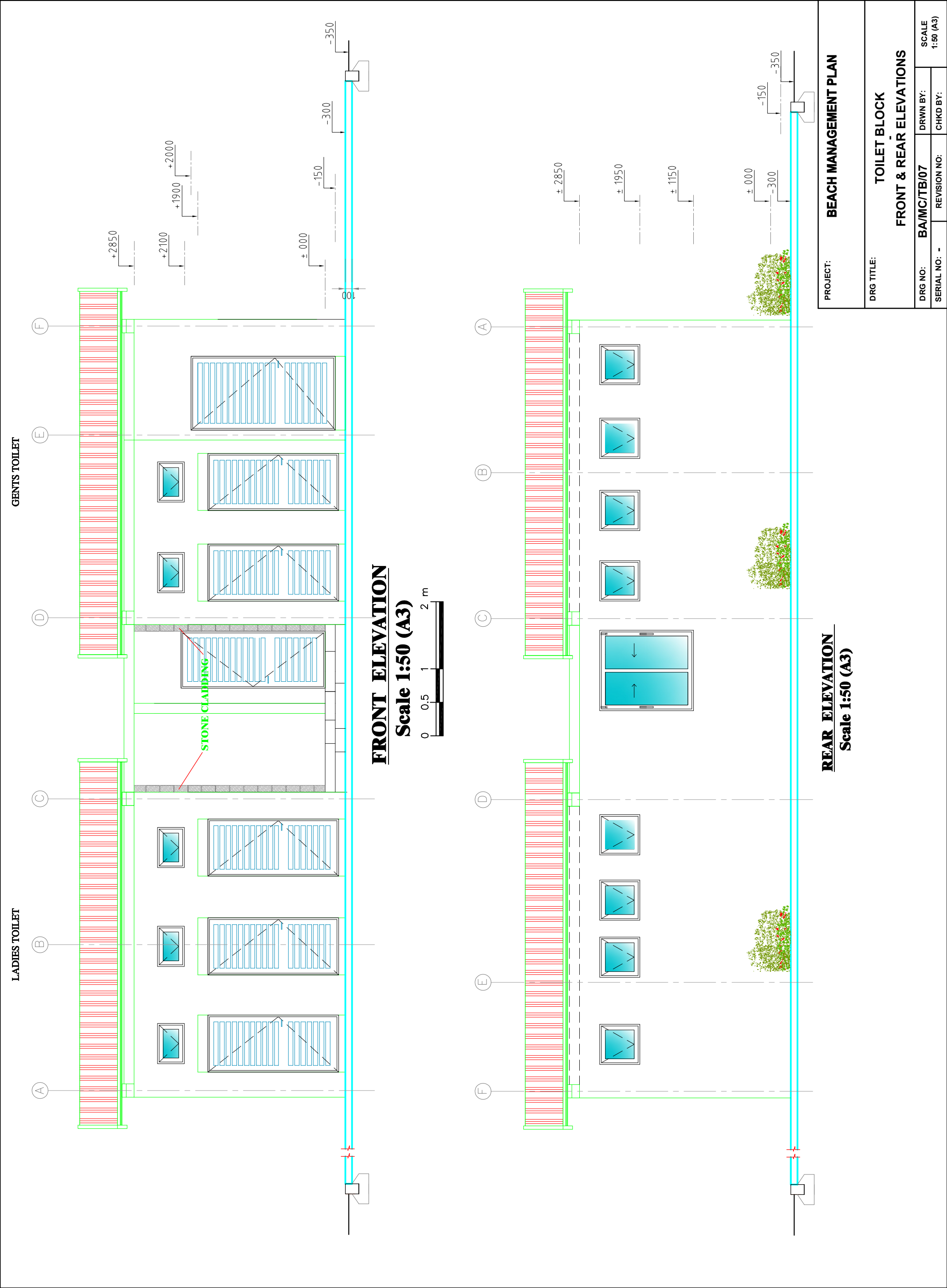


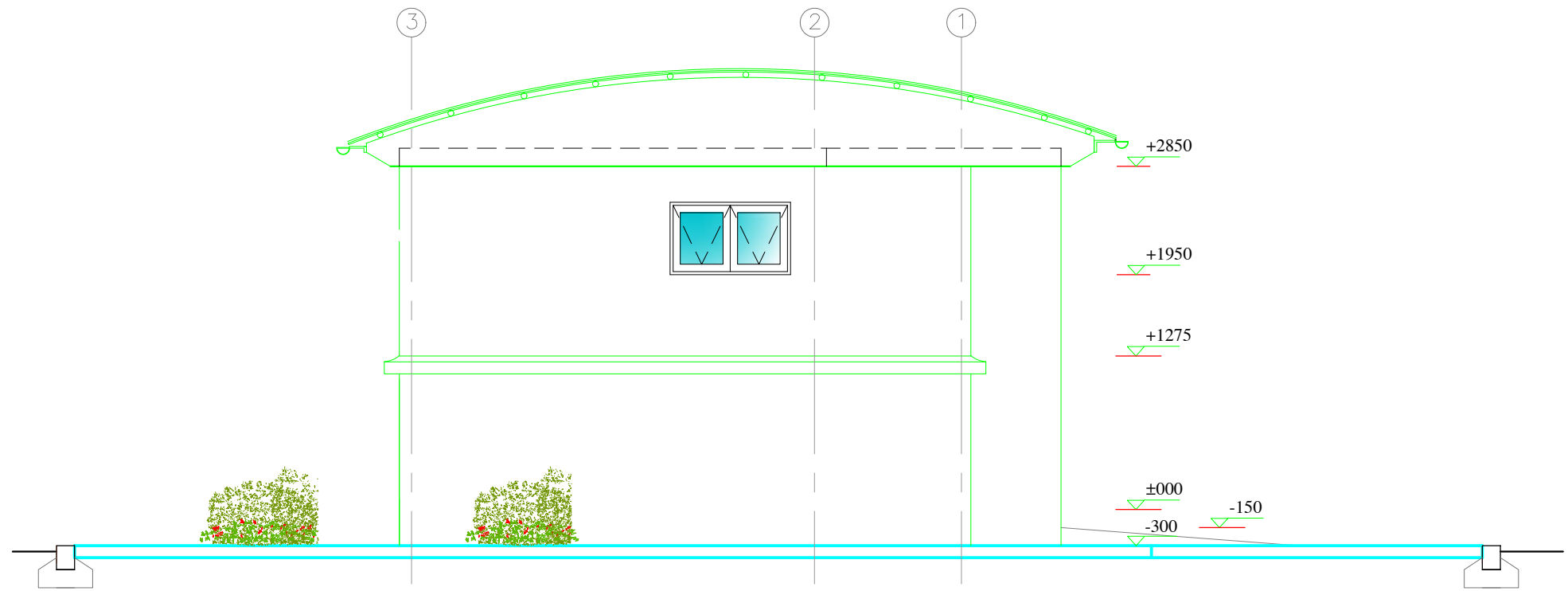
LOWER ROOF PLAN
Scale 1:50 (A3)

TENDER DRAWING

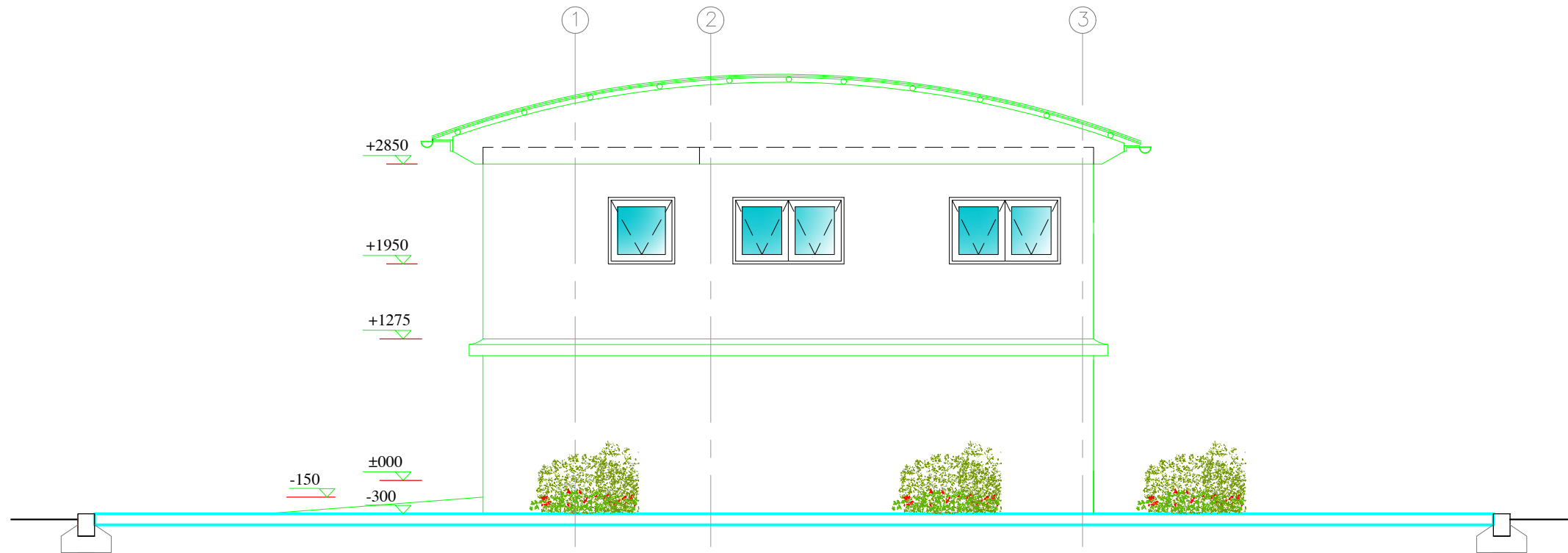
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DRG NO: BA/MC/TB/05	DRWN BY:		SCALE 1:50 (A3)
SERIAL NO: -	REVISION NO:		CHKD BY:





