



**ISLAMIC REPUBLIC OF AFGHANISTAN
MINISTRY OF ENERGY AND WATER**



CONTRACT

FOR

Construction of Water User Association Office Buildings

MEW/P-ARBP/NCB/Contract 2

ADB Grant No. and Title: 0506 /0507 -AFG: Panj-Amu River Basin Sector Project

Between

Ministry of Energy and Water

and

Newi Sadat Construction Company

AUGUST 2019

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Contract Agreement

THIS AGREEMENT made the 17 day of August 2019, between Ministry of Energy and Water (hereinafter "the Employer"), of the one part, and Newi Sadat Construction Company. (hereinafter "the Contractor"), of the other part:

WHEREAS the Employer desires that the Works known as Construction of Water User Association Office Buildings (MEW/P-ARBP/NCB/Contract 2) 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:

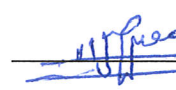
1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Contract documents referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement. This Agreement shall prevail over all other Contract documents.
 - (a) the Contract Agreement,
 - (b) the Letter of Acceptance,
 - (c) the Letter of Bid,
 - (d) the Particular Conditions of Contract,
 - (e) the List of Eligible Countries that was specified in Section 5 of the bidding document,
 - (f) the General Conditions of Contract,
 - (g) the Specifications,
 - (h) the Drawings,
 - (i) the Completed Activity Schedules or Bill of Quantities, and
 - (j) any other documents shall be added here.
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.

The Contract amount is **17,919,550 Afghani (Seventeen Million Nine Hundred Nineteen Thousands Five Hundred Fifty Afghani) inclusive of 10% Contingency amounting to 1,629,050.00 Afghani**

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

Eng. Khan Mohammad Takal
Acting Minister, Ministry of Energy and Water
For and on behalf of Employer

Witness, Name, Signature, Address, Date


Sayed Abdullah
President, NSCC
For and on behalf of Contractor



Witness, Name, Signature, Address, Date



دولت جمهوری اسلامی افغانستان
وزارت انرژی و آب

د افغانستان اسلامي جمهوري دولت
د انرژی و اوبو وزارت



معینیت آب
آمریت پروگرام سرمایه گذاری برای انکشاف منابع آب

☐ عاجل ☐ عادی ☐ اطمینانیه ☐ ابلاغیه ☐ سایر

شماره: ۱۳۱۹

تاریخ: ۱۳۹۸/۴/۳۰

Letter of Acceptance

July 20, 2019

To: Newi Sadat Construction Company
4th floor, Karimi Plaza, Da Afghanistan Bank Square, Jalalabad City, Afghanistan
+93(0) 700 604 355, +93(0) 786 089 031, office.sadat@yahoo.com, office.nscg@gmail.com

Subject: **Notification of Award Contract No. MEW/P-ARBP/NCB/Contract 2**

This is to notify you that your Bid dated 13th of January, 2019 for execution of the Construction of Water User Association Office Buildings (MEW/P-ARBP/NCB/Contract 2) for the Accepted Contract Amount of the equivalent of **17,919,550.00 Afghani (Seventeen Million Nine Hundred Nineteen Thousands Five Hundred Fifty Afghani) inclusive of 10% Contingency amounting to 1,629,050.00 Afghani**, as corrected and modified in accordance with the Instructions to Bidders is hereby accepted by our Agency.

You are requested to furnish the Performance Security within 28 days in accordance with the Conditions of Contract, using for that purpose the Performance Security Form included in Section 9 (Contract Forms) of the Bidding Document.

Authorized Signature:

Eng. Khan Mohammad Takal

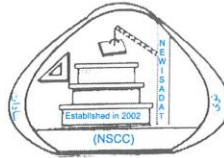
Deputy Minister, Water

Ministry of Energy and Water

website:

آدرس: سرک عمومی دار المان مقابل سناتوریم، کابل - افغانستان

NEWI SADAT
Construction Company



نوی سادات
ساختمانی شرکت

(NSCC)

No: _____

Date: _____

Date: January 13, 2019

NCB No.: .MEW/P-ARBP/NCB/Contract 2

Invitation for Bid No.: .MEW/P-ARBP/NCB/Contract 2

To: [Ministry of Energy and Water]

We, the undersigned, declare that:

- (a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (ITB) Clause 8.
- (b) We offer to execute in conformity with the Bidding Documents the following Works:
[Construction of Water User Association Office Buildings]
- (c) The total price of our Bid, excluding any discounts offered in item (d) below is:

[amount of foreign currency in words], [amount in figures], and [seventeen million nine hundred nineteen thousand and five hundred fifty Afghani], [17,919,550.00]

The total bid price from the Summary of Bill of Quantities for admeasurement contracts or Activity Schedule for lump sum contracts should be entered by the bidder inside this box. Absence of the total bid price in the

- (d) The discounts offered and the methodology for their application are as follows: [NIL... insert discounts and methodology for their application if any...]
- (e) Our bid shall be valid for a period of [118] days from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
- (f) If our bid is accepted, we commit to obtain a performance security in accordance with the Bidding Document.

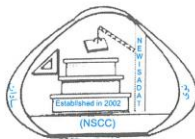
Bidding Document for MEW/P-ARBP/NCB/Contract 2

Procurement of Works-Small Contract

Main Office: JALALABAD
4th Floor, Karimi Plaza, Chaharrah Da Afghanistan Bank
Jalalabad City, Nangarhar Province
0093(0) 700 604 355 - 009(0) 700 623 801 - 009(0) 700 617 125
office_sadat@yahoo.com
office.nsc@gmail.com

Kabul Office:
Ahmad Shah Baba Mena, 9th Block, 25th Street, Near to
Hamza Durani School, Kabul Afghanistan
0093 (0) 796 859 996 - 0093(0) 786 089 031 - 0093 (0) 798 118 754
office_sadat@yahoo.com
office.nsc@gmail.com

NEWI SADAT
Construction Company



نوی سادات
ساختمانی شرکت

No: _____

(NSCC)

Date: _____

- (g) Our firm, including any Subcontractors or Suppliers for any part of the Contract, have nationalities from eligible countries in accordance with ITB 4.2.
- (h) We, including any Subcontractors or Suppliers for any part of the contract, do not have any conflict of interest in accordance with ITB 4.3.
- (i) We are not participating, as a Bidder in more than one Bid in this bidding process in accordance with ITB 4.3(e), other than alternative offers submitted in accordance with ITB 13.
- (j) Our firm, its affiliates or subsidiaries, including any Subcontractors or Suppliers for any part of the contract, has not been declared ineligible by ADB, under the Employer's country laws or official regulations or by an act of compliance with a decision of the United Nations Security Council.
- (k) [We are not a government-owned enterprise] / [We are a government-owned enterprise but meet the requirements of ITB 4.5].¹
- (l) We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract:²

Name of Recipient	Address	Reason	Amount
NIL.....	NIL.....	NIL.....	NIL.....

- (m) We understand that this Bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed.
- (n) We understand that you are not bound to accept the lowest evaluated Bid or any other Bid that you may receive.
- (o) We agree to permit ADB or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors appointed by ADB.

¹ Use one of the two options as appropriate.

² If none has been paid or is to be paid, indicate "None".



Bidding Document for MEW/P-ARBP/NCB/Contract 2

Procurement of Works-Small Contract

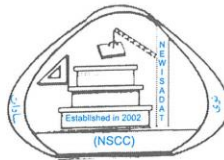
Main Office: JALALABAD
4th Floor, Karimi Plaza, Chaharrahi Da Afghanistan Bank
Jalalabad City, Nangarhar Province
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Hamza Durani School, Kabul Afghanistan
0093 (0) 796 859 996 - 0093(0) 786 089 031 - 0092 (0) 798 118 764
office_sadat@yahoo.com
office.nsc@gmail.com

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Section 4 - Bidding Forms

NEWI SADAT
Construction Company



نوی سادات
ساختمانی شرکت

No: _____ (NSCC) Date: _____

- (p) If our Bid is accepted, we commit to mobilizing key equipment and personnel in accordance with the requirements set forth in Section 6 (Employer's Requirements) and our technical proposal, or as otherwise agreed with the Employer.

Name Sayed Abdullah "Karimi"
In the capacity of Director of Newi Sadat Construction Company
Signed
Duly authorized to sign the Bid for and on behalf of Newi Sadat Construction Company
Date January 13, 2019

Bidding Document for MEW/P-ARBP/NCB/Contract 2

Procurement of Works-Small Contract

Main Office: JALALABAD
4th Floor, Karimi Plaza, Chaharrah Da Afghanistan Bank
Jalalabad City, Nangarhar Province
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office_sadat@yahoo.com
office.nsc@gmail.com

Section 8 - Particular Conditions of Contract

The following Particular Conditions of Contract shall supplement the GCC. Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

A. General	
GCC 1.1 (d)	The financing institutions is Asian Development Bank
GCC 1.1 (r)	The Employer is: Ministry of Energy and Water (MEW) Darul Aman Road, Kabul, Afghanistan Authorized Representative: Mr. Fardeen Azimi, PMO Director fardeen.azimi.b@gmail.com +93(0) 799 43 53 43
GCC 1.1 (w)	The Intended Completion Date for the whole of the Works shall be: Twelve Months from the date of notice to proceed (NTP).
GCC 1.1 (cc)	The Project Manager is: Waisuddin Rahimi Ministry of Energy and Water (MEW) Darul Aman Road, Kabul, Afghanistan waisuddin.rahimi@gmail.com +93(0) 793 85 7777
GCC 1.1 (ff)	The Site is located at the following locations ; The Water user association (WUA) buildings will be constructed at the following locations; 1. One office building for Sharawan Canal Water User Association along the Sharwan Canal. N=36,71285 E= 69,59055 Elevation= 851 meter 2. One office building for Polikhomri Water user association along the Polikhomri River 3. One office building for Kisham water user associations located at Kisham district along the Kisham river. 4. One office building for Khanabad water user associations located near to the security guard's room of Mechanical door of Khanabad weir. 5. One office building for Dasht-e-Qalah water user association along the Dasht-e-Qalah main canal near to Pengani Village.
GCC 1.1 (ii)	The Start Date shall be 7 (seven) days after the date of notice to proceed (NTP) .

GCC 1.1 (mm)	The Works consist of Construction of WUA Office Buildings in five (5) locations as indicated GCC 1.1 (ff)
GCC 2.2	Sectional Completions are: Not Applicable
GCC 2.3 (j)	The following documents also form part of the Contract: • Quality Control Plan and Safety Plan
GCC 3.1	The language of the contract is: English The law that applies to the Contract is the law of Islamic Republic of Afghanistan (IRoA)
GCC 8.3	Add sub-clause 8.3 as follows. “The Contractor shall comply with all applicable national, provincial and local environmental laws and regulations. The Contractor shall allocate the budget required to comply with this requirement”.
GCC 10.1	Project Manager's Decisions: Add the following at the end of the Sub-clause: “Notwithstanding anything contained hereinabove, the Project Manager is required to obtain approval of the Employer before exercising specific authorities as listed below: (i) Extension of the Intended Completion Date in accordance with Sub-Clauses 36.1 and 36.2. (ii) Instructing or approving Variations pursuant to Clause 47 if such Variation results in increase of Contract price by more than 0.5% in a single instance, and combined with all previously issued Variations results in increase of the Accepted Contract Amount by more than 2%.
GCC 11.1	The Project Manager may delegate any of his duties and responsibilities.
GCC 14.1	Schedule of other contractors: Not Applicable
GCC 19.1	The minimum insurance amounts and deductibles shall be: (a) Minimum insurance amount for loss or damage to the Works, Plant and Materials: 19 Million Afs. Deductibles: None (b) Minimum insurance amount for loss or damage to Equipment: 5 Million Afs. Deductibles: 100,000 Afghani (c) for loss or damage to property (except the Works, Plant, Materials, and Equipment) in connection with Contract: 3 Million Afs per occurrence, with the number of occurrences unlimited (d) for personal injury or death: (i) of the Contractor's employees: as per Afghanistan's law (ii) of other people: as per Afghanistan's law
GCC 20.1	Site Investigation Reports are: Reports available, if any, can be inspected at PMO Kabul
GCC 23.1	The following shall be designed by the Contractor: Not Applicable

GCC 24.1	Add the following at the end of the sub-clause. “The Contractor shall be responsible for the security of the Works, the Contractor's personnel, materials and equipment for the duration of the project. The Contractor shall make available a budget for all such safety and security measures. It shall be deemed that any safety and security related costs are included in the unit prices for other items in the Bill of Quantities”.
GCC 26.1	The Site Possession Date(s) shall be: 14 days after the signing of contract
GCC 29.1	Appointing Authority for the Adjudicator: Minister, Ministry of Justice, IRoA
GCC 30.3	The Adjudicator shall be paid by the hour at the rate of: as per MEW Policy The reimbursable expenses are: as per MEW Policy
GCC 30.4	Institution whose arbitration procedures shall be used: (a) Contracts with foreign contractors: International arbitration shall be conducted in accordance with the rules of Singapore International Arbitration Centre (SIAC). Arbitration shall be administered by SIAC The place of arbitration shall be: the place of the institution administering the arbitration. (b) Contracts with domestic contractors: Arbitration shall be conducted in accordance with the laws of the Employer's country.
GCC 34.2	The following additional clause shall apply: Respectful Work Environment The Contractor shall ensure that its employees and sub-contractors observe the highest ethical standards and refrain from any form of bullying, discrimination, misconduct and harassment, including sexual harassment and shall, at all times, behave in a manner that creates an environment free of unethical behavior, bullying, misconduct and harassment, including sexual harassment. The Contractor shall take appropriate action against any employees or sub-contractors, including suspension or termination of employment or sub-contract, if any form of unethical or inappropriate behavior is identified. The Contractor shall conduct training programs for its employees and sub-contractors to raise awareness on and prevent any form of bullying, discrimination, misconduct and harassment including sexual harassment, and to promote a respectful work environment. The Contractor shall keep an up to date record of its employees and subcontractors who have attended and completed such training programs and provide such records to the Employer or the Engineer at their first written request.

C. Time Control	
GCC 35.1	The Contractor shall submit for approval a Program for the Works within Fifteen (15) days from the date of the Letter of Acceptance.
GCC 35.3	The period between Program updates is Thirty (30) days.

	The amount to be withheld for late submission of an updated Program is 100,000.00 Afghani
D. Quality Control	
GCC 43.1	The Defects Liability Period is: Three Hundred and Sixty Five (365) days.
E. Cost Control	
GCC 53.1	The currency of the Employer's country is: Afghani (Afs)
GCC 54.1	The Contract is not subject to price adjustment in accordance with GCC Clause 54, and the following information regarding coefficients does not apply. The coefficients and indexes for adjustment of prices in local and international currencies shall be as specified in the Table(s) of Adjustment Data submitted together with the Letter of Bid.
GCC 55.1	The proportion of payments retained is: Ten (10) percent
GCC 56.1	The liquidated damages for the whole of the Works are 0.05% per day. The maximum amount of liquidated damages for the whole of the Works is Ten percent (10%) of the final Contract Price.
GCC 58.1	The Advance Payments shall be Ten (10) percent and shall be paid to the Contractor no later than Thirty (30) days after the date of signing of the contract.
GCC 58.3	Repayment of the Advance Payments shall be: Fifteen percent (15%) from each payment certificate.
GCC 59.1	The Performance Security amount is five percent (5%) of the Contract Amount
G. Finishing the Contract	
GCC 72.1	The date by which operating and maintenance manuals are required is: Not Applicable The date by which "as built" drawings are required is at the date of Issuance of Certificate of Completion.
GCC 72.2	The amount to be withheld for failing to produce "as built" drawings and/or operating and maintenance manuals by the date required in GCC 72.1 is 100,000.00 Afghani
GCC 73.2 (h)	The maximum number of days is: 200 days
GCC 75.1	The percentage to apply to the value of the work not completed, representing the Employer's additional cost for completing the Works, is fifteen (15) percent.
Additional (Contingency)	The contingency shall be spent after securing ADB approval, it means that prior approval of ADB is mandatory.

Section 5 - Eligible Countries

This section contains the list of eligible countries.

The current listing of all ADB member countries can be found at
<http://www.adb.org/about/members>.

List of ADB Member Countries

1.	AFG	Afghanistan	35.	FSM	Micronesia, Federated States of
2.	ARM	Armenia	36.	MON	Mongolia
3.	AUS	Australia	37.	MYA	Myanmar
4.	AUT	Austria	38.	NAU	Nauru
5.	AZE	Azerbaijan	39.	NEP	Nepal
6.	BAN	Bangladesh	40.	NET	The Netherlands
7.	BEL	Belgium	41.	NZL	New Zealand
8.	BHU	Bhutan	42.	NOR	Norway
9.	BRU	Brunei Darussalam	43.	PAK	Pakistan
10.	CAM	Cambodia	44.	PAL	Palau
11.	CAN	Canada	45.	PNG	Papua New Guinea
12.	PRC	China, People's Republic of	46.	PHI	Philippines
13.	COO	Cook Islands	47.	POR	Portugal
14.	DEN	Denmark	48.	SAM	Samoa
15.	FIJ	Fiji Islands, Republic of	49.	SIN	Singapore
16.	FIN	Finland	50.	SOL	Solomon Islands
17.	FRA	France	51.	SPA	Spain
18.	GEO	Georgia	52.	SRI	Sri Lanka
19.	GER	Germany	53.	SWE	Sweden
20.	HKG	Hon Kong, China	54.	SWI	Switzerland
21.	IND	India	55.	TAJ	Tajikistan
22.	INO	Indonesia	56.	TAP	Taipei, China
23.	IRE	Ireland	57.	THA	Thailand
24.	ITA	Italy	58.	TIM	Timor-Leste
25.	JPN	Japan	59.	TON	Tonga
26.	KAZ	Kazakhstan	60.	TUR	Turkey
27.	KIR	Kiribati	61.	TKM	Turkmenistan
28.	KOR	Korea, Republic of	62.	TUV	Tuvalu
29.	KGZ	Kyrgyz Republic	63.	UKG	United Kingdom
30.	LAO	Lao PDR	64.	USA	United States
31.	LUX	Luxembourg	65.	UZB	Uzbekistan
32.	MAL	Malaysia	66.	VAN	Vanuatu
33.	MLD	Maldives	67.	VIE	Viet Nam
34.	RMI	Marshal Island			

Section 7 - General Conditions of Contract

Ministry of Energy and Water

[Name of Employer]

**Constructon of Water User Association Office
Buildings**

[Name of Contract]

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General Conditions of Contract

A. General

1. Definitions

1.1 Boldface type is used to identify defined terms.

- (a) The **Accepted Contract Amount** means the amount accepted in the Letter of Acceptance for the execution and completion of the Works and the remedying of any defects.
- (b) The **Activity Schedule** is a schedule of the activities comprising the construction, installation, testing, and commissioning of the Works in a lump sum contract. It includes a lump sum price for each activity, which is used for valuations and for assessing the effects of Variations and Compensation Events.
- (c) The **Adjudicator** is the person appointed jointly by the Employer and the Contractor to resolve disputes in the first instance, as provided for in GCC 29.1 [Appointment of Adjudicator] hereunder.
- (d) **Bank** means the financing institutions named in the **Particular Conditions of Contract (PCC)**.
- (e) **Bill of Quantities** means the priced and completed Bill of Quantities forming part of the Bid.
- (f) **Compensation Events** are those defined in GCC 51.1 [Compensation Events] hereunder.
- (g) The **Completion Date** is the date of completion of the Works as certified by the Project Manager, in accordance with GCC 69.1 [Completion].
- (h) The **Contract** is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in GCC 2.3 below.
- (i) The **Contractor** is the party whose Bid to carry out the Works has been accepted by the Employer.
- (j) The **Contractor's Bid** is the completed bidding document submitted by the Contractor to the Employer.
- (k) The **Contract Price** is the Accepted Contract Amount stated in the Letter of Acceptance and thereafter as adjusted in accordance with the Contract.
- (l) **Days** are calendar days; months are calendar months.
- (m) **Dayworks** are varied work inputs subject to payment on a time basis for the Contractor's employees and Equipment, in addition to payments for associated Materials and Plant.
- (n) A **Defect** is any part of the Works not completed in accordance with the Contract.
- (o) The **Defects Liability Certificate** is the certificate issued by the Project Manager upon correction of defects by the Contractor.
- (p) The **Defects Liability Period** is the period calculated from the Completion Date where the Contractor remains responsible for remedying defects.

- (q) **Drawings** include calculations and other information provided or approved by the Project Manager for the execution of the Contract.
- (r) The **Employer** is the party who employs the Contractor to carry out the Works, as specified in the **PCC**.
- (s) **Equipment** is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.
- (t) **Force Majeure** means an exceptional event or circumstance: which is beyond a Party's control; which such Party could not reasonably have provided against before entering into the Contract; which, having arisen, such Party could not reasonably have avoided or overcome; and, which is not substantially attributable to the other Party.
- (u) **In writing** or **written** means hand-written, type-written, printed or electronically made, and resulting in a permanent record.
- (v) The **Initial Contract Price** is the Contract Price listed in the Employer's Letter of Acceptance.
- (w) The **Intended Completion Date** is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the **PCC**. The Intended Completion Date may be revised only by the Project Manager by issuing an extension of time or an acceleration order.
- (x) **Letter of Acceptance** means the formal acceptance by the Employer of the Bid and denotes the formation of the Contract at the date of acceptance.
- (y) **Materials** are all supplies, including consumables, used by the Contractor for incorporation in the Works.
- (z) **Party** means the Employer or the Contractor, as the context requires.
- (aa) **PCC** means Particular Conditions of Contract.
- (bb) **Plant** is any integral part of the Works that shall have a mechanical, electrical, chemical, or biological function.
- (cc) The **Project Manager** is the person named in the **PCC** (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Project Manager) who is responsible for supervising the execution of the Works and administering the Contract.
- (dd) **Retention Money** means the aggregate of all monies retained by the Employer pursuant to GCC 55.1 [Retention].
- (ee) **Schedules** means the document(s) entitled schedules, completed by the Contractor and submitted with the Letter of Tender, as included in the Contract. Such document may include the Bill of Quantities, data, lists, and schedules of rates and/or prices.
- (ff) The **Site** is the area defined as such in the **PCC**.
- (gg) **Site Investigation Reports** are those that were included in the bidding documents and are factual and interpretative reports about the surface and subsurface conditions at the Site.
- (hh) **Specification** means the Specification of the Works included in the Contract and any modification or addition made or approved by the Project Manager.

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- (ii) The **Start Date** is given in the **PCC**. It is the latest date when the Contractor shall commence execution of the Works. It does not necessarily coincide with any of the Site Possession Dates.
 - (jj) A **Subcontractor** is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract, which includes work on the Site.
 - (kk) **Temporary Works** are works designed, constructed, installed, and removed by the Contractor that are needed for construction or installation of the Works.
 - (ll) A **Variation** is an instruction given by the Project Manager which varies the Works.
 - (mm) The **Works** are what the Contract requires the Contractor to construct, install, and turn over to the Employer, as defined in the **PCC**.
- 2. Interpretation**
- 2.1 In interpreting these GCC, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Project Manager shall provide instructions clarifying queries about these GCC.
 - 2.2 If sectional completion is specified in the **PCC**, references in the GCC to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion Date for the whole of the Works).
 - 2.3 The documents forming the Contract shall be interpreted in the following order of priority:
 - (a) Contract Agreement,
 - (b) Letter of Acceptance,
 - (c) Letter of Bid,
 - (d) Particular Conditions of Contract,
 - (e) the List of Eligible Countries that was specified in Section 5 of the bidding document,
 - (f) General Conditions of Contract,
 - (g) Specifications,
 - (h) Drawings,
 - (i) Completed Activity Schedules or Bill of Quantities, and
 - (j) any other document listed in the **PCC** as forming part of the Contract.
- 3. Language and Law**
- 3.1 The language of the Contract and the law governing the Contract are stated in the **PCC**.
 - 3.2 Throughout the execution of the Contract, the Contractor shall comply with the import of goods and services prohibitions in the Employer's country when
 - (a) by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Borrower's Country prohibits any import of goods from, or any payments to, a particular country, person, or entity. Where the borrower's country prohibits payments to a

particular firm or for particular goods by such an act of compliance, that firm may be excluded.

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| 4. Contract Agreement | 4.1 The Parties shall enter into a Contract Agreement within 28 days after the Contractor receives the Letter of Acceptance, unless the Particular Conditions establish otherwise. The Contract Agreement shall be based upon the attached Contract forms in Section 8. The costs of stamp duties and similar charges (if any) imposed by law in connection with entry into the Contract Agreement shall be borne by the Employer. |
| 5. Assignment | 5.1 Neither Party shall assign the whole or any part of the Contract or any benefit or interest in or under the Contract. However, either Party

(a) may assign the whole or any part with the prior agreement of the other Party, at the sole discretion of such other Party; and

(b) may, as security in favor of a bank or financial institution, assign its right to any moneys due, or to become due, under the Contract. |
| 6. Care and Supply of Documents | 6.1 The Specification and Drawings shall be in the custody and care of the Employer. Unless otherwise stated in the Contract, two copies of the Contract and of each subsequent Drawing shall be supplied to the Contractor, who may make or request further copies at the cost of the Contractor.

6.2 Each of the Contractor's Documents shall be in the custody and care of the Contractor, unless and until taken over by the Employer. Unless otherwise stated in the Contract, the Contractor shall supply to the Engineer six copies of each of the Contractor's Documents.

6.3 The Contractor shall keep, on the Site, a copy of the Contract, publications named in the Specification, the Contractor's Documents (if any), the Drawings and Variations and other communications given under the Contract. The Employer's Personnel shall have the right of access to all these documents at all reasonable times.

6.4 If a Party becomes aware of an error or defect in a document which was prepared for use in executing the Works, the Party shall promptly give notice to the other Party of such error or defect. |
| 7. Confidential Details | 7.1 The Contractor's and the Employer's Personnel shall disclose all such confidential and other information as may be reasonably required in order to verify the Contractor's compliance with the Contract and allow its proper implementation.

7.2 Each of them shall treat the details of the Contract as private and confidential, except to the extent necessary to carry out their respective obligations under the Contract or to comply with applicable Laws. Each of them shall not publish or disclose any particulars of the Works prepared by the other Party without the previous agreement of the other Party. However, the Contractor shall be permitted to disclose any publicly available information, or information otherwise required to establish his qualifications to compete for other projects.

7.3 Notwithstanding the above, the Contractor may furnish to its Subcontractor(s) such documents, data and other information it receives from the Employer to the extent required for the Subcontractor(s) to perform its work under the Contract, in which event the Contractor shall obtain from such Subcontractor(s) an undertaking of confidentiality similar to that imposed on the Contractor under this Clause. |

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| 8. Compliance with Laws | <p>8.1 The Contractor shall, in performing the Contract, comply with applicable Laws.</p> <p>8.2 Unless otherwise stated in the Particular Conditions,</p> <ul style="list-style-type: none">(a) the Employer shall acquire and pay for all permits, approvals, and/or licenses from all local, state, or national government authorities or public service undertakings in the [Employer's Country or country where the Site is located] which (i) such authorities or undertakings require the Employer to obtain in the Employer's name, and (ii) are necessary for the execution of the Contract, including those required for the performance by both the Contractor and the Employer of their respective obligations under the Contract;(b) the Contractor shall acquire and pay for all permits, approvals, and/or licenses from all local, state, or national government authorities or public service undertakings in the [Employer's Country or country where the Site is located] which such authorities or undertakings require the Contractor to obtain in its name and which are necessary for the performance of the Contract, including, without limitation, visas for the Contractor's and Subcontractor's personnel and entry permits for all imported Contractor's Equipment. The Contractor shall acquire all other permits, approvals, and/or licenses that are not the responsibility of the Employer under Subclause 8.2(a) hereof and that are necessary for the performance of the Contract. The Contractor shall indemnify and hold harmless the Employer from and against any and all liabilities, damages, claims, fines, penalties, and expenses of whatever nature arising or resulting from the violation of such laws by the Employer or its personnel, including the Subcontractors and their personnel, but without prejudice to Subclause 8.1 hereof. |
| 9. Joint and Several Liability | <p>9.1 If the Contractor is a joint venture of two or more persons, all such persons shall be jointly and severally liable to the Employer for the fulfillment of the provisions of the Contract, and shall designate one of such persons to act as a leader with authority to bind the joint venture. The composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer.</p> |
| 10. Project Manager's Decisions | <p>10.1 Except where otherwise specifically stated, the Project Manager shall decide contractual matters between the Employer and the Contractor in the role representing the Employer.</p> |
| 11. Delegation | <p>11.1 The Project Manager may delegate any of his duties and responsibilities to other people, except to the Adjudicator, after notifying the Contractor, and may cancel any delegation after notifying the Contractor.</p> |
| 12. Communications | <p>12.1 Communications between parties that are referred to in the Conditions shall be effective only when in writing. A notice shall be effective only when it is delivered.</p> |
| 13. Subcontracting | <p>13.1 The Contractor may subcontract with the approval of the Project Manager, but may not assign the Contract without the approval of the Employer in writing. Subcontracting shall not alter the Contractor's obligations.</p> |
| 14. Other Contractors | <p>14.1 The Contractor shall cooperate and share the Site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of Other Contractors, as referred to in the PCC. The Contractor shall also provide facilities and services for them</p> |

	as described in the Schedule. The Employer may modify the Schedule of Other Contractors, and shall notify the Contractor of any such modification.
15. Personnel and Equipment	15.1 The Contractor shall employ the key personnel and use the equipment identified in its Bid to carry out the functions stated in the Schedule or other personnel and equipment approved by the Project Manager. The Project Manager shall approve any proposed replacement of key personnel and equipment only if their relevant qualifications or characteristics are substantially equal to or better than those proposed in the Bid. 15.2 If the Project Manager asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within 7 days and has no further connection with the work in the Contract. 15.3 If the Employer, Project Manager, or Contractor determines, that any employee of the Contractor be determined to have engaged in corrupt, fraudulent, collusive, coercive, or other prohibited practices during the execution of the Works, then that employee shall be removed in accordance with Clause 15.2 above.
16. Employer's and Contractor's Risks	16.1 The Employer carries the risks which this Contract states are Employer's risks, and the Contractor carries the risks which this Contract states are Contractor's risks.
17. Employer's Risks	17.1 From the Start Date until the Defects Liability Certificate has been issued, the following are Employer's risks: (a) The risk of personal injury, death, or loss of or damage to property (excluding the Works, Plant, Materials, and Equipment), which are due to (i) use or occupation of the Site by the Works or for the purpose of the Works, which is the unavoidable result of the Works, or (ii) negligence, breach of statutory duty, or interference with any legal right by the Employer or by any person employed by or contracted to him except the Contractor. (b) The risk of damage to the Works, Plant, Materials, and Equipment to the extent that it is due to a fault of the Employer or in the Employer's design, or due to war or radioactive contamination directly affecting the country where the Works are to be executed. 17.2 From the Completion Date until the Defects Liability Certificate has been issued, the risk of loss of or damage to the Works, Plant, and Materials is an Employer's risk except loss or damage due to (a) a Defect which existed on the Completion Date, (b) an event occurring before the Completion Date, which was not itself an Employer's risk, or (c) the activities of the Contractor on the Site after the Completion Date.
18. Contractor's Risks	18.1 From the Starting Date until the Defects Liability Certificate has been issued, the risks of personal injury, death, and loss of or damage to property (including, without limitation, the Works, Plant, Materials, and Equipment) which are not Employer's risks, are Contractor's risks.