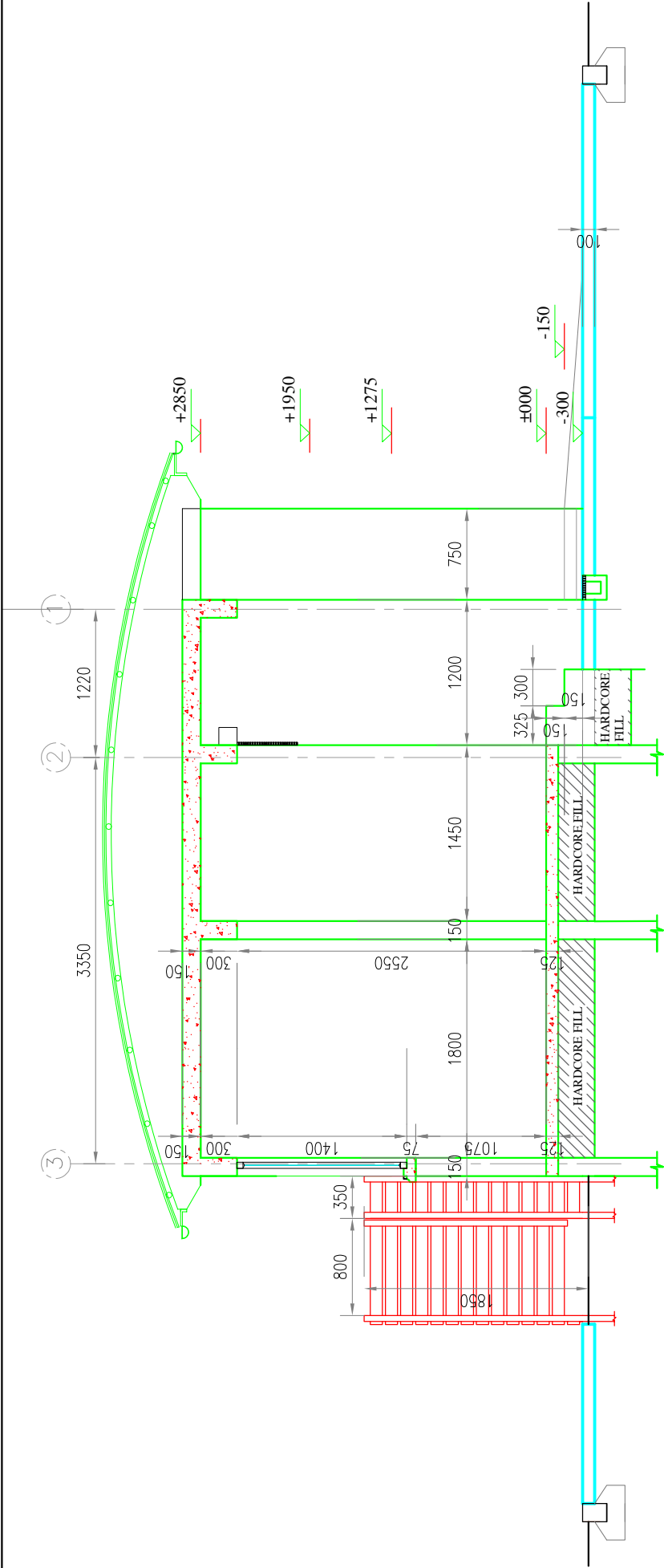


LHS ELEVATION
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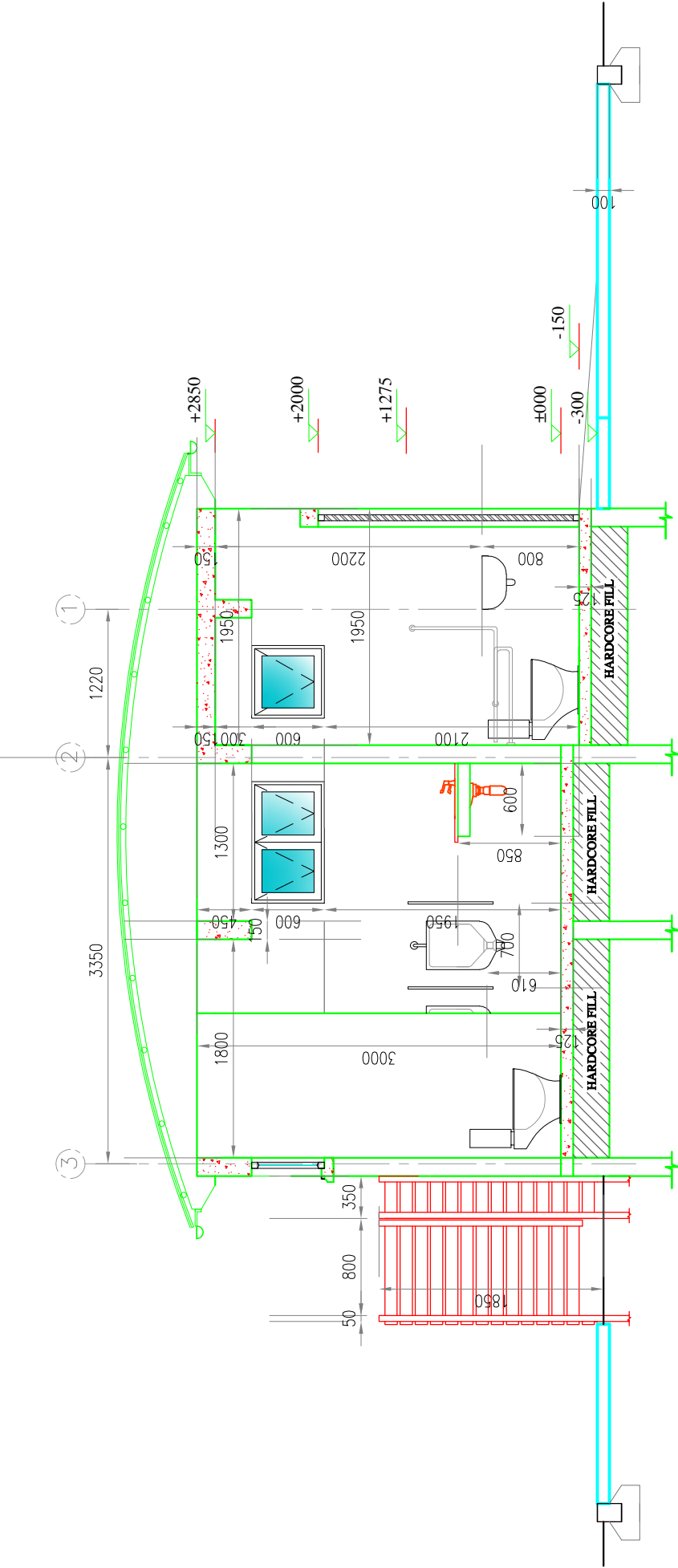


RHS ELEVATION
Scale 1:50 (A3)

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DRG NO: BA/MC/TB/08	DRWN BY:	SCALE 1:50 (A3)	
SERIAL NO: -	REVISION NO:		
	CHKD BY:		

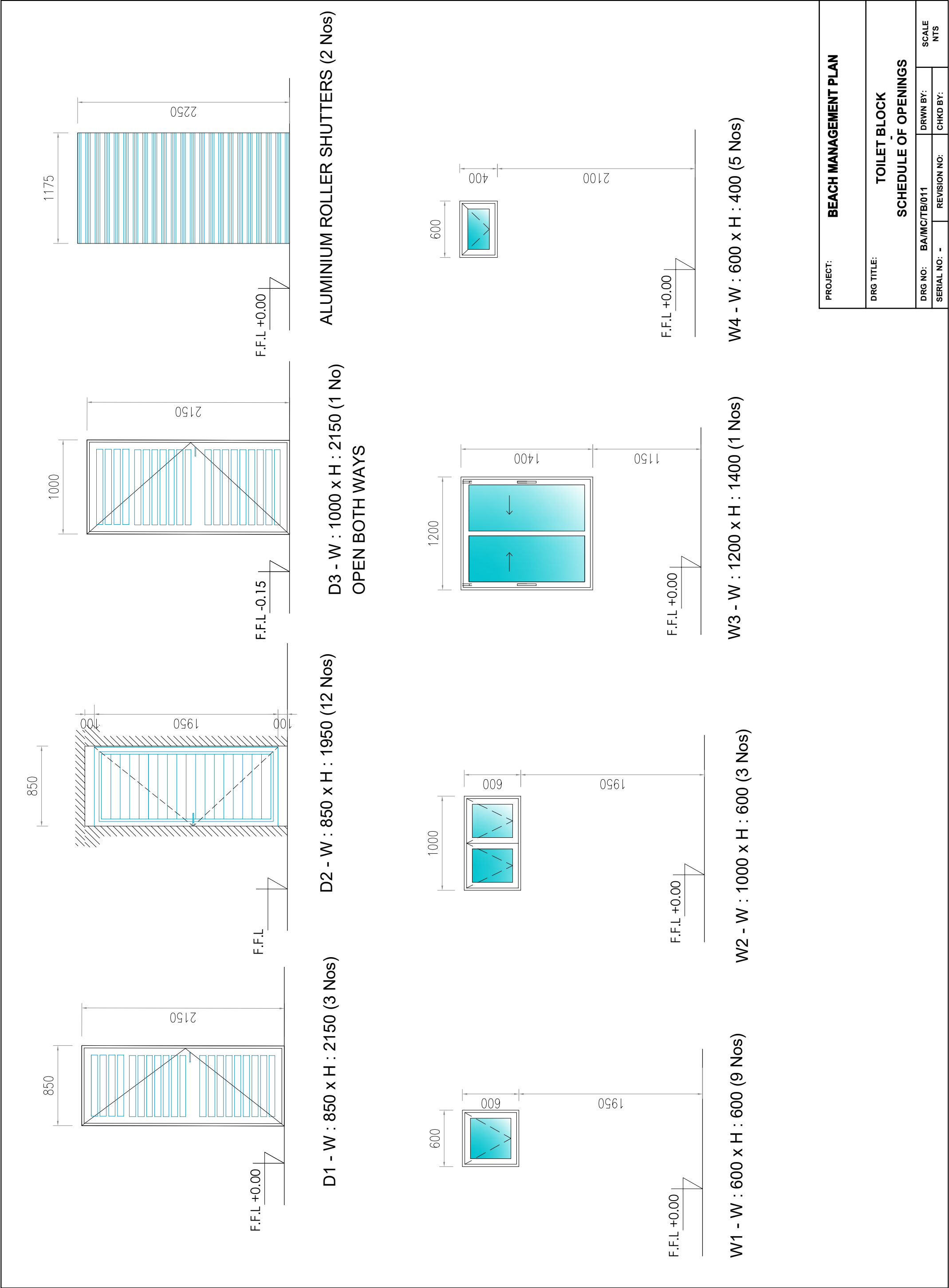


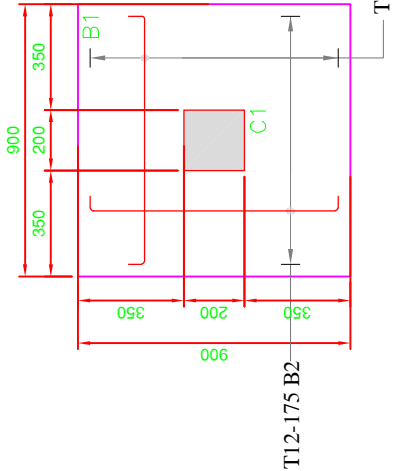
SECTION A-A
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SECTION B-B
Scale 1:50 (A3)

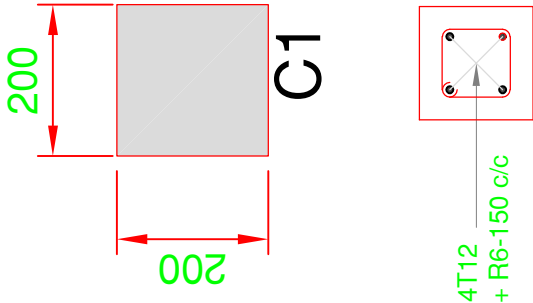
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DRG NO: BA/MC/TB/09	DRWN BY:	SCALE 1:50 (A3)	
SERIAL NO: -	REVISION NO:	CHKD BY:	





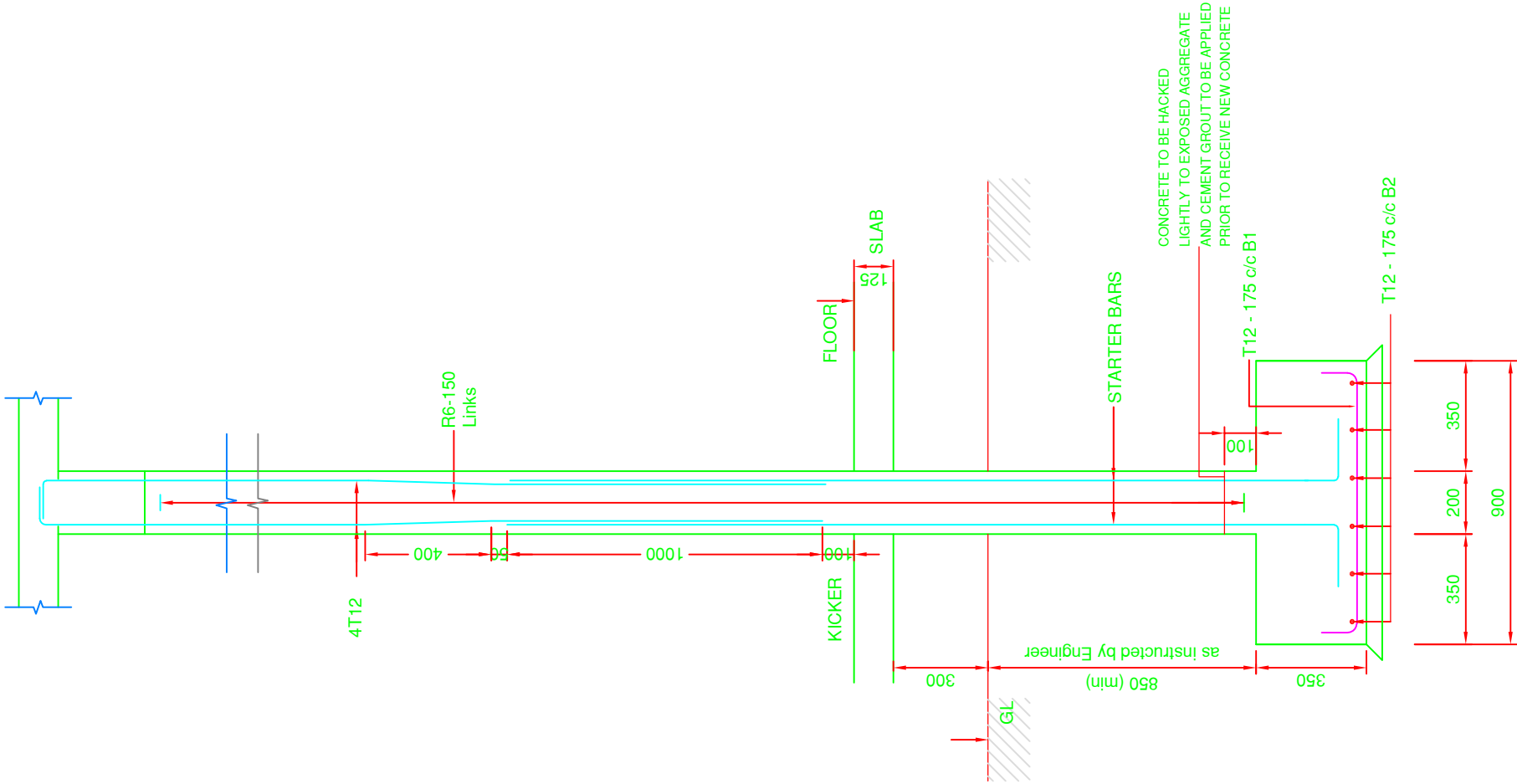
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TABLE FOR BASE				
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B1	900x900	350	T12 - 175 c/c B1 & B2	8

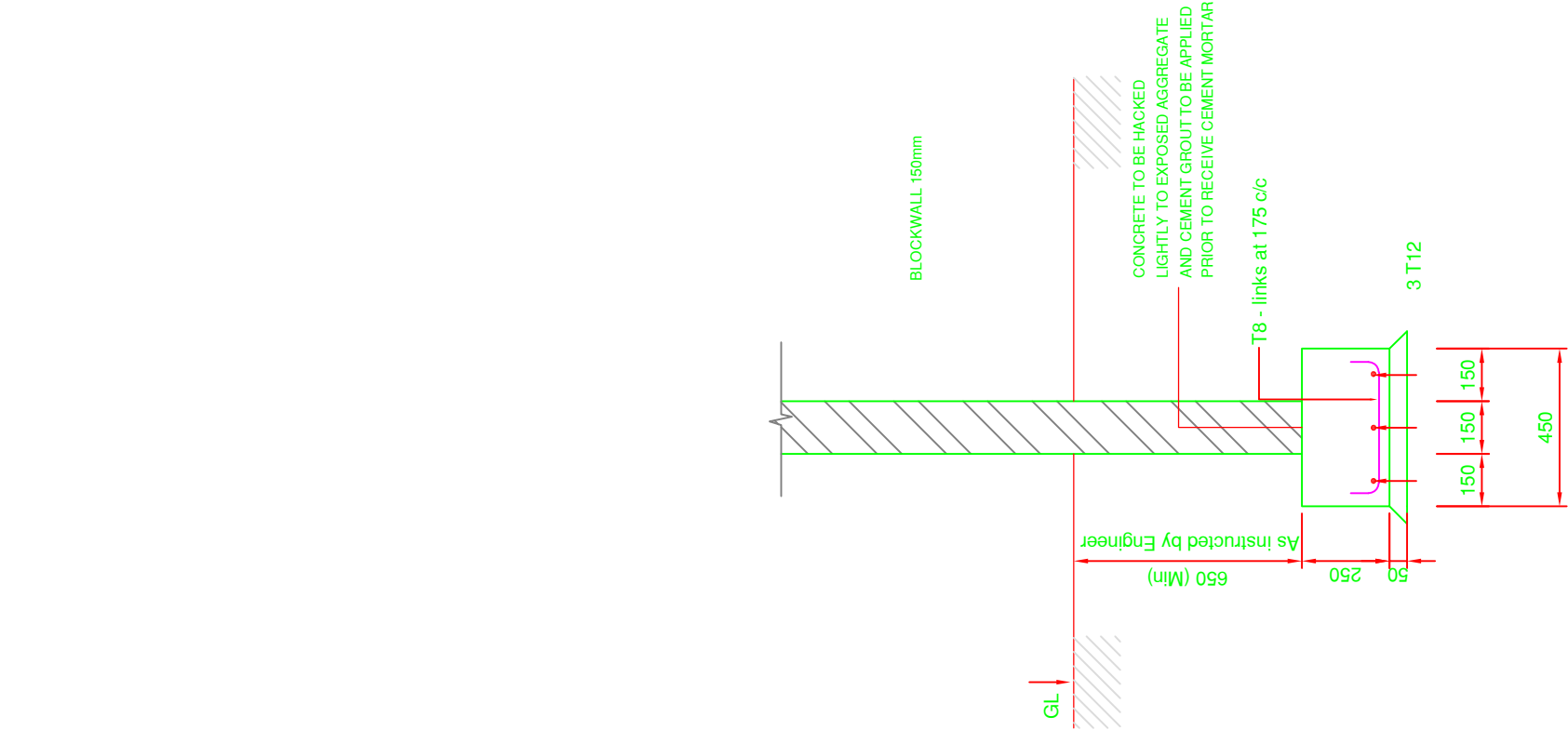


Column Reinforcement

SECTION A-A

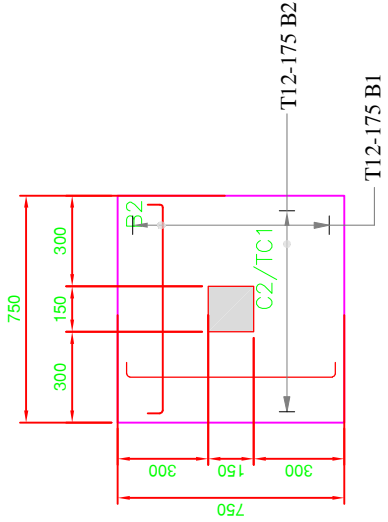


COLUMN C1 AND BASE B1 DETAILS
Scale 1:20



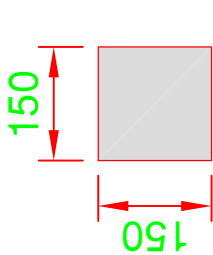
STRIP FOOTING DETAILS
FOR CONTINUOUS BLOCKWALL
Scale 1:20

PROJECT: BEACH MANAGEMENT PLAN			
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DRG NO: BA/MC/TB/013	REVISION NO:		SCALE NTS
SERIAL NO: -	DRWN BY:		CHKD BY:

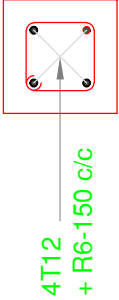


Scale 1:25

TABLE FOR BASE			
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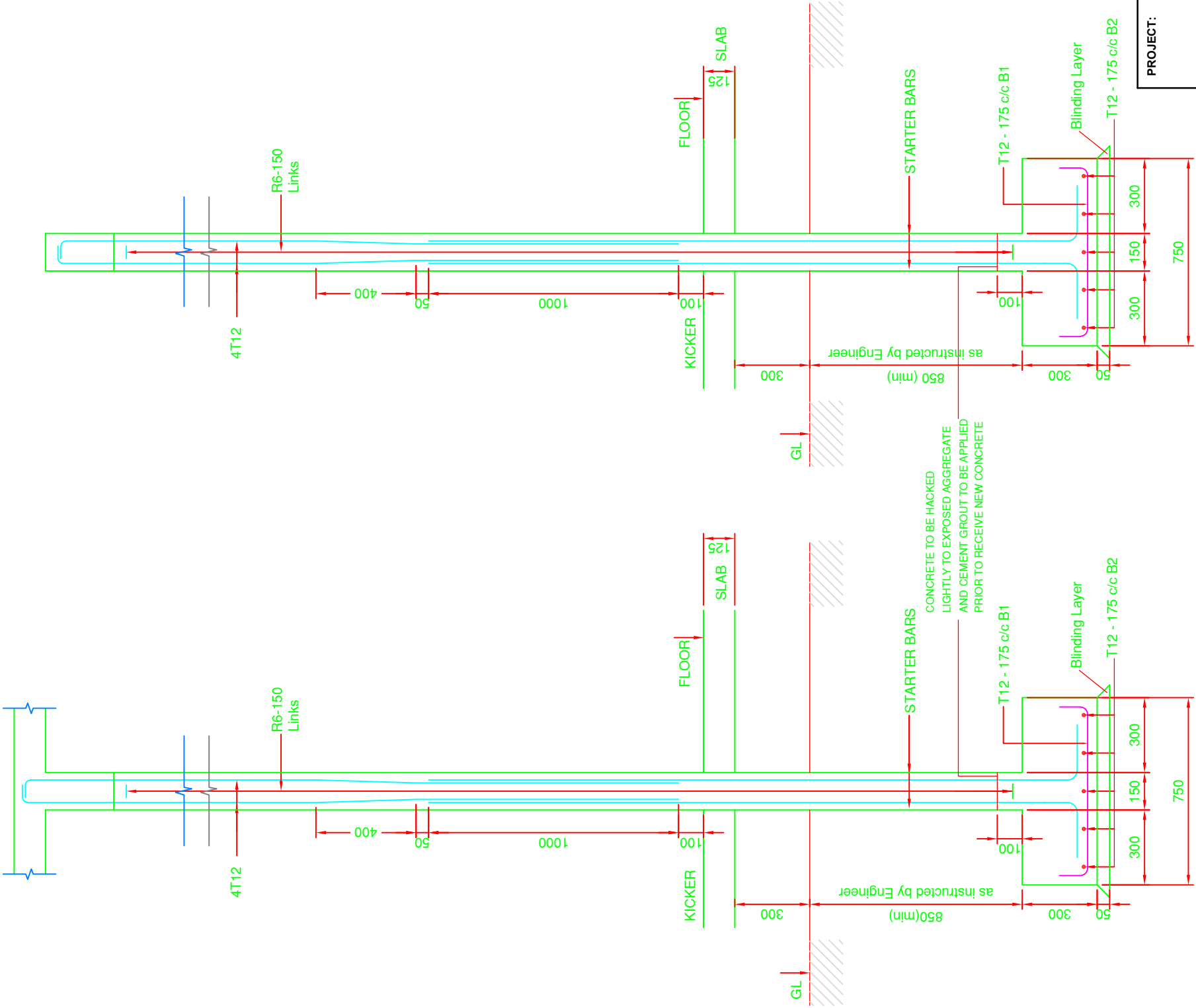


TC1/C2



Column Reinforcement

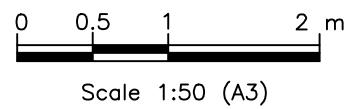
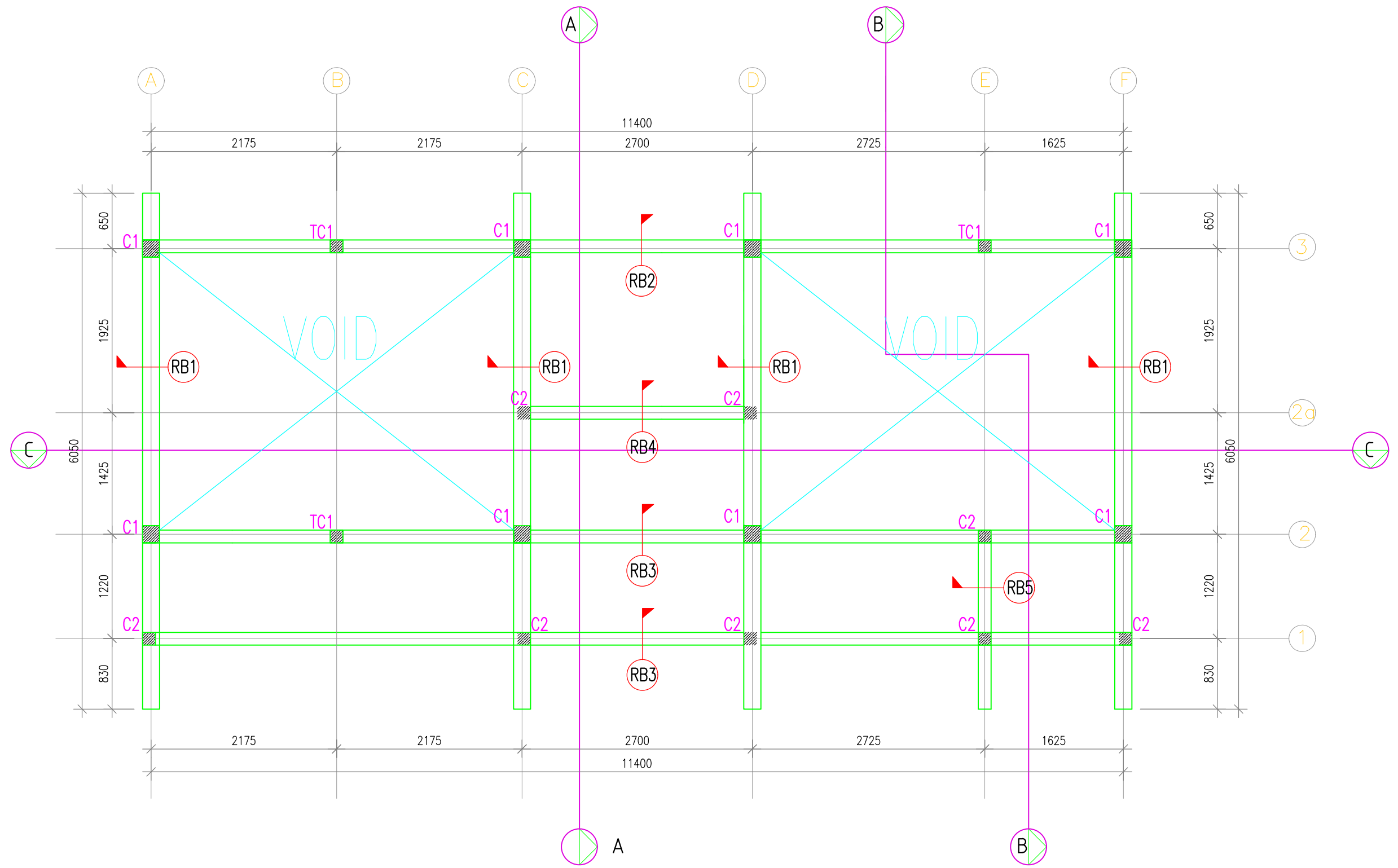
SECTION A-A



COLUMN C2 AND BASE B2
DETAILS
Scale 1:20

COLUMN TC1 AND BASE B2
DETAILS
Scale 1:20

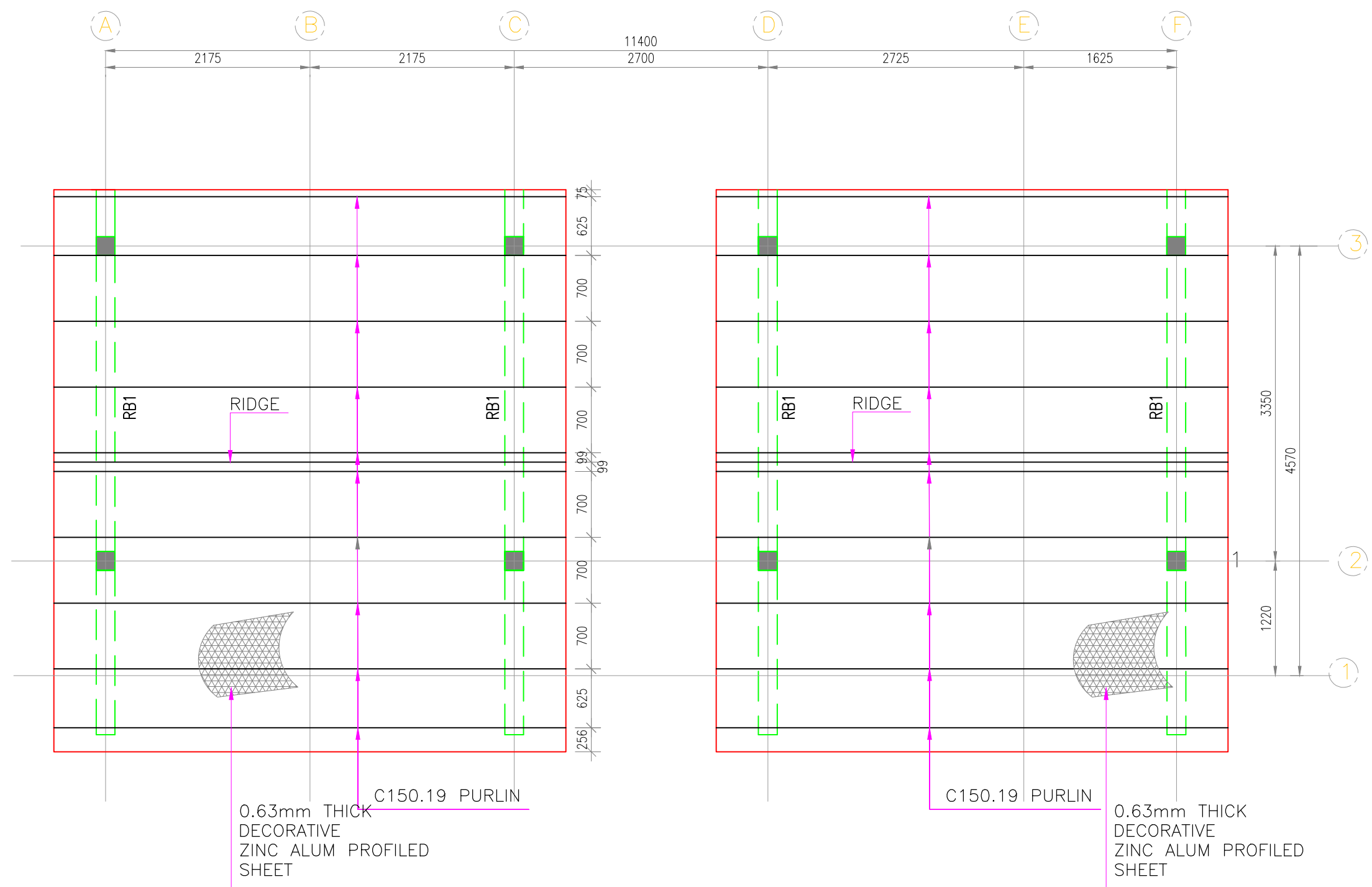
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SERIAL NO: -	CHKD BY:		