19. Insurance

- 19.1 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the **PCC** for the following events, which are due to the Contractor's risks:
- (a) loss of or damage to the Works, Plant, and Materials;
 - (b) loss of or damage to Equipment;
 - (c) loss of or damage to property (except the Works, Plant, Materials, and Equipment) in connection with the Contract; and
 - (d) personal injury or death.
- 19.2 Policies and certificates for insurance shall be delivered by the Contractor to the Project Manager for the Project Manager's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.
- 19.3 If the Contractor does not provide any of the policies and certificates required, the Employer may effect the insurance, which the Contractor should have provided and recover the premiums the Employer has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.
- 19.4 Alterations to the terms of an insurance shall not be made without the approval of the Project Manager.
- 19.5 Both parties shall comply with any conditions of the insurance policies.

20. Site Investigation Reports

- 20.1 The Contractor, in preparing the Bid, shall rely on any Site Investigation Reports referred to in the **PCC**, supplemented by any information available to the Contractor.

21. Contractor to Construct the Works

- 21.1 The Contractor shall construct and install the Works in accordance with the Specifications and Drawings.

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

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

23. Designs by Contractor and Approval by the Project Manager

- 23.1 The Contractor shall carry out design to the extent specified in the **PCC**. The Contractor shall promptly submit to the Employer all designs prepared by him. Within 14 days of receipt, the Employer shall notify any comments. The Contractor shall not construct any element of the permanent work designed by him within 14 days after the design has been submitted to the Employer or where the design for that element has been rejected. Design that has been rejected shall be promptly amended and resubmitted. The Contractor shall resubmit all designs commented on, taking these comments into account as necessary.
- 23.2 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Project Manager, who is to approve them if they comply with the Specifications and Drawings..
- 23.3 The Contractor shall be responsible for design of Temporary Works.

- 23.4 The Project Manager's approval shall not alter the Contractor's responsibility for design of the Temporary Works.
- 23.5 The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.
- 23.6 All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Project Manager before this use.
- 24. Safety**
- 24.1 The Contractor shall be responsible for the safety of all activities on the Site.
- 25. Discoveries**
- 25.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site shall be the property of the Employer. The Contractor shall notify the Project Manager of such discoveries and carry out the Project Manager's instructions for dealing with them.
- 26. Possession of the Site**
- 26.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the **PCC**, the Employer shall be deemed to have delayed the start of the relevant activities, and this shall be a Compensation Event.
- 27. Access to the Site**
- 27.1 The Contractor shall allow the Project Manager and any person authorized by the Project Manager access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.
- 28. Instructions, Inspections, and Audits**
- 28.1 The Contractor shall carry out all instructions of the Project Manager, which comply with the applicable laws where the Site is located.
- 28.2 The Contractor shall keep, and shall make all reasonable efforts to cause its Subcontractors and subconsultants to keep accurate and systematic accounts and records in respect of the Works in such form and details as will clearly identify relevant time changes and costs.
- 28.3 The Contractor shall permit ADB to inspect the Contractor's accounts, records, and other documents relating to the submission of bids and contract performance and to have them audited by auditors appointed by ADB. The Contractor shall maintain all documents and records related to the Contract for a period of three (3) years after completion of the Works. The Contractor shall provide any documents necessary for the investigation of allegations of fraud, collusion, coercion, or corruption and require its employees or agents with knowledge of the Contract to respond to questions from ADB.
- 29. Appointment of the Adjudicator**
- 29.1 The Adjudicator shall be appointed jointly by the Employer and the Contractor, at the time of the Employer's issuance of the Letter of Acceptance. If, in the Letter of Acceptance, the Employer does not agree on the appointment of the Adjudicator, the Employer will request the Appointing Authority designated in the **PCC**, to appoint the Adjudicator within 14 days of receipt of such request.
- 29.2 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not functioning in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days, the

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

30. Procedure for Disputes

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

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

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

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

B. Staff and Labor

31. Forced Labor

31.1 The Contractor shall not employ forced labor, which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty. This covers any kind of involuntary or compulsory labor, such as indentured labor, bonded labor, or similar labor-contracting arrangements.

32. Child Labor

32.1 The Contractor shall not employ children in a manner that is economically exploitative, or is likely to be hazardous, or to interfere with, the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral, or social development. Where national laws have provisions for employment of minors, the Contractor shall follow those laws applicable to the Contractor. Children below the age of 18 years shall not be employed in dangerous work.

33. Workers' Organizations

33.1 In countries where national law recognizes workers' rights to form and to join workers' organizations of their choosing without interference and to bargain collectively, the Contractor shall comply with national law. Where national law substantially restricts workers' organizations, the Contractor shall enable alternative means for the Contractor's Personnel to express their grievances and protect their rights regarding working conditions and terms of employment. In either case described above, and where national law is silent, the Contractor shall not discourage the Contractor's Personnel from forming or joining workers' organizations of their choosing or from bargaining collectively, and shall not discriminate or retaliate against the Contractor's Personnel who participate, or seek to participate, in such organizations and bargain collectively. The Contractor shall engage with such workers representatives. Worker organizations are expected to fairly represent the workers in the workforce.

34. Nondiscrimination and Equal Opportunity

34.1 The Contractor shall not make employment decisions on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment relationship on the principle of equal opportunity and fair treatment, and shall not discriminate with

respect to aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, promotion, termination of employment or retirement, and discipline. In countries where national law provides for non-discrimination in employment, the Contractor shall comply with national law. When national laws are silent on nondiscrimination in employment, the Contractor shall meet this Subclause's requirements. Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination.

C. Time Control

35. Program

- 35.1 Within the time stated in the **PCC**, after the date of the Letter of Acceptance, the Contractor shall submit to the Project Manager for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the Works. In the case of a lump sum contract, the activities in the Program shall be consistent with those in the Activity Schedule.
- 35.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work, including any changes to the sequence of the activities.
- 35.3 The Contractor shall submit to the Project Manager for approval an updated Program at intervals no longer than the period stated in the **PCC**. If the Contractor does not submit an updated Program within this period, the Project Manager may withhold the amount stated in the **PCC** from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted. In the case of a lump sum contract, the Contractor shall provide an updated Activity Schedule within 14 days of being instructed to by the Project Manager.
- 35.4 The Project Manager's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Project Manager again at any time. A revised Program shall show the effect of Variations and Compensation Events.

36. Extension of the Intended Completion Date

- 36.1 The Project Manager shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, which would cause the Contractor to incur additional cost.
- 36.2 The Project Manager shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Project Manager for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

37. Acceleration

- 37.1 When the Employer wants the Contractor to finish before the Intended Completion Date, the Project Manager shall obtain priced proposals for achieving the necessary acceleration from the Contractor. If the

	Employer accepts these proposals, the Intended Completion Date shall be adjusted accordingly and confirmed by both the Employer and the Contractor.
	37.2 If the Contractor's priced proposals for an acceleration are accepted by the Employer, they are incorporated in the Contract Price and treated as a Variation.
38. Delays Ordered by the Project Manager	38.1 The Project Manager may instruct the Contractor to delay the start or progress of any activity within the Works.
39. Management Meetings	39.1 Either the Project Manager or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.
	39.2 The Project Manager shall record the business of management meetings and provide copies of the record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken shall be decided by the Project Manager either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.
40. Early Warning	40.1 The Contractor shall warn the Project Manager at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price, or delay the execution of the Works. The Project Manager may require the Contractor to provide an estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date. The estimate shall be provided by the Contractor as soon as reasonably possible.
	40.2 The Contractor shall cooperate with the Project Manager in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Project Manager.

D. Quality Control

41. Identifying Defects	41.1 The Project Manager shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Project Manager may instruct the Contractor to search for a Defect and to uncover and test any work that the Project Manager considers may have a Defect.
42. Tests	42.1 If the Project Manager instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.
43. Correction of Defects	43.1 The Project Manager shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the PCC . The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

43.2 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the length of time specified by the Project Manager's notice.

44. Uncorrected Defects

44.1 If the Contractor has not corrected a Defect within the time specified in the Project Manager's notice, the Project Manager shall assess the cost of having the Defect corrected, and the Contractor shall pay this amount.

E. Cost Control

45. Contract Price

45.1 In the case of an admeasurement contract, the Bill of Quantities shall contain priced items for the Works to be performed by the Contractor. The Bill of Quantities is used to calculate the Contract Price. The Contractor will be paid for the quantity of the work accomplished at the rate in the Bill of Quantities for each item.

45.2 In the case of a lump sum contract, the Activity Schedule shall contain the priced activities for the Works to be performed by the Contractor. The Activity Schedule is used to monitor and control the performance of activities on which basis the Contractor will be paid. If payment for Materials on Site shall be made separately, the Contractor shall show delivery of Materials to the Site separately on the Activity Schedule.

46. Changes in the Contract Price

46.1 In the case of an admeasurement contract:

- (a) If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25%, provided the change exceeds 1% of the Initial Contract Price, the Project Manager shall adjust the rate to allow for the change.
- (b) The Project Manager shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15%, except with the prior approval of the Employer.
- (c) If requested by the Project Manager, the Contractor shall provide the Project Manager with a detailed cost breakdown of any rate in the Bill of Quantities.

46.2 In the case of a lump sum contract, the Activity Schedule shall be amended by the Contractor to accommodate changes of Program or method of working made at the Contractor's own discretion. Prices in the Activity Schedule shall not be altered when the Contractor makes such changes to the Activity Schedule.

47. Variations

47.1 All Variations shall be included in updated Programs, and, in the case of a lump sum contract, also in the Activity Schedule, produced by the Contractor.

47.2 The Contractor shall provide the Project Manager with a quotation for carrying out the Variation when requested to do so by the Project Manager. The Project Manager shall assess the quotation, which shall be given within seven (7) days of the request or within any longer period stated by the Project Manager and before the Variation is ordered.

47.3 If the Contractor's quotation is unreasonable, the Project Manager may order the Variation and make a change to the Contract Price, which shall be based on the Project Manager's own forecast of the effects of the Variation on the Contractor's costs.

- 47.4 If the Project Manager decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.
- 47.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.
- 47.6 In the case of an admeasurement contract, if the work in the Variation corresponds to an item description in the Bill of Quantities and if, in the opinion of the Project Manager, the quantity of work above the limit stated in GCC 46.1 [Changes in the Contract Price] or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in the form of new rates for the relevant items of work.
- 48. Cash Flow Forecasts**
- 48.1 When the Program, or, in the case of a lump sum contract, the Activity Schedule, is updated, the Contractor shall provide the Project Manager with an updated cash flow forecast. The cash flow forecast shall include different currencies, as defined in the Contract, converted as necessary using the Contract exchange rates.
- 49. Payment Certificates**
- 49.1 The Contractor shall submit to the Project Manager monthly statements of the estimated value of the work executed less the cumulative amount certified previously.
- 49.2 The Project Manager shall check the Contractor's monthly statement and certify the amount to be paid to the Contractor.
- 49.3 The value of work executed shall be determined by the Project Manager.
- 49.4 The value of work executed shall comprise,
- (a) in the case of an admeasurement contract, the value of the quantities of work in the Bill of Quantities that have been completed; or
 - (b) in the case of a lump sum contract, the value of work executed shall comprise the value of completed activities in the Activity Schedule.
- 49.5 The value of work executed shall include the valuation of Variations and Compensation Events.
- 49.6 The Project Manager may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.
- 50. Payments**
- 50.1 Payments shall be adjusted for deductions for advance payments and retention. The Employer shall pay the Contractor the amounts certified by the Project Manager within 28 days of the date of each certificate. If the Employer makes a late payment, the Contractor shall be paid interest on the late payment in the next payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the prevailing rate of

interest for commercial borrowing for each of the currencies in which payments are made.

50.2 If an amount certified is increased in a later certificate or as a result of an award by the Adjudicator or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

50.3 Unless otherwise stated, all payments and deductions shall be paid or charged in the proportions of currencies comprising the Contract Price.

50.4 Items of the Works for which no rate or price has been entered in shall not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

51. Compensation Events

51.1 The following shall be Compensation Events:

- (a) The Employer does not give access to a part of the Site by the Site Possession Date pursuant to GCC 26.1 [Possession of the Site].
- (b) The Employer modifies the Schedule of Other Contractors in a way that affects the work of the Contractor under the Contract.
- (c) The Project Manager orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time.
- (d) The Project Manager instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects.
- (e) The Project Manager unreasonably does not approve a subcontract to be let.
- (f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of the Letter of Acceptance from the information issued to Bidders (including the Site Investigation Reports), from information available publicly and from a visual inspection of the Site.
- (g) The Project Manager gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
- (h) Other contractors, public authorities, utilities, or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.
- (i) The advance payment is delayed.
- (j) The effects on the Contractor of any of the Employer's Risks.
- (k) The Project Manager unreasonably delays issuing a Certificate of Completion.

51.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Project Manager shall decide whether and by

how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

51.3 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast cost has been provided by the Contractor, it shall be assessed by the Project Manager, and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable, the Project Manager shall adjust the Contract Price based on the Project Manager's own forecast. The Project Manager shall assume that the Contractor shall react competently and promptly to the event.

51.4 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor's not having given early warning or not having cooperated with the Project Manager.

52. Tax

52.1 The Project Manager shall adjust the Contract Price if taxes, duties, and other levies are changed between the date 28 days before the submission of bids for the Contract and the date of the last Completion certificate. The adjustment shall be the change in the amount of tax payable by the Contractor, provided such changes are not already reflected in the Contract Price or are a result of GCC 54.1 [Price Adjustment].

53. Currencies

53.1 Where payments are made in currencies other than the currency of the Employer's country specified in the **PCC**, the exchange rates used for calculating the amounts to be paid shall be the exchange rates stated in the Contractor's Bid.

54. Price Adjustment

54.1 Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the **PCC**. If so provided, the amounts certified in each payment certificate, before deducting for Advance Payment, shall be adjusted by applying the respective price adjustment factor to the payment amounts due in each currency. A separate formula of the type indicated below applies to each Contract currency:

$$P_c = A_c + B_c \text{ Imc/loc}$$

where:

P_c is the adjustment factor for the portion of the Contract Price payable in a specific currency "c."

A_c and B_c are coefficients¹ specified in the **PCC**, representing the nonadjustable and adjustable portions, respectively, of the Contract Price payable in that specific currency "c;" and

Imc is a consolidated index prevailing at the end of the month being invoiced and loc is the same consolidated index prevailing 28 days before Bid opening for inputs payable; both in the specific currency "c."

54.2 If the value of the index is changed after it has been used in a calculation, the calculation shall be corrected and an adjustment made in the next

¹ The sum of the two coefficients A_c and B_c should be 1 (one) in the formula for each currency. Normally, both coefficients shall be the same in the formulas for all currencies, since coefficient A_c , for the nonadjustable portion of the payments, is a very approximate figure (usually 0.10 – 0.20) to take account of fixed cost elements or other nonadjustable components. The sum of the adjustments for each currency is added to the Contract Price.

payment certificate. The index value shall be deemed to take account of all changes in cost due to fluctuations in costs.

55. Retention

55.1 The Employer shall retain from each payment due to the Contractor the proportion stated in the **PCC** until Completion of the whole of the Works.

55.2 Upon the issue of a Certificate of Completion of the Works by the Project Manager, in accordance with GCC 69.1 [Completion], half the total amount retained shall be repaid to the Contractor and half when the Defects Liability Period has passed and the Project Manager has certified that all Defects notified by the Project Manager to the Contractor before the end of this period have been corrected. The Contractor may substitute retention money with an “on demand” bank guarantee.

56. Liquidated Damages

56.1 The Contractor shall pay liquidated damages to the Employer at the rate per day stated in the **PCC** for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the **PCC**. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor’s liabilities.

56.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Project Manager shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in GCC 50.1 [Payments].

57. Bonus

57.1 The Contractor shall be paid a Bonus calculated at the rate per calendar day stated in the **PCC** for each day (less any days for which the Contractor is paid for acceleration) that the Completion is earlier than the Intended Completion Date. The Project Manager shall certify that the Works are complete, although they may not be due to be complete.

58. Advance Payment

58.1 The Employer shall make advance payment to the Contractor of the amounts stated in the **PCC** by the date stated in the **PCC**, against provision by the Contractor of an unconditional bank guarantee in a form and by a bank acceptable to the Employer in amounts and currencies equal to the advance payment. The guarantee shall remain effective until the advance payment has been repaid, but the amount of the guarantee shall be progressively reduced by the amounts repaid by the Contractor. Interest shall not be charged on the advance payment.

58.2 The Contractor is to use the advance payment only to pay for Equipment, Plant, Materials, and mobilization expenses required specifically for execution of the Contract. The Contractor shall demonstrate that advance payment has been used in this way by supplying copies of invoices or other documents to the Project Manager.

58.3 The advance payment shall be repaid by deducting proportionate amounts from payments otherwise due to the Contractor, following the schedule of completed percentages of the Works on a payment basis. No account shall be taken of the advance payment or its repayment in assessing valuations of work done, Variations, price adjustments, Compensation Events, Bonuses, or Liquidated Damages.

59. Securities

59.1 The Performance Security shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued

in an amount specified in the **PCC**, by a bank acceptable to the Employer, and denominated in the types and proportions of the currencies in which the Contract Price is payable. The Performance Security shall be valid until a date 28 days from the date of issue of the Certificate of Completion in the case of a bank guarantee.

60. Dayworks

- 60.1 If applicable, the Dayworks rates in the Contractor's Bid shall be used for small additional amounts of work only when the Project Manager has given written instructions in advance for additional work to be paid for in that way.
- 60.2 All work to be paid for as Dayworks shall be recorded by the Contractor on forms approved by the Project Manager. Each completed form shall be verified and signed by the Project Manager within 2 days of the work being done.
- 60.3 The Contractor shall be paid for Dayworks subject to obtaining signed Dayworks forms.

61. Cost of Repairs

- 61.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction periods shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

F. Force Majeure

62. Definition of Force Majeure

- 62.1 In this Clause, "Force Majeure" means an exceptional event or circumstance,
- (a) which is beyond a Party's control;
 - (b) which such Party could not reasonably have provided against before entering into the Contract;
 - (c) which, having arisen, such Party could not reasonably have avoided or overcome; and
 - (d) which is not substantially attributable to the other Party.
- 62.2 Force Majeure may include, but is not limited to, exceptional events or circumstances of the kind listed below, so long as conditions (a) to (d) above are satisfied:
- (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies;
 - (b) rebellion, terrorism, sabotage by persons other than the Contractor's Personnel, revolution, insurrection, military or usurped power, or civil war;
 - (c) riot, commotion, disorder, strike or lockout by persons other than the Contractor's Personnel;
 - (d) munitions of war, explosive materials, ionizing radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity; and
 - (e) natural catastrophes such as earthquake, hurricane, typhoon, or volcanic activity.

- 63. Notice of Force Majeure**
- 63.1 If a Party is or will be prevented from performing its substantial obligations under the Contract by Force Majeure, then it shall give notice to the other Party of the event or circumstances constituting the Force Majeure and shall specify the obligations, the performance of which is or will be prevented. The notice shall be given within 14 days after the Party became aware, or should have become aware, of the relevant event or circumstance constituting Force Majeure.
- 63.2 The Party shall, having given notice, be excused performance of its obligations for so long as such Force Majeure prevents it from performing them.
- 63.3 Notwithstanding any other provision of this Clause, Force Majeure shall not apply to obligations of either Party to make payments to the other Party under the Contract.
- 64. Duty to Minimize Delay**
- 64.1 Each Party shall at all times use all reasonable endeavours to minimize any delay in the performance of the Contract as a result of Force Majeure.
- 64.2 A Party shall give notice to the other Party when it ceases to be affected by the Force Majeure.
- 65. Consequences of Force Majeure**
- 65.1 If the Contractor is prevented from performing its substantial obligations under the Contract by Force Majeure of which notice has been given under GCC Subclause 63 [Notice of Force Majeure], and suffers delay and/or incurs Cost by reason of such Force Majeure, the Contractor shall be entitled subject to GCC Subclause 30.1 [Procedure for Disputes] to
- (a) an extension of time for any such delay, if completion is or will be delayed, under GCC Subclause 36 [Extension of the Intended Completion Date]; and
 - (b) if the event or circumstance is of the kind described in subparagraphs (a) to (d) of GCC Subclause 62.2 [Definition of Force Majeure] and, in the case of subparagraphs (b) to (d), occurs in the Country, payment of any such Cost, including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Force Majeure, to the extent they are not indemnified through the insurance policy referred to in GCC Subclause 19 [Insurance].
- 65.2 After receiving this notice, the Project Manager shall proceed in accordance with GCC Subclause 10 [Project Manager's Decisions] to agree or determine these matters.
- 66. Force Majeure Affecting Subcontractor**
- 66.1 If any Subcontractor is entitled under any contract or agreement relating to the Works to relief from force majeure on terms additional to or broader than those specified in this Clause, such additional or broader Force Majeure events or circumstances shall not excuse the Contractor's nonperformance or entitle him to relief under this Clause.
- 67. Optional Termination, Payment and Release**
- 67.1 If the execution of substantially all the Works in progress is prevented for a continuous period of 84 days by reason of Force Majeure of which notice has been given under GCC Subclause 63 [Notice of Force Majeure], or for multiple periods which total more than 140 days due to the same notified Force Majeure, then either Party may give to the other Party a notice of termination of the Contract. In this event, the termination shall take effect 7 days after the notice is given, and the

Contractor shall proceed in accordance with GCC Subclause 73.5 [Termination].

67.2 Upon such termination, the Project Manager shall determine the value of the work done and issue a Payment Certificate, which shall include

- (a) the amounts payable for any work carried out for which a price is stated in the Contract;
- (b) the Cost of Plant and Materials ordered for the Works which have been delivered to the Contractor, or of which the Contractor is liable to accept delivery: this Plant and Materials shall become the property of (and be at the risk of) the Employer when paid for by the Employer, and the Contractor shall place the same at the Employer's disposal;
- (c) other Costs or liabilities which in the circumstances were reasonably and necessarily incurred by the Contractor in the expectation of completing the Works;
- (d) the Cost of removal of Temporary Works and Contractor's Equipment from the Site and the return of these items to the Contractor's works in his country (or to any other destination at no greater cost); and
- (e) the Cost of repatriation of the Contractor's staff and labor employed wholly in connection with the Works at the date of termination.

68. Release from Performance

68.1 Notwithstanding any other provision of this Clause, if any event or circumstance outside the control of the Parties (including, but not limited to, Force Majeure) arises, which makes it impossible or unlawful for either or both Parties to fulfill its or their contractual obligations or which, under the law governing the Contract, entitles the Parties to be released from further performance of the Contract, then upon notice by either Party to the other Party of such event or circumstance,

- (a) the Parties shall be discharged from further performance, without prejudice to the rights of either Party in respect of any previous breach of the Contract; and
- (b) the sum payable by the Employer to the Contractor shall be the same as would have been payable under GCC Subclause 67 [Optional Termination, Payment and Release] if the Contract had been terminated under GCC Subclause 67.

G. Finishing the Contract

69. Completion

69.1 The Contractor shall request the Project Manager to issue a certificate of Completion of the Works, and the Project Manager shall do so upon deciding that the work is completed.

70. Taking Over

70.1 The Employer shall take over the Site and the Works within 7 days of the Project Manager's issuing a certificate of Completion.

71. Final Account

71.1 The Contractor shall supply the Project Manager with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Project Manager shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the Project Manager shall issue within 56 days a schedule that states the scope of

the corrections or additions that are necessary. If the Final Account is still unsatisfactory after it has been resubmitted, the Project Manager shall decide on the amount payable to the Contractor and issue a payment certificate.

72. Operating and Maintenance Manuals

- 72.1 If “as built” Drawings and/or operating and maintenance manuals are required, the Contractor shall supply them by the dates stated in the **PCC**.
- 72.2 If the Contractor does not supply the Drawings and/or manuals by the dates stated in the **PCC** pursuant to GCC 72.1, or they do not receive the Project Manager’s approval, the Project Manager shall withhold the amount stated in the **PCC** from payments due to the Contractor.

73. Termination

- 73.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.
- 73.2 Fundamental breaches of Contract shall include, but shall not be limited to, the following:
- (a) the Contractor stops work for 28 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Project Manager;
 - (b) the Project Manager instructs the Contractor to delay the progress of the Works, and the instruction is not withdrawn within 28 days;
 - (c) the Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
 - (d) a payment certified by the Project Manager is not paid by the Employer to the Contractor within 84 days of the date of the Project Manager’s certificate;
 - (e) the Project Manager gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Project Manager;
 - (f) the Project Manager gives two consecutive Notices to update the Program and accelerate the works to ensure compliance with GCC Subclause 22.1 [The Works to be Completed by the Intended Completion Date] and the Contractor fails to update the Program and demonstrate acceleration of the works within a reasonable period of time determined by the Project Manager;
 - (g) the Contractor does not maintain a Security, which is required;
 - (h) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in the **PCC**; and
 - (i) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in executing the Contract, pursuant to GCC 74.1 [Fraud and Corruption].
- 73.3 When either party to the Contract gives notice of a breach of Contract to the Project Manager for a cause other than those listed under GCC 73.2 above, the Project Manager shall decide whether the breach is fundamental or not.
- 73.4 Notwithstanding the above, the Employer may terminate the Contract for convenience.

- 73.5 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure, and leave the Site as soon as reasonably possible.

**74. Fraud and
Corruption**

- 74.1 ADB's Anticorruption Policy requires Borrowers (including beneficiaries of ADB-financed activity), as well as Contractors, Subcontractors, Manufacturers, and Consultants under ADB-financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the ADB

- (a) defines, for the purposes of this provision, the terms set forth below as follows:
- (i) "corrupt practice" means the offering, giving, receiving, or soliciting, directly or indirectly, anything of value to influence improperly the actions of another party;
 - (ii) "fraudulent practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;
 - (iii) "coercive practice" means impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence improperly the actions of a party;
 - (iv) "collusive practice" means an arrangement between two or more parties designed to achieve an improper purpose, including influencing improperly the actions of another party;
 - (v) "obstructive practice" means (a) deliberately destroying, falsifying, altering, or concealing of evidence material to an ADB investigation; (b) making false statements to investigators in order to materially impede an ADB investigation; (c) failing to comply with requests to provide information, documents, or records in connection with an Office of Anticorruption and Integrity (OAI) investigation; (d) threatening, harassing, or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or (e) materially impeding ADB's contractual rights of audit or access to information; and
 - (vi) "integrity violation" is any act which violates ADB's Anticorruption Policy, including (i) to (v) above and the following: abuse, conflict of interest, violations of ADB sanctions, retaliation against whistleblowers or witnesses, and other violations of ADB's Anticorruption Policy, including failure to adhere to the highest ethical standard.
- (b) will reject a proposal for award if it determines that the Bidder recommended for award has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations in competing for the Contract;
- (c) will cancel the portion of the financing allocated to a contract if it determines at any time that representatives of the borrower or of a beneficiary of ADB-financing engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations during the procurement or the execution of that

	contract, without the borrower having taken timely and appropriate action satisfactory to ADB to remedy the situation; and
	(d) will impose remedial actions on a firm or an individual, at any time, in accordance with ADB's Anticorruption Policy and Integrity Principles and Guidelines (both as amended from time to time), including declaring ineligible, either indefinitely or for a stated period of time, to participate ² in ADB-financed, -administered, or -supported activities or to benefit from an ADB-financed, -administered, or -supported contract, financially or otherwise, if it at any time determines that the firm or individual has, directly or through an agent, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices or other integrity violations.
75. Payment upon Termination	75.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Project Manager shall issue a certificate for the value of the work done and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed, as indicated in the PCC. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer. 75.2 If the Contract is terminated for the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Project Manager shall issue a certificate for the value of the work done, Materials ordered, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works, and less advance payments received up to the date of the certificate.
76. Property	76.1 All Materials on the Site, Plant, Equipment, Temporary Works, and Works shall be deemed to be the property of the Employer if the Contract is terminated because of the Contractor's default.
77. Release from Performance	77.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor, the Project Manager shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterward to which a commitment was made.
78. Suspension of ADB Loan or Credit	78.1 In the event that ADB suspends the Loan or Credit to the Employer, from which part of the payments to the Contractor are being made, (a) the Employer is obligated to notify the Contractor, with copy to the Project Manager, of such suspension within 7 days of having received ADB's suspension notice.

² Whether as a Contractor, Nominated Subcontractor, Consultant, Manufacturer or Supplier, or Service Provider; or in any other capacity (different names are used depending on the particular Bidding Document). A Nominated Subcontractor is one which either has been (i) included by the Bidder in its prequalification application or bid because it brings specific and critical experience and know-how that are accounted for in the evaluation of the Bidder's prequalification application or the bid; or (ii) appointed by the Employer.

- (b) if the Contractor has not received sums due it within the 28 days for payment provided for in GCC 50.1 [Payments], the Contractor may immediately issue a 14-day termination notice.

79. Eligibility

- 79.1 The Contractor shall have the nationality of an eligible country as specified in Section 5 [Eligible Countries] of the bidding document. The Contractor shall be deemed to have the nationality of a country if the Contractor is a citizen or is constituted, incorporated, or registered, and operates in conformity with the provisions of the laws of that country. This criterion shall also apply to the determination of the nationality of proposed subcontractors or suppliers for any part of the Contract including related services.
- 79.2 The materials, equipment, and services to be supplied under the Contract shall have their origin in eligible source countries as specified in Section 5 [Eligible Countries] of the bidding document and all expenditures under the Contract will be limited to such materials, equipment, and services. At the Employer's request, the Contractor may be required to provide evidence of the origin of materials, equipment, and services.
- 79.3 For purposes of GCC 79.2, "origin" means the place where the materials and equipment are mined, grown, produced, or manufactured, and from which the services are provided. Materials and equipment are produced when, through manufacturing, processing, or substantial or major assembling of components, a commercially recognized product results that differs substantially in its basic characteristics or in purpose or utility from its components.

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Note 1 The figures and data (thickness, dimensions, diameters, width, length etc..) at this document, as well as the materials mentioned, are to be considered as minimum standards for the Contractor who is requested to provide and fixing materials and appurtenance of the same or better quality and of the same minimum dimensions.

Also it is to be intended that samples or detailed technical specifications of the proposed materials, goods, equipment, fittings and devices that the Contractor intends to provide and fix, must be submitted to the Engineer for a previous approval.

Note 2: All goods supplied and activities and works performed in the building shall comply in any case with the General Conditions of Contract regulations and norms

Note 3: The materials used and the fittings installed without the Engineer approval shall be immediately removed.

Note 4: Brand names, addresses, telephone and fax numbers of any manufacturers or supplier of the devices, fittings and goods provided and installed into the building shall be submitted to the Engineer together with the operating manuals

Abbreviations

mm	shall mean	millimetre
m.	shall mean	metre
mm ²	shall mean	square millimetre
m ²	shall mean	square metre
m ³	shall mean	cubic metre
kg	shall mean	kilogram
to	shall mean	tonne (1000 kg)
u.	shall mean	unit
h.	shall mean	hour
L.S.	shall mean	lump sum
km	shall mean	kilometre
l	shall mean	litre
%	shall mean	per cent
DN	shall mean	nominal diameter
m/m	shall mean	man-month
m/d	shall mean	man-day
FFL	shall mean	Final floor level
HDPE	shall mean	High density extruded polyethylene
RC	shall mean	Reinforced Concrete
ENGINEER	shall mean	Supervisor
PVC	shall mean	Polyvinyl chloride
D.D.	shall mean	Design Drawings
T.S.	shall mean	Technical Specifications
CA	shall mean	Contracting Authority

GI GENERAL INFORMATION

GI.01 Location and description

The Water user association (WUA) buildings will be constructed at the following locations;

1. One office building for Sharawan Canal Water User Association along the Sharwan Canal at the below location:
N=36,71285
E=69,59055
Elevation= 851 meter
The sketch of the site is attached as attachment number-1.
2. One office building for Polikhomri Water user association along the Polikhomri River at the below location;
N=3554477
E=06844303
Elevation = 648 meter
The sketch of the site is attached as attachment number-2.
3. One office building for Kisham water user associations located at Kisham district along the Kisham river and the exact location is shown in the sketch as attachment number -3.

4. One office building for Khanabad water user associations located near to the security guard's room of Mechanical door of Khanabad weir, the detail sketch is attached as attachment number – 4.
5. One office building for Dasht-e-Qalah water user association along the Dasht-e-Qalah main canal located at the following location;
N=3706926
E=06927660
Its near to Pengani Village and its sketch is attached as attachment number -5.

GI.02 Submittals

These specifications require that the Contractor submit to the Supervisor information or Drawings for review and approval prior to actually doing the work. The items to be submitted for review and approval by the Supervisor are generally referred to as "Submittals". The Contractor should read through these sections very carefully and understand the level of effort required to provide this information. It is also important that the Contractor plan well in advance for this review and approval process, as rejection of a Submittal will require time for revision, re-submittal and review and no additional Contract time will be granted for this re-work.

GI.03 Work Plan or Programme of Implementation of tasks

Within five (5) days from the date of the Commencement Order the Contractor shall submit to the Supervisor for approval a complete and practicable Programme of Implementation of tasks i.e. a work plan showing the orderly performance of the Works and the resources and materials required for it. The Plan must follow the outline shown below. The Plan should use the Work Plan, submitted as part of the Contractor's Tender as a starting point; and then make it more detailed.

The Programme of Implementation of tasks shall be reviewed and revised if necessary at intervals of not more than thirty (30) days and sooner than this during the construction season, if requested by the Supervisor. Major revisions, including changes to sequencing, delays, changes to methodologies, should be discussed in the regular construction status meetings between the Supervisor and the Contractor. The Contractor may use the Critical Path Method (CPM) construction scheduling software or an Excel spreadsheet as approved by the Supervisor.

The Contractor shall mobilise simultaneously to all sites and the construction work and shall commence simultaneously at all of the nominated project sites as listed in the Programme of Implementation of tasks for immediate commencement of work. The simultaneous mobilisation and construction work shall be within 7 days following approval of the Programme of Implementation of tasks.

The Programme of Implementation of Tasks must show the Contractor's proposed sequence of completing the Works, using a bar chart format, with a horizontal bar or line showing duration of each activity, including but not limited to the following discrete types of activities:

- submittal of material samples for Supervisor approval
- submittal of drawing for Supervisor approval
- material purchase, manufacture, transport and delivery
- site preparation, including access roads and temporary works if required
- construction of structures, including excavation, concrete works, backfill tasks
- installation of equipment
- site clean-up of materials and equipment.

The Plan must also include a listing of the Contractor's resources, including:

- the number and categories of supervisory and technical staff and skilled/unskilled labour to be employed on the Works;

- equipment (including vehicles) proposed for use on the Works and stating whether they are to be acquired from inside or outside Afghanistan, including programmed dates for order and delivery; materials and plant and proposed source (inside and outside Afghanistan);
- the method proposed for Laboratory testing of materials, soils and concrete;
- locations and sizes of constructional camps, accommodation, offices, workshops and stores at the Site; and
- method of storing equipment and materials at each Site.

GI.04 Notice of Operations

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

GI.05 Working Hours

No restriction will be placed by the Employer on the hours worked by the Contractor. It will be the responsibility of the Contractor to ensure that any work carried out during unofficial hours does not cause a nuisance in respect of noise.

The Contractor shall bear all costs in respect of overtime shift and night-work allowances.

GI.06 Water Supply

The Contractor shall make his/her own arrangements for the supply of water for the purposes of the Contract. The quality of the water shall be approved by the Supervisor and suitable for the purpose for which it is intended. The Supervisor may request laboratory test results to check the suitability of the water.

Waste water shall be disposed of clear of the Site to the satisfaction of the Supervisor so as to cause no damage or complaint.

GI.07 Sanitation

The Contractor is to arrange for a high standard sanitation to be maintained throughout the Camp and the Works. He shall construct and maintain at his/her own cost a system of surface drainage and waste disposal which shall be approved by the Supervisor before any work commences. Sanitary conveniences for the use of persons employed in the works shall be provided and maintained by the Contractor in accordance with the appropriate laws and regulations in force in Afghanistan to the extent and in such a manner and at such places as may be approved by the Supervisor, and all persons connected with the works shall be obliged to use them.

GI.08 Contractor's Power Supply

The Contractor shall make his/her own arrangements for the supply of electric power for the purposes of the Contract.

GI.09 Camps and Accommodation

The Contractor shall construct and maintain camp/camps to provide living accommodation for his/her staff and operatives.

The Contractor shall be responsible for and provide all services to the living quarters and shall pay all charges in connection therewith and shall see to it that all sanitary laws and other laws and regulations in force in the area are complied with. The Contractor shall be responsible for and provide all necessary fencing and security to these areas.

GI.10 Minimum safety requirements during construction

At a minimum, the Contractor must provide at his own cost safety equipment for his employees and ensure that the equipment is used appropriately. He shall require and ensure that his sub-contractors also comply with the requirements of this section. Minimum safety equipment includes the following:

Hard hats must be provided for and worn by all employees and site visitors when in the vicinity of overhead, falling or other related hazards.

Close-toed shoes must be worn by all construction workers when the potential for injury to feet or toes is present. This includes but may not be limited to workers in trenches, where tools or materials can fall from above them, workers operating any equipment, workers carrying materials or supplies at the job site.

Eye protection must be worn during all cutting, grinding and welding processes or any construction process where the potential for air-borne particulates or flash from a welding operation could injure a worker's eyes.

Hearing protection must be worn by workers engaged in very loud activities such as metal grinding or cutting, operating an electric saw, or operating loud machinery.

The Contractor shall take all necessary measures to protect the work and prevent accidents during the construction. He shall provide and maintain sufficient night-lights, barricades, guards, temporary sidewalks, temporary bridges, danger signals, watchmen and necessary alliances and safeguards to properly protect life and property. He shall also protect all excavations, equipment and materials so that the public are not be endangered.

The Supervisor or his representative, and any representative of the Contracting Authority has the right and ability to stop work at any stage and any element should that person believe that these minimum safety requirements are not being met or that the health and safety of the workers, public or other people present at the site is at risk of injury. The Contractor shall have no recourse for time extension should the work be delayed due to a safety-related stoppage.

The cost for providing adequate safety equipment and supplies is included in the Contractor's cost for Mobilization.

GI.11 Reports, meetings and data of the works

GI.11.1 Monthly Report

The Contractor shall furnish to the Supervisor, at the Contractor's own cost, at regular monthly intervals and in a form and number of copies determined by the Supervisor, with the following information:

- a. Brief summary of the physical progress for the preceding month and estimated progress for the report month;
- b. updated completion schedules based on the approved Construction Programme,
- c. inventory of construction equipment and materials on which an advance was made by the Contracting Authority as provided in the Conditions of Contract;
- d. any report which may be specifically requested by the Contracting Authority and/or the Supervisor.

GI.11.2 Site/Work Meetings

The Contractor shall attend all the Site/Work Meetings called by the Supervisor. At a minimum, during the construction season when work is in progress, the Contractor's on-site manager shall meet with the Supervisor weekly to review progress and any problems. The Contractor must be prepared to review and discuss his current Construction Schedule and his plans for the coming 4 weeks, including construction activities, material deliveries, submittals pending and in development, job site safety and access issues, and any other topics the Supervisor deems important to discuss.

separate payment shall be made to the Contractor for complying with the stipulations of this Sub-Clause.

GI.12 Disruption of local communities and protection of real estate

The Contractor shall take all measures necessary to avoid nuisance and disruption to local communities and ensure that the Contractor's operations do not cause flooding or pollution hazards. The Contractor shall control the movement of his crews and equipment on right-of-way including access routes approved by the Supervisor so as to minimise damage to crops, pasture or woodland and property and shall endeavour to avoid marring the lands. Ruts and scars shall be obliterated and damage to land shall be corrected and the land shall be restored as neatly as practicable to its original conditions.

No separate payment shall be made to the Contractor for complying with the stipulations of this Sub-Clause.

Gl.13 Temporary fencing

Contractor shall erect and maintain suitable and approved temporary fencing to enclose such areas of the works and areas of land occupied by the Contractor within the Site as may be necessary to safeguard the public or prevent theft or vandalism.

Fences crossed by the Works and forming boundaries of plots outside the area occupied by the Works shall not be cut through or destroyed for more than the distance necessary to permit the erection of new fencing etc., and the Contractor shall make the ends of the cut fences reasonably secure.

Contractor shall regularly inspect all such fencing, and any defects which may occur, shall be made good without delay. Temporary Fencing shall remain in position until the Works are completed and the Site cleared of all plant, materials and/or other waste matter.

No separate payment shall be made to the Contractor for complying with the provisions of this Sub-Clause.

Gl.14 Contractor's camp

The work to be done under this item consists of construction, erection, installation and maintenance of the Contractor's Project Site Offices or main camp, and shall include all offices, shops, warehouses, and other operational buildings; all housing and related facilities including accommodations for the Contractor's personnel.

The location of the Contractor's camps, including all buildings, utilities and facilities therefore, and of the camps or establishments of all persons/parties in the vicinity operating or associated with the Contractor shall be subject to approval of the Supervisor.

The work to be done under this item will terminate upon the actual Completion Date. However, if directed by the Supervisor or the Employer, the Contractor shall continue such work to the extent required by the Contractor's personnel during the period of maintenance. No compensation shall be paid for the continued operation and maintenance of the Contractor's Camps during the period of maintenance.

Upon completion of the Works, or at such time within the period of maintenance as directed by the Supervisor, the Contractor shall remove all buildings utilities and other facilities from the Site and restore all camp areas to a neat and clean condition.

Contractor shall protect the environmental interests and Afghanistan regulations at camp and works sites during execution of the contractual work.

The construction, operation and maintenance of all camps of the Contractor shall comply with all applicable provisions of current American Labour Camp Rules.

The Contractor shall furnish, make arrangements for, and carry out proper and adequate maintenance of the Contractor's Camp areas at such camp to provide a neat, well-kept camp in all respects with pleasant and healthy surroundings and conditions for all occupants of their camp.

Adequately equipped and properly staffed portable first aid stations or dispensaries shall be provided by the Contractor at camps and other strategic locations to administer first aid treatment at any time required and free of charge to all persons on the Site, including employees of the Supervisor and the Employer.

No payment shall be made for the works involved within the scope of this section of specifications unless otherwise specifically stated in the Bill of Quantities or herein. The cost thereof shall be deemed to have been included in the quoted unit rate of other items of the Bill of Quantities.

Gl.15 Landscape Preservation

The Contractor shall exercise care to preserve the natural landscape and shall conduct his/her construction operations so as to prevent any unnecessary destruction, scarring or defacing of the natural surroundings in the vicinity of the work. Except where clearing is required for permanent works, for approved construction roads and for excavation operations, all trees, native shrubbery, vegetation, fences and walls shall be preserved and protected from damage which may be caused by the Contractor's construction and restoration operations and equipment. Movement of crews and equipment within the rights-of-way and over routes provided for access to the work shall be performed in a manner to minimise damage to grazing land, crops or property. Any borrow pits, excavations, stockpiles of materials etc. should be landscaped and left behind in safe and stable condition (e.g. slopes of borrow pits gentle enough not to form hazards or traps)

Gl.16 Water Pollution

The Contractor shall comply with applicable regulations concerning the control and abatement of water pollution as follows:

- (a) The Contractor's construction activities shall be performed by methods that will prevent entrance or accidental spillage, of solid matter, contaminants, debris and other objectionable pollutants and wastes into flowing streams, flowing or dry watercourses, lakes and underground water sources. Specific attention is to be given to the disposal of lubricants in an environmentally sound way. Sanitary wastes shall be disposed of in the soil by burial at approved sites or by other approved methods.
- (b) The Contractor will provide suitable sanitary facilities for the use of his/her personnel;

Gl.17 Disposal of Waste

The disposal of waste materials shall be as follows:

- (a) Waste materials, including but not restricted to refuse, garbage, sanitary wastes, industrial wastes and oil and other petroleum products, shall be disposed of by the Contractor. Disposal of waste material, except from oils and other chemicals shall be by burning (preferred) where burning of such materials is approved by the Supervisor, where burning is not possible, burying can be used, provided burial of such materials is approved by the Supervisor. All methods should be in accordance with the environmental law. It is the contractor's responsibility to familiarise himself with the law, find appropriate disposal locations or waste handling agents. Failure to comply may result in penalties and further action as appropriate by the supervisor.
- (b) All waste material to be disposed of by burning shall be piled in designated burning areas in such a manner as will cause the least fire hazard. Burning shall be thorough and complete and all charred pieces remaining after burning, except for scattered small pieces, shall be removed from the construction area and disposed of as otherwise provided in this Clause. The Contractor shall at all times take special precautions to prevent fire from spreading beyond the piles being burned and shall be liable for any damage caused by his/her burning operations.
- (c) The waste materials to be disposed of by removal from the construction area shall be disposed of prior to the completion of the work under these Specifications. All waste materials removed except trees, shall become the property of the Contractor. Waste materials to be disposed of by dumping shall be hauled to an approved dumpsite. It shall be the responsibility of the Contractor to make any necessary arrangements.

Gl.18 Plaques and Sign Boards

The Contractor shall erect plaques and sign boards on all the structures giving the location and name of the building. The location, dimensions and style of the sign boards and plaques shall be as per the approval of the Supervisor.

Gl.19 Health and Safety Plan

Within 5 days from the date of the commencement order the contractor shall submit for approval by the supervisor a health and safety plan. All work executed by or on behalf of the Contractor in the performance of this Contract shall be in accordance with an agreed Health and Safety Plan. Minimum safety requirements shall be maintained at all times. The Contractor shall observe high standards of safety for persons and machines at all times and with regard to safety, and shall comply with local laws and ensure strict adherence to the following:

- (a) The Contractor shall take appropriate precautions where personnel are required to work in confined spaces and other hazardous areas, and to only permit employees to work in

confined spaces or other hazardous areas when there are adequate and continuous communication links with colleagues equipped to provide emergency assistance.

- (b) The Contractor shall protect men working in trenches from cave-ins by the proper shoring or sloping of trenches, and shall take special care of persons working in the trenches, and prohibit individual employees from working alone in trenches.
- (c) The Contractor shall provide to all worker's elementary safety equipment's such as shoes, helmets, glasses, jackets etc and no one shall be allowed to work on bare foot and without helmets.
- (d) The Contractor shall protect personnel from the moving parts of the machines by installing and maintaining proper guards.
- (e) The Contractor shall not permit casual observers close to excavating operations.
- (f) The Contractor shall provide adequate fencing around temporary open excavations.
- (g) Without approval of the plan, the contractor shall not be allowed to start the works.

GI.20 Grazing of Livestock

The Contractor shall provide reasonable care by hiring watchmen to ensure that livestock are not allowed within the construction rights-of-way during the operations.

GI.21 Wildlife

The Contractor shall take all necessary precautions to prevent danger to wildlife. The Contractor shall fully cooperate and assist as necessary with any protection plans developed by state authorities to avoid damage to or disturbance of wildlife.

GI.22 Utilities

It shall be the Contractor's responsibility to locate on the site all utilities whether or not they are indicated on the Drawings and to make the necessary arrangements with the utilities authorities for any work in the vicinity of the utilities and or diversions of the utilities. All such work shall be at the cost of the Contractor.

0.0 DEMOLITIONS AND REMOVAL

0.A Reference

References: Applicable Afghan Laws and Norms:

0.1 General information:

Though the site is not de-mined formally by a contractor but it seems to be clear. Therefore, the contractor has to be careful in the performance of all activities including demolition and removal.

0.2 Excavations:

Fill all excavations, open trenches and pits, and other hazardous ground openings in accordance with section 02.

0.3 Patching:

Wherever existing surfaces to remain are damaged by the Contractor during the performance of the work, the Contractor shall repair, patch, and finish such surface(s) to match finish of adjacent undamaged surface(s).

0.4 Disposal and title to materials:

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0.4.1 Materials

The debris and the materials coming from the demolitions and the excavations, and not reused for filling, shall become property of the Contractor Title to all materials resulting from demolition, and all materials and equipment to be removed, is vested in the Contractor upon approval by the Engineer of the Contractor's demolition and removal procedures, and upon authorisation by the Engineer to begin demolition.

The Government will not be responsible for the condition or loss of, or damage to, such properties after Notice to Commence.

0.5 Clean-Up:

0.8.1 Debris and Rubbish:

The Contractor shall not utilise housing area garbage bins to dispose of construction debris or demolished material, but shall utilise Contractor furnished garbage bins for disposing of any and all construction related disposable materials and shall transport these off station as often as is necessary. Remove and transport debris and rubbish in a manner that will prevent spillage on streets or adjacent areas. Clean up any such spillage from streets and adjacent areas.

0.8.2 Regulations:

Comply with station and Afghan hauling and disposal regulations.

1.0 Site clearance, excavations and fillings.

1.1 General information

The present activities mainly refer but are not limited to the land excavation and filling, to reach the designed ground level for the building construction, as at the Designed Drawing in attachment. The whole surrounding area disturbed by the contractor activities shall be restored in its previous conditions and/or according to the modifications requested by the design and to the Engineer instructions.

1.2 Existing utilities: (Not Applicable)

The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting the construction works. The Contractor shall co-ordinate with the Engineer for assistance in locating existing utilities.

1.3 Type of excavation

Mass excavation and back filling may be executed by use of machines. Fine excavations will be however implemented by hand.

1.3.1 *Unclassified excavation*

Unclassified excavation shall include all materials encountered during excavation, except the Structural excavation and the borrow excavation.

Unclassified excavation includes the removal of all materials encountered and all cut material indicated on the DD.

The Contractor shall remove and dispose of unclassified excavated material found unsuitable for incorporation into the permanent work by hauling and dumping to a designated site, which cost will be considered subsidiary to the item price.

1.3.2 *Structural excavation*

Structural excavation shall include all materials encountered during excavation executed for building construction, within the limit lines specified by the Drawings and/or as instructed by the Engineer.

This work shall consist of the necessary excavation and backfilling for structure foundations, drainage structures, retaining wall foundations, etc.

1.3.3 *Inspection:*

Inspection by the Engineer is requested before the casting of concrete and the final filling of the excavations made

1.3.4 *Trenches and Manholes:*

Provide, in accordance with the design drawings, local excavation for the following:

- a) trenches for building foundations
- b) trenches for new connection to:
 - the fresh water system
 - the waste water system (septic tank)
 - the general electric system
- c) Mandoles, inspection Chambers etc.

1.4 Materials

1.4.1 *Porous fill:*

capillary water barrier (indicated as porous fill) under concrete floor slabs shall consist of clean crushed stone, crushed gravel, or uncrushed gravel, 90-100 percent passing a 20 mm sieve and 0-5 percent passing a 4.75 mm. sieve with sand equivalent of not less than 50. Granular fill may be composed of an appropriate combination of sand and crushed rock to meet the above gradation requirements. The capillary water barrier shall be placed directly on the subgrade. The barrier shall be constructed in layers not exceeding 10 cm in compacted thickness, and each layer

shall be compacted with a minimum of two passes of a hand-operated plate type vibratory compactor.

1.4.2 Topsoil:

topsoil shall be free of subsoil. Refuse, stumps, rocks over 3 cm, brush, weeds, and other materials detrimental to plant growth. Topsoil shall be obtained from an approved topsoil donor area.

1.4.3 Satisfactory Soil Material:

satisfactory soil materials used as backfill for trenches, drains and for structures shall consist of native materials classified as well graded sands, silty sands or clayey sands which are free from debris, roots, wood, scrap materials and other vegetable matter and refuse.

1.4.4 Select Fill:

select fill material shall be composed of sand or crushed rocks This material shall have the following gradation.

Sieve Designation	Percentage passing (Weight)
40 mm	90 to 100
5 mm (No. 4)	25 to 40
0.425 mm (No. 40)	0-10

1.4.5 River Sand:

the sand shall be natural river sand, made up of hard and clean particles, clear in color and of spherical shape. The sand shall be clean and free from organic substances, clay, silt, and other impurities. The sand gradation composition shall be from 0.5 mm to 1.0 mm.

1.4.6 Bedding Materials:

shall be fine and coarse sands with a gradation from 0 mm to 3.0 mm.

1.5 Excavation methodology

1.5.1 Protection of Persons and Property:

All excavations shall be barricaded and posted with warning signs for the safety of persons. Warning lights shall be provided during hours of darkness.

1.5.2 Excavation for Structures:

excavation for structures shall conform to the dimensions and elevations indicated within a tolerance of plus or minus 15 centimetres and shall extend a sufficient distance from footings and foundations to permit placing and removal of concrete form work.

1.5.3 Trench Excavation:

Excavation shall consist of excavating for foundations or utilities and plant distribution trenches. Make trench sides as nearly vertical as practicable except where sloping of sides is allowed.

1.5.4 Excavation for Paved Areas:

Excavation shall consist of excavating and grading for paved areas as specified and in conformity with the lines, grades, cross sections, and dimensions shown on the drawings, and to replace unsatisfactory materials from other excavation and grading operations.

1.5.5 Stability of Sides:

Sides of excavations over 1.5m in depth shall be sloped to the angle of repose of the material excavated, or shall be shored and braced where sloping is not possible. Sides and slopes of excavations shall be maintained until completion of backfill placement in a safe condition by scaling, benching, shelving, or bracing.

1.5.6 Shoring and Bracing:

materials used for shoring and bracing, such as sheet piling, uprights, stringers and cross braces, shall be in good serviceable condition. All timber used shall be sound and free from large or loose

knots. Shoring and bracing in excavations shall be maintained regardless of the length of time excavations remain open.

1.5.7 Water Removal:

Excavation shall be performed in a manner to prevent surface water and subsurface or ground water from flowing into the excavations and to prevent water from flooding the project site and surrounding area. Water shall not be permitted to accumulate in excavations.

1.6 Back filling

Backfill *shall* consist of the placement of specified backfill material in layers of 30 cm max thickness 95% compaction at corridors service trenches.

1.6.1 Certified Laboratory - test reports:

Before delivery of materials, certified copies of the reports of all tests required herein under materials and in referenced publications shall be submitted to the Contract Manager for approval. Additional testing shall be submitted when the source of materials is changed. Certified test reports are required for the following:

Area Classification	Backfill or Fill Material
In all excavations, unless otherwise specified hereinafter	Excavated or borrow material that has been sampled, tested and approved as "Satisfactory Soil Material."
Under Buildings	Select fill material and porous fill
Under sidewalks	Excavated or borrow material that has been sampled, tested and approved as "Satisfactory Soil Material."
Under roads	Sub-base material, or excavated or borrow material that has been sampled, tested and approve as "Satisfactory Soil Material".
Under grassed areas	Sub-base material, or excavated or borrow material that has been sampled, tested and approve as "Satisfactory Soil Material'.

1.6.2 Preparation of Ground Surface to Receive Fill:

Vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials shall be removed from ground surface prior to the placement of fills. Sloped surfaces steeper than one vertical to four horizontal shall be ploughed, stripped, or broken-up in such manner that fill material will bond with the existing material.

1.6.3 Back filling of trenches:

Trenches shall be carefully back filled with materials specified, and deposited in 15 cm maximum layers, loos depth. Borrow materials shall be obtained from sources outside the station. Backfill shall be thoroughly and carefully tamped until utility line has a cover of not less than 30 cm. Care should be taken not to damage pipe or special coatings on utility line.

1.6.4 Subgrade Preparation for Paved Areas:

After the grading is substantially complete, and immediately in advance of depositing the surfacing material, the sub grade shall be brought to the proper lines, grades, and cross sections as indicated and in accordance with these Specifications. The entire sub grade shall be brought to a firm, unyielding surface, true line, grade and cross section, by rolling with an approved power roller, until thoroughly compacted.

1.6.5 Preparation of Planted Areas:

Planted areas shall be graded to the dimensions, elevations, and cross sections indicate on the Drawings. The top 10 centimetres, or as otherwise shown, of such areas shall consist of top soil as defined herein, which shall be lightly compacted. All material below the topsoil layer shall be compacted as specified for sub grade preparation.

1.7 Compaction:

1.7.1 Compaction Equipment:

All compaction equipment shall be of suitable size and number, and in satisfactory working condition to complete the work on schedule. Compaction equipment shall consist of sheepsfoot rollers, pneumatic type rollers, tamper rollers, vibrating tampers, or other compaction equipment suitable for the soil material being compacted and capable of obtaining the required density throughout the entire layer being compacted.

1.7.2 Placement and Compaction:

Backfill and fill materials shall be placed in layers not more than 30 centimetres in loose depth. Before compaction, each layer of backfill or fill material shall be moistened or aerated as necessary to provide the optimum moisture content of the soil material.

1.7.3 Compaction:

Fill, embankment, and/or backfill under concrete floor slabs and the upper 30 cm under paved areas shall be compacted to not less than 95 percent of the maximum density.

1.7.4 Moisture Control:

Provide equipment capable of adding measured amounts of moisture to the top soil material as determined by moisture-density relation tests. The moisture content in the soil material at the time of compaction shall be within plus or minus two percent of optimum.

1.8 Grading

1.8.1 General:

All areas within the limits of grading under this section, including adjacent transition areas, shall be uniformly graded. The finished surface shall be smooth within the specified tolerances, compacted, and within the tolerance specified below for each area classification, compacted as specified, and free from irregular surface changes.

1.8.2 Grassed Areas:

The finished surface of areas to receive topsoil shall be not more than 3 centimetres above or below the indicate sub grade elevations.

1.8.3 Sidewalk Areas:

The surface of areas under walks shall be shaped to line grade and cross-section, and finished surface shall not be above nor more than 1-2 centimetres below the indicate subgrade elevation.

1.8.4 Road Areas:

The surface of areas under walks shall be shaped to line, grade and cross-section, and finished surface shall not be above nor more than 1/2 centimetres below the indicate subgrade elevation.

1.9 Field sampling and testing:

1.9.1 Testing:

All testing shall be conducted by the Contractor as specified herein at the expense of the Contractor.

1.9.2 Granular Fill Testing:

Gradation test shall be made on each sample. Tests shall be performed for each 100 cubic metres of material used or fraction thereof and whenever the source is changed.

1.9.3 Compaction Testing:

Compaction tests shall be made in locations as selected by the Contract Manager as follows:

Materials	Test Frequency
Fill and Backfill	1 lift per every 100 m ²
Sub-grade (existing in place density)	1 lift per every 800 m ²
Fill in trenches under pavement	1 lift per every 200 m of trench

2.0 Concrete works

2.A Reference and General Information:

Reference: ACI, ASTM,

General information :

- This is very small one floor building with total footprint area of 92 square meter, therefore we used typical design and drawings.

2.1 Concrete *:

2.1.1 *Strength Requirements:* Concrete classified as follows shall be proportioned and mixed for the following strength characteristics

Class	Characteristics 28-day Cube Strength	Usage
C - 30	300 kg/sq.cm 4000 psi=280kg/sq.cm	For foundations and structures above foundations as indicate on drawings.

(*) Concrete made with high early strength Portland cement

2.2 Concrete Qualities:

2.2.1 Concrete Consistency:

Slump test ; Vebe test ; Compaction test and flow table test - slump shall fall within the following limits, provided the required strength is achieved:

Type of Structure	Slump of vibrated concrete centimetres	
	Minimum	Maximum
General Building Construction	5.0	10.0
Reinforced Concrete Walls	5.0	10.0
Floor slab	5.0	10.0

Type of Structure	Flow classes in mm	
	Minimum	Maximum
General Building Construction	420	480
Reinforced Concrete Walls	420	480
Floor slab	420	480

Type of Structure	Compaction classes < 1.46	
	Minimum	Maximum
General Building Construction	1.11(1.26)	1.25(1.45)
Reinforced Concrete Walls	1.11(1.26)	1.25(1.45)
Floor slab	1.11(1.26)	1.25(1.45)

2.2.2 Air voids percentage

According to ISO 6276: no more than 3%

2.3 Cement:
Shall be Portland, Type 325.

2.4 Water:
Water shall be fresh, clean, and potable.

2.5 Aggregates:
Generally, all natural sands and gravel, crushed stones or other products previously proven satisfactory by practice, can be used as aggregates in mixing concrete provided the requirements specified below are met. Aggregates shall not contain any substance which may be deleteriously reactive with the alkaline in the cement.

2.5.1 Fine Aggregate:
Shall be free from clay, organic materials, water soluble alkali and free from substances which might cause expansion in the concrete from reaction with alkali in the cement. Sand shall be sharp, fine granular, composed of hard, strong, durable, uncoated particles. Gradation shall conform to the following:

Percentage passing each laboratory sieve by weight	
Sieve (opening - mm)	Percent passing by weight
9.50	100
4.75	95 - 100
2.36	80 - 100
1.18	50 - 85
0.60	25 - 60
0.30	10 - 30
0.15	02 - 10

2.5.2 Coarse Aggregate:
Shall consist of angular crushed stone, or gravel other inert materials having similar characteristics.