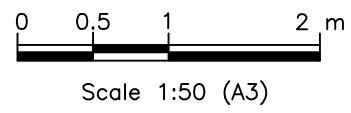
LOWER ROOF LAYOUT
Scale 1:50 (A3)

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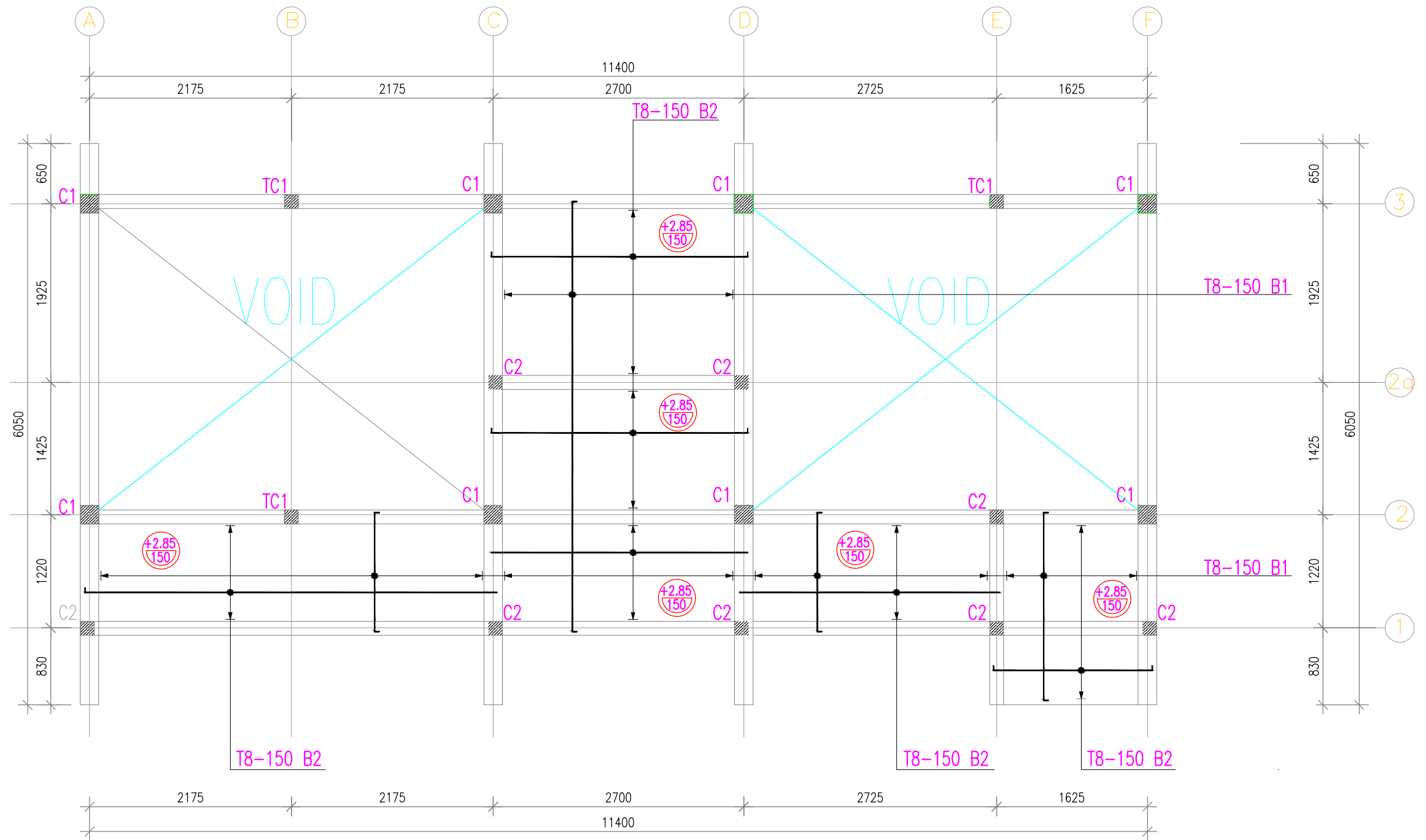
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SERIAL NO: -	REVISION NO:	
	CHKD BY:	



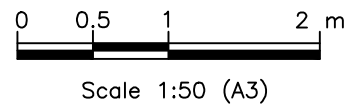
UPPER ROOF LAYOUT
Scale 1:50 (A3)



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	CHKD BY:	

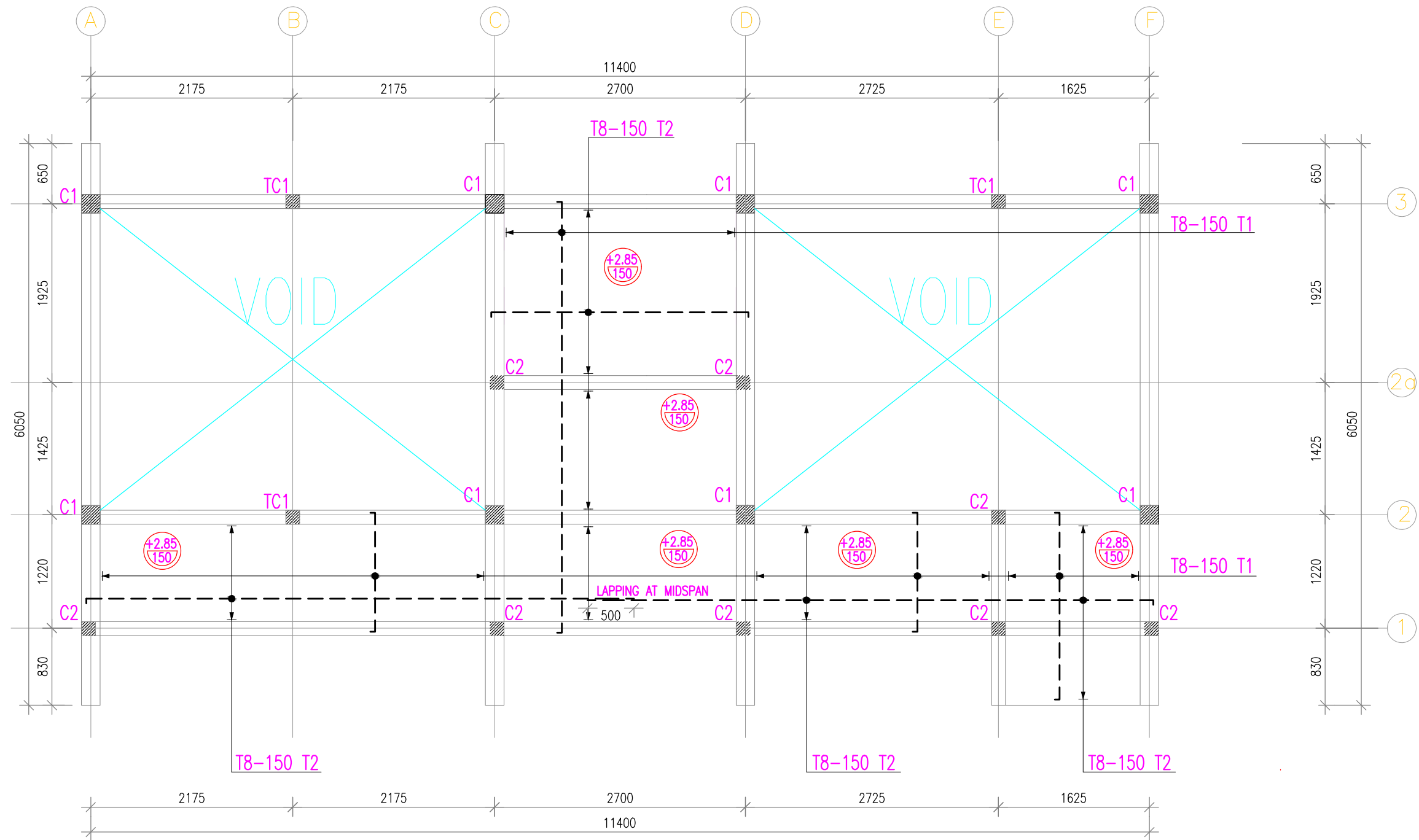


LOWER ROOF SLAB REINFORCEMENT (BOTTOM BARS)
Scale 1:50 (A3)



TENDER DRAWING

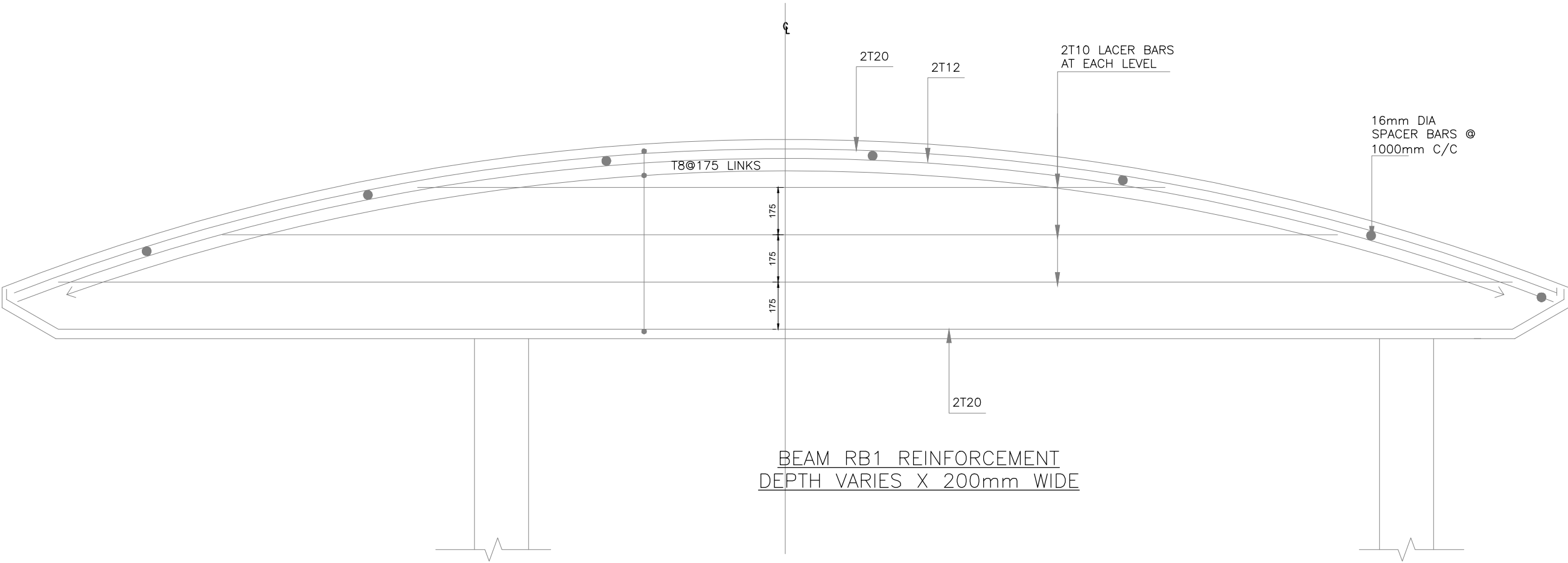
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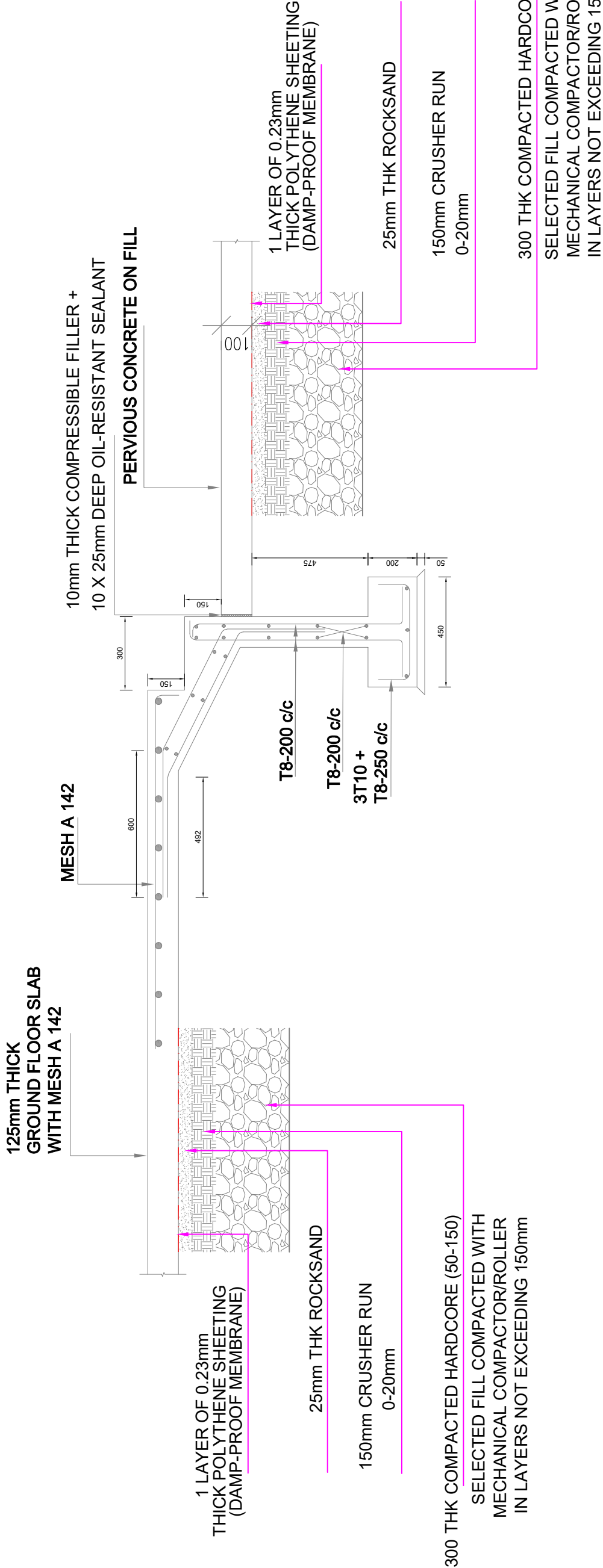
LOWER ROOF SLAB REINFORCEMENT (TOP BARS)
Scale 1:50 (A3)

TENDER DRAWING

PROJECT: BEACH MANAGEMENT PLAN			
DRG TITLE: TOILET BLOCK			
LOWER ROOF SLAB REINFORCEMENT - TOP BARS			
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SERIAL NO: -	REVISION NO:	CHKD BY:	