Percentage passing each laboratory sieve by weight		
Sieve (opening - mm)	Percent passing by weight	
	25mm	19mm
5.80	-	-
30,70	100	-
25,00	95 - 100	100
19	-	90 - 100
12,50	25 - 60	-
9,50	-	20 - 55
2,37		
4,75	0 - 10	0 - 10
2,37	0 - 5	0 - 5

2.6 Reinforcement :

2.6.1 Reinforcing Bars:
Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 60.
Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Provide each dowel in one piece, straight, cut accurately to length with ends square and free from burrs. Fix in locations as shown on the design drawings.
All reinforcing shall be supported and wired together to prevent displacement by construction loads, or the placing of concrete, beyond the tolerances specified in ACI 301. Any tack or spot welding of reinforcement shall not be performed without approval from the Engineer.
Reinforcement shall be free of loose rust and of any other coating which may adversely affect the bond.

Splices in bar reinforcement shall be located and lapped as shown on the design drawings. Bars in lapped splices shall be in contact unless otherwise shown on the design drawings. Additional splices, if required, shall be made only at locations, and in a manner approved by the Engineer. Welded splices shall not be used. All lap splices in bar reinforcement shall be fully in compliance with ACI 318-02.

Unless specifically indicated on the design drawings, splicing by means of proprietary mechanical splices shall not be used.

Concrete spacers, metal or plastic bar spacers i.e. chairs, shall be used for obtaining proper spacing of reinforcement from the bottom and sides of formwork.

Contractor shall do standard steel test in order to determine its strength, elongation and bent,

2.6.3

Tie Wires:

Shall be 1.2 millimetres in diameter, black annealed wire.

2.7

Concrete protective cover over reinforcement:

The minimum concrete reinforcement cover shall be as follows:

	Total : mm
a. Sides and bottom of footings cast against the earth	(50+25)= 75 mm
b. Concrete exposed to the weather	(25+5) = 30 mm

2.8

End splice for reinforcing bars:

End laps of reinforcing bars shall be not less than 15 bar diameters, or min. 200 mm, unless otherwise indicated.

2.9

Welded wire mesh lap splice:

Minimum one full mesh plus 20 centimetres overhang on each end, unless otherwise indicated.

2.10

Forms:

Set forms true to line and grades and make mortar-tight. Chamfer above grade exposed joints, edges, and external corners of concrete 20 millimetres unless otherwise indicated.

Before concrete placement, coat the contact surfaces of forms with a non-staining form coating compound.

Do not use mineral oil on formed surfaces to be painted.

Prevent concrete damage during form removal.

2.11

Mixing, transporting and placing concrete:

Concrete shall be poured monolithically

Furnish mixed concrete through standard concrete mixer. Conform to ASTM C94, except materials, testing, and mix designs as specified herein. Design mix to produce normal-weight concrete consisting of Portland cement, aggregate, and water to produce the following properties:

2.12

Placing:

- Place concrete within 90 minutes of either addition of mixing water to cement and aggregates or addition of cement to aggregates if the air temperature is less than -30 degrees Centigrade.
- Reduce mixing time to 60 minutes if the air temperature is greater than 30 degrees Centigrade.
- Additional water may be added, provided that both the specified maximum slump and water-cement ratio are not exceeded.
- Provide a fluent casting of concrete to prevent cold joints between different layers.
- Concrete layers thickness shall be according to the type of vibrator employed, to provide a proper vibration to the concrete cast
- Do not place concrete when:
 - (a) weather conditions prevent proper placement and consolidation;
 - (b) in uncovered areas during periods of precipitation; and

(c) in standing water.

Prior to placing concrete, remove dirt, construction debris, water, snow, and ice from within the forms.

2.12.2 Concrete Vibration:

Immediately after placing, each layer of concrete shall be vibrated using internal concrete vibrators supplemented by hand spading, rodding and tamping. Tamping or other external vibration of forms will not be permitted. Vibrators shall not be used to transport concrete inside forms. Internal vibrators submerged in concrete shall maintain a minimum frequency of not less than 8000 vibrations per minute. Duration of vibration shall be limited to time necessary to produce satisfactory consolidation, generally from 5 to 15 seconds.

2.12.3 Cold Weather:

Provide and maintain 10 degrees Centigrade minimum concrete temperature. Do not place concrete when the ambient temperature is below 5 degrees Centigrade. Cover concrete and provide with a source of heat sufficient to maintain 10 degrees Centigrade minimum while curing.

2.12.4 Hot Weather:

Provide and maintain 30 degrees Centigrade maximum concrete temperature. Cool ingredients before mixing, or use other suitable means to control concrete temperature to prevent rapid drying of newly placed concrete. Shade the fresh concrete and start curing as soon as the surface of the fresh concrete is sufficiently hard to permit curing without damage.

2.13 Surface finishing:

2.13.1 Defects:

Repair formed surfaces by removing minor honeycombs, pits greater than 2 square centimetres surface area or 6 millimetres maximum depth, or otherwise defective areas. Exposed surfaces shall be uniform in appearance and, finished to a smooth form finish unless otherwise specified.

2.13.2 Floated Finish:

Place, consolidate, and immediately strike off concrete to obtain proper contour, grade, and elevation before bleed water appears. Permit concrete to attain a set sufficient for floating and supporting the weight of the finisher and equipment. Do not spread dry cement over slab surface to absorb bleed water. Do not introduce a "topping mix" over the floated finish of a slab to achieve a smooth finish. Steel trowelling shall be done over a floated finish before fresh concrete sets. Surface shall be level to within 6 millimetres in 3 meters where floor drains are not provided.

2.13.3 Faced concrete structure corners finishing

Supply and fix triangular **plastic PVC** 20x20 mm profiles on corners of any faced concrete structure, (basement service tunnel walls, window sills and terrace parapet concrete borders) inside the form works and before casting. No sharp corners will be admitted anywhere.

Insert market type plastic drips in the window sills and terrace parapet borders before casting.

2.14 Curing and protection

Protect concrete from injurious action by sun, rain, flowing water, frost, mechanical injury, tire marks, and oil stains. Do not allow concrete to dry out from time of placement until the expiration of the curing period. Forms may be removed 48 hours after concrete placement. Prohibit foot and vehicular traffic and other sources of abrasion for not less than 72 hours after finishing operations.

2.14.1 Moist Curing and Water Spraying:

Provide uniform and continuous application of water spray throughout the curing period. Curing shall be by direct application of water, accomplished by fog spraying or sprinkling. Flood surface with water after concrete has sufficiently hardened so, as not to be damaged by the spray. Apply water spray a minimum of two to three times a day and as often as ambient temperature and

weather conditions dictate, for the minimum curing period of seven days. Allow concrete to cure under this method for a minimum period of seven days.

2.14.2 Levelling of the supporting surface:

The surface must be levelled removing all irregularities.

2.14.3 In-situ Slab:

To guarantee the continuity of adjacent elements a slab must be cast in concrete of resistance Rck 300Kg/sq.cm, with reinforced welded wire mesh 20x20cm diameter 8mm, over the panels.

2.15 Field quality control sampling and testing:

Collect samples of fresh concrete to perform tests specified.

2.15.1 Compressive Strength Tests:

Make minimum of two test cubes for compressive test.

Test cubes at 28 days. Provide concrete cubes for compressive tests not less than once for each 50 m³ (cubic metres) of concrete.

Not more than 10% of the specimens tested shall have a compressive strength less than specified. When the results of the test of the control specimens indicate that the concrete as placed does not meet specification requirements or where there is evidence that quality is below specification requirements, core boring shall be accomplished.

The cost of such tests will be borne by the Contractor. Strength of cores from each member or area shall be considered satisfactory if their average is equal to or greater than 90 percent of the design compressive strength of the class of concrete. Remove all concrete not meeting this strength criteria and replace with new acceptable concrete without additional cost to the Contracting Authority. Repair core holes with non-shrink grout. Match color and finish of adjacent concrete surface.

2.15.2 Test Results:

Submit test results as part of the "Daily Report to Inspector" except that Compressive Test results shall be reported by separate correspondence or submittal.

3.0 External and internal walls

3.1 External and internal walls composition:

3.1.1 Brickwork:

- *Application:*
Unless indicated or specified otherwise, lay brick in running bond. Completely fill joints between bricks with mortar. Form bed joints of a thick layer of mortar slightly furrowed or battered; bevel or pyramid the bed mortar. Form head joints by applying a full coat of mortar on the brick to be laid. Slushing of head joints will not be permitted. Lay closure bricks with mortar on each bedding surface of unit to be laid and units in place.
- The bricks shall be of first class, regular in shape, size and colour.
- The bricks should be free from flaws, cracks and lumps of any kind.
- Shall have minimum crushing strength 10.5N/mm².
- The bricks shall not absorb the water more than one sixth of the weight of the brick.
- The sand used shall be medium coarse, clean, sharp, free from clay, mica and other organic matter.
- The cement used shall satisfy the requirement of Portland Standard.
- The mortar is designated in specified proportion of cement and sand. The materials are weighed or measured and mixed on watertight platform after allowing bulking of sand.
- Bricks before laying shall be thoroughly soaked in water.
- The bricks laid truly horizontal in course with frogs upwards.
- The brickwork shall be raised 1m in height at a strength all-round the building.
- Only fresh mortar within ½ hour for cement mortar, the time of adding water shall be used.
- During rains, no brickwork is carried out when special arrangements are made.
- The brickwork shall be kept wet for at least 10 days.
- Standard Test would be applied on Brick sample according to ASTM C67 / C67M – 18

4.0 Roofing works

4.1 General information:

The following types of roofs shall be implemented:

- a) Flat roofs (reinforced concrete roof)

4.2 Submittals: Submit the following:

- Shop Drawings
- Fasteners
- Test Reports
- Certificates
- Manufacturer's Instructions
- Nails and fasteners
- Roof insulation, including field of roof and perimeter attachment requirements.
- Waterproofing materials

4.3 Storage and handling

Store and handle materials in a manner to protect from damage, exposure to open flame or other ignition sources, and from wetting, condensation or moisture absorption. Store in an enclosed building or trailer that provides a dry, adequately ventilated environment. Replace damaged material with new material.

4.4 Environmental conditions:

Do not install roof insulation during inclement weather or when air temperature is below 4 degrees C or when there is ice, frost, or moisture visible on the roof deck.

4.5 Thermal insulation

4.5.1 Material:

flat roof thermal insulation to be made with:

- 60-120 mm thick broken kiln brick will.
- 100 mm glass wool under galvanized iron sheet will be installed.

4.6 Bitumen membrane (flat roof – terraces):

4.6.1 Material

One prefabricated Damp Proof Membranes in polymer elasto-plastomeric bitumen, the layer shall be UVA rays protected type, with slate chips coat on top of it.

Minimum thickness (mm.)	4
Softening temperature (°C)	150 °C
Penetration rate at 25°C (dmm.)	20 dmm
Penetration rate at 60°C (dmm.)	110 dmm
Breaking load (N/5cm.)	500/400
Stretching breaking rate (%)	40/45
Flexibility in cold temperature (°C)	-10
Waterproofing rate (kPa)	>100
Water conduct (%)	±1
Steam diffusion resistance (μ)	40.000
Joint traction resistance (N/5cm.)	500/400

4.6 Roofing accessories:

4.9.1 Rainwater outlets

Provide rainwater **stainless steel** not less than 6/10 thickness **or PVC** market type outlets, according to the design drawings. Outlet material shall be heavy rust proof type in any case.
The following is included: overlapping on joints, soft soldering; brackets, riveting as necessary

4.9.2 Rainwater down pipes

Provide and fix: rainwater down pipes round pre-painted steel sheet made 6/10 min thickness, fixed to the building walls with proper fasteners and steel clamps where indicated at DD.

4.9.3 Flashing and covers:

Provide and fix shaped flashing and covers, made in pre painted steel sheet, 8/10, as needed for:

- a proper connection between the roof layers and the different smokestacks or vent pipes at roof level,
- other applications according to the design drawings.

4.7 Roofing with GI Sheet

Supply and fix of 24 gage GI sheet with its all accessories indicated at D.D., made up as follows:

4.10.1 Technical features

- GI sheet, 22 gage pre-painted and as indicated in the design drawing
- Thermal insulation:
- 100 mm glass wool under the GI sheet with steel mesh
- False ceiling according to the design drawing

5.0 Plastering works

5.1 General information

The present chapter refers but it not limited to the coating of the internal and external surfaces of the building that shall be plastered according to the D.D. and the present T.S. where not otherwise indicated. No un-finished walls and ceiling surfaces shall be admitted.

5.2 Plaster (Provide asbestos-free materials).

5.2.1 *Gypsum base coat plaster:* Gypsum Neat Plaster Base Coat

5.2.2 *Gypsum finish coat plaster:* Gypsum Gauging Plaster Finish Coat

5.2.3 *Cement plaster base coat:* Cement Plaster Base Coat

5.2.4 *Cement plaster finish coat:* Cement Plaster Finish Coat

5.2.5 *Osmotic cement plaster for drinkable water containers (Water storage tank)*

5.2.6 *Hydrated lime*

5.2.7 *Aggregates*

5.2.8 *Sand for Gypsum Base Coats*

a. Sand Gradation: Percentage Retained by weight (plus or minus 2 percent) on each sieve.

Sieve Size	Max.	Min.
No. 4 [4760 microns]	0	0
No. 8 [2380 microns]	5	0
No. 16 [1190 microns]	30	5

No. 30 [590 microns]	65	30
No. 50 [300 microns]	95	65
No. 100 [150 microns]	100	90

5.2.9 Sand for Gypsum Sand Float Finish

- a. Sand Gradation: Percentage Retained by weight (plus or minus 2 percent) on each sieve.

Sieve Size	Max.	Min.
No. 20 [850 microns]	0	
No. 30 [590 microns]	0.5	
No. 100 [150 microns]	100	40
No. 200 [75 microns]	100	70

5.2.10 Sand for Cement Plaster

- a. Sand Gradation: Percentage Retained by weight (plus or minus 2 percent) on each sieve.

Sieve Size	Max.	Min.
No. 4 [4760 microns]	0	0
No. 8 [2380 microns]	10	0
No. 16 [1190 microns]	40	10
No. 30 [590 microns]	65	30
No. 50 [300 microns]	90	70
No. 100 [150 microns]	100	95
No. 200 [75 microns]	200	97

- b. Sand for Base Coats: Not more than 50 percent shall be retained between any two consecutive sieves, nor more than 25 percent No.50 300 microns, and not exceeding 3percent for aggregate exceeding No. 200 75 microns.
- c. Sand for Finish Coats: Natural colour sand shall pass the No. 16 sieve 1190 microns. Sand for smooth finish shall pass the No. 30 sieve 590 microns.
- d. Sand for Finish Coats for One-Coat System: Sand for finish coat shall be natural color and shall be graded within the limits shown above for base coats, except that the sand shall pass the No. 8 sieve 2380 microns, and for smooth finish the sand shall pass the No. 30 sieve 590 microns.]

5.2.11 Water:

Suitable for domestic consumption, and free of mineral and organic substances that affect the hardening and durability of the plaster or stucco.

5.3 Proportioning:

Unless specified otherwise, materials are specified on a volume basis and shall be measured in approved containers, to ensure that the specified proportions will be controlled and accurately maintained during the progress of the work. . Prepare ready-mix gypsum plaster cement plaster and for use by the addition of water only.

5.3.1 Gypsum Base Coat Plaster:

Mix the base coats for double-up work in the proportion of 45 kilograms of gypsum neat plaster to not more than 70 liters of damp loose sand on gypsum lath and not more than 85 liters of damp loose sand on masonry.

• Application

Apply scratch coat 5 to 6 mm thick to cover the base with sufficient material and pressure to form a good bond on the wall or ceiling base. Rake or scratch the surface and allow to set firm and hard. Apply the brown coat to bring the base coat out to the screeds, compact and straighten to a true surface without the application of water, and cross or scratch to receive the finish coat.

5.3.2 Gypsum Finish Coat Plaster:

Prepare lime-putty in accordance with the printed directions of the manufacturer. Use putty following preparation or following a soaking period as recommended by the manufacturer. Lime-Putty Gypsum-

Gaged (White Coat) Use over [sand and gypsum plaster. Mix finish coat in the proportions of one part of gypsum gauging plaster to a volume of hydrated lime or lime putty. This mix is approximately equivalent to one 45 kg bag of gypsum gauging plaster to:

- a. Not more than four 22.5 kilogram bags of hydrated lime, or
- b. Not more than 127 liters of lime putty, or
- c. Not more than 132 liters of lime putty.

• *Application:*

Moderately moisten or fog spray base coat of plaster that has become dry before finish coat is applied. Accelerate plaster, if necessary, to provide a setting time of not more than 4 hours from the time the plaster is mixed.

Apply lime-putty gypsum-gauged finish white coat or aggregated white coat over the base coat, scratch in thoroughly, lay on well, double back, and fill out to a true, even surface.

Allow the finish to dry a few minutes, then trowel well with water. Apply maximum pressure in order to compact the finish coat and provide a smooth finish free from blemishes and irregularities. Apply trowel finish coats of gypsum-gaged lime-putty over properly prepared base coats as thin as possible and 2 to 3 mm thick, except as necessary in spots to level out hollows in base coat

5.3.3 *Cement Plaster Base Coat*

Portland Cement Base Coat Plaster: Base coat types are two coats applied prior to the application of the finish coat. The two base coat types consist of the scratch coat and the brown coat. Mix scratch coat in proportion of one part by volume portland cement, 0 to 3/4 parts by volume hydrated lime and 2 1/2 to 4 parts sand. Mix brown coat in proportion of one part by volume Portland cement, 0 to 3/4 parts by volume hydrated lime and 3 to 5 parts sand (volume of sand per sum of cement and lime).

- *Application:* Apply the scratch coat to cover the base with sufficient material and pressure to form a good bond on the wall and ceiling base. Rake or score horizontally. Apply the brown coat after the scratch coat has been aged at least 24 hours in addition to the moist curing period. Apply the brown coat and float plaster surface to a true, even plane with rod or straightedge to receive the finish coat.

5.3.4 *Cement Plaster Finish Coat:*

Mix finish coat in the proportion of one part by volume of portland cement to not more than one part by volume of hydrated lime, and not more than 4 parts by volume of damp loose sand. Workability shall govern the actual amount of lime and sand used in the finish coat, within the limits specified herein.

- *Application:* After the brown coat has been moist cured for not less than 24 hours and aged at least an additional 5 days, apply the finish coat to a thickness of not less than 3 mm. Where previous coat has become dry, dampen the surface evenly with water, prior to the application of the finish coat.

5.3.5 *Osmotic Cement Plaster (type SikaSeal NT2 for the water storage tank – see also item 9.4.3 - Waterproofing works and joints)*

Mix and apply in accordance with the manufacturer instructions.

5.4 Mixing

5.4.1 *Job-Mixed Materials:*

Mix materials in mechanical mixers except finish coats containing lime may be hand mixed. The mechanical mixers shall be an approved type that accurately and uniformly controls the quantity of water. When mixing by hand, mix dry plaster aggregate to a uniform color in the mixing box, add water, and hoe the plaster immediately into the water and mix thoroughly to a proper consistency.

5.4.2 *Ready-Mixed Packaged Materials:*

Mix ready-mixed packaged gypsum plaster cement plaster in accordance with manufacturer's printed instructions.

5.5 Patching and pointing:

Cut out and patch loose, cracked, damaged, or defective plaster Patch shall match existing work in texture, collar and finish flush with previously applied plaster surfaces. Point work abutting or adjoining finish work in a neat manner. Remove droppings or splatterings from surfaces. Leave clean and in a condition to receive paint or other finish.

6.0 Metal work

6.1 General information

Metal works shall be implemented for the construction of:

- Staircases and ramps handrails
- Steel grill for windows

6.2 Submittals:

Submit the following

6.2.1 *Shop drawings:*

Before to raise the metal structures submit shop drawings to Contract Manager for approval. Reproductions of contract drawings as shop drawings are unacceptable.

Provide type, grade, dimensions, and details of beams and built-up girders, including reinforcing, accessories and anchorage. Bending diagrams, assembly diagrams, splicing and laps of bars, shapes,. Do not scale dimensions from structural drawings to determine lengths of reinforcing rods.

6.2.2 *Certificates of Compliance:*

Submit the following manufacturer's certifications:

- a) Steelwork
- b) Bolts and nuts
- c) Surface painting material
- d) Electrodes and

6.3 Structural Steel

Provide: structural steel as per D.D. with a minimum yield strength of 250 MPa 36 ks.

6.3.1 *Installation:*

After final positioning of steel members, provide full bearing under base plates and bearing plates using non shrink grout. Place non-shrink grout in accordance with the manufacturer's instructions.

6.3.2 *Connections:*

Do not tighten anchor bolts set in concrete with impact torque wrenches. Punch, sub-punch and ream, or drill bolt holes. Bolts, nuts, and washers shall be clean of dirt and rust, and lubricated immediately prior to installation.

6.3.3 *Bolts:*

Bolts shall be tightened to a "snug tight" fit. "Snug tight" is the tightness that exists when plies in a joint are in firm contact. If firm contact of joint plies cannot be obtained with a few impacts of an impact wrench, or the full effort of a man using a spud wrench, contact the Contract Manager for further instructions.

Test a minimum of 3 bolt, nut, and washer assemblies

6.3.4 *Welding:*

Use only shielded metal arc welding and low hydrogen electrodes steel. Provide qualified welders, welding operators, and tackers. If more than 20 percent of welds made by a welder contain defects identified by testing, then all welds made by that welder shall be tested by radiographic or ultrasonic testing, as approved by the Contract Manager.

6.3.5 *Steel works treatment:*

a) *Painting*

Metal works both for internal and external installations will be made according to using proper profiles as per the design drawings, welded or bolts and nuts assembled and treated, where no galvanized type, with:

- Rust proofing, red oxide of lead in boiled linseed oil, two coats
- Enamel Paint, (oil-synthetic enamel) for metal surfaces, two coats, colour to be sampled and submitted to the Engineer for approval.

6.4 Rainwater down pipes:

Provide and fix: rainwater down pipes round plastic film coated steel sheet 8/10 thick, fixed to the building walls with proper clamps. The 3,00 m terminal at bottom will be crash proof cast iron made or heavy steel pipe made.

Final finishing: plastic film coated, blue color, same RAL as at the existing blocks in the compound.

6.5 Flashing and covers:

Provide and fix shaped flashing and covers, made in pre painted steel sheet, 8/10mm, as needed for:

- a proper connection between the roof layers and the different smokestacks, manholes, domes or vent pipes at roof level,
- the roof perimeter walls covers
- other applications according to the design drawings.

Final finishing: plastic film coated, blue color, same RAL as at the existing blocks in the compound.

6.6 Steel handrails and parapets

Provide:

- at any ramp for disables
- at any entrance stair to the buildings
- wherever indicated at DD

Provide and fix: metal parapet in steel profiles, to be fixed according to the D.D. with proper fasteners to the stair flights concrete structure.

Provide working drawings for approval prior to implementation.

Provide round handrail pipes not less than 50 mm diameter and not less than 2-2.5mm. thickness and round tubular pipes for parapets not less than 20 mm dia and 20 cm spaced.

Fix the handrail not less than 60mm distance from the closest vertical surface. Fix the handrail and the parapets pipes every 1,50 m. on posts or clamps.

The materials involved belong to Class 1 of fire resistance.

The handrail pipe shall be fixed at about 100 cm over the finished floor.

Special closing units at the extremities, the internal and external corners, and the fastening nylon shelves are to be included.

7.0 Flooring, tiling and coating works

Reference: UNI EN 87; UNI EN ISO 10545 (Ceramic tiles)
UNI EN 1324; UNI EN 1346/48; EN 12004; 12002 (adhesives)

7.1 General:

The present activity refers but it is not limited to the:

- paving of the external and internal stepping and no motor able surfaces
- tiling of the walls' surfaces at sanitary areas

according to the D. D. and the following specifications.

No internal floors shall remain unpaved even if not full indicated in the D.D. and T.S.

7.2 Submittals (three samples minimum requested)

Submit the following:

a) Paving and coating materials

- **Stoneware tiles** (floors): sets of four tiles mounted showing colours, finish, pattern, and form of each type, with joints between the tiles grouted.
Apply to: any floor except Server room and Auditorium
- **Flexi PVC floor tiles** made from polymer thermoplastics, anti-static and fire resistant
Apply to: server room, auditorium
- **Ceramic tiles** (walls): sets of four tiles mounted showing size, form, finish, and range and shades in each colour, with joints between the tiles grouted.
Apply to: rest rooms at any building
- **Ceramic tiles accessories**: pieces of each type, showing color, finish type, and style.
Apply to: rest rooms at any building
- **Granite boards**: single board
Apply to: external stairs and external doors' thresholds
- **Window sills**: single marble board 3 cm. thickness
Apply to: external windows
- **Skirting**: set of two or more units per any kind of floor, showing joint system
Apply to: relevant floors

7.3 Environmental conditions:

Do not start tile work unless the ambient temperature in work area is at least 10 degrees C and rising. Maintain the ambient temperature above 10 degrees while work is in progress and for at least 3 days after its completion. Do not use adhesives in unventilated areas.

7.4 Materials

7.4.1 Stoneware Tiles: UNI En 176 group B I

Smoothed and/or polished type, according to the DD and the ENGINEER instructions, standard grade,

Nominal Facial Dimensions Nominal Thickness
200 by 200 or 300 by 300 x 9,0

- Features:
 - single colour, opaque surface, anti-slip type
 - shock resistance: at least 2 Nm (0.20 kgm);
 - bending resistance: at least 2.5 N/mm² (25 kg/cm²);
 - wear coefficient at tribometer: 15 mm per 1 km of path;

- water adsorption: not over the 0.1%;
- freezing resistance: -30°
- abrasion resistance: not less than 1;
- mass loss for acid attack: not over the 0.5%;
- basic proof attack: not over the 15%.

7.4.2 *Flexi PVC floor tiles*

Made from polymer thermoplastics and resistant to most chemicals.

- Thermal and sound reducing qualities.
- Volatile organic compounds are not admitted,
- Anti-static type
- 5 mm. minimum thickness
- Hardness (ISO 868): Shore A80
- Abrasion (DIN 50504): Nmm 15
- Wear Resistance (DIN 53516) mm 87.9
- Fire resistance: Class 1

7.4.3 *Ceramic wall tiles and accessories*

Ceramic wall tiles: finish with cushioned edges.

Nominal Facial Dimensions Nominal Thickness

in millimetres: 150 by 150 x 8

250x250 standard dimensions.

7.4.4 *Granite boards*

Hard, sound, granite boards, to provide and fix at doors thresholds, and onto the stairs steps rises and skirting, unless indicated otherwise at DD. .

- Doors thresholds: the joint between the marble board, the stoneware tiled floors and/or the PVC rooms' floor is to be made beneath the door panel, to be hidden when the door is closed.
- Stairs: Marble boards for steps shall be 30 mm thick; rises shall be 20 mm thick min. skirting: 10 mm thick min. Steps projection: 10 mm max.

Round edges exposed to foot traffic. Sand-rubbed finish on exposed surfaces. Bevel vertical edges to maximum of 13 mm in height or as indicated.

Provide at following areas:

- external staircases
- external stairs landings
- main entrance doors thresholds of Block A and B
- where otherwise indicated at D.D.

7.4.5 *Marble windows sills*

Hard, sound, marble boards, to provide and fix at windows sills unless indicated otherwise at DD. .

Provide at following areas:

- Windows sills, both buildings
- where otherwise indicated at D.D.

7.4.6 *Skirting:*

Provide according to the floors coating materials, as per manufacturer instructions.

7.4.7 *Aggregate:*

Sand for grout shall pass a number 16 sieve.

7.4.8 *Water:*

Clean, potable.

7.4.9 *Portland Cement:*

White for grout, gray for other uses.

7.4.10 *Mortars and Grouts*

Mortar Tile Setting

- Portland cement mortar
- Dry-set Portland cement mortar: factory sanded.
- Organic adhesive(the use of organic adhesives is limited to wall applications)
- Cementitious adhesives

7.4.11 *Grout:*

- Commercial portland cement: .
- Sand portland cement:
- Tile-setting and grouting epoxy.

7.5 Execution

Do not start tile work until roughing in for plumbing, heating, ventilating, air conditioning, and electrical work has been installed and tested; and built-in bathtubs, shower stalls, and membrane waterproofing have been installed and tested.

7.6 Preparation

7.6.1 *Sub floor Preparation:*

Do not begin floor tile installation in areas receiving wall tile until wall tile installation has been completed.

7.6.2 *Bending on Structural reinforced –concrete floor:*

Prepare with mortar setting bed before applying tile with dry set mortar. Fill areas where the floor does not meet the required tolerances and level.
Provide expansion joints where indicated.

7.7 Installation

7..7.1 *Ceramic/Stoneware Floor Tile:*

Portland cement mortar: Recess, or depress setting bed where indicated.

Provide joint according to previous point 9 between:

- walls and floor at any room with polystyrene foam market type strips 50/10
- at doors threshold (doors panel beneath) with PVC “U” profiles, market type. grey colour whether not otherwise requested by the Engineer.

7..7.2 *Ceramic indoor walls’ tiling:*

Wall surfaces to receive ceramic tile, set in a mortar setting bed shall have square corners, be plumb and true, with variations not exceeding 2.5 mm. per metre

7..7.3 *Granite boards*

Provide the “Granite” boards on the clean and brushed concrete stair flights surface, set in a mortar setting bed in Portland cement. The surface shall have square corners, be plumb and levelled.

Provide 30mm thickness boards for steps and 20 mm. boards for risers.

No slippery band or a 55 cm. min. surface treatment requested on external steps border.

The protrusion of steps border shall not exceed 20mm. toward the stair flight and 10 mm from the stair sides.

7..7.4 *Marble windows’ sills*

Provide marble boards split in two sections with a 10 mm. open joint under the window frame to prevent cold bridges. Fill the joint with silicone rubber to the top.

Fix on clean walls ‘surface, setting on a mortar bed in Portland cement.

The surface shall have square corners, levelled and without sharp edges and shall protrude 30 mm to the exterior and 20 mm to the interior.

Provide a 5x10 drip on the external border.

7..7.5 Flexi PVC floors

- **Preparation**

Carefully read the producer detailed installation instructions.

Be sure the floor you're laying over is dry, clean and flat.

Gently remove wall base, millwork, or trim you'll re-use.

Have all recommended tools and materials on hand.

Properly acclimate the flooring according to the instructions.

- **Installation**

Cut pieces in an area where you can lay them out flat.

Leave enough "extra" on each piece so that you can adjust it to match the pattern.

Glue down pieces as soon as possible after cutting and fitting.

- **Finishing up**

Make final cuts only after pieces are adhered in place.

Trace complex wall edges onto felt paper to use as a trim pattern.

Lay pieces into the adhesive

Clean and seal seams.

7..7.6 Grouting and Pointing Joints:

Provide expansion and control joints in tile.

Install expansion and control joints as follows:

- a. Insert pre formed joint filler or back-up material in joints to proper depth to provide correct cavity depth for sealant.
- b. Prior to grouting, keep joints open and clean by stuffing with paper or other material to prevent filling with dirt, grout, or mortar.
- c. After tile is grouted and completely dry, remove paper or other temporary filler material; brush joints clean and fill with back-up material and sealant

7..7.7 Cleaning:

Acid cleaning of unglazed tile when necessary, shall be done no sooner than 14 days after setting tile.

8.0 Painting works

Reference: EN 13300 UNI EN 10795

8.1 General:

The present activity mainly refers but it is not limited to:

- The final painting of the internal and external building surfaces where not otherwise coated with different materials
- The proper treatment of the exposed or hidden structures namely all the wooden and steel structures not otherwise protected.

According to the D. D. and the present T.S.

No un-painted or un-protected building surfaces shall be admitted.

8.2 Submittals:

submit the following for approval before fixing:

- Shop Drawings
- Product Data

For each type of coating, sealant, or other product furnished, submit data from the manufacturer's paint laboratory indicating that the product conforms to requirements of the referenced

8.3 Environmental conditions

8..3.1 Exterior Coatings:

Do not apply coating to surfaces during foggy or rainy weather

8..3.2 Interior Coatings:

Apply coatings when surfaces to be painted are dry

8.4 Materials

- 8.4.1 *Primer Coating, (Exterior), one coat*
- 8.4.2 *Primer Coating, (Interior), one coat*
- 8.4.3 *Water Paint, Acrylic with quartz flour (Exterior) two coats*
- 8.4.4 *Water Paint Vinyl (Interior) two coats*
- 8.4.5 *Distemper (Interior) two coats*
- 8.4.6 *Rust proofing, red oxide of lead in boiled linseed oil, two coats*
- 8.4.7 *Enamel Painting, (oil-synthetic enamel) for metal surfaces, two coats*
- 8.4.8 *Thinner*

8.5 Execution

- 8.5.1 *Surface preparation:*
Remove dirt, splinters, loose particles, grease, oil, and other substances deleterious to coating performance
- 8.5.2 *Preparation of metal surfaces*
 - a) *Ferrous Surfaces:*
Brush-off blast and clean entire surface. Water jetting to may be used to remove loose coating and other loose materials.
Galvanized Surfaces With Only Dirt and Zinc Oxidation Products: Clean with solvent, steam, or non-alkaline detergent solution.
 - b) *Aluminum, Other Non-Galvanized, and Non-Ferrous Surfaces:*
Surface Cleaning: Solvent clean in accordance and wash with mild non-alkaline detergent to remove dirt and water soluble contaminants.
- 8.5.3 *Preparation of concrete and cementitious surfaces*
 - a) *Concrete and Masonry:*
Remove the following deleterious substances: . Dirt, Grease, and Oil. Wash surfaces.
 - b) *Gypsum Board, Plaster, and Stucco:*
Surface Cleaning: Plaster and stucco shall be clean and free from loose matter; gypsum board shall be dry. Remove loose dirt and dust by brushing with a soft brush or rubbing with a dry cloth prior to application of the first coat material.
- 8.5.4 *Preparation of wood surfaces:*
Initial surface cleaning and sanding and scraping.

8.6 Application

- 8.6.1 *Coating Application:*
Apply coating materials in accordance with manufacturer instructions. Thoroughly work coating materials into joints, crevices, and open spaces. Touch up damaged coatings before applying subsequent coats. Interior areas shall be broom clean and dust free before and during the application of coating material.
 - a. *Drying Time:*
Allow time between coats, as recommended by the coating manufacturer, to permit thorough drying, but not to present topcoat adhesion problems. Provide each coat in specified condition to receive next coat.
 - b. *Primers, and Intermediate Coats:*
Do not allow primers or intermediate coats to dry more than 30 days, or longer than recommended by manufacturer, before applying subsequent coats.
Follow manufacturer's recommendations for surface preparation if primers or intermediate coats are allowed to dry longer than recommended by manufacturers of subsequent coatings. Each

coat shall cover surface of preceding coat or surface completely, and there shall be a visually perceptible difference in shades of successive coats.

c. **Finished Surfaces:**

Provide finished surfaces free from runs, drops, ridges, waves, laps, brush marks, and variations in colors.

8.6.2 Equipment:

Apply coatings with approved brushes, approved rollers, or approved spray equipment, unless specified otherwise. Spray areas made inaccessible to brushing by items such as ducts and other equipment.

8.6.3 Thinning of Paints:

Reduce paints to proper consistency by adding fresh paint, except when thinning is mandatory for the type of paint being used. Obtain written permission from the Contract Manager to use thinners. The written permission shall include quantities and types of thinners to use.

8.6.4 Coating Systems:

a. **Systems by Substrates:**

Apply coatings that conform to the respective specifications listed at the following points:

- 1 Exterior Metal Surfaces
- 2 Interior Metal Surfaces
- 3 Exterior Concrete, Concrete Masonry, Plaster
- 4 Interior Concrete, Concrete Masonry, Plaster
- 5 Exterior Wood Surfaces
- 6 Interior Wood Surfaces

Minimum Dry Film Thickness (DFT): Apply paints, primers, varnishes, enamels, undercoats, and other coatings to a minimum dry film thickness of 0.0375 mm each coat unless specified otherwise. Coating thickness where specified, refers to the minimum dry film thickness.

8.7 Coating systems for metal

8.7.1 Exterior metal surfaces

Rust proofing: 0.50 mm
Intermediate: semi-gloss 0.0375 mm
Topcoat: semigloss 0.0375

8.7.2 Interior metal surfaces

Rust proofing - 0.050 mm
Intermediate: semigloss 0.0375 mm
Topcoat: semigloss 0.0375 mm

8.8 Coating systems for concrete and cementitious substrates

8.8.1 Exterior surfaces

Primer: 0.0375 mm
Intermediate: (flat) 0.0375 mm
Topcoat: (flat) 0.0375.

8.8.2 Interior surfaces

Primer: 0.050 mm
Intermediate: eggshell 0.0375 mm
Topcoat: eggshell 0.0375 mm

9.0 Doors and windows

9.1 General:

The present activity mainly refers but it is not limited to the provision of doors, windows and gates as per D.D. and according to the present T.S.

9.2 Submittals:

Submit the following:

- Shop Drawings
- Drawings or catalogue data showing each type of unit with installation instructions.
- Product Data
- Accessories
- Sample warranty
- Samples, section of each type of unit showing the stile, rail, veneer, finish, core construction. and finish colours
- Submit a minimum of three colour selection samples.

9.3 Wooden doors:

Provide wood doors of the types, sizes, and designs indicated in the drawings.

Apply to: internal doors

9.3.1 Interior flush doors:

Flush doors shall conform to drawings. Hollow core doors shall have lock blocks and 25 mm minimum thickness hinge stile. Stile edge bands of doors to receive natural finish shall be hardwood, compatible with face veneer of walnut. No visible finger joints will be accepted in stile edge bands. Provide hollow core flush doors with faces of good grade walnut. Hardwood veneers shall be plain sliced.

9.3.2 Accessories

a) Door Light Openings:

Provide glazed openings with the manufacturer's standard wood mouldings. The mouldings for doors to receive natural finish shall be of the same species and colour as the face veneers. Mouldings for flush doors shall be lip type and in accordance to the D.D.

b) Hardware-doors:

Provide, as far as feasible, locks, hinges, pivots, and closers of one lock, hinge, pivot, or closer manufacturer's make. Modify hardware as necessary to provide features indicated or specified. Hardware shall be designed to support a dead load to 1-1/2 times the door and attached hardware without deformation which would interfere with the operation of the door. Hinges on natural wood or plastic surfaced interior doors should be steel with finish brass or bronze plated. Handles will be brass.

9.3.3 Finishes:

a) Natural Finish:

Provide doors finished at the factory by the door manufacturer as follows: The coating shall be AWI QS medium rubbed sheen, closed grain effect. Seal edges, cut-outs, trim, and wood accessories, and apply two coats of finish compatible with the door face finish. Touch-up finishes that are scratched or marred, or where exposed fastener holes are filled, in accordance with the door manufacturer's instructions. Match colour and sheen of factory finish using materials compatible for field application.

b) Plastic Laminate Finish:

Factory applied, General or Specific purpose type, 1.25 mm minimum thickness. Glue laminated plastic for hollow core doors to wood veneer, plywood, or hardboard backing to form door panel. Combined minimum thickness of laminate sheet and backing shall be 2.5 mm

c) Collar:

Provide door finish colours as selected by the Engineer from the colour selection samples.

9.4 Appurtenances:

9.4.1 Locks and keys

Provide key units per each door installed.

9.4.2 Door closers

Reference: UNI EN 1154

a) *Provide automatic doors' closer at the following doors:*

- Main entrance doors

b) *Features:*

- Aluminium alloy body
- Nylon case
- Steel bracket with regulating stop
- Steel spring in oil bath
- Thermostatic device onto the regulation valves.
- Final finishing colour: black where not otherwise requested by the Engineer.

9.5 PVC windows

Apply to: windows and external doors indicated at D.D.

Minimum features:

- Thermal conductivity of PVC profile to be not more than 0.14 kcal/m.hr °C
- PVC window profiles with multi chambered profile to reduce the transfer of heat. K value of PVC window to be not more than 1.4 kcal/m 2.hr °C,
- PVC profiles reinforcements made of galvanized steel to be installed in chambers of the PVC profile to provide the necessary strength to the window members. Separate sealed chambers in profile and zinc coating on steel bestows longevity to the product during its usage period. Minimum thickness of steel reinforcement to be not less than 16 SWG. Reinforcements profiles to be screwed to the PVC profile using self-drilling special screws. The unification of the duo renders strength to the window.
- Highly weather resistant quality to be achieved by anti-ultraviolet and high impact resistant formulation. Withstanding long exposure in extreme weather change under scorching sun, storms, dryness, high humidity.
- PVC windows profiles to be designed using multi-chambered profile with tight seal, for noise separation.
- An average sound separation of 30 dB in double-glazing is requested.
- PVC to have high electrical insulation not less than 1015 ohms-cm. Fully safe from electrical conductivity.
- PVC materials to be made with flame retardant product, not to cause, support or enhance the natural development of fire. PVC sections do not support combustion and to be self-extinguishing to prevents the promotion of fire spread.
- PVC material absorbs water below 0.1%. Weather stripping in the meeting rail to provide water resistance proofing.
- PVC windows to be highly resistive to the attacks of acids, alkalis, waste gases, and salts.
- Weather stripping in the windows at the meeting rail to provides maximum seal for energy saving reasons
- PVC windows to be easily operated under any weather conditions.

10.0 Electric systems

10.1 General

Scope:

This section consists in the description of the electrical installations of the water user association buildings.

10.2 Contractors documentation (shop drawings)

Based on the design documents, the Contractor shall submit to be verified and approved by the Engineer and Employer and all possible alterations that could happen during the construction period: buildings logs, building books, test certificates of the materials and all other test certificates, as well as other necessary documentation.

The Contractor shall submit for the Engineer's and Project Manager approval at the time for submission of detailed design, in three copies, the following:

- Design calculations for the illumination
- Design of main riser cable dimension including the relevant calculations
- Detailed design plans and shop drawings of all floors (1:50)
- Relevant layout plans and details (such as the electrical scheme and front view of the distribution boards)
- Details of materials (such as the material specifications of each appliances)
- Manufacturer's specifications and details with supporting calculations where appropriate.
- Method statement for execution of all aspects of the work on Site
- Contractor' s updated work Programme.

The detailed design submitted to the Engineer and Employer for approval shall give full information regarding the design of the works proposed, and approval of the design shall be obtained before any work is commenced.

Prior to submission of the detailed design the contractor shall reach agreement with the competent authorities that statutory approvals can be reached within a determined period of time.

10.3 Performance criteria of the electrical system

Earthing system :

- TNC System for Main Distribution Power Panels (NPP & EPP)
- TNS System for UPS and Sub distribution

Rated operational voltage (Ue) :

- 400 V (L/L)
- 230 V (L/N)

Rated insulation voltage (Ui)

- ≥ 690 V

Rated impulse withstand voltage (U imp) of low voltage facilities :

- 12 kV

Test voltage of low voltage facilities :

- 1 min. 50 Hz 3500 V

Rated frequency :

- 50 Hz

Rated service :

- uninterrupted

Voltage drop between sources and loads :

- 4 % maximum on AC (from transformer outgoing clamps to the farthest socket)

Cos phi :

- 0,90 on mains supply

Neutral sizing :

- in accordance with codes and standards
- equal to phase sections on the circuits from the sources (mains and genset)

Breaking capacity and short-circuit withstand:

- CEI 947.2 P1 (cycle 0 – 3 min. – CO)

10.4 Normal power supply (main)

The supply from the network from a nearby transformer station it is supposed that a connection might be possible.

- a) Main distribution panel (located in the Administration building) as shown on the on line diagram:
- One transformer unit (located in the close compound and out of the present project) shall provide 250 kW to the main low voltage panel at Administration building
 - One diesel generator (located in the close compound and out of the present project) shall supply 100 kW to the emergency low voltage panel at Administration building.
 - One UPS installed in the Server room at Administration building is dedicated only for computer system

A low voltage panel shall be equipped with circuit breakers to reduce the dimension of the cables. The panels supply all distribution boards of the buildings.

- b) Sub distribution.
Sub distribution boards made up by a metallic cabinet with two electrically separate units: one for main supply users and one for generator supply users are installed in both building.
The distribution boards shall be installed at both buildings corridors and shall be wall recessed type.
- c) Power consumption metering
The total power consumption is measured at main power supply panel, located at Administration building (P.01).

10.5 Distribution boards

13.8.1 Main distribution boards for Mains

References: IEC 60439 (Low-voltage switchgear and control-gear assemblies),

IEC 60947 (Low-voltage switchgear and control-gear)

- a) *Basic technical features*
- Form and earthing system : as mentioned on the one line diagram
 - With-drawable equipment as shown on the one line diagrams
 - In accordance with the local electricity company regulations
 - Protection degree IEC 529 : IP 31 / IP 20 with open doors
 - Rated voltage : 690 V
 - Operating voltage : see the one line diagram
 - No use of fluids
 - No fuses, all protections by means of circuit breakers with electronic trip units
 - Digital measuring device in TRMS (true values) on each general supply for :
 - 3A, 3V, kW, kVAr, kVA, Hz, cos.phi
 - Pmax. and I1, I2, I3 max. on 8, 10, 15, 20 or 30 min.
 - Recording of the max. values
 - Alarms transmission of presets (dry contacts)
 - Over-voltage protection device on each phase
 - Automatic power factor correction :
 - harmonics filter
 - automatic change over for condensor battery in order to guarantee the same working hours on all condensers.
 - dry type
 - IEC 60831-1/2

- Selectivity calculations to be delivered (discrimination)
- All the settings are tested and sealed
- Test reports to be delivered

b) *Dimensions/weight*

No particular specifications. Cabinet accesses and cables entries in accordance with the local space conditions

Fitting in the technical room and its access (to be checked)

c) *Noise*

Not applicable

13.8.2 *Sub distribution boards for mains, gens-et*

References: IEC 60439 (Low-voltage switchgear and control-gear assemblies),
IEC 60947 (Low-voltage switchgear and control-gear)

a) *Basic technical features*

- Form and earthing system : as mentioned on the one line diagram
- In accordance with the local electricity company regulations
- Protection degree IEC 529 : IP 31 / IP 20 with open doors
- Rated voltage : 690 V
- Operating voltage : see the one line diagram
- No use of fluids
- No fuses, all protections by means of RCCD, RCB and MCB
- Over-voltage protection device on each phase
- Selectivity calculations to be delivered (discrimination)
- Using Bus bar system for supply of RCCD, RCD and MCB
- All switching appliances must be plug-in type
- Direct connection of outgoing cable, except for PE
- All the settings are tested and sealed
- Test reports to be delivered

b) *Dimensions/weight*

- Depth max. 30 cm. No rear access allowed. Connections from above
- Access to the room to be checked
- Floor structure to be checked

10.6 Electrical Installation

13.9.1 *Wires and Cable:*

Wires and cables shall meet applicable requirements for type of insulation, jacket, and conductor specified or indicated. Wires and cables manufactured more than 12 months prior to date of delivery to site shall not be used.

Feeder low voltage cables for 400/230 distribution system shall conform to EN per TNC/S system. The type of insulation shall be moisture and heat resistant, suitable for maximum operating temperature of 70 degrees Centigrade.

Cables shall be in one piece without splices between connections except where the distance exceeds the lengths in which the cable is furnished.

Bends in cables shall be not less than those specified by the manufacturer for the type of cable specified.

All conductors shall be copper, stranded or solid as required.

Minimum Conductor Sizes: All sockets: 2,5mm² / indoor light installation 1,5mm² 400V/230V

Color coding:

Phase: Black, grey, brown (in cables)

Phase: black (wires)

Neutral: light blue

Protection Earth: yellow/green (stripes)

Insulated potential equalisation: yellow/green (stripes)

switched wire: not black, not light blue, not yellow/green (stripes)

Bonding Conductors:

- min. 4mm²
- cable trays 16mm²
- distribution boards. 70mm²

13.9.2 *Conduits, boxes:*

Inside buildings there will be all cables laid in conduits according to the drawing of the typical installation of an office. That means that with in the suspend ceiling the installation will be on the surface, underneath the ceiling the installation shall be of recessed type. The change of the type of installation has to be done with in a recessed box.

Within the staircase the installation will be laid in concrete. The installation of the conduits and boxes must be made before pouring the concrete and fixed properly to the iron and form work.

13.9.3 *Labelling:*

All cables shall be labelled according the scheme of the distribution boards with their circuit number. If a circuit number is not available (i.e. BMS connections) the appliances and room number on both ends shall the content of the labelling.

If cables or conduits are installed for later use or spare space than this shall be noted also on the label.

Same information must be provided on both ends of cables and conduits.

10.7 Luminaries

References: EN 60598 : luminaries

- Part 1 : General requirements and tests
- Part 2 : Particular requirements – Section 1 : Fixed general purpose luminaries
- Section 2 : Recessed luminaries

EN 60 570 : Electrical supply tracks for luminaries

IES recommendations

Local rules and regulations

13.10.1 *Indoor luminaries:*

Luminaries in all offices, rooms with computer workplaces, meeting rooms, shall be selected as glare protected.

For internal lighting, the minimum average illumination degree Em has to be designed as follows:

Rooms	Illumination
Offices and similar	500 lux
Corridors, staircases	150 lux
Archives, storage rooms	150 lux
Technical rooms	200 lux
Workshop, kitchen, bakery,	400 lux

All luminaries in the buildings must be equipped with electronic ballasts, with terminals (min. section 2,5mm²) and additional terminals to connect a following luminary. The toilets and wash rooms are equipped usually with down-lights (IP44).

According to the design drawing following type shall be part of the installation

- 1.- Mercury Ceiling mounted rectangular luminaire with lamp type HQL E40, 250W, IP 40 in **auditorium and workshop** , CQS/IQNET marking. Class II Fixture (double isolation).
- 2 - Fluorescent Ceiling mounted rectangular luminaire with lamp type FLC, 4x18W G13, FD 75lm/w IP 40 in **toilets, kitchenette, and administrative areas**. CQS/IQNET marking. Class II Fixture (double isolation).

- 3.- Ceiling circle down light luminaire with saving energy lamp FLC 1x26W, Dia.250-300mm, when is possible inside mounting in false ceilings. CQS/IQNET marking. Class II Fixture (double isolation).IP 65 at toilet cubicles.

13.10.2 *Emergency luminaries:*

Reference: EN 1838 : Emergency lighting

EN 60598.2.22 : Luminaries for emergency lighting

IES recommendation

Emergency lighting has to fulfill the requirements of EN 1838. In addition some lighting fixtures of the corridors are supplied from generator and local UPS-s, so there is illumination of the escape ways.

The emergency light is installed in all corridors and escape way.

The installation of cables for the supply of the relevant fixtures shall comply with the DIN 4102 part 12 norms with fire resistance of 30minutes. For all riser cables and supply cables up to the last fixtures has to be according this regulation, which include also the cable clamps.

The lighting fixtures that show the direction are equipped with pictograph.

Emergency Lighting fixtures shall have protection degree IP 20 in administrative area and IP 54 in washing area, kitchen, bakery, workshops and IP4

The cabling for the emergency supply of lighting fixtures system shall comply with DIN VDE 4102 E30 or E90 norms.

a) *Emergency lighting*

- Insulation class I
- Permissible ambient temperature: -5 °C up to +40 °C
- Mechanical design

Sheet steel enclosure with separate enclosure section for accommodating the battery. Interior cover for the protection of the electronic components in blue, with block diagram and all relevant technical data. Enclosure with internal earthing studs. Cable feed-through from above. Enclosure door hung on the right with viewing window for the optical status indication.

Dimensions: (B x H x D) 24 Ah version: 400 x 600 x 160 mm

Electrical design: Supply cable (max. 4 mm²) and output circuits (max. 2 x 2.5 mm² per terminal) are arranged on the loop terminals on the central terminal strip. The cables are fed via a metal flange. As an option a metal flange plate with 10 x M20 plastic feed-throughs is available. The pre-wired battery cable is fastened to the batteries with plug-on terminals. Air and creep paths as per IEC. Three potential-free contacts (2xno/1xnc) are available for external fault signalling/status indication. Maintained light and non-maintained light circuits can be programmed as required via the control module.

b) *Exit Luminaire.*

With rounded enclosure outline and clear cover made of plastic. 30% luminous flux with mains operation and 100% luminous flux with battery operation.

Automatic cut-out for failures within the lamp circuit. Switching modes (maintained/non-maintained and switched emergency luminaries) freely programmable with suitable emergency lighting systems. Mixed operation possible in a single circuit

- Marking: single-sided silk screened legend
- Viewing distance: 17 m
- Voltage range: 230V 50/60 Hz, 220 V DC +25/-20%
- Current drawn (battery operation): 60 mA
- Power consumption: 11 W
- Permissible temperature range: -10°C up to +40°C
- Loop terminals: 3 x 2.5 sqmm
- Insulation class: I; Degree of protection: IP 20
- Colour of enclosure: White/Silver
- Inclusive lamp (tool-free replaceable): filament lamp 1x 11 W
- Dimensions (mm): L = 355, H = 100, D = 65

10.8 Switches

Note: ordinary switches shall be walls recessed, flush mounting type , no exposed boxes shall be admitted

The number of the lights connected to one switch and in one circuit is to be limited by the appropriate standards. If there is more than one light in the room, the command may be by two-way or more switches.

- For controlling the light in the corridor there are to be 2-way switches at both ends of the corridor.
- The position for installing and the number of the light connected to one switch and in one circuit must be in accordance with IEC 60884-1 CEE7 as per DD, Standard EN 60609-1 and degree of protection of the installed assembly CEI 64-8/7-1998.
- 10 A, 250 V switches shall be normally installed, IP 54 switches for toilets, lavatories and wet areas, as per detailed DD, fixing of wires with diameter 1,5 mm². They shall be installed close to the doors, 15 cm far from to the next door frame and 90 cm over the FFL.

10.9 Sockets

Reference. EN 60 309.1 : Socket outlets for industrial use – Part 1 : general rules

EN 60 309.2 : Socket outlets for industrial use – Part 2 : dimensional interchangeable rules

10.10.1 Sockets installation:

Provide and fix according to the following instructions and indication given at D.D.

- Every working place, meeting rooms, special conference room, and press rooms shall be supplied with:
 - 2 sockets (earthing contact) white (no back up from emergency set)
 - 2 sockets RJ45 for IT/telephone (structured cabling)
- Upper management working place are supplied with
 - 3 red sockets triple type under generator and UPS and two RJ45 for IT/telephone (structured cabling)
- Corridors
 - 2 sockets (white)
- Outdoor Area
 - Cleaning services sockets
- All rooms shall be additionally equipped with 1 white socket near to the entrance (cleaning services).

10.10.2 Basic technical features:

Two poles + PE or Four poles + PE, industrial concept

PE = pin positioned as specified in the standards

Wall mounting or flush mounting as mentioned on the drawings

Floor-box is recessed.

Break proof where stated.

Protection degree IP in accordance with the site conditions.

10.10 Internal distribution of the low voltage installations

The electrical system distribution in the buildings shall run in cable trays (100x50mm section) fixed on top of the suspended ceiling.

Electric cables shall be recessed (under plastered or fixed in the dry walls cavity), threaded into corrugated or rigid PVC pipes from the cable trays to the sockets and switches.

No exposed cables and wires shall be admitted

11.0 Plumbing systems

11.A Reference :

Reference : UNI EN 1602, UNI 89422, UNI EN 771-3, applicable Afghan Laws and Norms

Reference: UNI EN 10240; UNI EN 1074-1; UNI EN 1074-2; UNI EN 1092-2; UNI EN 1213

11.1 General information

NOTE: Water supply for one toilet and kitchen shall be provided. The fresh water system described in the present Technical Specification so refers to the systems to be implemented out of any water supply plant (water well and pumping station).

The fresh water supply in the compound is made up by main D 50 mm (2") HDPE pipe and the new buildings' systems shall be connected to the general system as per D.D.

11.2 Submittals

Submit the following:

- a) Pipe and fittings
- b) Valves
- c) Plumbing fixtures
- d) Pipe hangers and supports
- e) Strainers
- f) Drains

11.3 Piping

Notice: all pipes shall be buried, laid under floor or recessed. No faced pipes shall be admitted.

18.3.1 Buried pipelines

Provide HDPE pipes dimensioned according to the design drawings.

Buried pipe lines (horizontal main pipes for building water supply) will have a little deflection, so the contained water could be drained in the main entrance manhole.

Pipes assembly according to the manufacturer instruction and systems recommended.

Provide proper indication of the flow direction onto all pipes into the control manholes

The external pipes shall be buried at a 80 cm min. depth, laid into a trench over a 10 cm. thick sand bed

A warning plastic strip shall be laid into the trench, 40 cm above the pipes top.

Insulation coat is requested when the pipes laid less than the specified depth and in service tunnel.

Where the location of the water line is not clearly defined by dimensions on the drawings, do not lay water line closer horizontally than 1.0 m from any sewer line. Where water lines cross under gravity sewer lines, encase sewer line fully in concrete for a distance of at least 3.0 m on each side of the crossing,

Do not lay water lines in the same trench with electric wiring.

Terminate the external pipelines at approximately 1.5 m from the building unless otherwise indicated.

18.3.2 Indoors pipes

Provide HDPE pipes dimensioned according to the design drawings.

Provide galvanised pipes dimensioned according to the D.D. for **vertical main lines**, protected by thermal insulation of expanded polyethylene, conductivity not less than 0.04 W/mK, with vapour membrane, fire resistant, minimal thickness 9 mm. adequately fixed to ensure the stability of the installation against damage from passing equipment.

Wall thickness of steel pipe and fittings shall be determined by the manufacturer

All joints of pipes will be sealed to prevent leakage, either arising from use or from temperature variations or other causes.

All hardware, linings and insulation, pipe fixings, and all requirements to complete the work in a first-class manner will be included.

- Installation:

Threaded Joints: Make screwed joints up tight with a stiff mixture of graphite and oil, inert filler and oil, or graphite compound; apply to male threads only. Threads shall be full cut; do not leave more than three threads on the pipe exposed after assembling the joint.

Provide proper indication of the type of water (cold or sanitary hot) and of the flow direction onto all pipes exposed at technological areas, into the control manholes and onto the collector sets.

11.4 Water Valves and Appurtenances

Provide valves suitable for working pressure of at least 690 kPa. Valves shall have threaded end connections with a union on all sides of the valve. Ball valves may be provided in lieu of gate valves. Provide blue finish and red finish on hand wheels for valves in cold domestic water piping and hot domestic water piping, respectively.

All exposed water valves shall be brass body made and chromium plated.

Ball Valves: full port design, copper alloy, shall be bronze or cast-iron body. Valves shall have two-position lever handles.

11.5 Pipe Hangers and Supports:

Provide with adjustable type galvanized steel support rods, except as specified or indicated otherwise.

11.6 Toilet rooms fittings

11.6.1 Restrooms

Provide the following, as per D.D.:

- a) first class standard, ceramic **sitting pan**, provided with:
 - best quality body flush tank, fitting the same pan style
 - heavy duty plastic seat and lid.
- b) first class standard, ceramic **squatting pan**, provided with:
 - best quality body flush tank, fitting the same pan style
- c) first class ceramic wash basin, **half pedestal type**, provided with:
 - plastic siphoned drain pipe
 - mixer faucet connected to the fresh and hot sanitary water systems, brass body, 1/2" connection, chromium plated
- d) First class **urinals** provided with:
 - plastic siphoned drain pipe
 - push button tap connected to the fresh water system, brass body, 1/2" connection, chromium plated
- e) floor drain, solid P.V.C. made, provided with:
 - siphon system and secure stainless steel grill on top of it, removable for cleaning.

All sanitary fittings shall conform to the same style.

11.6.2 Kitchen

Provide the following, as per D.D.:

- a) Stainless steel sink, single pan, mounted on bi-laminated MDF furniture
 - plastic siphoned drain pipe
 - mixer faucet connected to both fresh and hot sanitary water system, brass body, 1/2" connection, chromium plated

11.7 Control manholes:

Provide and fix control manholes and covers, pre cast concrete or cast in-situ body made. Covers shall be cast iron made, type 25 KN where motor able.

11.8 Testing Procedure

Test water pipes at 1,5 time the ordinary working pressure of 3 kg/cm² for a time period of 48 hours.
No leakage is admitted at the end of the testing period.
Provide tests and certifications of good system performance from a registered body.

12.0 Waste/Storm water system

21.A References:

Reference : UNI EN 1602, UNI 89422, UNI EN 771-3, applicable Afghan Laws and Norms

Reference: ISO 2531; EN ISO 9001

12.1 General information

The waste water systems of the building shall be connected to a collecting pipeline that shall end at two septic tanks where the foul waters shall be stored and pumped out by tanker.

There is no availability of a public waste water system to drain the foul waters of the facility and therefore the tank shall be full close type, emptied by tankers time by time in accordance to the number of users.

The storm water system shall collect the rain waters coming from the down pipes of the buildings and from the road gullies and shall drain them to final drainage points, as indicated at D.D..

12.2 Submittals:

Submit the following for approval:

- Manufacturer data and specifications
- Metal items
- Frames, covers, and gratings
- Product Data
- Pipeline materials including joints, fittings, and couplings
- Submit manufacturer's standard drawings or catalogue cuts.

12.3 Pipes:

12.3.1 Internal PP Plastic network:

Install heavy duty P.P. pipes of different diameter, and relevant fittings in accordance with the drawings.

Make joints with the gaskets specified for joints with this piping and assemble in accordance with the manufacturer requirements for assembly.

Make joints to other pipe materials in accordance with the recommendations of the plastic pipe manufacturer.

12.3.2 External pipelines

Heavy duty P.P. pipes will be well benched to direct the flow of water easily round the bends without causing any turbulent flow.

Plastic Pipes will be laid underground, laid over a sand bed and protected with a concrete layer class 12/15 after joining.

Terminate the external pipelines at a point approximately 1,00m. from the building, unless otherwise indicated.

Where the location of the sewer is not clearly defined by dimensions on the drawings, do not lay sewer line closer horizontally than 1,00m. to a water main or service line.

Install pressure sewer lines beneath water lines only, with the top of the sewer line being at least 0.60 m below bottom of water line.