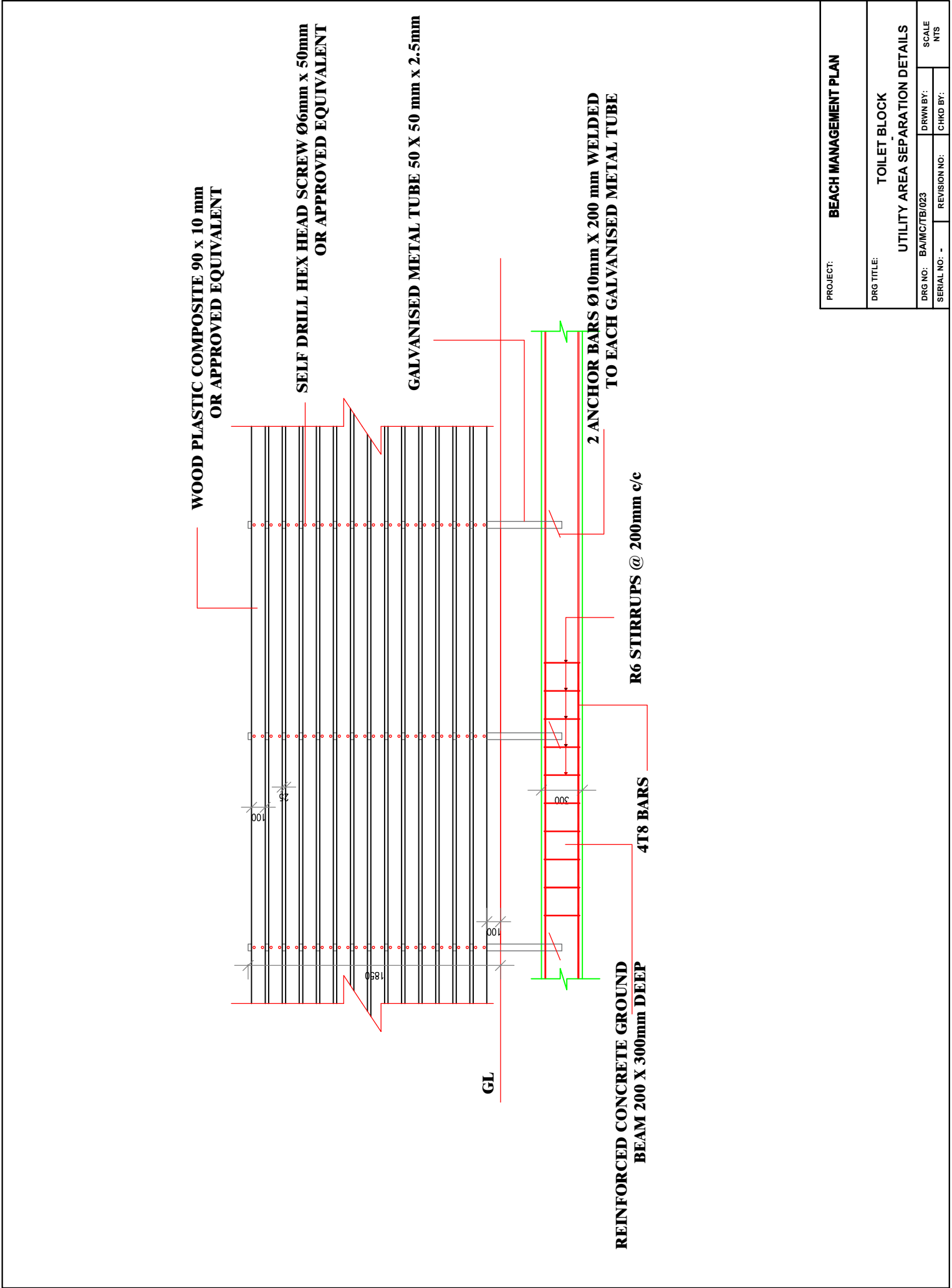


PROJECT: BEACH MANAGEMENT PLAN		
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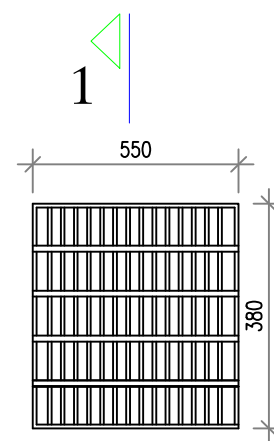
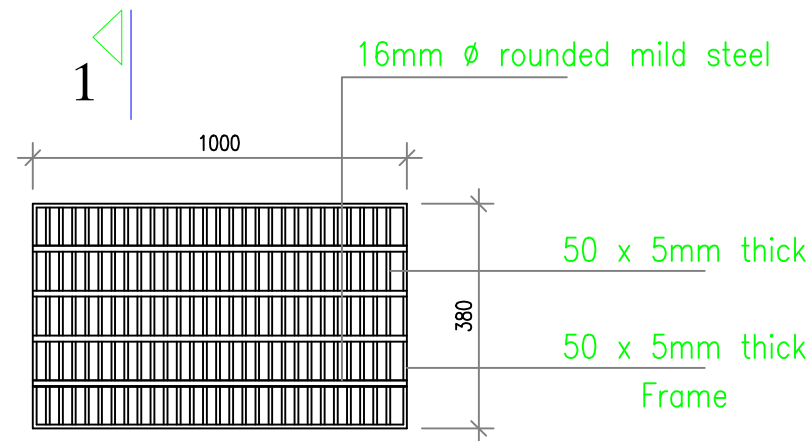


DETAILS AT STEPS

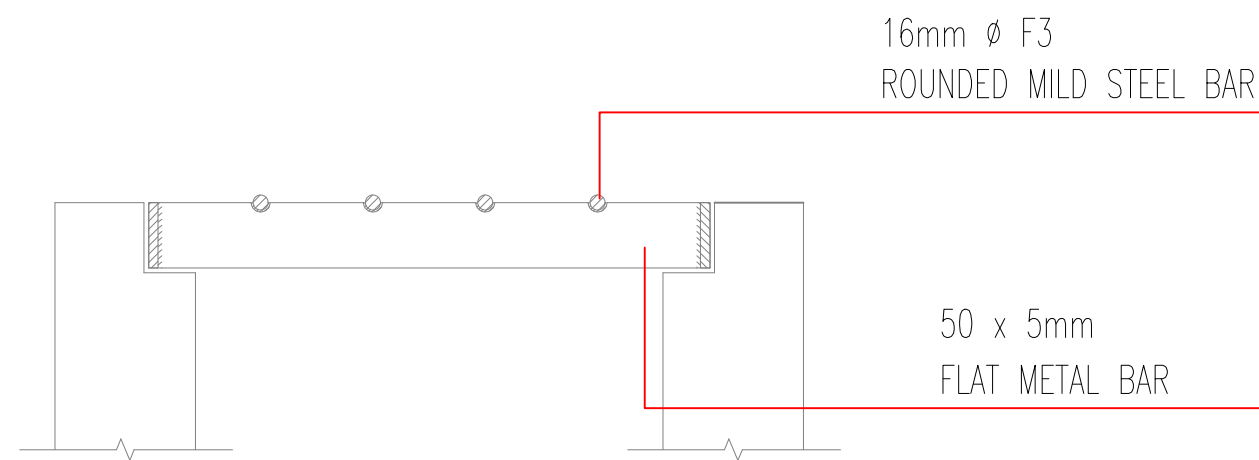
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SERIAL NO: -	REVISION NO:	CHKD BY:	



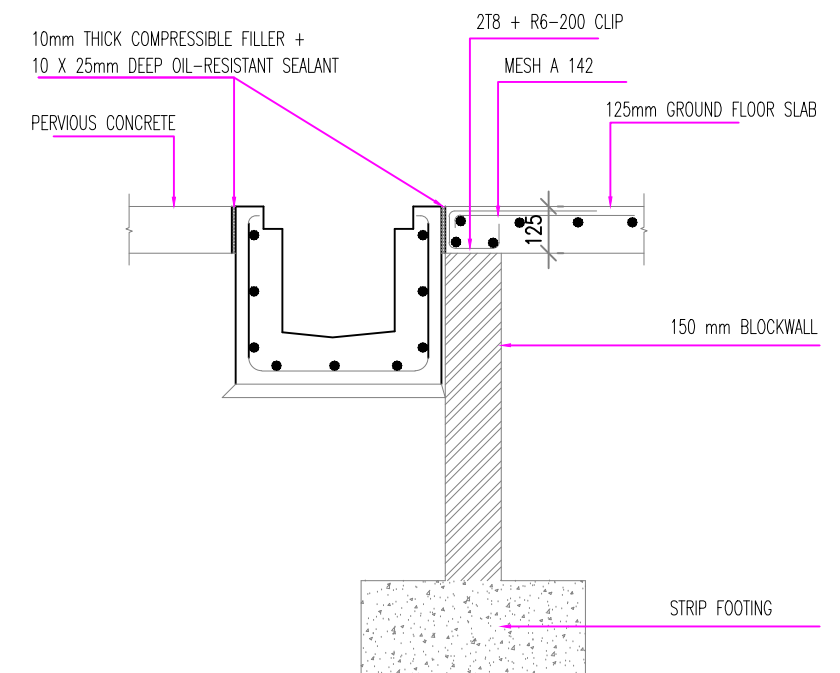
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DRG TITLE: TOILET BLOCK UTILITY AREA SEPARATION DETAILS			
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SERIAL NO: -		CHKD BY:	NTS



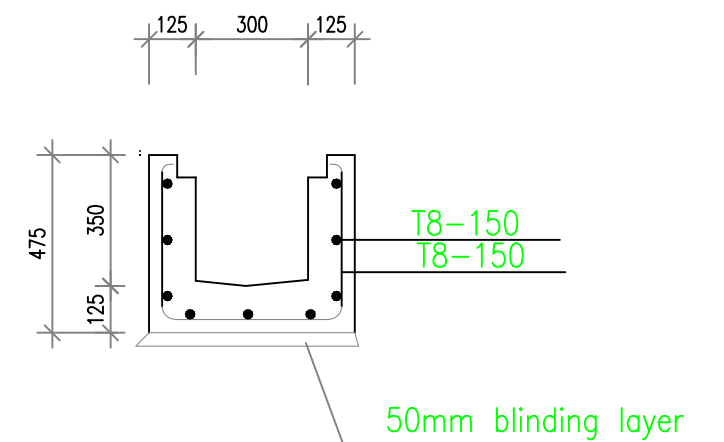
GRATING DETAILS



SECTION 1-1

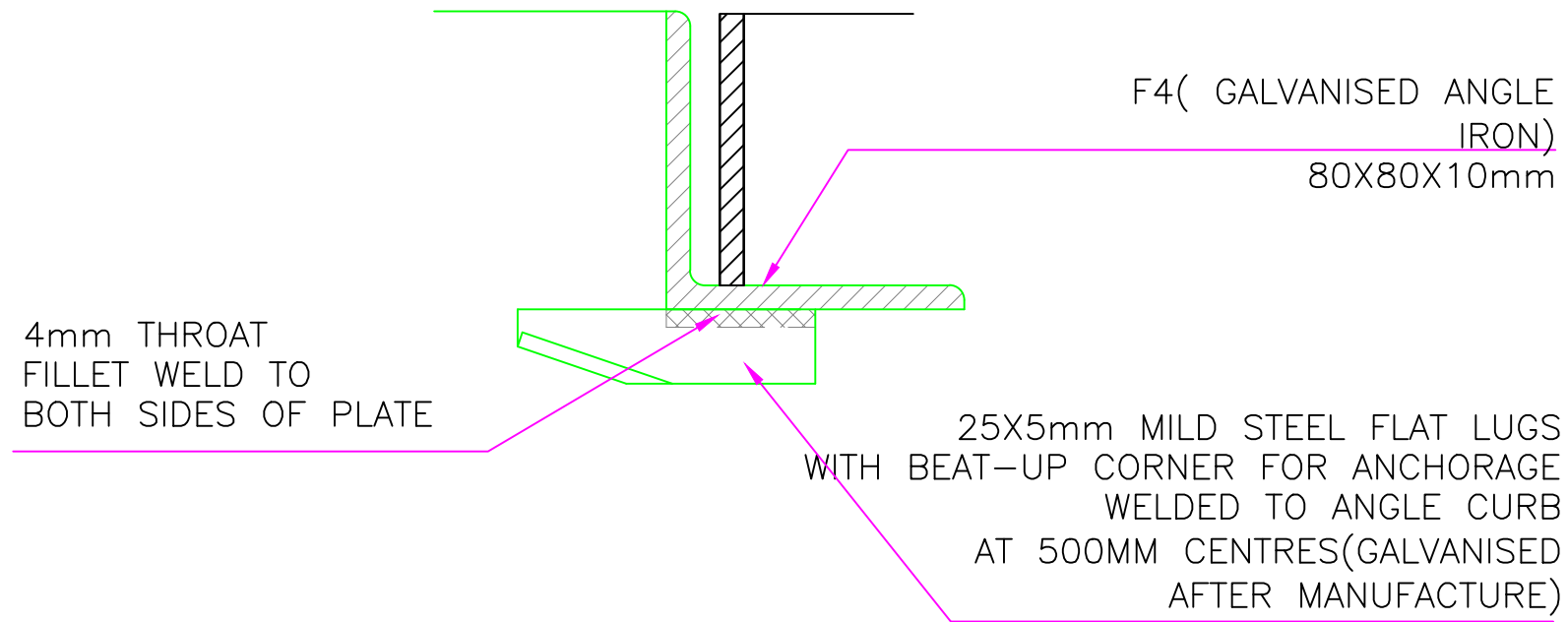


SECTION AT ENTRANCE CHANGING ROOM

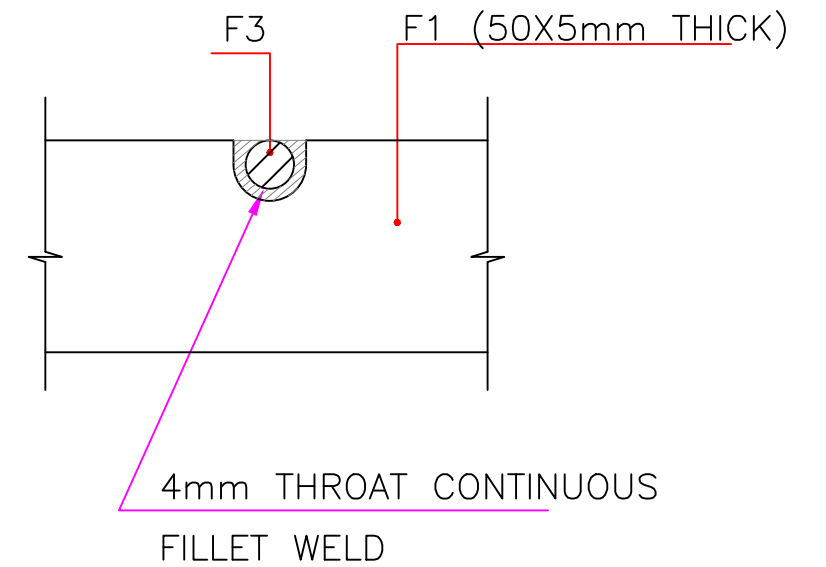


DRAIN DETAILS

PROJECT: BEACH MANAGEMENT PLAN		
DRG TITLE: TOILET BLOCK DRAIN DETAILS (1 OF 2)		
DRG NO: BA/MC/TB/024	DRWN BY:	SCALE NTS
SERIAL NO: -	REVISION NO:	
	CHKD BY:	

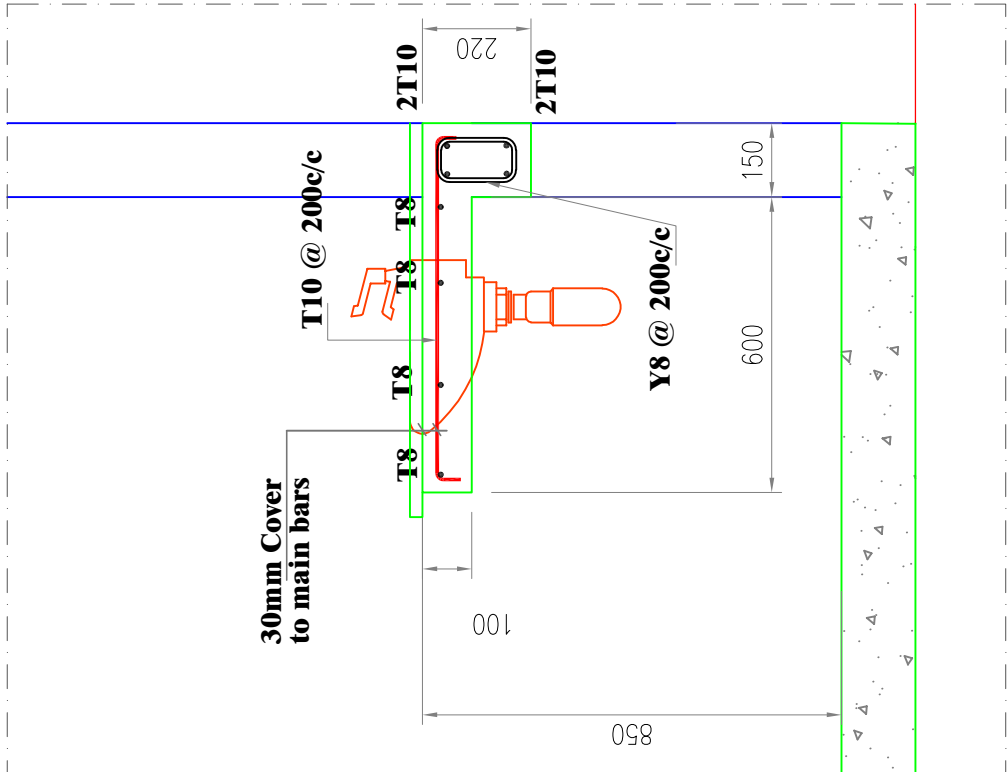


ANGLE SUPPORT DETAILS



R16 WELDING DETAILS

PROJECT: BEACH MANAGEMENT PLAN		
DRG TITLE: TOILET BLOCK DRAIN DETAILS (2 OF 2)		
DRG NO: BA/MC/TB/025	DRWN BY:	SCALE NTS
SERIAL NO: -	REVISION NO:	
	CHKD BY:	



SECTION 1-1

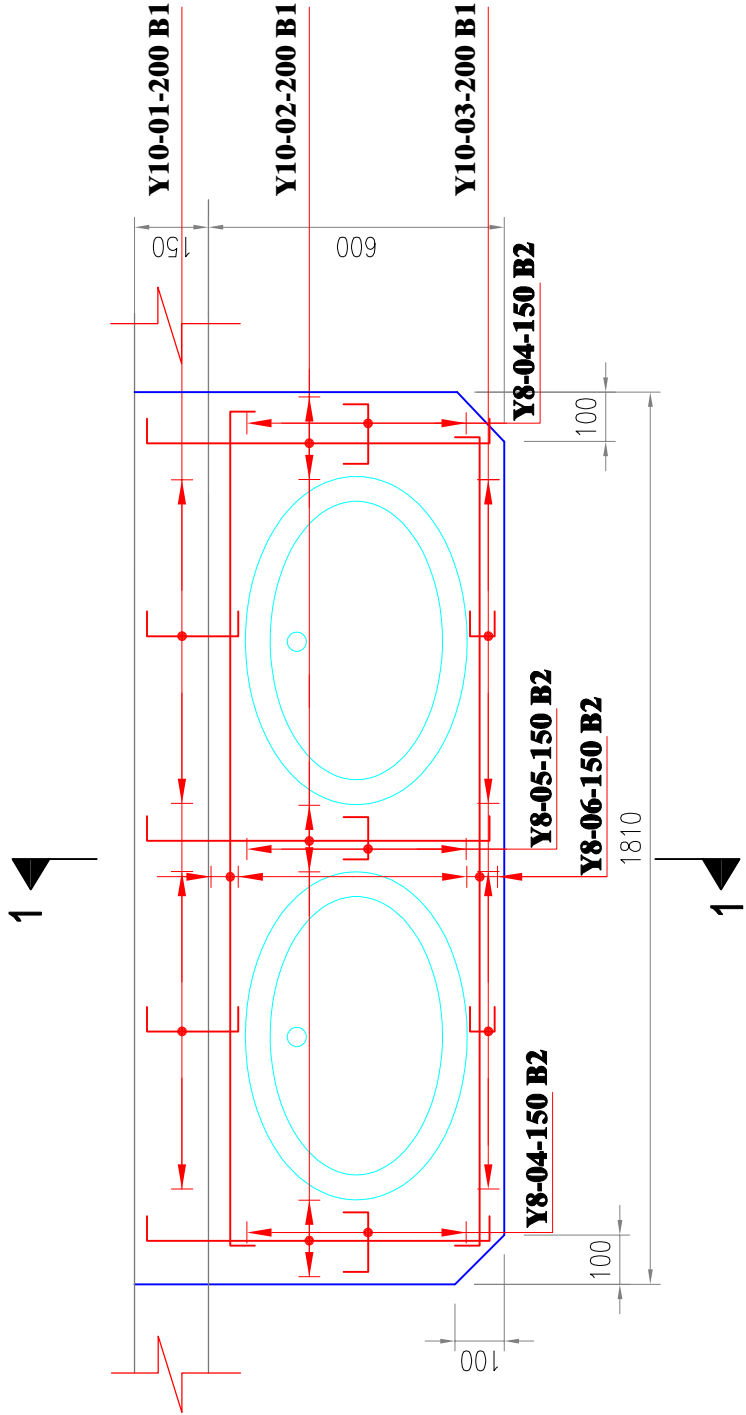
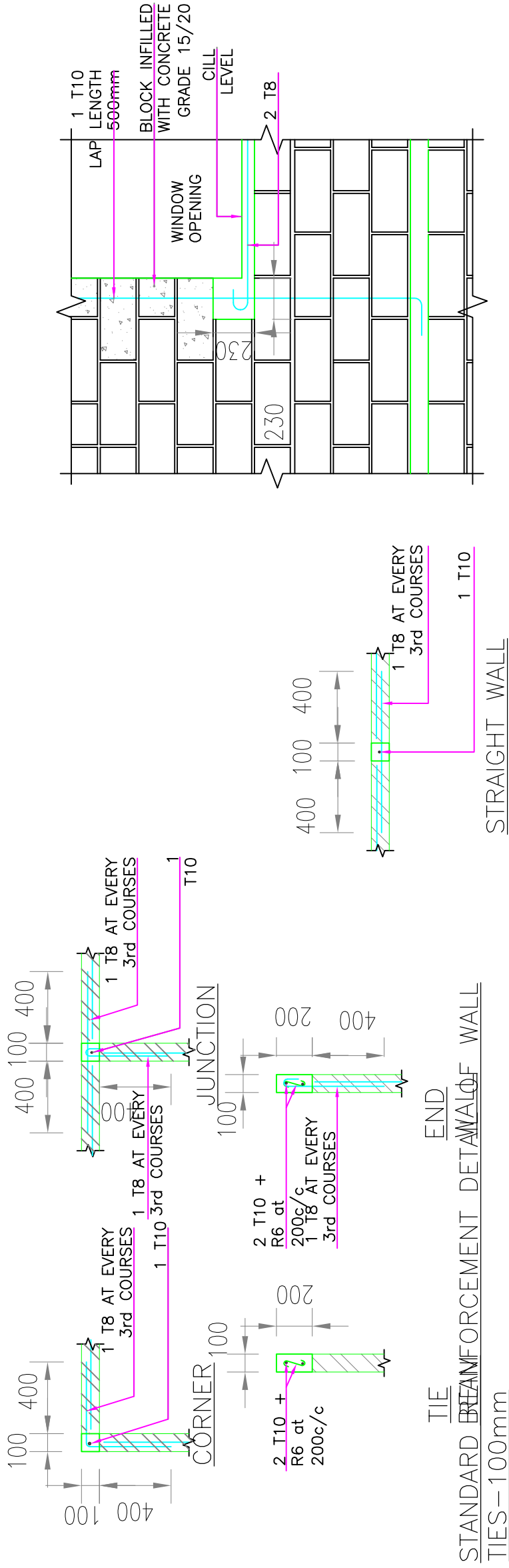
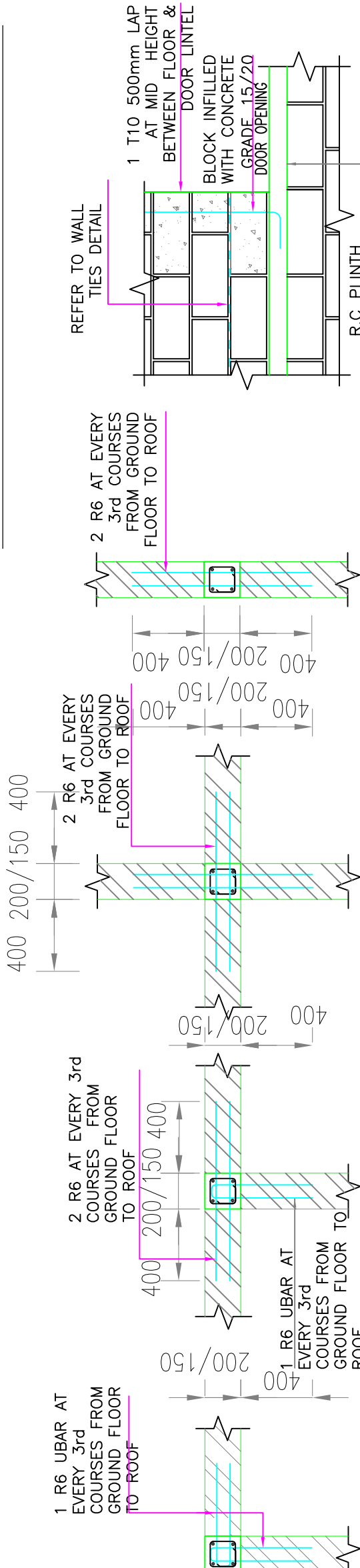


TABLE TOP REINFT. DETAILS

PROJECT: BEACH MANAGEMENT PLAN			
DRG TITLE: TOILET BLOCK CONCRETE TABLE DETAIL			
DRG NO: BA/MC/TB/026	REVISION NO:		SCALE
	SERIAL NO: -	CHKD BY:	NTS