Where sanitary sewer lines pass above water lines, encase sewer in concrete for a distance of 3 m on each side of the crossing.

Where sanitary sewer lines pass below water lines, lay pipes so that no joint in the sewer line will be closer than 0.9 m, horizontal distance, to the water line.

12.3.3 Ventilation head

Ventilation head are used for protection of vertical ventilation sewerage pipes from outdoor conditions. Ventilation head can be made of heavy duty PVC or zinc coated tin.

12.4 Floor drains

Provide and fix: floor drain solid P.V.C. made, provided with siphon system and removable drain cap for cleaning.

12.5 Manholes:

Provide pre-cast or cast in situ concrete manholes at any pipeline direction change, and not more than 50 m. spaced, drops, cleansing wells and inspection chambers necessary for foul sewer and rainwater drainage.

Provide all manholes, drops, cleansing wells and inspection chambers necessary for foul sewer and rainwater drainage.

Manholes and inspection chambers situated on access roads and fire engine access roads shall be strong to carry a load of 250 KN, equipped with covers allowing maintenance access.

The depth of sewer manholes shall be sufficient to provide a slope of at least 2%,

Depth shall not be less than 1,00m. and manholes shall be provided with access rod stair when deeper than 1,50 m.

12.6 Fan Coils Condensation drainage

All fan coil units shall have condensation's pipes of polypropylene connected by welding, from the condensation tray, or to the built-in pump outlet, plugged according manufacturer's instruction, i.e. prefabricated pipe connector.

The drainage pipes shall be connected to the specially designed PP network drain line at lower level. Cabinet and Cassette type fan coils heating/cooling units shall have drainage pipelines of PP pipes connected by welding.

PP pipes shall be DN 50 and shall be laid in the suspended ceiling space (horizontal) and in the walls partitions and/or cavities (vertical). They shall be taken to the nearest drain network, properly connected.

Warning: no exposed pipelines shall be permitted.

12.7 Septic tanks

One septic tanks have been designed to store the foul waters waiting for their removal by tanker.

The tank is buried, concrete made and of 18m³ sized, to cover a peak of need of foul waters storage

21.8.1 Technical features

The septic tank shall have reinforced concrete foundation slab, walls and cover slab and shall be fully buried.

Waterproofing is requested at inside walls, made up by a layer of bitumen primer and two bitumen layers crossed and hot fixed by torch. Alternatively, waterproofing can be made by osmotic cement laid by trowels in three coats up to the

Manhole 80x80 shall be made on top of the cover slab to allow access for maintenance, provided by a cast iron cover with rubber gaskets to prevent smell.

Steel stairs have been designed for the same reason.

Special attention shall be paid to protect the waterproofing at sewerage pipes inlet point, to prevent easy worn out by the falling waters.

13.0 Ancillary works

13.1 Site Information Boards:

The Contractor shall provide a site information board in accordance with the MEW Engineer's Instruction

14. Stone Masonry

14.1 Scope

The work under this section of specifications consists of furnishing all plant, labor, equipment, appliances, materials and performance of all operations required in connection with the construction of stone soling in strict accordance with the specifications and Drawings and/or as directed by the Supervisor. The scope of this section of specification is covered with detailed specifications as laid down herein.

The terms "Stone Soling" and "Stone Masonry" refer to the rock sub-base material that underlies the building columns and beams.

14.2 Material

Material shall be of approved quality it shall be comprise strong hard durable stone of the approved size free from impurities, quarry sap, dust, dirt and solubility characteristics. The stone shall be obtained from approved quarries and shall be sound, free from laminations and weak cleavages.

14.3. Quality Control

The quality of material used in stone soling shall conform to the following.

- Maximum Los Angeles Abrasion value 30% determined as per ASTM C- 535-81.
- Soundness 5 cycles with sodium sulphate determined as per ASTM C-88-8.
- Specific Gravity shall be not less than 2.5 determined as per ASTM C-127- 84.
- Water Absorption shall not be more than 1.5%

14.4. Construction

14.4.1 Preparation of Sub-grade

Sub-grade shall be formed of suitable materials free of clods, sod, roots, stumps, brush or other objectionable material.

Sub-grade material shall be placed in successive layers not exceeding 6 inch in thickness and each layer shall be thoroughly compacted at optimum moisture content.

The sub-grade shall be compacted at optimum moisture content and loose pockets, if any, cut-out and refilled with selected materials in layers not more than 150mm thick and formed to levels and grades shown on the drawings.

Compaction shall be done by approved methods consistent with the soil/material to be compacted. The maximum dry weight density of the sub-grade shall not be less than 95% of Modified AASHTO requirements.

14.4.2 Stone Soling

The Stone Ballast shall be well graded and broken hard of 2" mesh obtained from an approved quarry. The soling stone shall be 100mm in size from an approved quarry,

The stone shall be laid and packed to even grades and well rolled using vibratory roller/plate compactor to a consolidated thickness in lifts not less than 6 inches.

The whole of the surface of the compacted stone soling layer will be blinded with an approved gritty material/ stone dust or fine sand material. After the interstices have been filled with smaller size crushed stone, so as to effectively fill in the voids and crevices, soling area may be watered, if necessary and again thoroughly rolled with the same roller to produce a smooth and even surface free from irregularities, true to line and level.

Care is to be taken to avoid any damage to existing structures, mains or pipes while rolling operation is in progress. In places inaccessible for a roller, compaction shall be done by hand tampers weighing not less than 20 lb. or power reamers as directed by the Supervisor.

14.4.3 Stone Masonry

Stone used in masonry shall be regular quarry stone of approved quality, free from seams and other defect. All masonry stone shall be kept slightly moist at the time of use. Stone used for masonry shall be two-thirds of the wall thickness. Round stone will be permitted only in limited amount in combination with angular stone and shall not be used in walls having a thickness less than forty (40) cm.

14.4.4 Types of Masonry

The stone masonry will be divided into two (2) types, Type A and Type B, according to cement mortar used for jointing. The cement-sand ratio by volume is given in the following table:

Type of stone masonry

Ratio of cement-sand

Type A	One part of Portland cement to three sand (1:3)
Type B	One part of Portland cement to four sand (1:4)

14.4.5 Laying of Stones Masonry wall

All stones shall be thoroughly wetted before laying. The stones shall be hammer-dressed on the face, sides and beds to such an extent that the stones will come into close proximity with the neighbouring stone. Stones shall be laid principally with horizontal layer and vertical joints are staggered and as neatly as possible. Face stone shall be comparatively larger and uniform in size and color to give a good appearance and breadth of stones shall be greater than the height. Face stone should tail into wall to a sufficient depth to bond well. Stones shall be laid with broader face downward to give a good bedding. Face joints shall be broken and face of wall shall be truly in plumb. All face stones in one course should be of same height. Height may vary but height of any course will not be greater than that of a course below it and difference in heights of two adjacent courses shall not exceed 30mm. Corner stones of quoins should be a good stone and dressed to correct angle and laid as headers and stretchers.

Bond stones running right to the full thickness of wall shall be provided one for every 0.5m² of wall surface and shall be staggered. For wall thickness greater than 75cm bond stones may be of two pieces placed side by side overlapping at least 15cm. breadth of bond stones shall not be less than 1.5 times the height.

Heart stones shall be not less than 150mm in any direction, carefully laid, hammered down with a wooden mallet into place and solidly bedded with mortar, chips and spalls being wedged in to avoid thick beds of joints and mortar. Beds and joints shall not exceed 25mm thick. Interstices, if any, may be filled with pieces or spalls of stones embedded in mortar. There shall be no pockets of air in any part of the masonry. All stone masonry walls built on concrete foundations shall be properly tied into these foundations using reinforcing bar, as specified by the Supervisor. Not more than 1m height of masonry wall shall be constructed at a time.

All stone masonry walls built off concrete foundations shall be properly tied into these foundations using reinforcing bar, or as specified by the Supervisor.

Joints on the face of all stone masonry exposed to view shall be neatly finished. The mortar in the joints of the stone masonry shall first be removed to a depth of three (3) cm. The joint shall then be cleaned thoroughly with a wire brush of all loose materials and filled with cement mortar with a mix proportion of one port-land cement and two part of sand by volume (1:2). The surface of the face stone shall be cleaned of all mortar upon completion of the finishing operation.

15. Well installation for Drinking Water

15.1 Description and Requirement for New Water Supply Well and Pumping System

Install a well for drinking water, with well casings, pumping system and drop pipe (pump column) as required. The depth of a new well, for the purposes of Tendering the Works is based on a depth of 100 meters. If the depth of the well exceeds 100 meter, the Contractor is to inform the site Supervisor and a change order for additional payment will be negotiated. If the drilled and complete well depth is less than 100 meters, the Contracting Authority will be granted a credit for the depth of well not constructed.

A hand dug shallow well will not be acceptable. Only a drilled well, to depths greater than 10 meters, with a minimum 3-meter length slotted screen, filter pack and minimum 5-meter sanitary seal will be accepted or as specified in the Drawings. The slotted screen must be placed in the water-bearing zone and the sanitary seal from the ground surface down.

Vertical and Plumb Well

The Contractor will not be paid for a finished well that is not vertical and plumb. Each well shall be constructed and casing installed plumb and true to line. No “doglegs” will be permitted. In order to ensure that the well is plumb, each well shall be tested for straightness by lowering a weighted messenger down the well casing and screen. This messenger shall be constructed of schedule 80 6-inch diameter PVC having a length of 5m. If the test demonstrates that the well is out of plumb (i.e., the weighted messenger cannot pass the entire length of casing and screen), the well shall be rejected and all costs of correcting or abandoning the well shall be paid by the Contractor. The cost to test each well shall be the full responsibility of the Contractor.

Well Materials and Construction

The well boring will be a minimum of 10-inches in diameter. The well itself must be constructed within 10-inch diameter steel temporary casing. The well casing and screen shall be steel or Schedule 80 PVC (flushed threaded) of 6-inches diameter or metric equivalent. To construct the well, place a 50 cm (~20 inches) long section of blank 6-inch diameter casing at the very bottom of the borehole (this acts as a debris trap or “sump”). Weld the 6-inch diameter slotted well screen section to this and set the slotted screen in the water-bearing zone. Weld the slotted screen properly to the solid (non-slotted) steel casing. The blank steel casing must extend up to the ground surface. See the Drawings for a well construction detail. If PVC casing is used, the material must be flush-threaded and machine-slotted at the factory.

Well Filter/Gravel Pack

The 10-inch boring and 6-inch casing size will allow for placement of 2-inches minimum thickness of gravel pack in the annular space between the 10-inch temporary casing and well casing (steel well material). The terms “Filter Pack” and “Gravel Pack” are interchangeable – they have the same meaning. The filter (gravel) pack should extend a minimum of 1 meter above the slotted well screen. The filter pack must extend up to the bottom of the sand layer above the sanitary seal. The well must be surged for a minimum of 2 hours and additional gravel placed around the casing (between the borehole and casing) as the gravel pack settles.

Sanitary Seal, Well Surge and Development

Once the well screen and blank casing are securely placed in the well, and the gravel/filter pack is in place, surge the well for a minimum of two hours or until the gravel pack is no longer settling. Following surging of the well, and after the gravel pack is no longer settling, place a minimum layer of 1 meter of clean, fine sand on top of the filter pack. Place a bentonite layer of 0.5-meter thickness on top of the sand. A sanitary seal consisting of a lean concrete slurry, a minimum of 5 meters thick, shall be placed on top of the sand. This creates a sanitary seal that prohibits transmission of shallow contaminated water from entering the well bore. Following construction of the well, the well shall be pumped to develop it until the water runs clear and there is no sand in the water.

Pumping Systems and Wellhead Finishing

A heavy duty submersible pump, supplied with sufficient water-proof pump cable to reach from the pump to the surface is to be provided. Splices in the pump’s electrical power supply cable will not be accepted. Pumps sizing calculations and recommendation shall be provided by the Contractor to the Supervisor for approval. The Contractor will not be paid for supply of the pump unless the Supervisor has approved the pump size. Minimum pump column pipe size shall be 2 inch or 50mm galvanized iron pipe. Provide complete pipe and fitting from well to building, buried a minimum of 1 meter deep.

Provide a check valve, drain valve and isolation valves at the well discharge point.

The well discharge point shall be installed either in a concrete vault or within a well-insulated wellhead building to provide adequate freeze protection. An unprotected/un-insulated wellhead installation will not be acceptable.

15.2 Well Capacity and Water Quality Testing

Well are to be pumped continuously for a period of 2 hours and the flow measured with tanks to indicate the production capacity of the well. The final sizing of the water storage tank shall not be determined until after the well has been tested. The Contractor is solely responsible for providing well pumps capable of pumping the well to determine its capacity.

After installing the well pump and pumping continuously, and prior to collecting water samples for laboratory analysis, the well shall be disinfected. Upon completion of well development operations, each well shall be thoroughly cleaned of all foreign substances, including tools, timbers, rope, debris of any kind, cement, oil, grease, joint dope, and scum. Casing pipe shall be thoroughly swabbed, using alkalis as necessary, to remove any oil, grease, or joint dope.

Following the above cleaning, each well shall be chlorinated with a solution of chlorine which when mixed with a volume of water equal to that contained within the well will result in a minimum 100 mg/l concentration in all parts of the well. The Contractor will be responsible for supplying and transporting the chlorine solution to the well site. A tremie pipe should be used to place the chlorine solution in the well and insure proper distribution of the disinfectant.

The solution shall be left undisturbed for at least 16 hours and then pumped or bailed to waste by the Contractor until the discharge water is free of chlorine as indicated by negligible chlorine residual.

Water samples from the well, after pumping the disinfected well for a minimum of 2 hours will be collected. The samples shall be collected as recommended by a testing laboratory qualified to complete a drinking water panel. Minimum analyses include Total Fecal Coliform and basic minerals, including but not limited to Total Dissolved Solids, ph, Boron, Nitrate, Nitrite, Arsenic, Bromine/Bromate and Total Hardness. Water samples shall be transported to DACAAR lab in Kabul or another equally certified lab in lab-provided containers with preservatives as recommended by the lab. Prior to water quality testing, the name and location of the laboratory to be used shall be submitted to the Supervisor for approval. Test results from an unapproved lab shall result in non-payment of this item.

15.3 Well Rehabilitation

If an existing well is to be used for potable water supply, it must be re-developed and water samples collected and analyses performed prior to its use. The Contractor shall surge the well for a minimum of two hours, then pump as specified above to determine the well capacity.

Wells are to be pumped continuously for a period of 2 hours and the flow measured with tanks to indicate the production capacity of the well. The final sizing of the water storage tank and pumping system shall not be determined until after the well has been tested. The Contractor is solely responsible for providing well pumps capable of pumping the well to determine its capacity.

Once the well has been re-develop to the satisfaction of the Supervisor and a properly-sized pumping system installed, meeting the specification in this section, the well shall be disinfected and water quality samples collected.

16. MISCELLANEOUS

29.1 Solar

	Equipment.	Specification.	Qty.	Remarks
1	Solar Panels	CSUN-260W	10	
2	Inverters	INVT-2Kw (120-410V)	1	
3	Batteries	JPC12-250Ah	2	
4	Wire	AWG4/16mm ²	(30) m	
5	DC, Breaker	DCB10A1Ø	2	
6	AC, Breaker	-	-	
7	Battery terminal joints	Coper	4	
8	joint box	Small	1	
9	Fuse-box	medium	1	
10	Profile for Panels Frame	Black Rectangular Steel Pipes	115 m	As per Kabul markets
11	Exhaust-fan	55-100W	1	
12	Profile for Battery Frame	Black Rectangular Steel Pipes	Based on need	

The contractor shall supply a good quality water pump with all required accessories including installation and configuration

29.2 Water Tank

RCC elevated water Tank as indicated in the Design Drawing

Drawings

Attached separately

Supplementary Information Regarding Works to Be Procured

These are one story small office buildings at the following locations;

1. One office building for Sharawan Canal Water User Association along the Sharwan Canal at the below location:
N=36,71285
E=69,59055
Elevation= 851 meter
The sketch of the site is attached as attachment number-1.
2. One office building for Polikhomri Water user association along the Polikhomri River at the below location;
N=3554477
E=06844303
Elevation = 648 meter
The sketch of the site is attached as attachment number-2.
3. One office building for Kisham water user associations located at Kisham district along the Kisham river and the exact location is shown in the sketch as attachment number -3.
4. One office building for Khanabad water user associations located near to the security guard's room of Mechanical door of Khanabad weir, the detail sketch is attached as attachment number – 4.
5. One office building for Dasht-e-Qalah water user association along the Dasht-e-Qalah main canal located at the following location;
N=3706926
E=06927660
Its near to Pengani Village and its sketch is attached as attachment number -5.

Personnel Requirements

Using Form PER - 1 and PER - 2 in Section 4 (Bidding Forms), the Bidder must demonstrate that it has personnel who meet the following requirements:

No.	Position	Total Work Experience [years]	Experience in Similar Work [years]
1	Project Manager, one person for all sites	<u>5</u>	<u>3</u>
2	Construction (Civil) engineer – two persons for all sites	<u>4</u>	<u>2</u>
3	Site supervisor – one person for each site and totally five persons.	<u>4</u>	<u>2</u>

The number of personnel described in the table above for each position is what is expected for completion of the works and it may well be necessary to appoint others when necessary depending on the work program.

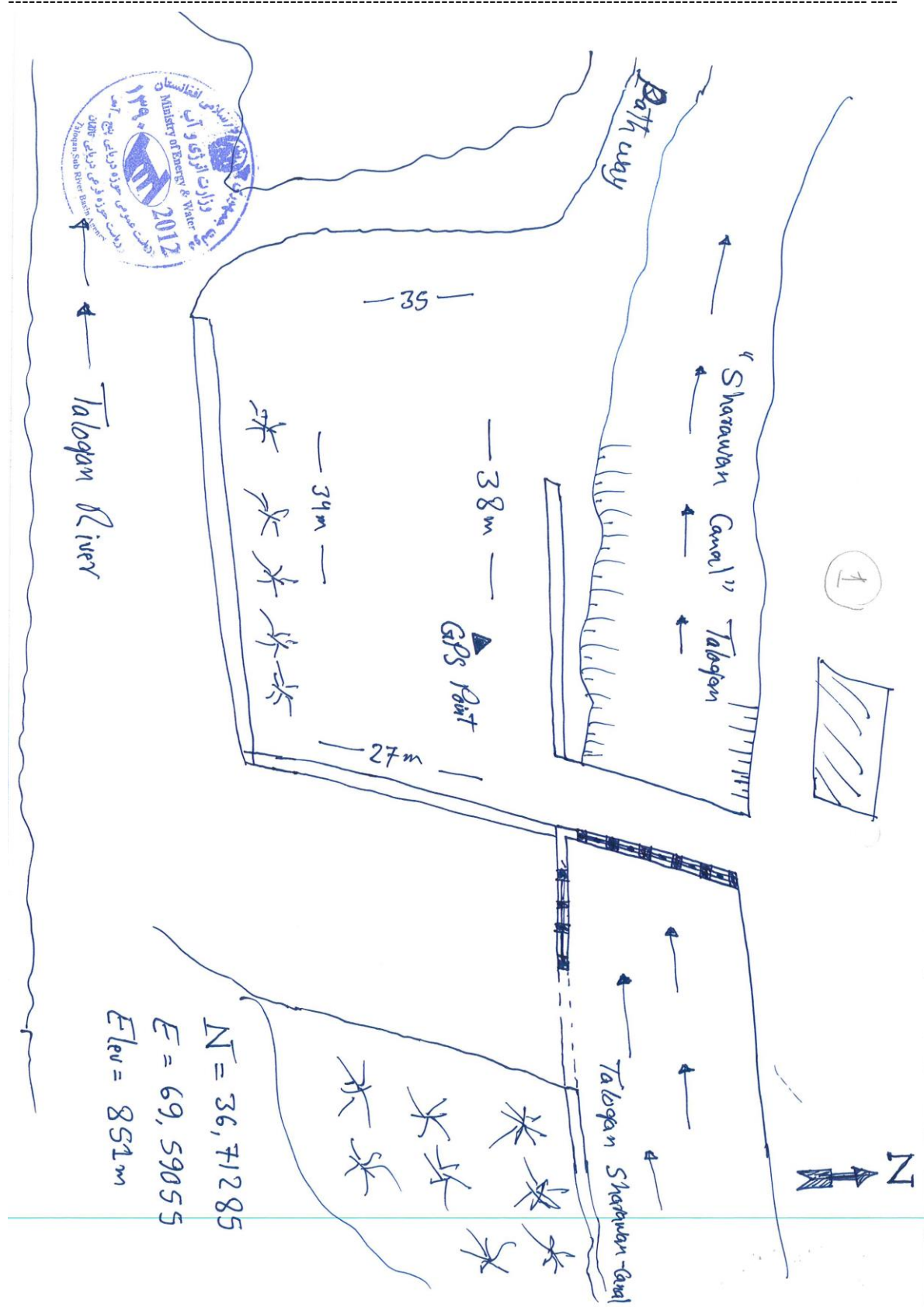
Equipment Requirements

Using Form EQU in Section 4 (Bidding Forms), the Bidder must demonstrate that it has the key equipment listed below:

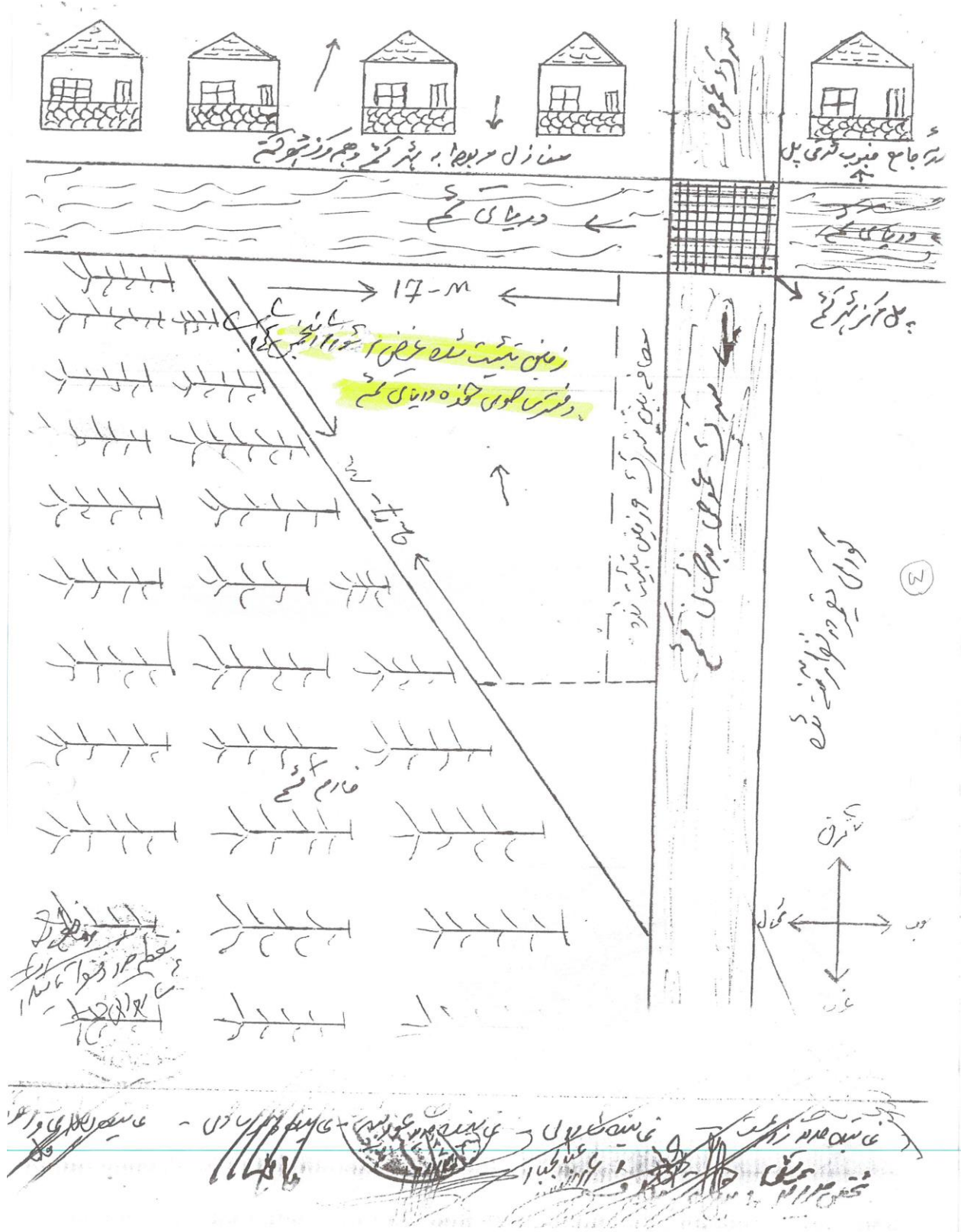
No.	Equipment Type and Characteristics	Minimum Number Required
1	Concrete Mixer (manual), medium size	<u>3</u>
2	Vibrator, standard	<u>3</u>
3	Dump Truck, 8 Ton	<u>2</u>
4	Generator, 10 KW	<u>3</u>

In case of lease or hire of the equipment, an agreement with the owner of equipment must be submitted clearly stating the availability of the equipment for the construction period of the proposed work.

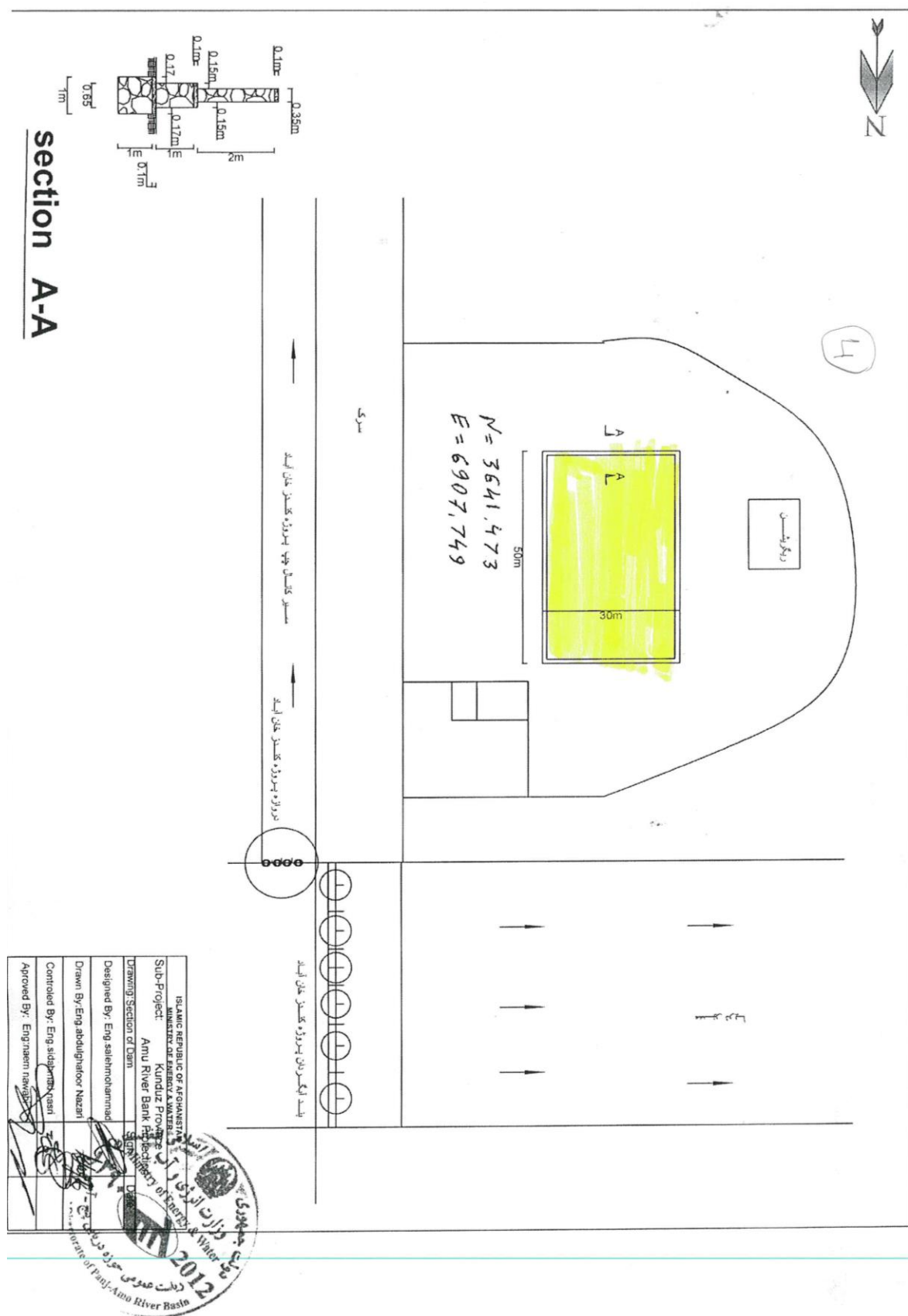
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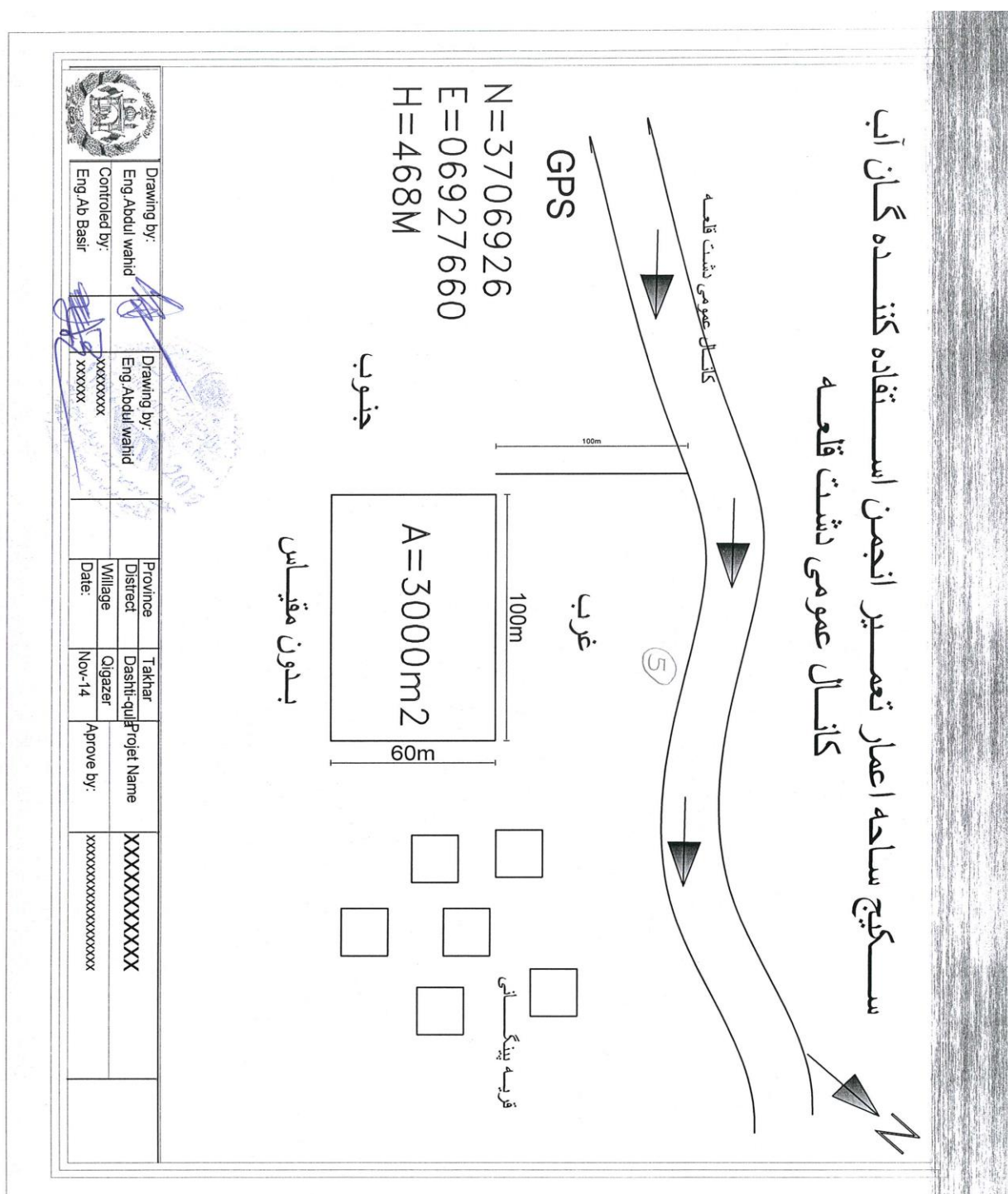