DETAIL OF JAMB TO WINDOW OPENING

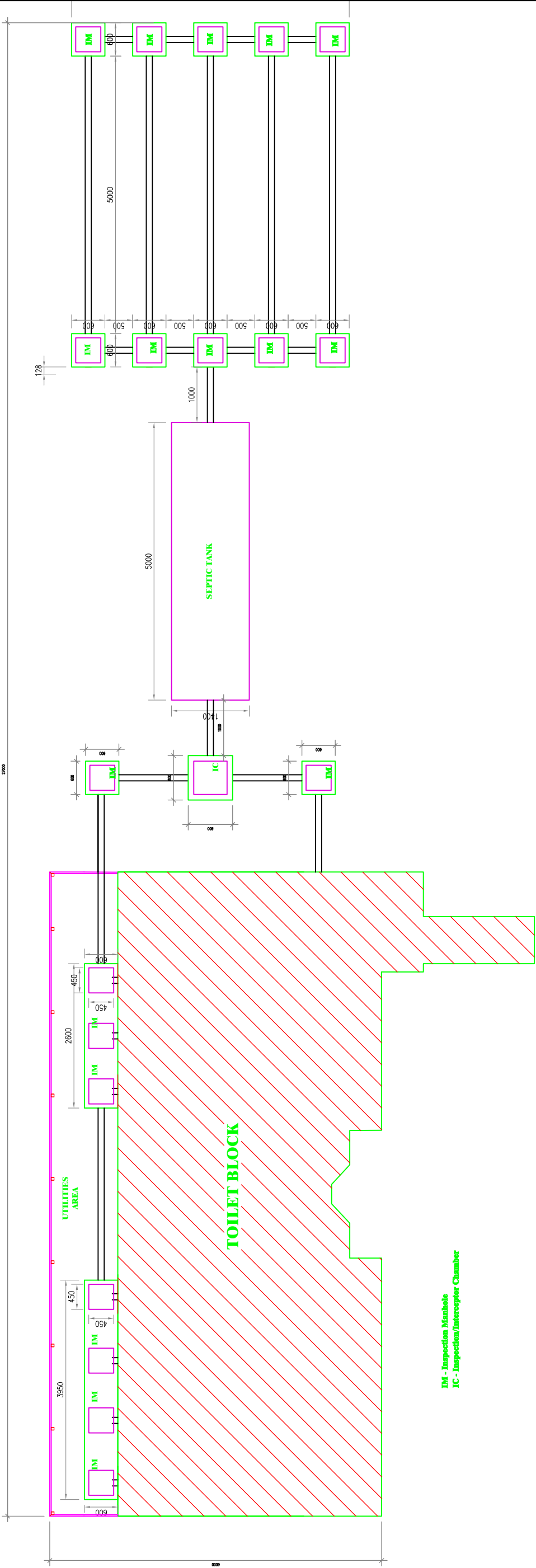


DETAIL OF JAMB TO DOOR OPENING

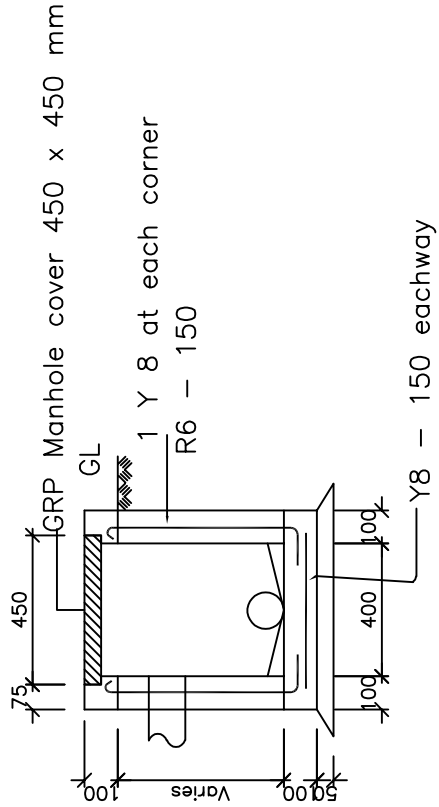
STANDARD REINFORCEMENT DETAIL OF WALL TIES—150mm & 200mm

- NOTES:—
- 1). COVER TO TIE COLUMN—25mm.
 - 2). TIE COLUMN MAXIMUM SPACING UP TO NEAREST JUNCTION OR TIE AT EVERY 3000mm INTERVAL.
 - 3). R.C TIE BEAM IS TO BE PROVIDED AT THE TOP OF 100mm LOW WALL.
 - 4). ALL VERTICAL REINFORCEMENT TO BE FIXED INTO BOTH TOP & BOTTOM SUPPORT.

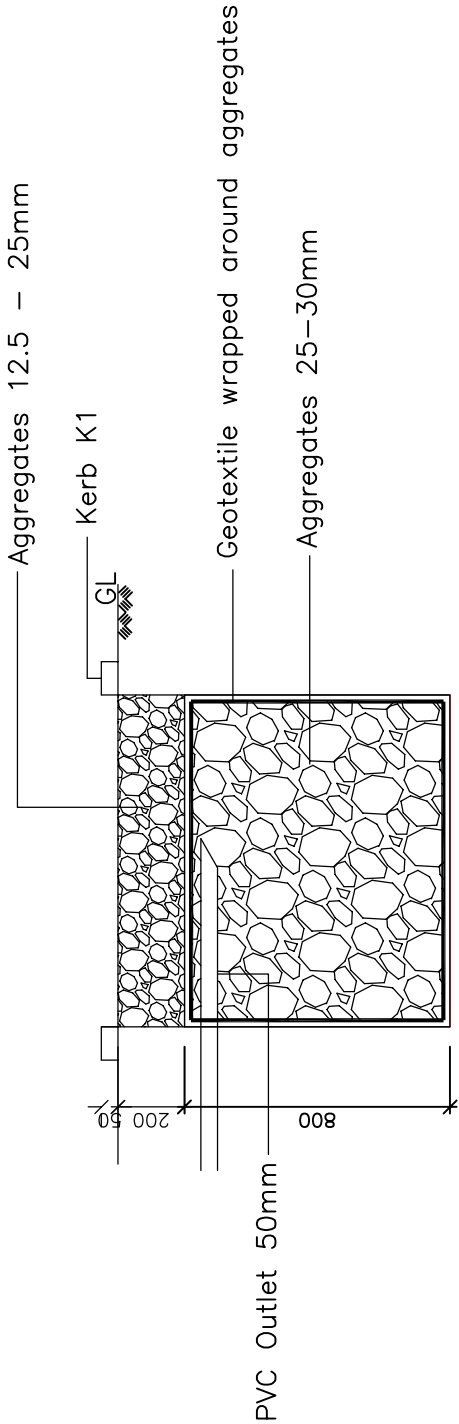
PROJECT: BEACH MANAGEMENT PLAN			
DRG TITLE: TOILET BLOCK STANDARD REINFORCEMENT DETAILS FOR WALL TIES			
DRG NO: BA/MC/TB/027	DRWN BY:	SCALE NTS	
SERIAL NO: -	REVISION NO:	CHKD BY:	



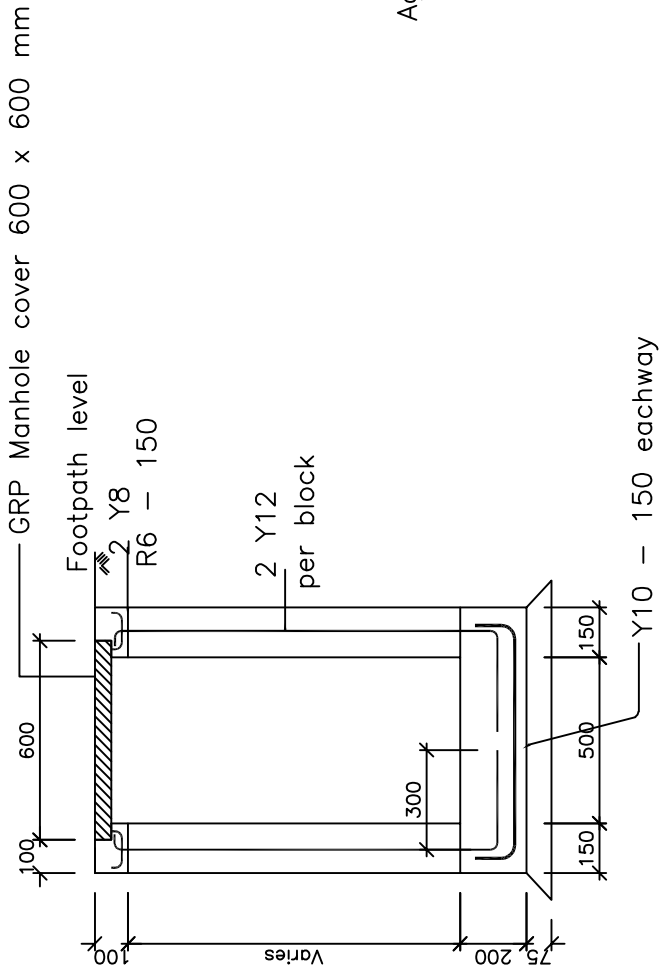
PROJECT:		BEACH MANAGEMENT PLAN	
DRG TITLE:		TOILET BLOCK WASTEWATER RETICULATION NETWORK	
DRG NO:	BA/MC/TB/028	DRWN BY:	SCALE NTS
SERIAL NO:	-	REVISION NO:	CHKD BY:



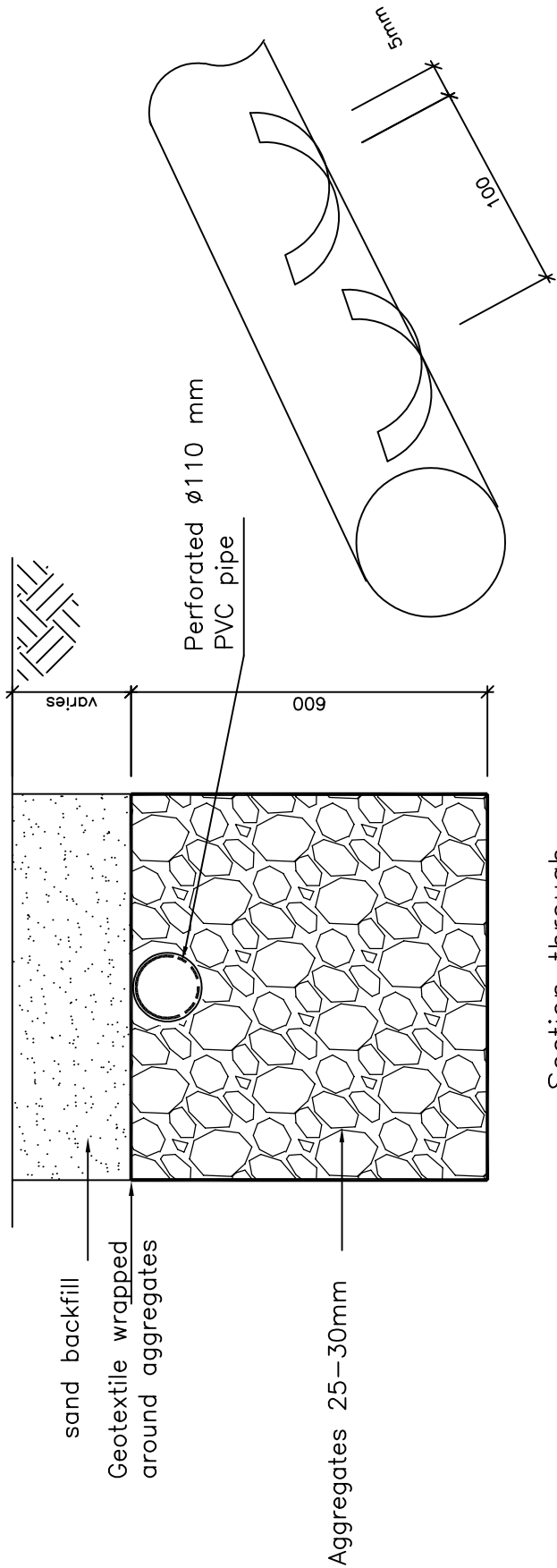
Section through Inspection Manhole



Section through soakaway

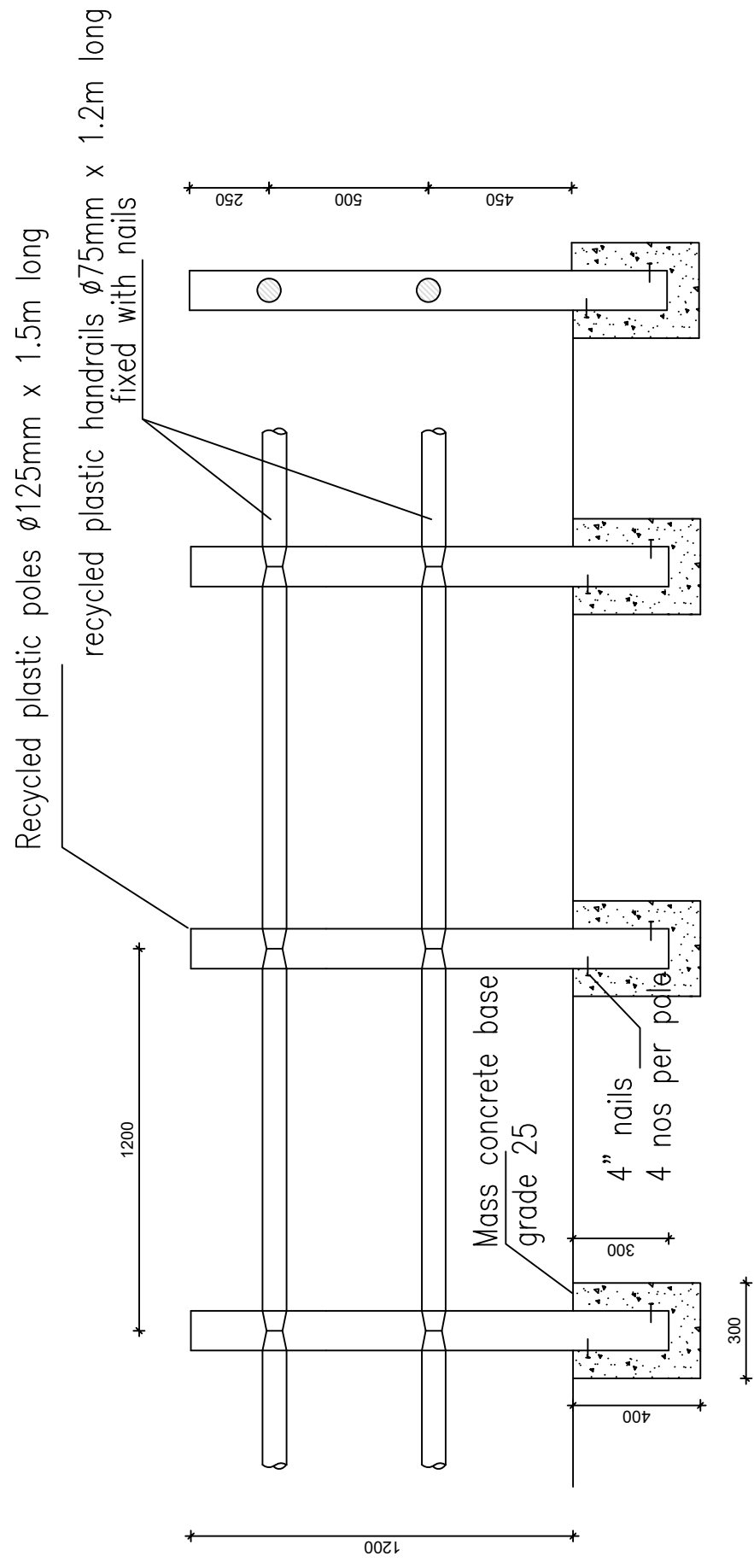


Section through Inspection/Interceptor chamber



Pipe detail

PROJECT: BEACH MANAGEMENT PLAN			
DRG TITLE: TOILET BLOCK SEWERAGE SYSTEM DETAILS			
DRG NO: BA/MC/TB/029	DRWN BY:		SCALE NTS
SERIAL NO: -	REVISION NO:		CHKD BY:



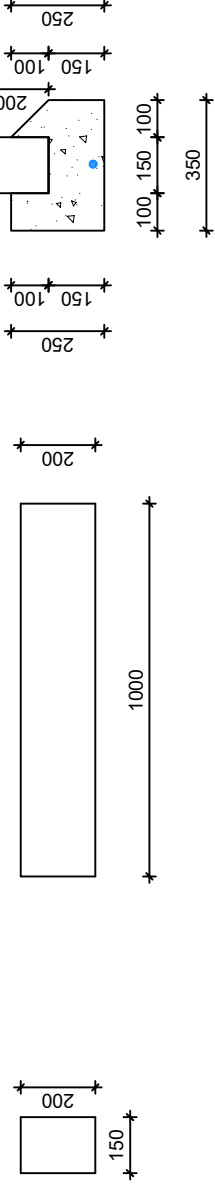
Recycled plastic Parapet detail

Section

Entrance 1.2m wide at every 25m

Note: All poles and handrails to be finished with 2 coats gloss paint of approved colour

Type K5 – Edging

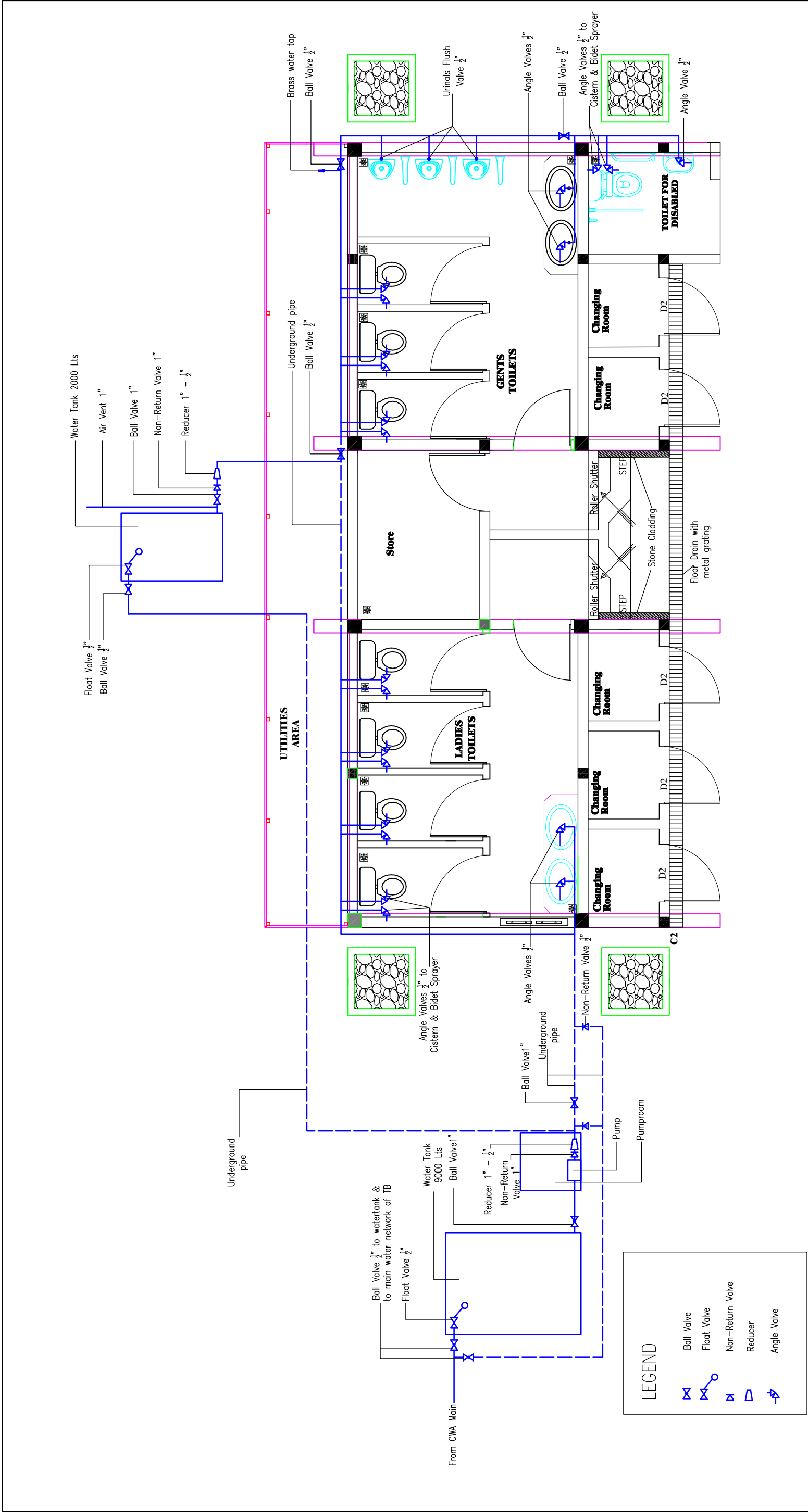


Side

Front

Haunching Details – Kerb K5

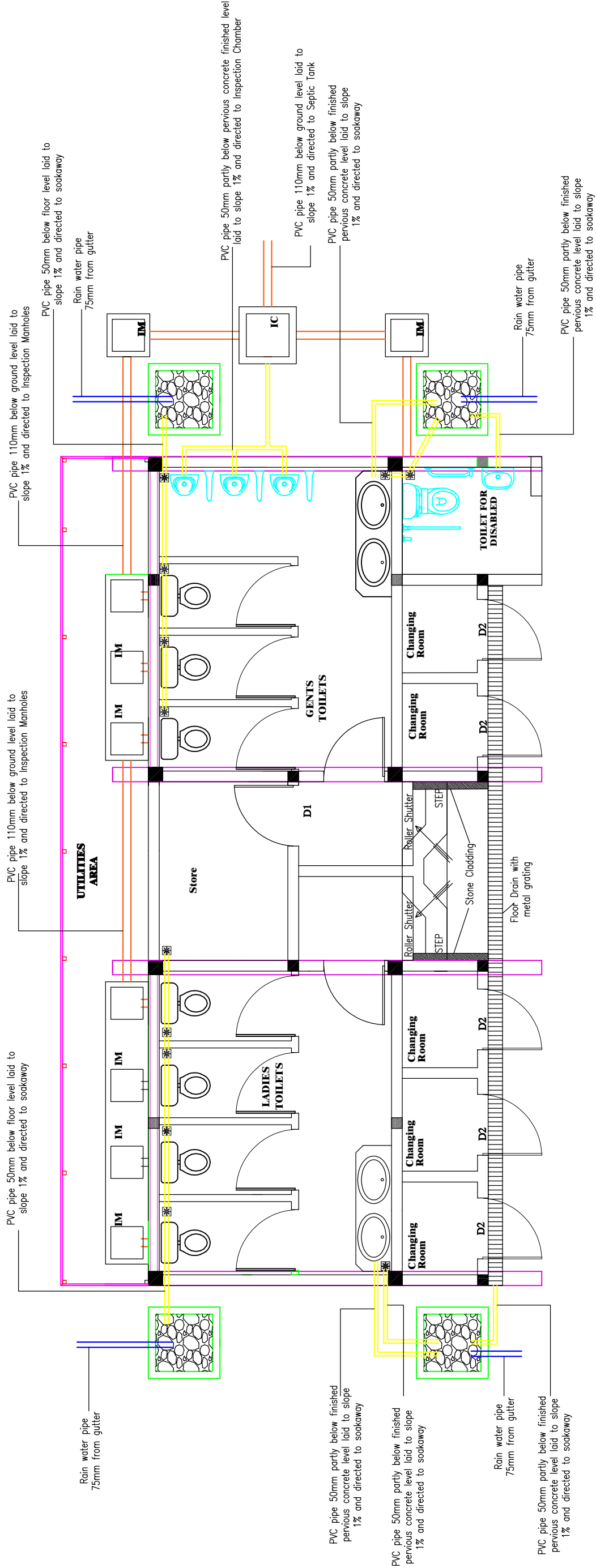
PROJECT:		BEACH MANAGEMENT PLAN	
DRG TITLE:		TOILET BLOCK - PARAPET & KERB DETAILS	
DRG NO:	BA/MC/TB/030		SCALE NTS
SERIAL NO: -	REVISION NO:	DRWN BY: CHKD BY:	



NOTE 1 : All external valves to be in brass type and should be coupled with brass type flexible adaptors to allow for future maintenances.

NOTE 2 : All underground pipe to be in polyethylene pipe or approved equivalent and buried to a minimum depth of 600mm with approved selected backfill.

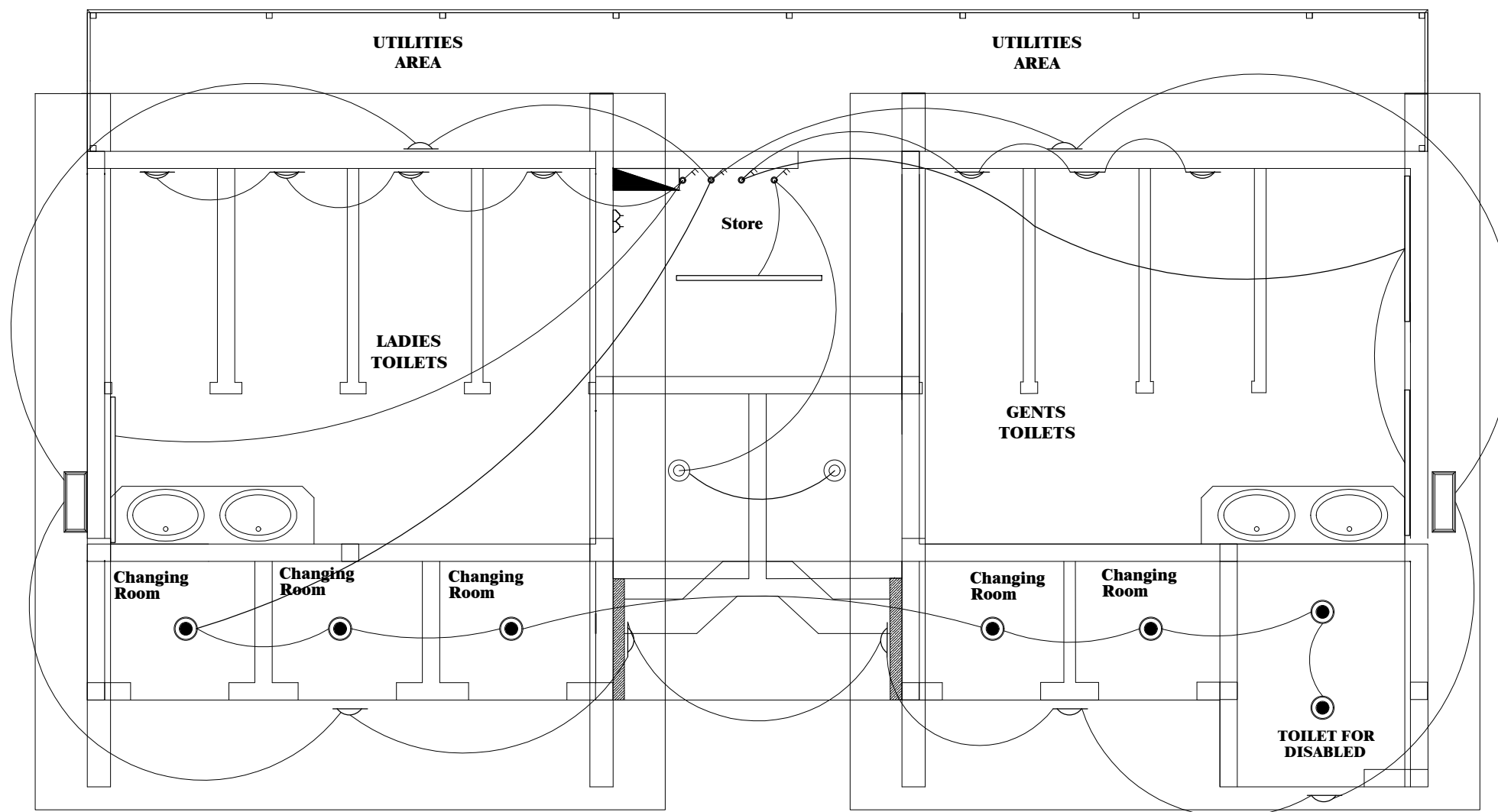
PROJECT: BEACH MANAGEMENT PLAN			
DRG TITLE: TOILET BLOCK			
PLUMBING DETAILS - POTABLE WATER			
DRG NO: BA/MC/TB/031	DRWN BY:		SCALE
SERIAL NO: -	REVISION NO:		NTS













NOTE 1 : All used water pipe laid should be tested prior to casting of concrete/pervious concrete floor in the presence of the Client's Representative

NOTE 2 : Any manhole found along the pervious concrete footpath should be flush with footpath level to the Client's Representative's satisfaction

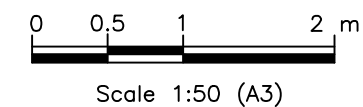
PROJECT: BEACH MANAGEMENT PLAN			
DRG TITLE: TOILET BLOCK PLUMBING DETAILS - WASTEWATER			
DRG NO: BA/MC/TB/032	REVISION NO:	DRWN BY:	SCALE NTS
SERIAL NO: -		CHKD BY:	



Legend

	<u>Weatherproof Bulkhead with 20 Watts Energy Saving Bulb connected to timer</u>
	<u>Weatherproof LED tube light 18 w 4 ft long</u>
	<u>Distribution board</u>
	<u>Double Gang Switch (All switches to be fixed in store room with labels)</u>
	<u>Ceiling mounted LED light with Energy saving bulb 20 watts capacity</u>
	<u>Connection</u>
	<u>Weatherproof LED Flood Light 100W with integrated motion sensor connected to timer</u>
	<u>Wall mounted LED light with Energy saving bulb 20 watts capacity</u>
	<u>Recessed Ceiling mounted LED light with integrated occupancy sensor with energy saving bulb 20 watts capacity embedded in concrete ceiling</u>
	<u>Twin Socket</u>

ELECTRICAL LAYOUT
Scale 1:50 (A3)



PROJECT: BEACH MANAGEMENT PLAN			
DRG TITLE: TOILET BLOCK ELECTRICAL LAYOUT			
DRG NO: BA/MC/TB/33	DRWN BY:	SCALE 1:50 (A3)	
SERIAL NO: -	REVISION NO:	CHKD BY:	