Attachment number -3



Attachment number -4







CONSTRUCTION OF WATER USER ASSOCIATION OFFICE BUILDING

CONTRACT: MEW/P-ARBP/NCB/CONTRACT 2

THE DRAWINGS (h)

**MINISTRY OF ENERGY AND WATER
PROJECT MANAGEMENT OFFICE (PMO)
PANJ-AMU RIVER BASIN SECTOR PROJECT (P-ARBP)**

2019

+2.800
1 Story

+0.000
Ground Floor

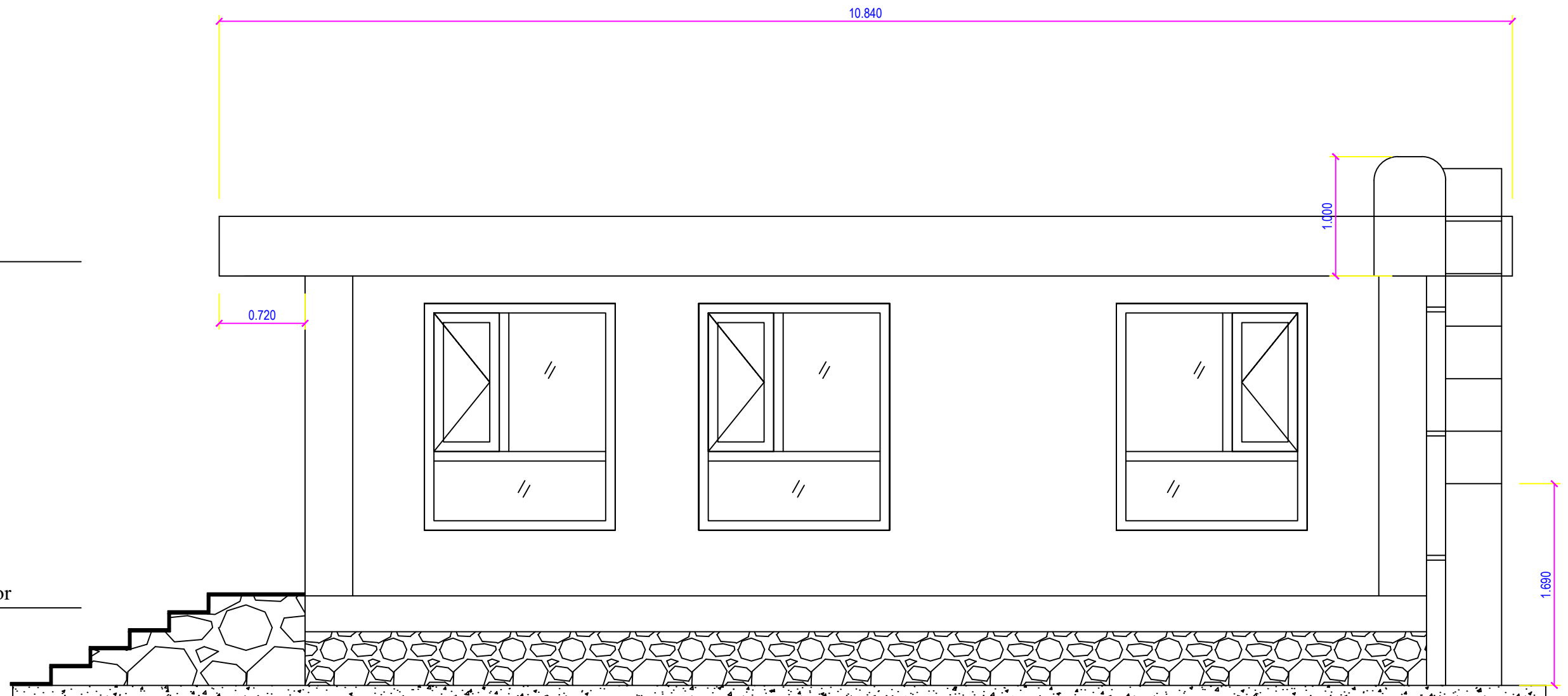


Front View

 Islamic Republic of Afghanistan	 Ministry of Energy & Water (MEW)	 Asian Development Bank (ADB)	Project Management Office	Project	Drawing Content	Consultant			Employer		DWG NO
			Water Resource Development Investment Program	P-ARBP Water User Association Building	Front Views	Drawn:	Design:	Recommended:	Checked:	Approved:	2/14
											Date:

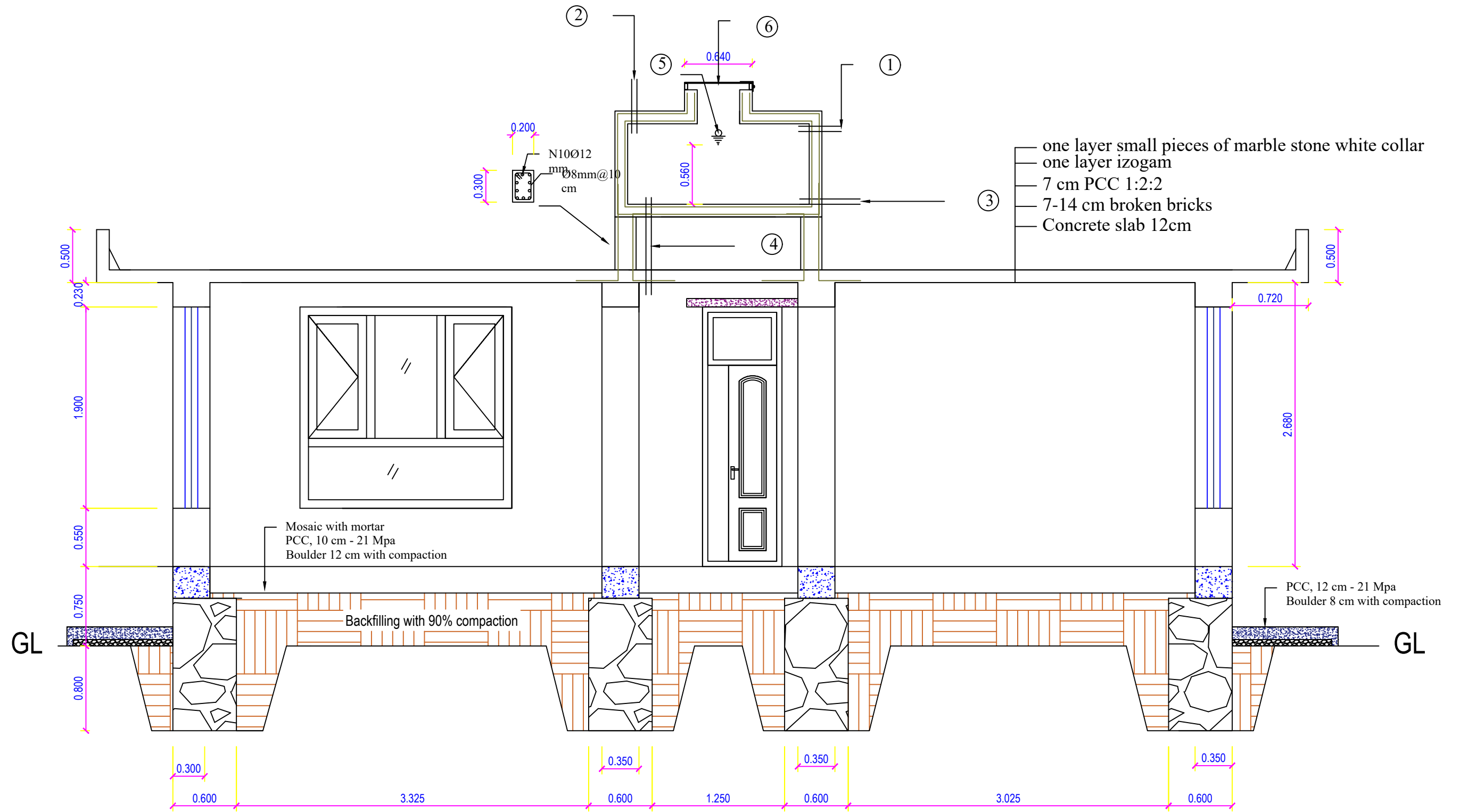
+2.800
1 Story

+0.000
Ground Floor



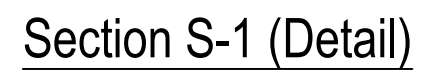
Side view

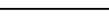
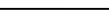
 Islamic Republic of Afghanistan	 Ministry of Energy & Water (MEW)	 Asian Development Bank (ADB)	Project Management Office	Project	Drawing Content	Consultant			Employer		DWG NO
			Water Resource Development Investment Program	P-ARBP Water User Association Building	Side View	Drawn:	Design:	Recommended:	Checked:	Approved:	3/14
											Date:

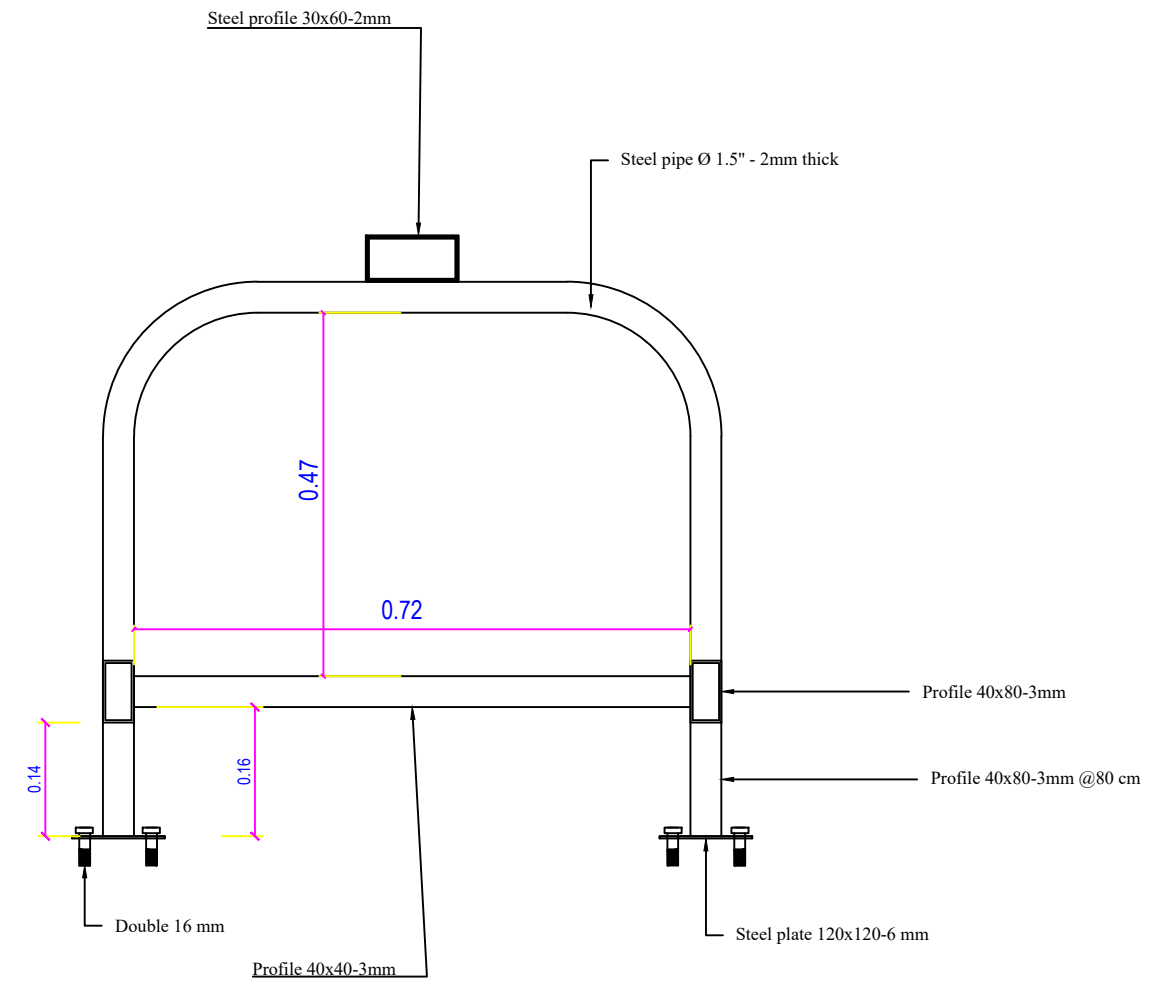
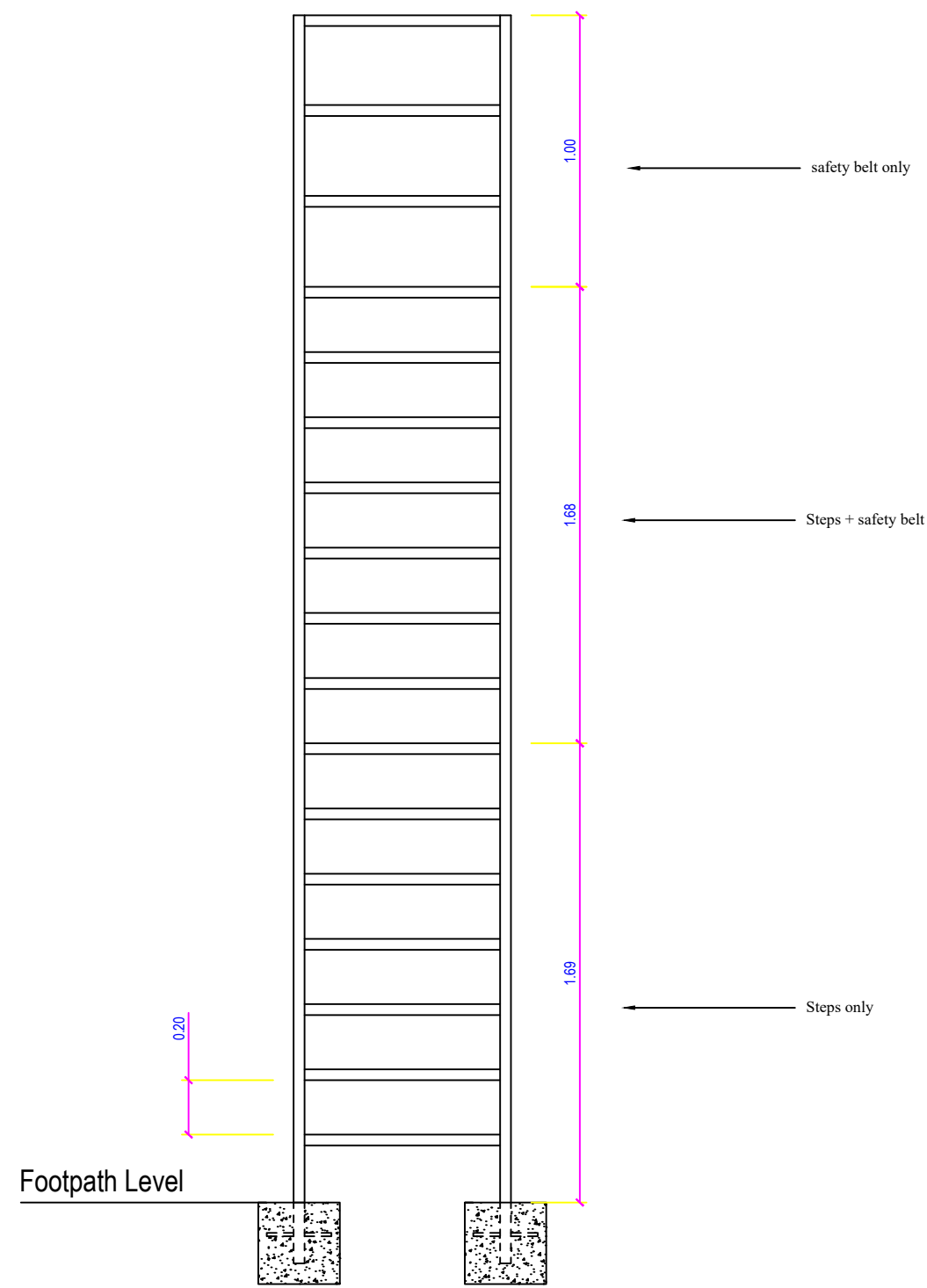


Section S-1

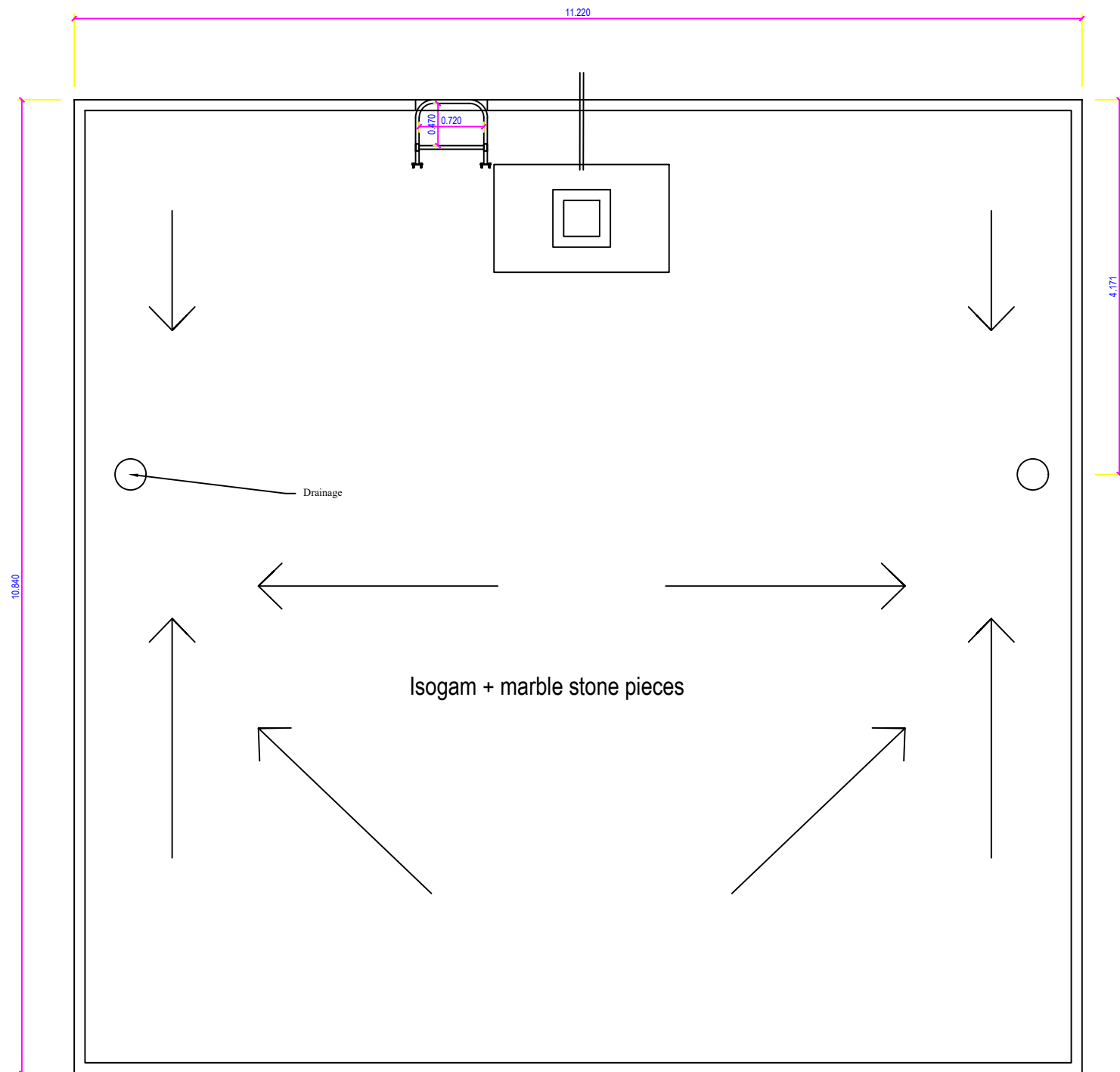
 Islamic Republic of Afghanistan	Ministry of Energy & Water (MEW)  Asian Development Bank (ADB)	Project Management Office Water Resource Development Investment Program	Project P-ARBP Water User Association Building	Drawing Content Section S-1	Consultant			Employer		DWG NO
					Drawn:	Design:	Recommended:	Checked:	Approved:	4/14
										Date:



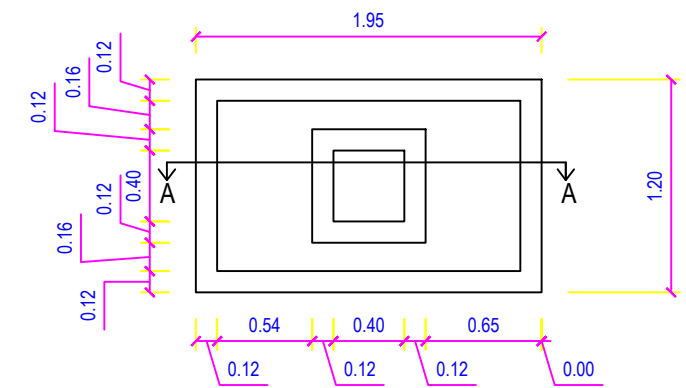
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			Water Resource Development Investment Program	P-ARBP Water User Association Building	Section S-1 Details	Drawn:	Design:	Recommended:	Checked:	Approved:	5/14
											Date:



 Islamic Republic of Afghanistan	Ministry of Energy & Water (MEW)  Asian Development Bank (ADB)	Project Management Office Water Resource Development Investment Program	Project P-ARBP Water User Association Building	Drawing Content Stair Details	Consultant			Employer		DWG NO 6/14 Date:
					Drawn:	Design:	Recommended:	Checked:	Approved:	



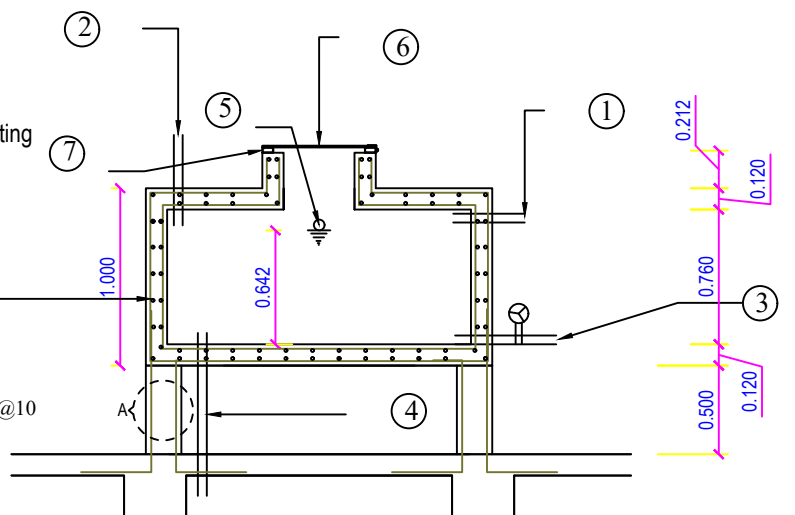
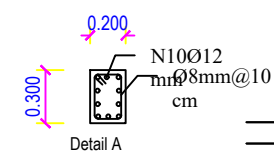
Roof Plan



Water Tank Plan

- 1= inlet pipe Ø1"
- 2= exhaust pipe Ø1"
- 3= cleaning pipe Ø1"
- 4= out let pipe Ø1"
- 5= overflow pipe Ø1.5 "
- 6= 3 mm steel plate with hinges, locking system, lock , anti-rust and painting
- 7= Steel frame 60x30-2mm

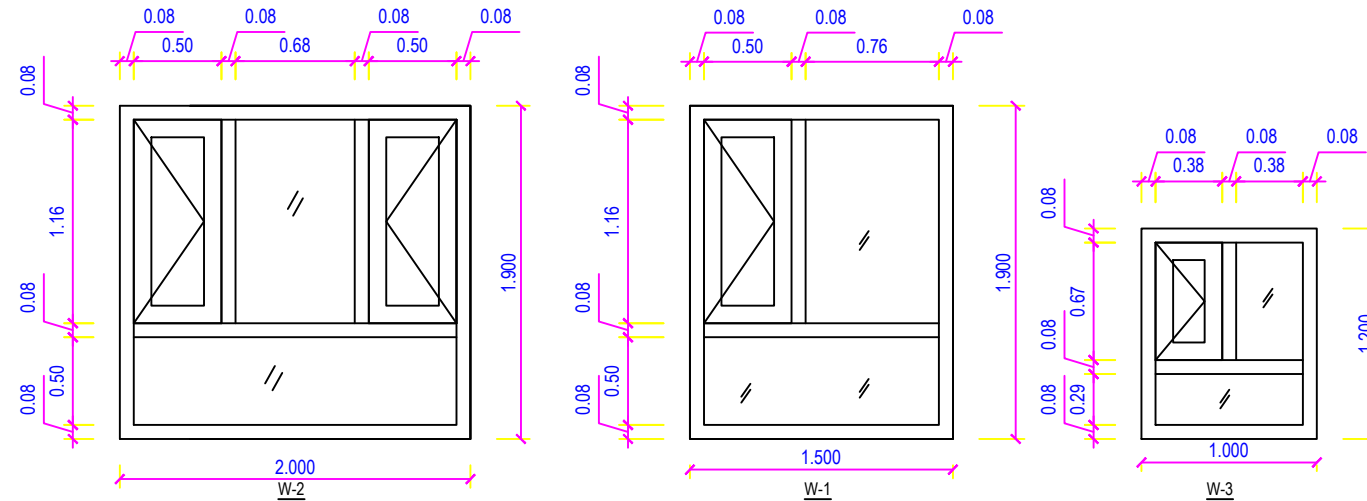
Ø10 mm @15 cm c/c. Its double mesh in both directions (vertically & horizontally)



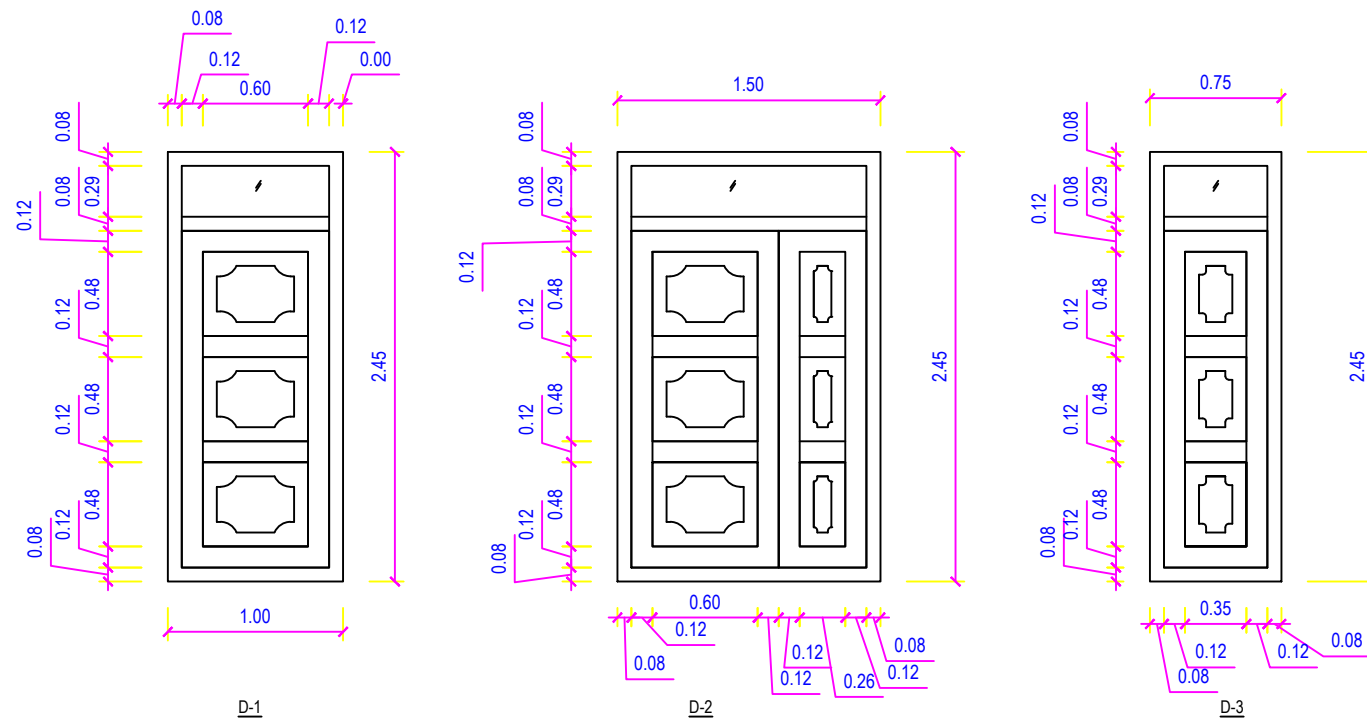
Section A-A

- Note:
- 1. Water proof admixture Isomat or equivalent shall be added into concrete
 - 2. Water stopper shall be used in the joint
 - 3. Water tanker shall be plastered appropriately

 Islamic Republic of Afghanistan	Ministry of Energy & Water (MEW)		Asian Development Bank (ADB)	Project Management Office	Project	Drawing Content	Consultant			Employer		DWG NO
				Water Resource Development Investment Program	P-ARBP Water User Association Building	Roof and Water Tank Plane	Drawn:	Design:	Recommended:	Checked:	Approved:	7/14
												Date:



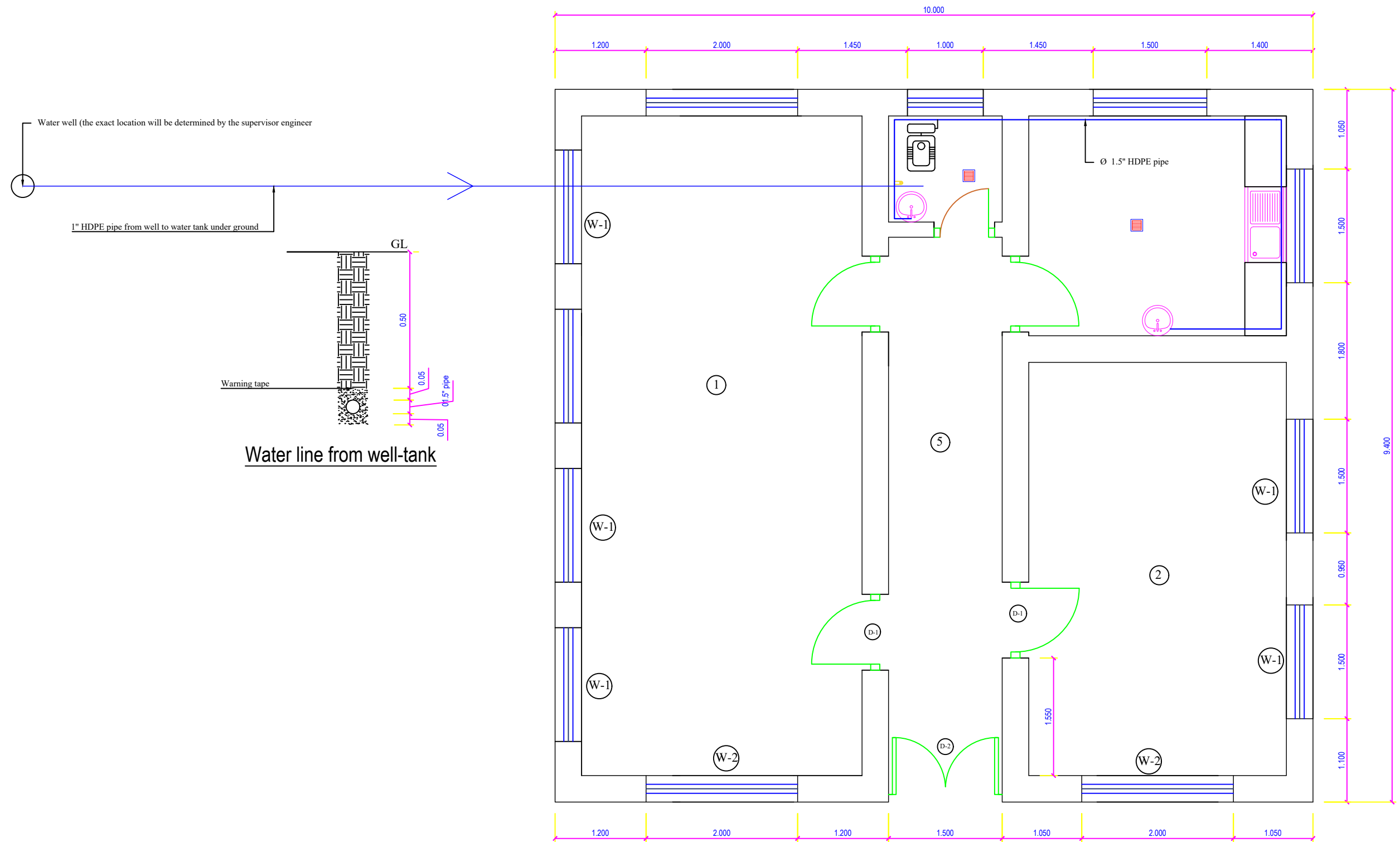
- General note:
1. Wood should be high quality khar wood, computerized cut and enough dried.
 2. Main frame should be 8 cm x 12 cm
 3. Opening shall be 10 cm x 5 cm
 4. Glass will be high quality and 4 mm thick
 5. Hinges will be 4 inches high quality
 6. All part of the windows shall be painted (wood primer coat and oil paint)
 7. Opening part of the windows shall have steel mesh



- General note:
1. Wood should be high quality khar wood, computerized cut and enough dried.
 2. Main frame should be 8 cm x 12 cm
 3. Opening shall be 12 cm x 5 cm
 4. Glass will be high quality and 4 mm thick
 5. Hinges will be 4 inches high quality
 6. The middle part of the door should be 30 mm khar wood
 7. All part of the doors shall be polished appropriately

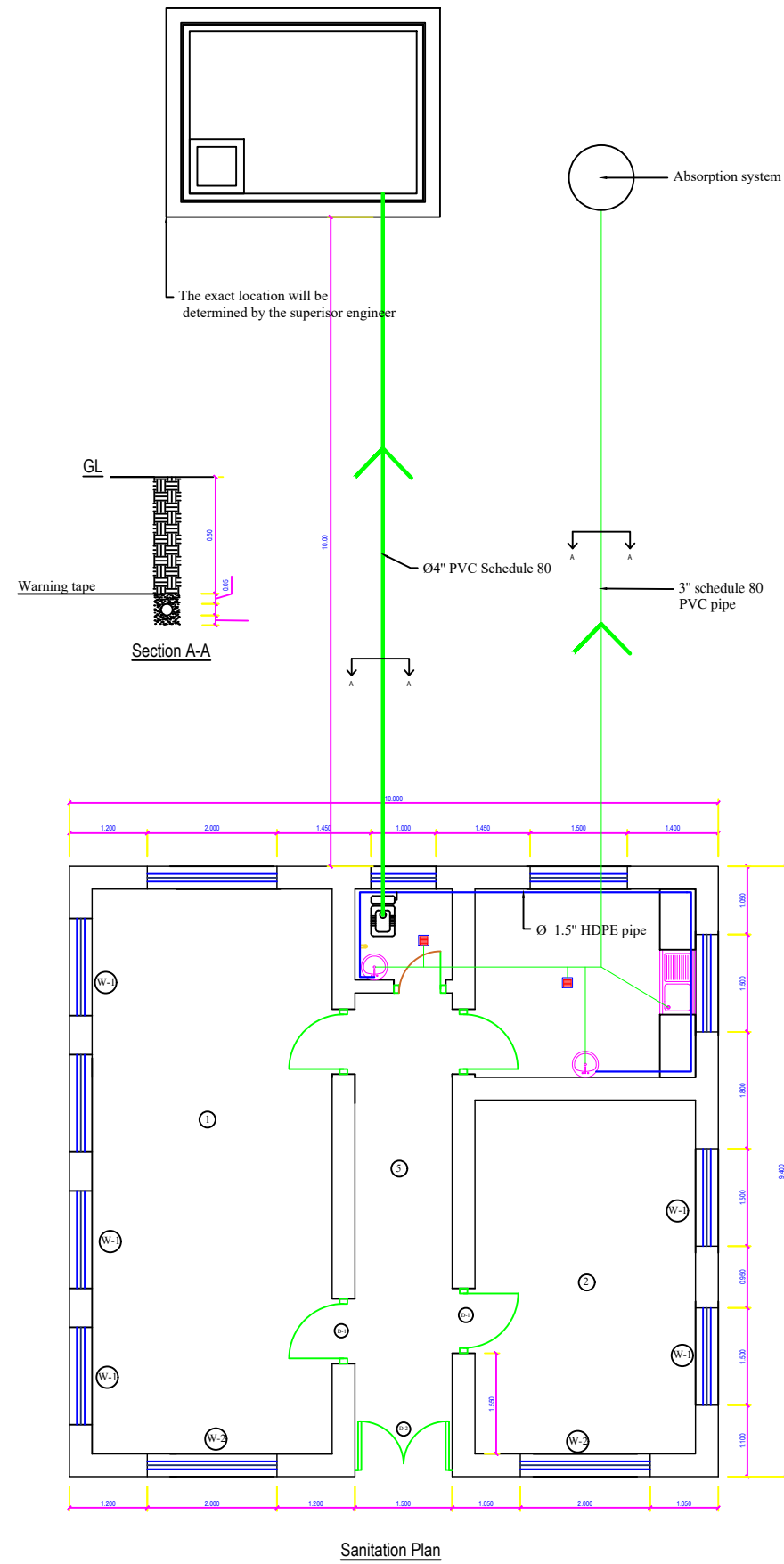
 Islamic Republic of Afghanistan	Ministry of Energy & Water (MEW)  Asian Development Bank (ADB)	Project Management Office	Project	Drawing Content	Consultant			Employer		DWG NO
		Water Resource Development Investment Program	P-ARBP Water User Association Building	Window and Door Details	Drawn:	Design:	Recommended:	Checked:	Approved:	8/14
										Date:

 Islamic Republic of Afghanistan	Ministry of Energy & Water (MEW)   Asian Development Bank (ADB)	Project Management Office	Project	Drawing Content	Consultant			Employer		DWG NO
		Water Resource Development Investment Program	P-ARBP Water User Association Building	Doors & Windows Grails	Drawn:	Design:	Recommended:	Checked:	Approved:	9/14
										Date:



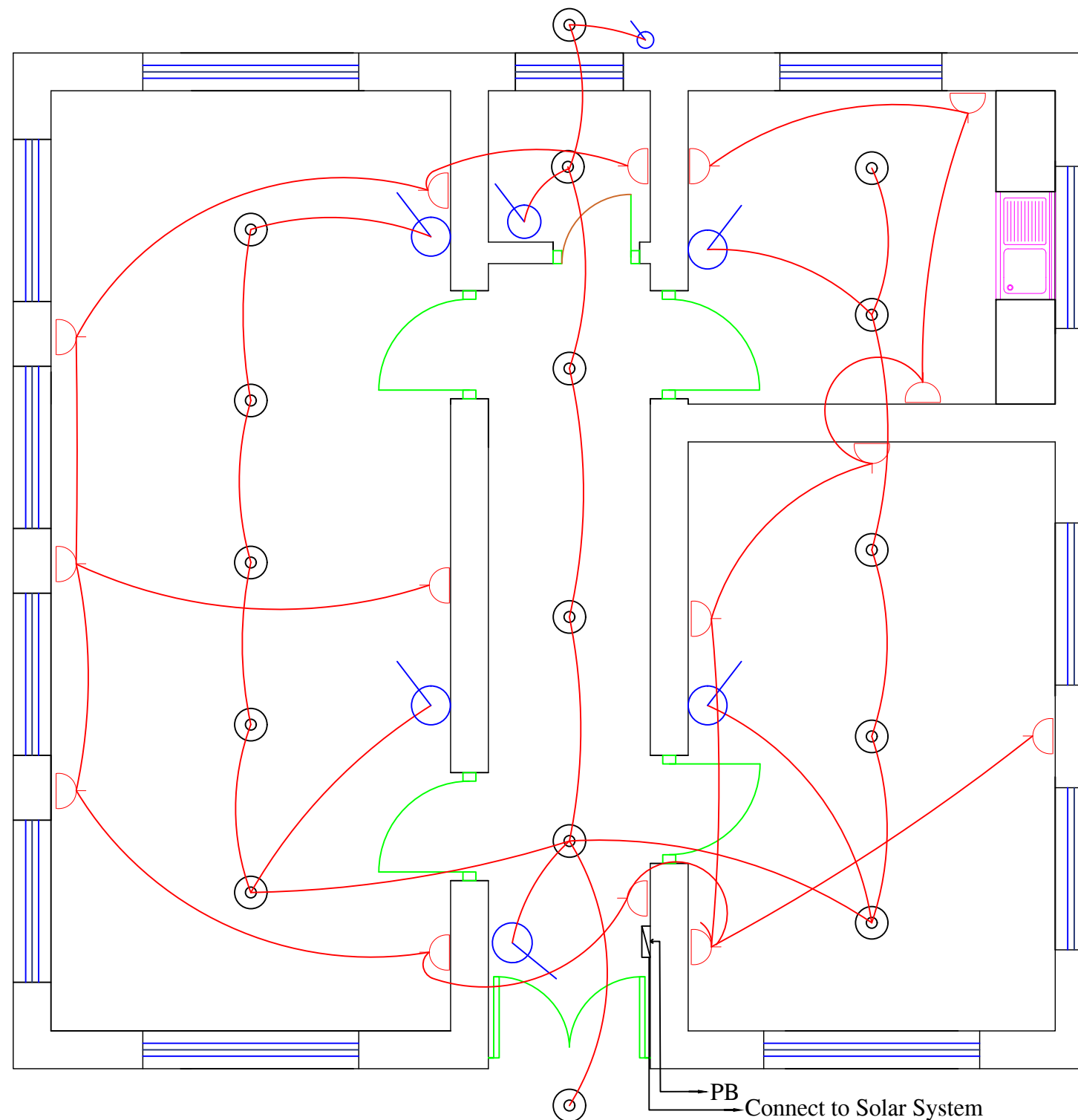
Water Supply Plan

 Islamic Republic of Afghanistan	 Ministry of Energy & Water (MEW)	 Asian Development Bank (ADB)	Project Management Office	Project	Drawing Content	Consultant			Employer		DWG NO
			Water Resource Development Investment Program	P-ARBP Water User Association Building	Water Supply Plan	Drawn:	Design:	Recommended:	Checked:	Approved:	10/14



Sanitation Plan

 Islamic Republic of Afghanistan	Ministry of Energy & Water (MEW)   Asian Development Bank (ADB)	Project Management Office Water Resource Development Investment Program	Project P-ARBP Water User Association Building	Drawing Content Sanitation Plan	Consultant			Employer		DWG NO
					Drawn:	Design:	Recommended:	Checked:	Approved:	11/14
										Date:



Electrical Plan

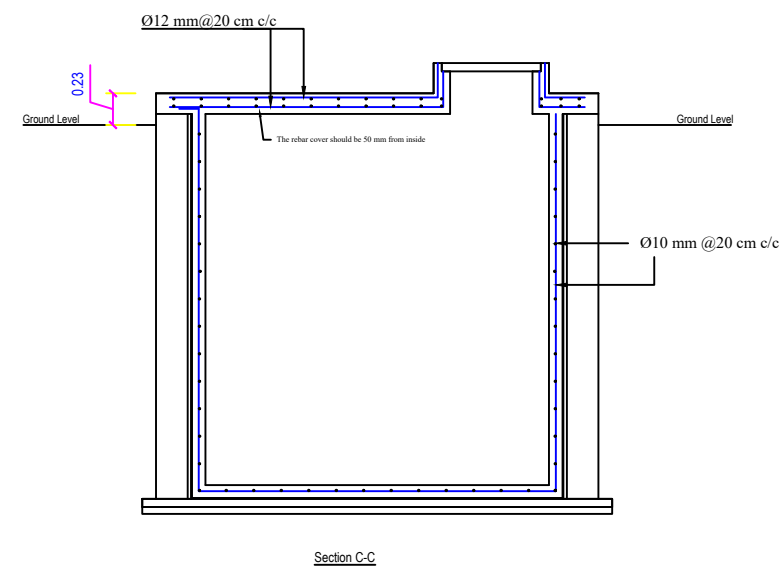
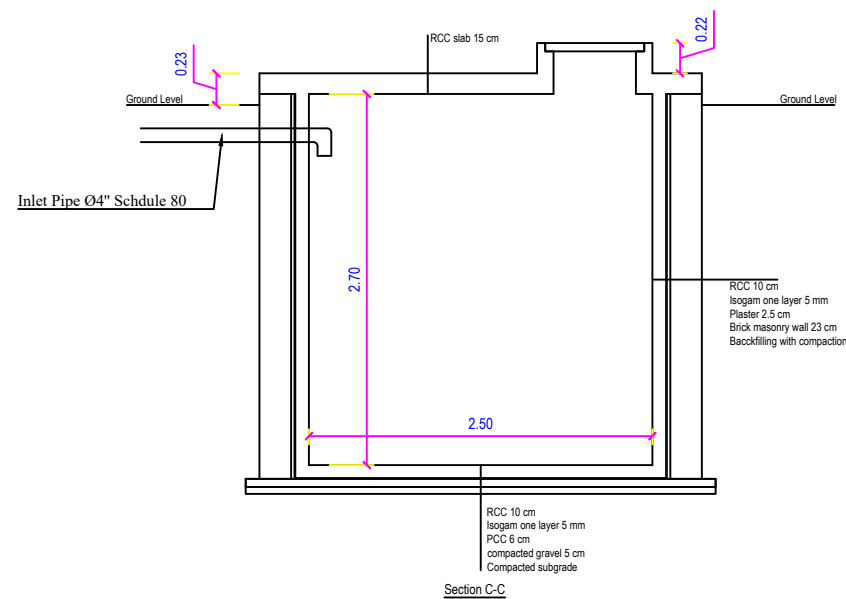
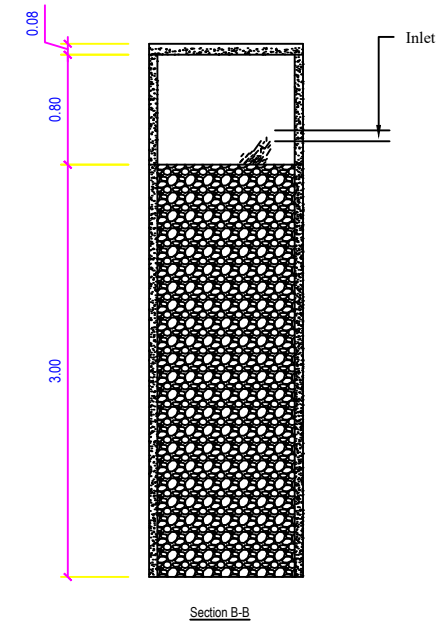
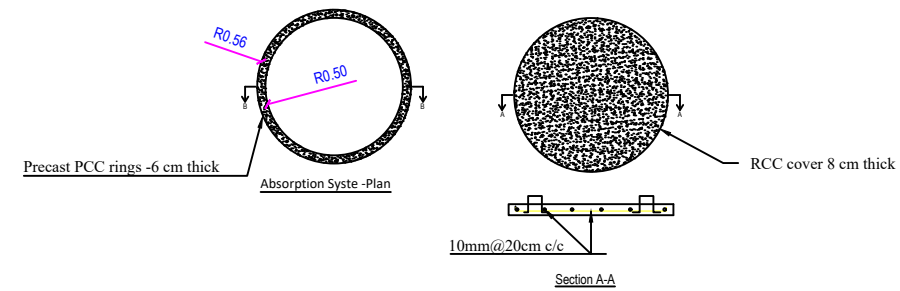
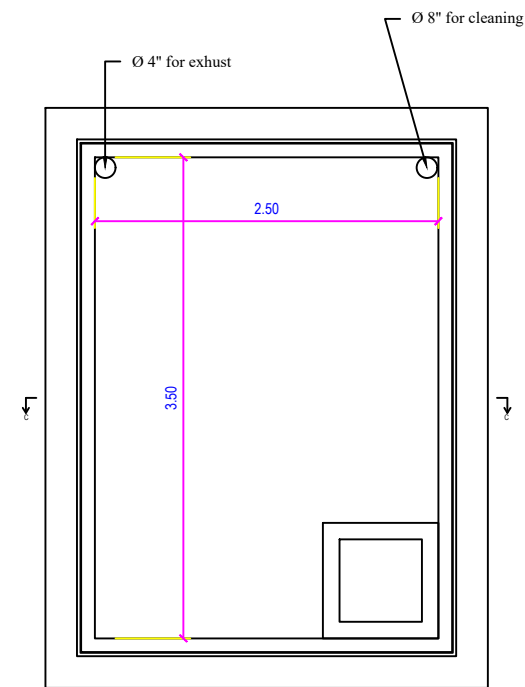
Note :

1- All the Wiring Should be in PVC Conduit Under Plaster

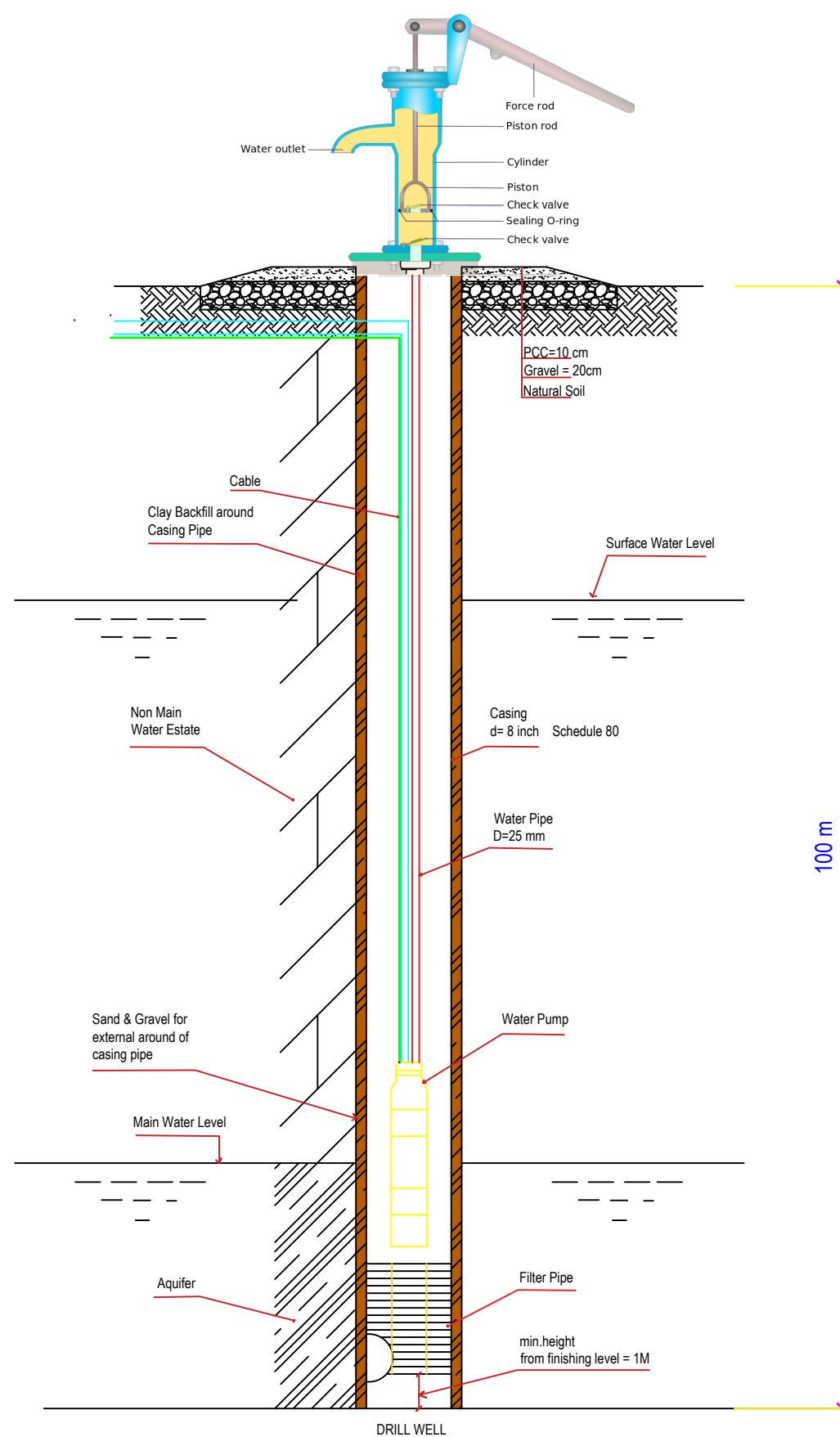
2- Single Core 1x2.5 mm Wire Should be Used for Socket

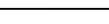
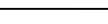
3- Single Core 1x1.5 mm Wire Should be Used for Lights

 Islamic Republic of Afghanistan	Ministry of Energy & Water (MEW)   Asian Development Bank (ADB)	Project Management Office Water Resource Development Investment Program	Project P-ARBP Water User Association Building	Drawing Content Electrical Plan	Consultant			Employer		DWG NO
					Drawn:	Design:	Recommended:	Checked:	Approved:	12/14
										Date:



 Islamic Republic of Afghanistan	Ministry of Energy & Water (MEW)  Asian Development Bank (ADB)	Project Management Office Water Resource Development Investment Program	Project P-ARBP Water User Association Building	Drawing Content Septic Tank Detail	Consultant			Employer		DWG NO
					Drawn:	Design:	Recommended:	Checked:	Approved:	13/14
										Date:



 Islamic Republic of Afghanistan	Ministry of Energy & Water (MEW)   Asian Development Bank (ADB)	Project Management Office	Project	Drawing Content	Consultant			Employer		DWG NO
		Water Resource Development Investment Program	P-ARBP Water User Association Building	Water Well Detail	Drawn:	Design:	Recommended:	Checked:	Approved:	14/14 Date:



CONSTRUCTION OF WATER USER ASSOCIATION OFFICE BUILDING

CONTRACT: MEW/P-ARBP/NCB/CONTRACT 2

BILL OF QUANTITY (BOQ) (i)

**MINISTRY OF ENERGY AND WATER
PROJECT MANAGEMENT OFFICE (PMO)
PANJ-AMU RIVER BASIN SECTOR PROJECT (P-ARBP)**

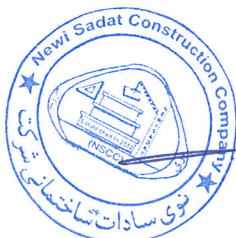
2019

Bill of Quantity

Construction of Water User Association Office Building

Note: The Bill of Quantity shall be read/priced in conjunction with the Instructions to Bidders, General and Particular Conditions of Contract, Technical Specifications, and Drawings

No.	Item Description	Unit	Quantity	Unit Cost in Afs	Total Cost in Afs
Section 1: General Requirement					
1.1	Mobilization: Compensation in full for the cost of establishing Camp, equipments, materials and personal for all project sites	LS	1.00	50,000.00	50,000.00
1.2	Demobilization: Compensation in full for the cost of removing Camp, equipments facilities and personal from all project sites	LS	1.00	25,000.00	25,000.00
1.3	Provision of insurance according to the GCC 19.1	LS	1.00	120,000.00	120,000.00
Sub-total Section 1					195,000.00
Section 2: Civil Work					
2.1	Cleaning and leveling of the site	LS	5.00	5,000.00	25,000.00
2.2	Excavation of Foundation including removal and transportation of excavated materials according to the drawing and specification	CUM	250.00	200.00	50,000.00
2.2	Compaction of foundation, it should reach to 90% compaction, otherwise, 30 cm granular materials (sub-base material) shall be applied and compacted	LS	5.00	20,000.00	100,000.00
2.3	Backfilling with compaction, the compaction shall be 90% minimum. The contractor can use the excavated materials for backfilling; in case this material is unsuitable, the contractor must provide suitable granular materials for backfilling without any additional cost.	CUM	280.00	250.00	70,000.00
2.4	Stone masonry work with pointing according to the drawing and specification	CUM	260.00	3,500.00	910,000.00
2.5	Brick masonry work according to the dwg and spec	CUM	210.00	5,000.00	1,050,000.00
2.6	Reinforcement Cement Concrete (RCC), M250 for beam, slab and parapet wall according to the drawing and spec	CUM	180.00	13,000.00	2,340,000.00
2.7	Boulder 12 cm thick with leveling and compaction inside the rooms, corridors and foothpath around the building	CUM	75.00	800.00	60,000.00
2.8	PCC (21 mpa) inside the rooms, corridors, foothpath around the building and on the roof according to the drawing and specification	CUM	100.00	5,000.00	500,000.00
2.9	Mosaik work with mortar inside the rooms, corridor and stair according to the specification	Sq.m	350.00	1,800.00	630,000.00
2.10	Tiles for toilet and kitchen according to the specification	Sq.m	190.00	1,800.00	342,000.00
2.11	Ceramic for toilet and kitchen floors according to the specification	Sq.m	80.00	1,800.00	144,000.00
2.12	Construction of RCC water tank (1.95 x 1x1.2) m according to the drawing and spec	No	5.00	60,000.00	300,000.00
2.13	Fabrication and installation of stair according to the drawing and specification	No	5.00	50,000.00	250,000.00
2.14	Broken bricks (burnt bricks) on the roof with appropriate slope and thickness according to the drawing and specification	CUM	75.00	1,500.00	112,500.00
2.15	Installation of Isogam one layer and it should be overlapped on the parapet wall and placement of marble stone pieces on the top according to the drawing and specification	Sq.m	675.00	200.00	135,000.00
2.16	Plaster work with mortar (1:3)	Sq.m	2,250.00	250.00	562,500.00
2.17	Painting 100% weathershade with all relevant activities such as prime coat, putty and etc..	Sq.m	2,250.00	150.00	337,500.00
2.18	Water supply, plumbing and sanitation systems according to the drawing and specification	LS	5.00	215,000.00	1,075,000.00
2.19	Electrical work according to the drawing and specification	LS	5.00	250,000.00	1,250,000.00



2.21	Water well: Ø 12" bore wells, Ø 8" PVC schedule 80 casing and filter, gravel filling and all other required activities. The depth of wells would be different site to site and it will be decided by the supervisor engineer on that time.	No	5.00	200,000.00	1,000,000.00
2.22	Supply and installation and configuration of water pumps for each well with all required activities such as Aluminum cable, electrical cable, delivery pipe and connection the water tank	No	5.00	30,000.00	150,000.00
2.23	Supply, installation and configuration of Hand pump with all required activities such as concrete apron and etc...	No	5.00	20,000.00	100,000.00
2.24	Supply, installation and configuration of solar system: to operate a 1" water pump, 15 lights, a TV, and a computer with all requirements.	No	5.00	170,000.00	850,000.00
2.25	Construction of septic tank complete work according to the drawing	No	5.00	250,000.00	1,250,000.00
2.26	Gutter with downspout, drain and all accessories	LS	5.00	6,000.00	30,000.00
2.27	Supply and installation of a desk, one revolving chair, three simple chairs and one file cabinet for each site	set	5.00	30,000.00	150,000.00
2.28	Supply and installation of carpet	Sq.m	380.00	400.00	152,000.00
Sub-total Section 2					13,925,500.00
Section 3: Carpentry (Doors and Windows)					
3.1	Wooden Doors with all required accessories and oil painting	Sq.m	100.00	5,000.00	500,000.00
3.2	Wooden window with painting, 4 mm double layer glasses, hinges, handles, steel mesh with all accessories according to the drawing and spec	Sq.m	255.00	4,000.00	1,020,000.00
3.3	Steel grill for doors and Windows as per drawing and specification	Sq.m	260.00	2,500.00	650,000.00
Sub-total Section 3					2,170,000.00
Total of Section 1 to Section 3 = A					16,290,500.00
Contingency = A * 10%					1,629,050.00
Grand Total					17,919,550.00

Note: 1. All materials will be subject to the approval of supervision engineer.

Newi Sadat Construction company

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Handwritten signatures and initials in blue ink.